

# The Effect of Using Murottal Quran Therapy on Low Birth Weight Infants

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Received: March 29, 2018 Accepted: May 28, 2018 Online Published: July 11, 2018

doi:10.5539/gjhs.v10n8p14

URL: <https://doi.org/10.5539/gjhs.v10n8p14>

## Abstract

The birth of infants with low birth weight in Indonesia is still quite high. This condition largely causes neonatal mortality which is currently ranked the 10th highest in the world. Baby with Low birth weight may have health problems that will influence their life. The current health technology development has been able to improve the resistance of infants, although some previous research has explained that the medical and nursing procedures can cause stress in infants with low birth weight. Stress conditions in infants can lead to excessive use of energy so that it can lose a baby's weight. Murottal therapy is one form of music therapies that can be used to reduce stress, decrease pain and stabilize physiological conditions such as vital signs and oxygen saturation. This study aimed at knowing the effect of Murottal Therapy on the weight gain of premature infants. The research design was quasi experiment using pre post test control group design. The sampling technique used was consecutive sampling. 94 low birth weight infants who were being treated in perinatology taken as the sample of this study. Intervention was given for 30 minutes in the morning and afternoon for 7 days in row. The result of the research showed that there was an increase in infant weight that was 72.87 grams in the intervention group and the statistical test results revealed that there was a significant weight gain between the intervention group and the control group ( $p = 0.023$ ). Therefore it can be concluded that the use of Murottal Alquran Therapy gave an effect on the infants' weight gain, thus it is suggested to use this therapy as part of nursing interventions for low birth weight infants in perinatology.

**Keywords:** Al Quran, murottal, weight, infants

## 1. Introduction

Babies with low birth weight are babies born with less than 2500 grams (Hockenberry & Wilson, 2009). In the premature and low birth weight infants, the maturity of organ has not been achieved completely. Based on that condition many problems occur. Stopped Breathing is a problem which often happened to babies with low birth weight. Stopped breathing is a condition of babies who suddenly stop breathing due to the arrangement in the brain that has not been perfect yet, in addition the surfactant of these babies have not functioned optimally so that the development of lung is hampered and the babies experience shortness of breath along with the increase of heart rate (Hockenberry & Wilson, 2009). Besides respiratory problems, infants with low birth weight are also susceptible to hypothermia or a decrease in body temperature which is less than 36.5 degrees Celsius. These are occurred because the ability of the babies to produce heat (shivering response) has not optimal yet and the thinness of sub-cutaneous fat owned by the babies (Hockenberry & Wilson, 2009). Another problem that occurs is related to the ability of the babies to suck and swallow that is still weak, thus the babies in this condition have not been able to suck milk from their mother therefore they need to use nasogastric hoses for the fulfillment of food needs.

Infant care in the NICU room or other intensive room has a positive and negative effect. Some studies suggest that the development of the body system including the nervous system occurs for 25-40 weeks after conception. For babies who born prematurely, this time is usually spent in NICU or other rooms that have a loud, sharp and unpredictable sound (Lotas, 1992; Rabold, 2013). The sound can be sourced from the activities of medical devices such as pumps, ventilator engine, alarms, bed side monitors and nursing activities and general rooms such as telephone ringing, the sound of water in the sink, bells, or other alarms (Timmons, 2015). Mature babies can anticipate loud noises, but for premature babies or low birth weight babies, it can be a source of stress. The Decreasing of self-regulatory and autonomy abilities may occur due to stress in premature infants, because in such condition they cannot choose or limit the stimulus they receive (Bremmer, Byers, & Kiehl, 2003; Timmons, 2015).

Rabold (2013) suggest that the NICU environment may contribute to the slowing of cognitive, emotional, neurological and sensory development.

The focus of the treatment done by nurses for low birth weight babies who are treated in the NICU's room is to optimize the function of neurologic development and infant behavior, and to improve their physiological health status. The efforts that can be done to achieve those things are fulfill their physiological needs such as oxygen, nutrients, fluids, and prevent the infection and reduce stress levels. Several nursing strategies have been undertaken to minimize stress relating to the NICU environment, such as grouping nursing activities, positioning and using nesting, touching and massaging, using kangaroo models, oral sucrose, non-nutritive sucking, and music therapy (Hodges, 2010).

