



THE EFFECT OF AUDITORY STIMULATION THERAPY FOR BABY'S PAIN SCALE

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ABSTRACT

Auditory stimulation is one of non-pharmacological pain management that can be done in premature babies by playing music or mother's voice with an acceptable to the baby (50-60 dB). This study aimed to analyze the effect of giving music therapy and mother's voice therapy in controlling the pain response of premature babies while undergoing an invasive procedure. The research design used in this study was a quasi-experimental research with pre and posttest one group design, purposive sampling used in this study, involving 43 premature babies in a Samarinda Hospital. Observation checklist was further used for data collection. Based on the paired t-test, it obtained a sig-value of 0.000 ($p < 0.05$) with a difference of 5.535 (95% CI 4.682 - 6.388) for music therapy and sig-value of 0.000 with a difference of 5.860 (95% CI 5.204 - 6,517) showing a sig value < 0.05 for mother's voice during the invasive procedure. The analysis showed that there were significant differences before and after giving auditory stimulation of the mother's voice during an invasive procedure.

Keywords: baby; pain scale; therapy

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INTRODUCTION

Data from Riskesdas (2018) shows the proportion of low birth weight (premature) babies in East Kalimantan Province reaches more than 6.5%, this shows that East Kalimantan Province is one of the regions that has a high proportion of preterm birth rates in Indonesia. Meanwhile, Indonesia's national proportion for preterm babies reaches 6.2%. WHO data (2013) states that it is estimated that one in six babies born is premature or 115.5 per 100 live births.

According to Maryunani and Sari (2013), premature babies are babies born at 37 weeks gestation or less with a birth weight of less than 2500 grams. Kyle and Carman (2015) suggest that premature babies with prolonged hospitalization and a number of invasive procedures that cause pain have a higher risk of experiencing memory pain. Pain can appear at any age including premature babies, the causes of which include disease processes, injuries, procedures and surgical interventions.

According to Wilson (2010 in Azarmnejad, 2015), auditory stimulation is any sound that stimulates the auditory system. A baby's sense of hearing begins to form when the baby is still in the womb at the age of 8 weeks of gestation. The formation of the baby's sense of hearing will be completed by the time the fetus is 24 weeks old. And by the time the fetus is 25 weeks

old, he can already hear the sounds around him. When born into the world, babies are aware of the sounds around them such as the voices of their parents, music or sounds in the baby's environment and the baby will respond to sound stimuli they hear. The purpose of this study was to analyze the effect of music therapy and mother's voice on the pain response of invasive procedures in preterm infant.

Auditory stimulation is one of simple pain management non pharmacology for baby, music therapy has positive effect for physiological states of baby (heart rate and respiratory rate can be lower, get more oxygen). Music therapy can to reduce baby's stress during hospitalization (van Dokkum et al, 2020). Menke et al (2021) states that music therapy by the parents can get positive effect for baby (parents help the baby to enhance well being, help the baby more relax and reduce the stress level), parent child interaction will be better.

METHOD

The method of research is quasi experiment to identify a huge difference the influence of an intervention. In this case intervention for the provision of auditory stimulation of the sound of music and mother's voice in lowering the pain due to invasive procedures in premature infants. According to time this research included in a kind of cross sectional study the research conducted measuring 1 variables simultaneously time in a moment. Researcher used lullaby music nina bobo song for therapy music, during invasive procedure, researcher play the music for 10 minutes and assess the pain scale before and after intervention with PIPP ceclist. For mother's voice therapy, researcher record the mother's voice when the mother singing the religion song, dzikir or reading the holy Al- Qur'an. The baby listened mother's voice for 10 minutes with mp3 when invasive procedure start, researcher assess baby's pain scale before and after intervention.

Data analysis used 2 tests, for the univariate test, the researcher identified data on the characteristics of the respondents including age, weight, age at birth (weeks) and gender of the respondent and calculated the frequency. For the bivariate test, researchers used paired t test. Patient demographic data is sourced from medical records, parents and room nurses. For intervention data collection, the researcher conducted 4 stages, the first stage, the researcher assessed the baby's pain score before doing music therapy during an invasive procedure, the second stage the researcher gave music therapy during an invasive procedure for 10 minutes, then the researcher re-measured the baby's pain score. The third stage is carried out when the baby gets the next invasive action schedule, 15 minutes before the procedure, the researcher measures the baby's pain score. During the invasive action, the researcher turned on the mother's voice recording for 10 minutes and then after the procedure was completed, the researcher re-measured the baby's pain score.

