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ORIGINAL RESEARCH

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## COMPARISON OF EFFECTIVENESS OF A PROGRESSIVE MOBILIZATION AND MOZART MUSIC THERAPY ON NON-INVASIVE HEMODYNAMIC STATUS CHANGES IN PATIENTS WITH HEAD INJURY IN THE INTENSIVE CARE UNIT

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### Abstract

**Background:** The instability of hemodynamic status in patients with head injury with decreased consciousness has an effect on the increase of intracranial pressure. The recovery of hemodynamic status can be done through nursing intervention either by providing a sensory stimulus (music therapy) or motor stimulus (progressive mobilization).

**Objective:** To compare the effectiveness of progressive mobilization of level I with Mozart's music therapy on non-invasive hemodynamic status changes in patients with head injury with decreased awareness.

**Methods:** This was a quasi-experimental study with pretest-posttest design. There were 34 samples selected using consecutive sampling, which 17 samples assigned in a group of progressive mobilization and group of music therapy. Paired t-test and Wilcoxon test were used for paired group, and Independent t-test and Mann-Whitney test for unpaired group.

**Results:** Progressive mobilization of level I had significant effect on changes in systolic blood pressure ( $p = 0.0001$ ), diastolic blood pressure ( $p = 0.002$ ) and MAP ( $p = 0.019$ ), and no significant effect on heart rate ( $p = 0.155$ ), respiration ( $p = 0.895$ ) and oxygen saturation ( $p = 0.248$ ). Mozart's music therapy had a significant effect on changes in systolic blood pressure ( $p = 0.0001$ ), diastolic blood pressure ( $p = 0.0001$ ), respiration ( $p = 0.032$ ) and oxygen saturation ( $p = 0.008$ ), but no effect on MAP ( $p = 0.561$ ). There was a significant difference between the two interventions in the systolic blood pressure and heart rate variables ( $p < 0.05$ ), while the diastolic blood pressure, MAP, respiration and oxygen saturation variables did not show a difference ( $p > 0.05$ ).

**Conclusion:** The Mozart's music therapy is more effective on non-invasive hemodynamic status changes in patients with head injury with decreased consciousness compared with progressive mobilization of level I.

**Keywords:** head injuries; hemodynamics; progressive mobilization; Mozart music

## INTRODUCTION

The brain is an organ that is vital to all activities and functions of the body, because in the brain there are various control centers such as physical control, intellectual, emotional and skill ([Rahmanti & Putri, 2016](#)). A head injury is any injury that results in

trauma and problem in the nervous system in the brain ([Lumandung, Siwu, & Mallo, 2014](#)). The main cause a serious head injury is a traffic accident. The death rate from traffic accidents in the world in 2013 reached 1.2 million and injured more than 30 million per

year, and 50% of them suffered from head injuries. In Indonesia, based on data from the Indonesian National Police (POLRI) in 2013, there were 80 people per day or 3 people per hour died on the highway due to traffic accidents with head injuries ([Lumandung et al., 2014](#)).

Generally, patients with head injury with a decreased awareness will experience increased blood pressure and intracranial pressure (ICP) accompanied by a decrease in pulse and respiratory frequency. The brain is located inside the skull, the increase in ICP will disrupt blood flow to the brain and result in ischemic cerebral ([Rihiantoro, Nurachmah, & Hariyati, 2008](#)). ICP monitoring is an effort to prevent and control the improvement of ICT and also maintain cerebral perfusion pressure (CPP). Hemodynamic status is an important component in ICP monitoring as it affects oxygen delivery function and involves the functioning of the heart as a blood pump throughout the body especially to the brain ([Leksana, 2011](#)).