Music therapy as one of the interventions to reduce stress in infants with Low Birth Weight is usually done using classical music. The music which is used as therapy can be live music, recorded music, or a mother's song for her baby (Loewy, 2013). Classical music by Mozart is a music therapy that can reduce stress levels in infants so that it lowers the use of energy that will impact on baby's weight gain (Lubetzky, 2010). In addition music therapy also has a positive effect to decrease the length of stay, stabilize oxygen saturation rate, increase stimulation tolerance, decrease stress, improve infant and parent bonding as well as improve baby and parent interaction (Gooding, 2010). The use of music therapy in this study is music therapy using the strains of the holy verses of Al Quran or murrotal. This therapy has been used for adult patients and children with various conditions. This Murottal has been shown to decrease anxiety in children with dental restorations (Zanzabiela & Alphianti, 2013), to decrease anxiety in patients with hemodialysis (Zahrofi & Nashif, 2014), to improve elderly sleep quality (Oktavia, 2013) as well as increasing endorphin levels and decreasing the intensity of maternal pain 1 (Azis, Nooryanto, & Andarini, 2013).

The research on the use of music therapy using murottal is still rarely done for infants or neonates. Unlike the use of classical music that has been widely done both in Indonesia and in the world. This is possibly happened Only in Islamic hospitals, this action can be done freely by nurses. Based on the preliminary study, the average number of low birth weight and premature babies treated at Al Islam Hospital, Al Ihsan Hospital and Cibabat Hospital is 25-30 babies / month with average length of stay for 1 week to 1 month. But nonetheless, murrotal has been used in conditions such as anxiety in adult patients (Faradisi, 2009; Nashif, 2014) which its results have a positive effect. Based on the above matters, the researcher is interested to do research about the influence of music therapy using murottal Al Quran for infant weight with low birth weight.

## **2. Methodology**

### *2.1 Design and Sample*

This study was a quasi-experimental using control group pretest-posttest design which conducted at perinatology room or treatment room of the third level at Al Ihsan Hospital and Cibabat General Hospital to 94 infants with low birth weight who were being treated. The samples were taken consecutively starting from July till October 2016.

A consecutive sampling technique was used to recruit the sample for control an intervention group of the study in both hospital. The sample size was determined by using power of test 10 % that will be used to analyze the data. Based on that power of test, an alpha 0.05 and deviation standard 7.65 by recent study (Loewy, 2013), the sample size was 39 infant each group. To allow for 10 % drop out rate, there was a need to add the sample by 10 %. Therefore, the result of the sample was 86 infant, but to increase the generalibility, until the end of this study the participant was 94 infant

### *2.2 Instrument*

The measurement weight of infant in pre-intervention and post intervention, we used the digital weight scale that was calibration before use by the infant. The reason for using digital scale is the level of accuracy when compare with the manual weight scale.

### *2.3 Data Collection Procedure*

The research procedure was begun with the selection of samples according to inclusion criteria. The inclusion criterias were the babies with weight between 1000-2500 grams, and geastation age below 37 weeks. Next the infants in the intervention group were given Murottal Al Quran therapy by music box player for 30 minutes in the morning and afternoon for 7 days in row. On the first day until the eighth day, the weight was measured based on the operating procedure standard.

### *2.4 Data Analysis*

Data was entered and analysis using the SPSS package version 20. The collected data were processed and analyzed starting from univariate to bivariate. The univariate analysis used frequency distribution while bivariate analysis

used a paired t test for each group and independent t test (pooled t test) to see the difference between control and experimental group.

### 3. Results

Table 1. The distribution of average weight infants before and after the treatment in the intervention group (n = 47)

Weight Characteristics	Mean	Standard Deviation	Maximum Minimal
Weight before treatment	1796.81	317.32	1300-2400
Weight after treatment	1869.68	327.62	1250-2500

This table showed that in the intervention group, the mean of infant's weight after the intervention was greater or increased compared to the weight before the intervention, in other words it can be explained that the weight after intervention was greater than the weight before the intervention. The increase was about 72.87 grams.

Table 2. The distribution of average weight infants before and after treatment in the control group (n = 47)

Weight characteristics	Mean	SD	Maximum Minimal
BB's first day	1863.40	312.79	1080-2490
BB 8th day	1890.43	308.75	1140-2690

Based on the Table 2 above, it can be explained that in the control group it also found an increase in body weight when it compared to weight on the first day and on the eighth day, it was about 27.03 grams.

The normality test was used in order to show that the sample data came from a normal distributed population and it was conducted before bivariate analysis. Normality test results in the control group and the intervention group were as follows:

Table 3. The normality test data baby weight loss before and after the intervention of the control and intervention group (n = 47)

variable	Group	Kolmogorof – Smirnof		Shapiro- Wilk			
		statistical	df	P value	statistical	df	P value
Weight before treatment	Control	0.083	47	.200	.978	47	.518
	Intervention	0.107	47	.200	0.951	47	0,146
Weight after treatment	Control	0.088	47	.200	.982	47	0.682
	Intervention	0.093	47	.200	.971	47	0.297

The results of the analysis in the Table 3 showed that all the data were normally distributed, it can be seen from the p value was greater than 0.05 alpha. Furthermore, the data were analyzed using paired t test to see the average difference before and after the intervention in the intervention and control as well as pooled t test to see the difference in average weight gain between the intervention group and the control group. The results of the analysis were presented in the table below:

Table 4. The hypothesis testing differences mean weight babies on intervention group and a control group (n = 47)

Variable	mean	SD	P value	n
<b>The Intervention group</b>				
Weight before treatment	1796.81	317.32	0.00	47
Weight after treatment	1869.68	327.62		
<b>The Control group</b>				
Weight at first day	1863.40	312.79	0.79	47
Weight at 8th day	1890.43	308.75		

The Table 4 above showed the result based on the analysis using t test dependent (paired t test) that it showed a significant difference with p value of 0.00 ( $p < 0.05$ ), it meant at alpha 5% it was seen the significant difference of mean of the infant weight before and after treatment in the intervention group, whereas in control group with p value was 0.079 which meant it was more than 0.05. In other words there was no significant difference in weight between the first day and the eighth day.

Before the hypothesis test of the two groups of independent (control and intervention, the homogeneity or equality test was done using Levene test, the test results showed that the two groups were homogeneous, it was proved by the p value of 0.555 which its value was greater than 0.05 (the test results attached).

Table 5. The hypothesis testing of difference weight babies increasing in the control group and intervention group

Variable	Mean	P value	N
Intervention group	72.87		
Control group	2.27	0,023	94

The results of the analysis in Table 5 above showed that the statistical test result using independent t-test p value was  $< 0.05$ , which meant that at alpha 5% there was significant difference between weight gain in LBW infants in the intervention group and the control group.

#### 4. Discussion

Various ways have been done by nurses in the nursery to increase weight optimally in addition to the way of providing nutrition. One of way is by giving them music therapy. Music is defined as the science or art using a tone or voice. Music is formed by some of the things called elements those are frequency, intensity, timbre, intervals and duration. Viewing those elements, murotal Al Quran has all the elements that can lead to the emergence of tranquility. In addition babies who get Murotal Al Quran get stimulus audio that it can introduce them to listen to the chanting of holy verses of Al Quran as early as possible. Giving this Murottal Alquran therapy has the same the mechanism as other music therapy which is often used such as the lulabies, video recordings or classical music.

In the univariate statistical analysis of the study, it was found that infants who received murotal Al Quran therapy had an average total weight gain of 72.87 grams after being given the murrotal Al Quran for 7 days with the duration of 30 minutes per day with 2 times of giving in other word se s they got an increase about 10.41 gram per days. While in the control group there was only an average total weight gain of 27.02 grams after 7 days or by 3.86 grams per day. The results of this study were supported by similar research that had been done before by Hariati (2010) who used music in the form of lulabies in premature babies. The results showed that there was a weight gain of  $> 20$  grams per day in the intervention group whereas in the control group they also experienced an increase of  $< 20$  grams per day. In line with other research done by Arnon et al. (2006) who suggested that premature infants who were given therapeutic music had an increase of 15-20 grams per day.

The results of this study are also supported by research from Cevasco and Grant (2005) who conducted a study on 62 preterm infants. This study aimed at seeing the difference of weight in giving music therapy using pacifier activated lullaby (PAL) for 3 days. The results obtained an average increase in body weight on the first day was

about 13.85 grams with an average after 3 days was about 22.89 grams. Most all of the research that supports Murrotal Al Quran research uses music as an intervention act. This happened because there have not been a research on infants using Murrotal Alquran yet, so that Murrotal Alquran is assumed to have the same characteristic with other music therapies whether it is given in CD, Recording or given directly. In general the murrotal Al Qur'an is reciting the Qur'an by focusing on the truth of the Qur'anic recitations and songs (Safitri, 2012) in Nafi'ah (2015). This reading has varying tempos and rhythms so that it can be interpreted as a meaningful musical therapy.

The result of statistical analysis using paired t test in the control group and the intervention group showed significant results ( $p = 0.00$ ), meaning that both in the intervention and control group there was significant weight before and after the intervention. Although when it was seen from the increase, weight gain in infants who received an intervention was far greater than the increase in infant weight in the control group.

This increase in infant weight occurs because basically every baby gets appropriate nutrients according to their needs either orally, or enteral (OGT or NGT), depending on the ability to suck and swallow. However, it is influenced by many factors, especially by the physiological gastrointestinal organs. In LBW infants, especially those who born with gestation periods less than 28 weeks (premature) have a poorly developed organs. These infants have a smaller muscle tone in the lower esophageal sphincter area, small stomach capacity, improper sucking and swallow coordination ability and longer active sleep time (Hockenberry & Wilson, 2009).

Further research results in each group of both intervention and control were analyzed further using independent t test to see the difference in mean of weight gain of infants LBW that happened both in control group and intervention. The results showed that there was a significant difference in mean weight gain between the control group and the intervention group ( $p = 0.023$ ;  $\alpha = 0.05$ ).