Music therapy and mother's voice therapy are given through mp3s that are played at a distance of 60 cm from the baby with a volume of 50-60 db. This is in accordance with the baby's hearing ability so that it does not damage the baby's hearing function. This research was compared pain scale before and after music therapy and mother's voice therapy, involved 43 premature babies in NICU room AW. Sjahranie Hospital Samarinda. Purposive sampling used for this study. PIPP (Premature Infant Pain Profile) ceclist, the music therapy and mother's voice therapy during invasive intervention, 10 minutes every intervention.

RESULTS

Demographic

Majority of baby was born in gestational age 28 and 31 weeks (20.9%), male (55.8 %), 1050 gr (20.9%), age 3 day (16.3 %).

Table 1.
 Respondent characteristics (n= 43)

Respondent characteristics	f	%
Age (3 day)	7	16.3
Gender (male)	24	55.8
Weight (1050 gr)	9	20.9
Gestational age (28 and 31 week)	9	20.9

Music therapy

Data analysis test used paired t test, the result showed the majority of the baby. Most respondent reached score 11 before music therapy which is as much 9 respondent (20.9 %) with average score 10.21 and there is 17 respondent (39.5 %) get pain score 5 after music therapy , the average pain score is 4.67. There was a significant difference in pain scores before and after being given music stimulation, the score before was 10.21 and after being given the score reached 4.67. From the results of the paired t test, it shows the sig value of 0.000 ($p < 0.05$) with a difference of 5.535 (95 % CI 4.682- 6.3888), this means that there is a significant difference in the mean score of pre and post pain in the provision of music stimulation during invasive procedures.

Table 2.
 Paired t test Music Therapy

Pre- post music	Mean	CI 95%		t	df	Sig(2-tailed)
		Lower	upper			
	5.535	4.682	6.3888	13.094	42	0.000

Mother's voice therapy

Majority of baby (44.2 %) reached score 5 having been given a voice recording mother and get score 2 after getting stimulation. Average of that score is 4.42. From the result of the paired t test, it shows the sig value of 0.0000 ($p < 0.05$) with a difference of 5.860 (95 % CI 5.204 - 6.517), this means that there is a significant difference in the mean score of pre and post pain during the provision of stimulation of the mother's voice during invasive procedures.

Table 3.
 Paired t test Music Therapy

Pre- post mother's voice	Mean	CI 95%		t	df	Sig(2-tailed)
		Lower	upper			
	5,860	5,204	6,517	18,013	42	0,000

DISCUSSION

Pain can be experienced by all ages, and can be interpreted as something unpleasant, even premature babies can also feel pain. Age of infants according to McGrath and Hiller in Perry et al (2014) states that the age of the baby affects the coping ability of the baby when experiencing pain. In infants, the ability to communicate is lacking, besides that, babies are

less able to express their pain behavior so that the age of the baby affects the baby's ability to behave. The younger the baby also affects the reaction when experiencing pain.

Gender also affects children in making perceptions of pain. Boys and girls have different responses to analgesics and have different responses and responses to pain. Apart from being influenced by age and sex, the baby's response to pain is also influenced by genetics, family and hormones (Kyle and Carman, 2014). The results of research by Melo and Cardoso (2017) state that male premature babies born at 28-36 weeks of gestation have more reactions in responding to pain than female babies. In addition, Melo and Cardoso also mentioned that the effect of body weight in preterm infants did not show a significant difference in pain response. The score found before the baby received music therapy and the mother's voice from the results of the study was higher or an average of 10 (moderate pain), this could indicate that the baby felt discomfort and pain during invasive procedures. So that non-pharmacological pain management is needed to reduce the pain of the baby during the procedure.

The results of this study indicate a decrease in infant pain scores after being given music therapy intervention and stimulation of mother's voice. This is in line with the results of research by Loewy et al (2013 in Efendi and Tane 2019) which states that music therapy can effectively affect the physiology of babies. In line with Loewy, Karakoc (2014 in Efendi and Tane, 2019) also said that besides being able to improve physiological functions, it can also reduce baby stress due to pain.

Music therapy and mother's voice therapy are a form of non-pharmacological pain management that can help reduce the baby's pain score. Mother's voice therapy is a development of music therapy. Loewy, et al (2013 in Efendi and Tane, 2019) stated that the mother's voice can help babies reduce stress due to pain during hospitalization. The results of research by Efendi et al (2018) stated that stimulation of the mother's voice can help increase the stability of the physiological function of the baby while undergoing invasive procedures. From the research results, it is known that there is a decrease in pain scores before and after being given music therapy. The average pain score before being given music therapy was 10.21 (moderate pain) after being given music therapy the average pain score reached 4.67 (mild pain) this indicates a significant reduction in pain scores with an average score of 5.535 (CI 4.682- 6.3888).