Hemodynamic monitoring is central to critical client care. Hemodynamic status is defined as examination of the physical aspects of the blood circulation, including cardiac function and peripheral vascular physiological characteristics ([Johnson & Meyenburg, 2009](#)). The recovery of hemodynamic status of head injury patients can be done through nursing interventions by providing stimuli both sensory and motor stimuli. Music therapy is one form of auditory sensory stimulus that will provide stimulation of the nervous system to create stability of the status of hemodynamics that affects the improvement of cerebral tissue perfusion ([Rihiantoro et al., 2008](#)). The therapy with instrumental healing sound music performed for 90 minutes is an estimated time to have a meaningful effect, as in previous studies showed that 90-minute time listening to soft music had the same therapeutic effect as using a 10-milligram Valium tranquilizer ([Rihiantoro et al., 2008](#); [Thaut et al., 2007](#)). The use of Rhythmic Auditory Stimulation (RAS) is an effective use of therapy compared to the use of

methods that only use physical exercise without stimulant ([Thaut et al., 2007](#)).

In addition, the sensory stimulus to support the acceleration of recovery in head injury with decreased awareness can also be given a motor stimulus by providing physical exercise in the form of mobilization. The American Association of Critical Care Nurses (AACN) introduces progressive interventions that consist of 5 levels: Head of Bed (HBO), passive and active Range of Motion (ROM) drills, lateral rotational therapy, prone position, movement against gravity, the position of the feet hanging, standing and walking. Continuous Lateral Rotation Therapy (CLRT) and Head Of Bed (HOB) are giving a 30° semi-fowler position and 30° left and right tilts ([Vollman, 2010](#)).

Mobilization contributes to the value of oxygen saturation in emergency patients. Progressive mobilization of level I can maintain the value of oxygen saturation in critical patients with installed ventilator ([Thaut et al., 2007](#)). The process of blood circulation is also influenced by body position and body gravity changes so that perfusion, diffusion, distribution of blood flow and oxygen can flow throughout the body ([Thaut et al., 2007](#); [Vollman, 2010](#)). Mobilization is expected to increase oxygen transport. The mobilization in ICU can be seen as an early rehabilitation process to maintain muscle strength and prevent poor changes in cardiovascular response, it is expected to accelerate the ventilator weaning process and shorten the length of stay in ICU ([Rahmanti & Putri, 2016](#)).

However, both progressive mobilization and music therapy are still rarely implemented, which may affect the length of stay of patients in ICU. In many studies, both sensory stimuli in the form of music therapy and motor stimuli in the form of progressive mobilization of level I both yielded a good non-invasive hemodynamic response status to accelerate the recovery period of head injury patients. However, lack of studies compares the effect of the two. Thus, this study aimed to examine the effectiveness of progressive

mobilization of level I with music therapy on non-invasive hemodynamic status changes in patients with head injury with decreased awareness in the ICU.

## METHODS

### *Study design*

This was a quasi-experimental study with pretest-posttest design.

### *Setting*

This research was conducted in the intensive care unit of the General Hospital of Prof. Dr. Margono Soekarjo Purwokerto from 24 January to 24 February 2017.

### *Sample*

The target population in this study was patients with head injury with decreased awareness in in the intensive care unit of the General Hospital of Prof. Dr. Margono Soekarjo Purwokerto from December 2016 until January 2017, which amounted to 78 people. Of the total population, 34 samples were selected using consecutive sampling, which 17 samples assigned in a group of progressive mobilization and group of music therapy. The inclusion criteria of the sample were head injury patients with awareness level or GCS  $<12$ , MAP  $> 55$  mmHg and  $<140$  mmHg, systolic blood pressure 90- 180 mmHg, and oxygen saturation  $> 90\%$ , and aged  $\geq 15$  years.

### *Intervention*

The intervention was conducted by three research assistants. The inclusion criteria of the research assistant were an ICU nurse practitioner with minimal education of diploma 3 degree in nursing, having experience working in the ICU for at least 2 years. The research assistants have been given a training and explanation from the researchers about the purpose and the procedures of the study prior to direct intervention. Those research assistants were assured to have complete understanding about the intervention stages, both in the

intervention of mobilization and music therapy.