The results of this study are supported by other studies that use music therapy in infants, Hariati (2010) who conducted research on 30 preterm infants. The results showed that there was a significant weight gain between the control group and the intervention group on a daily basis. In addition, another study was conducted by Standley (2000) to 40 premature people. Music therapy was given for 10-30 minutes 2 times a week and the result indicated that there was an increase in daily weight in premature infants both men and females. Another study using music therapy was also done by Caine (1991) who applied 60 minutes of music stimulation using a tape recorder the results of this study indicated that there was a significant difference in the average of weight gain.

The increase of Weight gain in LBW infants can be seen from several mechanisms. Sherwood (2004) suggested that weight gain mechanisms can occur through mechanisms of positive energy balance. This balance was occurred because the amount of energy from food intake was greater than the amount of energy used which derived from the external work and internal functions of the body. The excess energy will be stored or not used by the body so that it is stored in adipose tissue and ultimately it can be used to increase energy.

The mechanism of energy loss in low birth weight babies is described by Hockenberry and Wilson (2009) who state that infants who born under months or low weight spend 70% or more of the time for active sleep. This type of sleep will spend more energy than sleep quietly because at this time there will be much blood flows to the brain, the frequency of the breath is more volatile and the condition of apneu is more frequent. Musical therapy with Murotal Al Quran was able to reduce energy loss through quiet sleep enhancement. This is proved by Arnon et al. (2006) who explains that the use of live music has a significant effect on decreasing pulse rate and increasing quiet sleep ( $p$  value 0.001). In addition, the enhancement of a quiet sleep toward the increasing of energy consumption declining was also supported by Lubetzky et al. (2009) in 20 preterm infants. This research showed that giving music therapy will decline resting energy expenditure (REE) thus it causes metabolic efficiency that leads to the increase of infant weight.

The increase of quiet sleep on the use of music therapy is also in line with the relaxation effect on murotal reading of Al Quran studied by Alkahel in Handayani et al. (2014) which explains that the Quran which is listened will give a relaxation effect about 65%. This occurred because music therapy using murottal Al Quran produces sound waves or sounds that will be received by the earlobe and then vibrate the tympanic membrane. Then the vibration is passed to the cortical organ in the cochlea where the vibration is converted from the conduction system to the nervous system through the auditory nerve (nerve VIII) as electrical impulses. The electrical impulse then proceeds to the auditory cortex in the cerebral cortex and the later hearing path to the limbic symbionte via the limbic cortex (Prasetyo, 2005). Furthermore, from the limbic cortex and the auditory pathway proceeds to the hippocampus adjacent to the amygdaloid nuclei. The amygdala which is the area of conscious behavior that acts on the subconscious level receives the signal and then passes it to the hypothalamus.

In the hypothalamus which regulates most of the vegetative function and endocrine function of the body, the auditory path is passed to the reticular formation as the impulse distributor in the delta wave to the autonomic nerve fibers. Those Nerve fibers have two systems of sympathetic and parasympathetic nerves. Both of these nervous systems affect the contraction and relaxation of organs (Guyton & Hall, 2007). In the use of the Murrotal Al Qur'an, murotal is capable of spurring the parasympathetic nervous system which has the opposite effect on the sympathetic nervous system. Thus, there is a balance between the sympathetic nervous system and the parasympathetic nervous system which causes relaxation and quiet sleep enhancement.

Besides reducing energy losses, murrotal music therapy also has an impact on increasing energy formation by increasing the ability of mouth receptors. Guyton and Hall (2007) explain that food intake as an energy source for gaining weight is affected by mouth receptors, ranging from suctioning, mastication, saliva, tasting and ingestion. In general, the ability to suck and swallow and its synchronization in infants who are under weight or born less than 32 weeks has not been perfect as a result the efforts to increase body weight are obstructed. Standley (2000) through his research on non-nutritive sucking explains that the ability to suck of infants who get music therapy has increased 2.43 times better, so it can be concluded that music therapy can contribute to the development of the infants' ability to suck and swallow.

## 5. Conclusions and Suggestions

The conclusions of this study can be drawn as follows (1) There was an increase in average weight of the infants in intervention group before and after the intervention. (2) There was an increase in the average weight of infants in the control group before and after the intervention. (3) There was a significant difference in the average weight before and after the intervention in the intervention group, whereas the control group did not have a significant difference. (4) There was a significant difference in the increasing average weight between the control group and the intervention group.

Based on the above conclusions, music therapy using murottal Al Quran can be considered as one of the nursing intervention for nurses in the perinatology room to be one of nursing intervention and standard operating procedures in nursing care for low birth weight infants which aimed at increasing the baby's weight. In addition Lecturers and students in educational institutions can learn murottal Alquran music therapy and at the same time do further research on this matter.

## Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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