Original Research

The Differences In Quality of Sleep Among Babies Aged 3-12 Months Before and After A Baby Massage's Class

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ABSTRACT

Introduction: The toddler years are a golden period for growth and development. One effort that parents can make to help improve the quality of their baby's sleep is by doing massage. Babies who get a massage will be able to sleep soundly, so that when they wake up their concentration is full. This study aims to prove whether there is a difference in quality of sleep among babies aged 3-12 months before and after a baby massage's at Muhammadiyah Gresik Hospital, Indonesia

Methods: This research used a Pre-Experimental Design One Group Pre-Post Test Design using a sample of 34 subjects selected using a purposive sampling technique. The data instrument is in the form of an observation sheet before and after the massage. The variable measured in this study was improving the quality of the baby's sleep. Wilcoxon sign rank test analysis obtained a p value = 0.000.

Results: In babies aged 3-12 months before the baby massage was carried out, the results showed that the majority of babies experienced good quality sleep, 18 (53%) babies, and after the massage, the majority of babies experienced good quality sleep, 25 (74%) babies.

Conclusions: There are differences in quality of sleep among babies aged 3-12 months before and after baby massage in the baby massage class at Muhammadiyah Gresik Hospital, Indonesia. The importance of the influence of sleep on infant development because sleep is a physiological process that alternates with longer periods of wakefulness. Sleep has enormous benefits for their growth and development and optimizes their brain development, because sleep activity is one of the stimuli for the process of brain growth and development. Further research involves a larger number of samples is highly suggested.

1. INTRODUCTION

Infancy is a golden period for growth and development so it needs special attention. Stimulation given in a loving manner from an early age will have a very important influence on helping them develop optimally during their growth period. One of the factors that influences a baby's growth and development is sleep and rest (Barry, 2022).

Babies need 14-15 hours of sleep every day, including naps. Getting enough sleep will make the baby's body and brain develop well and normally. According to Sukmawati & Imanah (2020) the prevalence of sleep disorders in children under 3 years in 5 large cities in Indonesia was found in (44.2%) of the cases studied with an average age of 6 months. During infancy, several changes occur, the pattern of the sleep-wake cycle is only clearly visible at the age of 3-6 months and at this age it is only

possible to measure the quality of the baby's sleep, namely the proportion of sleep that occurs more at night. The sleep patterns of babies over six months of age begin to appear similar to those of adults (Tham et al., 2017).

Data obtained from World Health Organization in (2012) in the journal Pediatrics noted that around 33% of babies experienced sleep problems. Research conducted by Hiscock (2012) in Melbourne, Australia found that 32% of mothers complained of recurring sleep disorders in their babies (Hiscock, 2012). Other research states that estimates of the number of babies who experience sleep disorders vary between 7.4% and 74%. It is known that almost all respondents (95.9%) want to change their children's sleep patterns, although only a third of respondents (34.5%) reported sleep disorders, which was followed by 2,219 respondents in six countries, namely Indonesia, Thailand, Japan, New Zealand, Singapore, and the United States. The aim of this research is to explore the prevalence of desired change or Desired Area of Change (DAC) (Mindell et al., 2022). In Indonesia, quite a lot of babies experience sleep disorders such as waking up at night, namely around 44.2%.

Baby massage is very beneficial for stimulating the baby's growth and development. Massage is done with love and affection and paying attention to the baby's needs so that it will produce extraordinary effects. Through massage touch on muscle tissue, it can increase blood circulation thereby improving the function of the body's organs properly. Baby massage will provide continuous stimulation to the body, providing a sense of security and comfort to the baby. The stimulation and training given to babies will affect special functions, including motor skills, speech and intelligence. Babies become relaxed, comfortable, calm, gain weight and sleep soundly so they can stimulate their growth and development (Tham et al., 2017).

According to research results (Cahyani & Prastuti, 2020), massage was given to 64 babies aged 3-6 months. The results of the study showed that 34 (50%) babies who were not treated had problems with quality of sleep, 29 (42.6%) of them had problems, and 34 (50%) babies who received massage had problems with quality of sleep, 39 (57%). 4%). This research was conducted at Cahaya Bunda Clinic, Riau (Cahyani & Prastuti, 2020).