Progressive mobilization level I in the intervention group 1 was performed every 2 hours for 3 consecutive days based on previous study, and music therapy in the intervention group 2 was performed with a 60-80 beat size and a sound power of 50-70 hertz for 90 minutes per day which was divided into 3 intervention times, namely in the morning, noon and afternoon, according to previous study. Each time was conducted in 30 minutes. The type of the music was Mozart's music.

### *Data collection*

The research assistants explained the research procedure and provided the consent form to the respondents and their family. The research assistants filled out the assessment and observation sheet covering the respondent's characteristics of name, age, medical diagnostic type, Glasgow Coma Scale (GCS), and non-invasive hemodynamic status before and after intervention.

### *Instrument*

The observation sheet was used to describe the respondent's characteristic data (age, sex, medical diagnosis, GCS) and non-invasive hemodynamic status (blood pressure, MAP, heart rate, respiratory rate and oxygen saturation). The non-invasive hemodynamic status was observed from bedside monitor.

### *Ethical consideration*

The ethical approval of the study was obtained from the research ethics committee of Poltekkes Kemenkes Semarang with approval number: 281 / KEPK / Poltekkes-smg / EC/2016, which stated that the research met the requirements. Prior to the research, respondents were given informed consent by providing information about the purpose, benefits and research procedures.

### *Data analysis*

Paired t-test and Wilcoxon test were used for paired group, and Independent t-test and Mann-Whitney test for unpaired group.

## RESULTS

Table 1 shows that the average age of respondents in the progressive mobilization group was 36.41 years and in the music therapy group was 35.76 years. The majority of respondents were male and having medical

diagnosis of post craniotomy SDH. The mean of GCS in the progressive mobilization group was 8 and in the music therapy group was 9.12. The Levene's test showed there was no significant difference of the characteristics of respondents between the two groups with  $p$ -value  $>0.05$ .

**Table 1** Characteristics of respondents based on age, gender, medical diagnosis, and *Glasgow Coma Scale* (GCS) (n=34)

Characteristics	Progressive Mobilization group	Music therapy group	<i>p</i> value
Age (Mean $\pm$ SD)	36.41 $\pm$ 11.58	35.76 $\pm$ 11.09	0.272
Gender [n(%)]			
Male	10 (58.8)	10 (58.8)	1.000
Female	7 (41.2)	7 (41.2)	
Medical diagnosis [n(%)]			
EDH	1 (5.9)	2 (11.8)	0.423
SDH	2 (11.8)	3 (17.6)	
ICH	3 (17.6)	1 (5.9)	
Post Craniotomy EDH	3 (17.6)	2 (11.8)	
Post Craniotomy SDH	4 (23.5)	4 (23.5)	
Post Craniotomy ICH	2 (11.8)	3 (17.6)	0.817
Post Craniotomy SAH	2 (11.8)	2 (11.8)	
GCS (Mean $\pm$ SD)	8.00 $\pm$ 1.80	9.12 $\pm$ 1.49	

**Table 2** The homogeneity of non-invasive hemodynamic status before and after intervention in the progressive mobilization group and music therapy group (n=34)

Variable	Group	Pre (Mean $\pm$ SD)	<i>p</i> -value	Post (Mean $\pm$ SD)	<i>p</i> -value
Systolic blood pressure	Mobilization	149.59 $\pm$ 9.88	0.092	128.88 $\pm$ 13.17	0.897
	Music	158.06 $\pm$ 14.41		140.06 $\pm$ 13.89	
Diastolic blood pressure	Mobilization	86.24 $\pm$ 12.43	0.246	76.35 $\pm$ 7.48	0.327
	Music	90.65 $\pm$ 8.57		74.88 $\pm$ 10.12	
MAP	Mobilization	98.41 $\pm$ 12.71	0.072	92.06 $\pm$ 7.59	0.376
	Music	100.12 $\pm$ 17.39		98.00 $\pm$ 10.68	
Heart Rate	Mobilization	96.88 $\pm$ 27.76	0.761	90.47 $\pm$ 12.02	0.889
	Music	89.88 $\pm$ 27.37		80.71 $\pm$ 14.16	
Respiration	Mobilization	21.35 $\pm$ 7.71	0.077	21.59 $\pm$ 3.66	0.863
	Music	18.28 $\pm$ 5.22		21.24 $\pm$ 2.41	
Oxygen saturation	Mobilization	96.76 $\pm$ 3.11	0.738	98.06 $\pm$ 3.03	0.025
	Music	96.00 $\pm$ 2.87		99.24 $\pm$ 1.39	