In the PIPP instrument, pulse rate, breath and oxygen saturation are related components in measuring infant pain. When pain occurs, it results in an increase in respiratory rate, pulse and oxygen saturation, with music can help calm the mind of a premature baby so that it can normalize pulse rate, breath and oxygen saturation. Music therapy according to Cirik and Efe (2018) is one of the therapies that is easy to do and simple, besides music therapy can affect the performance of the limbic system in the brain so that it can help babies overcome their pain. The results of research by Emaliyawati dkk (2017) show that there are significant changes in changes in respiratory rate, pulse frequency and oxygen saturation after being given lullaby music therapy intervention.

The results of research by Yurkovich et al (2018 in Efendi and Tane, 2019) state that music therapy can help reduce pulse and respiration in infants who experience pain. Standley et al (in Meschini and Piccinini, 2017) state that music therapy has a good effect on premature babies, especially in regulating pulse frequency, breath frequency and sleep patterns. Shabani et al in Mangat et al (2018) stated that music therapy was proven to reduce the heart rate of

premature babies while undergoing blood sampling and was proven to reduce infant pain scores as evidenced by changes in infant expression. From the results of the study, it is known that there is a decrease in pain scores before and after being given the mother's voice. The average pain score before being given mother's voice therapy was 10.28 (moderate pain) after being given mother's voice therapy the average pain score reached 4.42 (mild pain) this indicates a significant decrease in pain scores with an average score amounting to 5.860 (CI 5.204- 6.517). Karimi in Azarmnejad (2015) states that there is a striking change in the pain score of premature babies after being given stimulation of the mother's voice. In line with Karimi, Azarmnejad also mentioned that there was a striking difference in the reduction of pain in infants who received stimulation of the mother's voice compared to those who did not.

The results of research by Efendi et al (2018 in Efendi and Tane, 2019) state that mother's voice stimulation therapy combined with touch therapy can help premature babies maintain the stability of their physiological functions. Standley et al in Ribaupierre et al (2015) stated that stimulating the mother's voice in premature babies can help prevent apnea and increase oxygen saturation when the baby is experiencing pain. In premature babies, the ability to capture auditory stimulation is acquired since they are still in the womb, namely at 25 weeks of gestation. From 33 weeks of age, the fetus has been able to remember the mother's voice. Stimulation of the mother's voice can affect the heart rate of premature babies. Therefore, auditory stimulation is very effective in helping to deal with pain that arises during treatment of premature babies (Ribaupierre et al, 2015).

The analysis showed that there was a significant change in the pain score before and after receiving music therapy and mother's voice stimulation therapy. The average pain score for music therapy was 5.535, while for mother's voice stimulation the average pain score reached 5.860. This suggests that the mother's voice stimulation therapy is proven to be effective in reducing pain scores in preterm infants. The results of research by Standley and Moore in Ribaupierre et al (2015) state that music therapy is more effective than stimulating the mother's voice in reducing infant pain, especially in increasing oxygen saturation and reducing the occurrence of apnea in infants when experiencing pain. In contrast to Standley, Walworth et al (2012 in Efendi and Tane, 2019) stated that stimulation of the mother's voice can help in improving the baby's neurodevelopment.

Dokkum et al (2020) state the positive auditory stimulation can to help promote brain development, can feel comfort when invasive procedure during and help baby comfort sleep. Menke et al (2021) states that music therapy can support baby's respiratory rate, stable heart rate and reduce apnea risk. Parental music therapy can to increase parental infant interaction and reduce parental anxiety. According to Menke, Roa and Ettenberger (2018) states that parental music therapy can increase parental mental health. So, parental music therapy is effective therapy to do in baby's room or NICU.

Alipour, et al in Efendi and Tane (2019) stated that giving music therapy did not cause significant changes in heart rate, respiratory rate, and behavior changes in premature babies. While Loewy et al (2013 in Efendi and Tane, 2019) stated that lullaby music therapy can affect the physiological functions of premature babies. Listening to music or listening to the mother's voice according to Kyle and Carman (2014) is a form of distraction in non-pharmacological pain management that can be done in premature babies in reducing pain that appears. This is because the technique is in accordance with the baby's ability to hear so that it helps the baby react to pain.

CONCLUSION

Auditory stimulation (music therapy or mother voice therapy) can to help babies in hospitalization, baby can be rilexed, pain scored can be reduced, help promote baby's comfort sleep, stable heart rate, stable respiratory rate and can help improving the baby's neurodevelopment. So, music therapy with or without parents so effectived to do in baby's room or NICU room.

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