From a preliminary study that was carried out in a hospital baby massage class. Muhammadiyah Gresik by researchers used interviews with 10 mothers of babies aged 3-12 months. The results of the interviews showed that 6 mothers said that their babies were fussy easily and often woke up at night, crying and if they woke up the baby had difficulty starting to sleep again. A total of 4 people said the child slept soundly and was never fussy at night. Baby massage can be interpreted as touch therapy carried out on babies to provide body contact. The mass of the baby is an external stimulus that plays an important role in physical growth and emotional development

in children. This action also works to stimulate the central nervous system, the baby's brain will produce more serotonin or the calming hormone. Babies who are gaining weight will sleep soundly, so that when they wake up they will have full concentration. Gently massaging the baby's body can also be useful for reducing sleep disorders in babies, providing an extraordinary sense of positive security between the baby and his parents, can improve motor function in babies, reduce abdominal pain and difficulty defecating (Astrid, 2018).

Babies are said to have poor quality of sleep if they sleep less than 9 hours at night, wake up more than 3 times during their night's sleep, and wake up for more than 1 hour. At the beginning of sleep, babies always seem fussy, cry and have difficulty falling back asleep after waking up (Dewi et al., 2020). And if it happens continuously it will interfere with the baby's growth and development. One effort that parents can make to help improve the quality of sleep in babies is by doing baby massage. Baby massage is a health service and treatment which is the oldest therapy that has been known to humans since civilized civilization using certain techniques (Septiana & Jayanti, 2019).

Based on the description above, researchers are interested in conducting research on differences in quality of sleep in babies aged 3-12 months before and after baby massage in the baby massage class at Muhammadiyah Gresik Hospital, Indonesia.

2. METHODS

2.1 Design

The design of this study is Pre-Experimental Design One Group Pre–Post Test Design, which is a research design that reveals causal relationships by involving one group of subjects, groups of subjects are observed before and after the intervention (Nursalam, 2013). In this study, researchers wanted to know the difference in the quality of sleep for babies aged 3-12 months before and after the baby's massage.

2.2 Population, Samples and Sampling

2.2.1 Population

The population in this study was all babies aged 3-12 months who were participants in the baby mass class of Muhammadiyah Gresik Hospital in June–August 2022, which amounted to 37 babies.

2.2.2 Samples

Sample is a selection process from a population that can represent the existing population (Nursalam, 2013). In this study, the following sample size formula was used:

$$n = \frac{37}{1 + N\,(d)^2}$$

Information:
n: sample size
N: population size

d: significance level (p)

The population of babies in the mass class of babies is 37 babies, the sample size was formulated as follow:

$$n = \frac{37}{1+37\,(0,05)^2}$$

$$n = \frac{37}{1+37\,(0,0025)}$$

$$n = \frac{37}{1+0,09}$$

$$n = \frac{37}{1,09}$$

$$n = 33,94$$

$$\mathbf{n = 34}$$

Finally, 34 participants were recruited.

2.2.3 Sampling

In this research, the sampling technique used was Non-Probability Sampling (Purposive Sampling).
1) Inclusion criteria was:
   a. Babies aged 3-12 months who come to the baby mass class of Muhammadiyah Gresik Hospital, Indonesia.
   b. Babies aged 3-12 months who are healthy / not sick (hot).
   c. Babies aged 3-12 months who are willing to be respondents.
2) Exclusion criteria was:
   a. Sick babies aged 3-12 months (hot)
   b. Mothers of babies aged 3-12 months who are not willing to be respondents.2.3 Study Selection

2.3 Variable

1) The Independent variable is the mass of the baby
2) The dependent variable is the quality of the baby's sleep.

2.4 Instruments

Data collection in this study was for independent variables, namely infant massage using sop massage technique, while for quality of sleep using questionnaire sheets. A questionnaire is a number of written questions that can be used to obtain information from a respondent in the sense of obtaining his personal information, or some things that the respondent knows.

The questionnaire used is a closed questionnaire. A closed questionnaire means a questionnaire that already has an answer so that respondents only need to choose the answer. The questionnaire used is in the form of questions and has been tested for validity by previous researchers.