The Levene's test results showed in the table 2 shows that the status of hemodynamic during pretest was homogeneous between the group of mobilization and music group. While

after intervention the status of hemodynamic during pretest was also homogeneous, except oxygen saturation ( $p=0.025$ ).

**Table 3** Effect of progressive mobilization level I on non-invasive hemodynamic status (n=17)

Variable	Pre (Mean ± SD)	Post (Mean ± SD)	Pre Median (Min-Max)	Post Median (Min-Max)	T	Z	p value
<b>Paired t-test</b>							
Systolic BP	149.59±9.88	128.88±13.17	-	-	8.549	-	0.0001*
Heart Rate	96.88±27.76	90.47±12.02	-	-	1.494	-	0.155
Respiration	21.35±7.71	21.59±3.66	-	-	0.133	-	0.895
<b>Wilcoxon test</b>							
Diastolic BP	-	-	89(55-102)	79(61-88)	-	-3.080	0.002*
MAP	-	-	96(84-138)	91(82-113)	-	0.002	0.019*
Oxygen Saturation	-	-	98(91-100)	100(91-100)	-	-2.348	0.248

**Table 4** Effect of Mozart's music therapy on non-invasive hemodynamic status (n=17)

Variable	Pre (Mean ± SD)	Post (Mean ± SD)	Pre Median (Min-Max)	Post Median (Min-Max)	T	Z	p value
<b>Paired t-test</b>							
Systolic BP	90.65±8.57	74.88±10.12	-	-	5.364	-	0.000*
Heart Rate	100.12±17.39	98.00±10.68	-	-	0.594	-	0.561
Respiration	18.28±5.22	21.24±2.41	-	-	0.279	-	0.032*
<b>Wilcoxon test</b>							
Diastolic BP	-	-	89(55-102)	79(61-88)	-	3.481	0.000*
MAP	-	-	96(84-138)	91(82-113)	-	0.923	0.356
Oxygen Saturation	-	-	98(91-100)	100(91-100)	-	2.646	0.008*

**Table 5** Difference of non-invasive hemodynamic status between the group of progressive mobilization and the group of music therapy (n=34)

Variable	Posttest						
	n	(Mean ± SD)	Mean difference	Median (Min-Max)	t	Z	p value
Independent t-test							
Systolic BP							
Mobilization group	17	128.88±13.17	11.18	-	2.407	-	0.022*
Music group	17	140.06±13.89					
Diastolic BP							
Mobilization group	17	76.35 ± 7.48	1.47	-	0.482	-	0.633
Music group	17	74.88 ± 10.12					
MAP							
Mobilization group	17	92.06 ± 7.59	5.94	-	1.870	-	0.071
Music group	17	98.00 ± 10.68					
Heart Rate							
Mobilization group	17	90.47 ± 12.02	9.76	-	2.168	-	0.038*
Music group	17	80.71 ± 14.16					
Mann Whitney							
Respiration							
Mobilization group	17	-	-	23(15-51)	-	-0.122	0.903
Music group	17	-					
Oxygen saturation							
Mobilization group	17	-	-	100(91-100)	-	-1.163	0.245
Music group	17	-					

Table 3 shows that there was a significant effect of progressive mobilization level I on systolic blood pressure ( $p=0.001$ ), diastolic blood pressure ( $p=0.002$ ) and MAP ( $p=0.019$ ). There was no significant effect on heart rate ( $p=0.155$ ), respiration (0.895), and oxygen saturation ( $p=0.248$ ).

Table 4 shows that there was a significant effect of Mozart's music therapy on systolic blood pressure ( $p=0.000$ ), diastolic blood pressure ( $p=0.000$ ), respiration ( $p=0.032$ ), and oxygen saturation ( $p=0.008$ ). There was no significant on heart rate ( $p=0.561$ ) and MAP ( $p=0.356$ ).

Table 5 shows that there were significant differences in systolic blood pressure ( $p=0.022$ ) and heart rate ( $p=0.038$ ) between the group of progressive mobilization and the group of Mozart's music therapy.

## DISCUSSION

### Effect of Progressive Mobilization Level I on Hemodynamic Status Changes

The result of paired sample t-test shows that there was significant decrease of systolic and diastolic blood pressure (toward stable or normal) after given the progressive mobilization level I.

The results of this study are in line with previous study which involved 21 patients with cerebral injury with the provision of a position of 30° head of bed position and the provision of right and left tilted position, which indicated that was a change in blood pressure after given progressive mobilization intervention ([Ningtyas, Pujiastuti, & Indriyawati, 2017](#); [Olviani, 2015](#)). Similar with another study indicated that there was an influence of giving lateral position on blood pressure based on MAP calculation in patients ([Rifai, 2015](#)). In addition, the position of the 30° head up elevation was greatly effective in lowering intracranial pressure without decreasing the CPP value or disturbing the perfusion of oxygen to the cerebral ([Olviani, 2015](#)).

On the other hand, this study also revealed that there was a significant difference of MAP before and after intervention with the difference of average decrease of 6.35 mmHg. Lateral position affects the increase in MAP indicating that indirectly the state of cardiac output is increased and hemodynamic is improved, so that it can be one choice of nursing actions to improve MAP in patients in intensive care. MAP describes the average perfusion of systemic blood circulation. It is important to maintain a MAP above 60 mmHg to ensure brain perfusion, coronary artery and renal perfusion ([Kurniawan, 2015](#)).

This study showed no difference in heart rate variable after given progressive mobilization intervention of level I. This is in line with previous study indicated that there was no significant effect of pulse monitoring before and after given the progressive mobilization level I ([Rahmanti & Putri, 2016](#)). However, the results of this study were also in contrast with study explained that mobilization significantly affects heart rate and blood pressure, and decreases oxygen saturation ([Olviani, 2015](#)).

Critical patients usually have a weak heartbeat rhythm, unstable breathing or low cardiovascular reception, so mobilization is better intervention for them rather than being left in a static position. The cardiovascular system attempts to regulate in two ways namely by replacing the plasma volume or with the inner ear as a vestibular response that affects the cardiovascular system during position change ([Vollman, 2010](#)).

This study also revealed that there was no significant difference in respiration before and after given the level I progressive mobilization. This results were not in line with previous study indicated that there was a significant difference in respiration after given mobilization in patients with cerebral injury ([Rifai, 2015](#)). However, it is consistent with the theory stated that early mobilization in the cardiovascular system increases cardiac output, improves myocardial contraction, strengthens heart muscle, lowers blood

pressure, and improves venous return; while early mobilization in the respiratory system increases the frequency and depth of respiration and ventilation alveolar, and lowers respiratory work ([Rifai, 2015](#)).

Progressive mobilization in this study also had no significant effect on oxygen saturation, which is similar with previous study revealed that the implementation of progressive mobilization level I has no effect on oxygen saturation in critical patients. This is due to the patient's hemodynamic instability that can be a barrier to mobilization, so that mobilization intervention is sometimes discontinued and then re-implemented once patient condition is stable ([Olviani, 2015](#)).

### **Effect of Mozart's Music Therapy on Hemodynamic Status Changes**

Findings of this study indicated that Mozart's music therapy had a significant effect on systolic and diastolic blood pressure. These results were in line with previous study explained that there is a change in blood pressure both systolic and diastolic in hypertensive patients after given classical music therapy ([Suherly & Meikawati, 2012](#)).