2.5 Procedure

The procedure in the study is as follows:
1) The researcher takes care of the research cover letter to the hospital. Muhammadiyah Gresik.
2) Take care of research licensing and data collection in the class of the hospital infant masse. Muhammadiyah Gresik.
3) Conducting preliminary studies.
4) Complete the research proposal until the implementation of the research proposal exam.
5) Explain to potential respondents about the purpose of the study and if willing to become respondents are welcome to sign informed consent.
6) Providing questionnaires about the quality of sleep of infants aged 3-12 months to respondents and explaining to respondents how to fill out the questionnaire, after filling out the questionnaire is returned to the researcher.
7) Manage data.
8) Babies are massaged 1X with a massage duration of 30 minutes.
9) Providing a questionnaire about quality of sleep to respondents to find out their quality of sleep after a massage, filling out a questionnaire 1 X 24 hours after the massage is then filled out a questionnaire sheet and returned to the researcher (photo of the questionnaire sheet).
10) After the data is collected, data collection is carried out then the researcher carries out data processing and data analysis.
11) Preparing research reports.

2.6 Data Analysis

2.6.1 Data Processing

After the questionnaire sheets from the respondents are collected, data processing is carried out in the following ways:
1) Editing
   Editing is an effort to re-examine the correctness of the data obtained or collected can be done at the data collection stage or after it has been collected.
2) Coding
   Providing numeric codes (numbers) to data consisting of several categories. Providing this code is very important when processing and analyzing data using a computer. Usually in providing code, a list of codes and their meanings is also made in one book to make it easier to see and the meaning of a code from a variable.
3) General Data
   a. Respond
      Answer 1 : R1
      Answer 2 : R2
      Answer 3 : R3
   b. Age
      3-6 months   : U1
      7-9 months   : U2

10-12 months : U3
c. Gender
Male   : Jk1
Female : Jk2

d. Health Status
Pain   : Sk1
Healthy   : Sk2
e. Special Data
Quality of sleep criteria for babies aged 3-12 months.
Good   : 3
Enough : 2
Special : 1
f. Skoring
Scoring for quality of sleep for the yes statement scores 1 and no score 0.
Good score 1
Enough score 2
Less score 3

4) Tabulating
Tabulating is the grouping of data into one specific table according to certain criteria. In this data, it is considered that the data has been processed so that it must be immediately arranged in a format pattern that has been designed. According to Arikunto (2006), the results of data tabulation are interpreted using the following scales:
100%   : Entirely
76 - 99%   : Almost entirely
51 – 75%   : Most
26 – 50%   : Half
1 – 25%   : Fraction
0%   : None

2.6.2 Data Analysis

To describe the study, the data were systematically analyzed and to compare the quality of sleep of infants aged 3-12 months before treatment and after treatment using the Wilcoxon signed Rank test, where the ordinal data were processed and analyzed. To determine the level of effectiveness between independent variables and dependent variables, the formulation of the treatment meaning value ≤0.05.
1) Analyzes Univariat
Univariate analysis is data obtained from the results of data collection presented in the form of a frequency distribution table, a measure of central or graphical tendency (Nursalam, 2013). Univariate analysis aims to describe the characteristics of each research variable. Analysis of age category data while numerical data analysis includes the quality of infant sleep in this study using statistical analysis using the SPSS 25 software.
2) Bivariate Analysis
Bivariate analysis is an analysis to determine two variables, both comparative, associative, and correlative. In this study, bivariate analysis

was carried out to determine the effect of infant mass on the quality of infant sleep, namely by testing paired t-test samples if the data was normal distributed. However, if data was not normal distributed, Wilcoxon was applied.

2.7 Ethical Clearance

This study was approved by institutional ethics board with certficate number: 178/KET/II.3.UMG/KEP/A/2022.