The music therapy in both coma and post-surgery patients showed a positive effect on hemodynamic status, ECG and respiration ([Novita, 2012](#)). It is said that a person who listens to the appropriate music then his/her pulse and blood pressure can be decreased and stabilized, brain waves slow down, and brain muscles become relaxed ([Kurniawan, 2015](#)). This is supported by previous research concluded that music therapy may decrease hemodynamic status (blood pressure, pulse and respiration) in comatose patients ([Rihiantoro et al., 2008](#)).

Music is generated from stimuli whose waves are transformed through the ossicles in the middle ear and through cochlear fluid to the auditory nerve as well as to the autonomic nerve area and then the auditory nerve delivers these signals to the auditory cortex in the temporal lobes and subsequently stimulates the release of the endorphin

hormone. This hormone has a relaxing effect on the body that can decrease muscle tension, increase the threshold of consciousness, and stabilize hemodynamics by decreasing heart rate, breathing and blood pressure ([Novita, 2012](#)).

However, the music therapy had no effect on Mean Arterial Pressure (MAP), which was in contrast with previous study explained that there was a significant effect of music therapy on MAP, heart and breath frequency, all of which show a decrease in mean ([Rihiantoro et al., 2008](#)). Decreasing indicator of hemodynamic status in head injury patients with decreased awareness will help the stabilization of patient's hemodynamics as well as assist recovery process ([Rihiantoro et al., 2008](#)).

In this study, the duration of music therapy intervention was sometimes less than 30 minutes or less than 90 minutes due to the condition of patients sometimes changed drastically to unstable. Giving duration of Mozart's music therapy of less than 90 minutes is incompatible according to previous studies indicated that the 90 minutes listening to soft music had the same therapeutic effect as using a 10-milligram Valium sedative ([Thaut et al., 2007](#)).

On the other hand, Mozart's music therapy showed no significant effect on heart rate. According to previous study, reading the Quran can be compared with the rhythm of music even has a spiritual value that is much greater than music. The Qur'an-murrotal therapy affects the value of GCS, but does not affect systolic and diastolic blood pressure, respiratory and pulmonary frequency ([Widaryati, 2016](#)). However, the music stimulus will give a message to the hypothalamus, which further reduces the neuropeptide secretion and then proceeds to the autonomic nervous system. The decreased secretion neuropeptide causes the parasympathetic nervous system to influence over the sympathetic nervous system resulting in a relaxed condition. This condition also decrease catecholamine release by the adrenal



medulla resulting in decreased frequency of heart rate, blood pressure, blood vessel obstruction and consumption of oxygen by the body ([Hegde, 2014](#)).

Findings of this study also revealed that there was no significant effect of Mozart's music therapy on respiration with p-value = 0.032, with an average increase of 2.96 x/ min. This finding was in contrast to previous research concluded that there was a decrease in mean on the patient's breathing frequency after music therapy ([Rihiantoro et al., 2008](#)). Music is considered affecting respiratory breathing rhythmic.

In contrast, music therapy had a significant effect on oxygen saturation. The music proved to be effective in stabilizing oxygen saturation levels and there were no negative effects on apnea and bradycardia. Therefore, one of the efforts to reduce the effects of stress due to noise or excessive environmental stimulation is to provide music therapy, thereby reducing stress on the head injury patients in the ICU, which ultimately will reduce the need for oxygen so that blood oxygen levels increase ([Rahmadevita, Rustina, & Syahreni, 2013](#)).

When the sound of music received is a calming and regular sound repeatedly like Mozart's classical music, then the sound of music will impulse the hypothalamus to respond to the adrenal medulla glands to suppress the release of the hormone epinephrine and norepinephrine or the release of catecholamine into the blood vessels to decrease. As a result, the concentration of catecholamine in the plasma becomes low, so the heart rate and oxygen consumption decrease and the blood oxygen level increases, which eventually makes the respiratory frequency to be slow ([Kirby, Oliva, & Sahler, 2010](#)).

#### **Differences of Non-Invasive Hemodynamic Status in the Group of Progressive Mobilization Level I and the Group of Mozart Music Therapy**

Statistical analysis using Independent t-test showed that progressive mobilization of level

I and Mozart music therapy had a significant difference in giving an influence on systolic blood pressure. The progressive mobilization showed a greater effect in decreasing systolic blood pressure compared with the music therapy. Providing a motor stimulus in the form of progressive mobilization can improve perfusion of cerebral tissue in the head injury patients to support the acceleration of recovery ([Olviani, 2015](#)), which in line with the results of the previous study explaining that there is a change in blood pressure after the progressive mobilization of level I ([Rahmanti & Putri, 2016](#)).

Similar with diastolic blood pressure, findings of this study revealed that progressive mobilization level I and Mozart's music therapy had no significant difference in decreasing diastolic blood pressure. However, music therapy showed a greater effect in lowering diastolic blood pressure compared with mobilization. This is line with previous studies revealed that progressive mobilization and music therapy had a significant influence on diastolic blood pressure ([Olviani, 2015](#)).

On the other hand, there was no significant difference of the effect of both interventions on MAP, but the progressive mobilization showed a greater influence on MAP compared with music therapy. It is in accordance with the results of the previous study, which explains that the lateral position affects the increase in MAP. Studies also suggest that one of the management to decrease ICP is to give semi-fowler position with 15 ° - 30° to increase venous drainage from the head and may cause a decrease in systemic blood pressure that can be compromised by cerebral perfusion pressure ([Kayana, Maliawan, & Kawiayana, 2013](#)).

Mozart's music therapy and progressive mobilization had no significant difference on heart rate and respiration rate. However, Mozart's music therapy showed a greater influence than the progressive mobilization. This occurs because the progressive mobilization of level I implemented in this study was head of bed 15 ° - 30° and tilted the



client right and left without taking ROM action. Although ROM has benefits but it was not performed because it is a contraindication for head injury patients as it may lead to an increase in ICP ([Darmayanti & Oktamianti, 2014](#)). So that the result of progressive mobilization level I did not significantly affect respiration.

Additionally, finding of this study showed no significant difference of effect on oxygen saturation in both groups. But Mozart's music therapy had a greater effect in increasing oxygen saturation compared with progressive mobilization. This result can be influenced by airway obstruction with the accumulation of secretion. Thus, the action of suction is performed. Previous study said there was an effect of ETT mucus sucking action on oxygen saturation level ([Kitong, Mulyadi, & Malara, 2014](#)).

The results of this study could be a positive input in clinics or hospitals, which is related to the impact of Mozart's music therapy in reducing systolic and diastolic blood pressure, increasing respiration and oxygen saturation in patients with head injury with critical condition in intensive care room in addition to medical therapy to shorten the length of stay in the ICU.

The limitation of this research is that the researcher was less selective in determining the respondent's criteria in the research, for instance, the dismissal of intervention if the respondent hemodynamic status suddenly changed drastically towards the abnormal then re-implemented when the hemodynamic status of the respondent was stable, which this type of patients should be excluded in this study.

## CONCLUSION

The non-invasive hemodynamic status in the progressive mobilization group showed there were significant differences in systolic blood pressure, diastolic blood pressure and MAP before and after given intervention; while no

difference in heart rate, respiration and oxygen saturation. While hemodynamic status in the Mozart music therapy showed a significant difference in systolic blood pressure, diastolic blood pressure, respiration and oxygen saturation before and after intervention; and no significant difference on MAP and heart rate. The Mozart's music therapy is more effective on non-invasive hemodynamic changes compared with the progressive mobilization of Level I.

## Declaration of Conflicting Interest

None declared.

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## Author Contribution

All authors contributed equally in this study.

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