3   RESULTS

Table 1. Frequency Distribution of Infant

No	Age	Frequency	Percentage (%)
1	3 months - 6 months	15	44%
2	7 months - 9 months	10	29%
3	10 months - 12 months	9	27%
	Sum	34	100%

Table 2. Frequency Distribution of Baby Gender

No	Gender	Frequency	Percentage (%)
1	Men	18	53%
2	Woman	16	47%
	Sum	34	100%

Table 3. Frequency Distribution of Infant Health Status

No	Health Status	Frequency	Percentage (%)
1	Sick	9	26%
2	Healthy	25	74%
	Sum	34	100%

Table 4. Frequency Distribution of Baby Sleep Quality Before Massage

No	Sleep Quality	Frequency	Percentage (%)
1	Good	2	6%
2	Enough	18	53%
3	Less	14	41%
	Sum	34	100%

Table 5. Frequency Distribution of Baby Sleep Quality After Massage

No	Sleep Quality	Frequency	Percentage (%)
1	Good	25	74%
2	Enough	9	26%
3	Less	0	0%
	Sum	34	100%

Table 6. Assessment of Baby Sleep Quality Before and After Massage

No.	Sleep Quality of Babies Aged 3-12 Months	Before doing Massage	Presented	After the massage	Presented
1.	Good	2	6%	25	74%
2.	Enough	18	53%	9	26%
3.	Less	14	41%	0	0%
	Sum	34	100%	34	100%
	Uji Wilcoxon p (0,000) < α (0.05)				

From table 1, the age frequency of half of the babies shows the age of 3-6 months, namely 15 babies (44%). From table 2. above, it shows that of the 34 babies, the majority were male, namely 18 (53%).

From table 3. above, the frequency of the baby's health status is mostly healthy, namely 25 babies (74%). From table 4. above, it shows that the quality of the baby's sleep before the massage was carried out, the majority of babies experienced sufficient quality of sleep, namely 18 babies (53%). From table 5. above, it shows that the quality of baby's sleep after massage, most of the babies experienced good quality of sleep, namely 25 babies (74%). Based on table 6. it is known that babies aged 3-12 months before being carried out masse most of the baby's quality of sleep is sufficient, namely 18 (56%) babies, greater than the lack of quality of sleep 14 (41%) babies and good quality of sleep 2 (6%). The quality of sleep of infants aged 3-12 months after being carried out was a majority of good babies amounting to 25 (74%) babies compared to adequate quality of sleep of 9 (26%) and none less than 0 (0%). Based on the results of the study and according to the results of Wilcoxon's statistical test , a significant number or probability value (0.000) was much lower than the significant standard of 0.05, then there was a difference in the quality of sleep for babies aged 3-12 months before and after massage in the hospital baby massage class. Muhammadiyah Gresik.

4   DISCUSSION

Based on table 4, it is known that the quality of sleep of babies aged 3-12 months before the baby's massage was obtained, the results of most respondents had sufficient quality of sleep of 18 babies (53%). The important influence of sleep on the development of the baby because sleep is a physiological process that alternates with a longer period of awakeness (Rini, 2013). For babies, sleep has enormous benefits for their growth and development to optimize brain development, because sleep activity is one of the stimuli for the brain growth and development process (Astrid, 2018).

Sleep functions restoratively and homeostatically and is important in energy reserves. During sleep energy is stored and directed to provide important cellular functions. Given the decrease in the activity of these organs during sleep and can provide fulfillment of energy that has been lost

(Mustayah & Retnowati, 2022). If the sleep cycle is reduced, it will cause conditions that can damage the organs that experience it (Handiyani et al., 2018).

Babies are said to experience poor quality of sleep if they sleep less than 9 hours at night, more than 3 awakenings at night and more than 1 hour long awakening. During starting sleep the baby looks always fussy, crying and after waking up has difficulty falling back asleep (Anggraini & Sari, 2020). According to Tham (2017) that there is a good influence of giving baby massage on the quality of baby sleep at the age of 1-6 months and the quality of baby sleep seems to increase when after the baby's massage is done, so that the baby's quality of sleep is lacking. In the opinion of researchers, poor quality of sleep can make children fussy easily, there is a low immune system, and growth can be disturbed. Sleep is a very important need, because sleep time for babies can affect the development of the baby so that his sleep needs must be met, the same as the nutritional needs of the child.

Then babies who experience quality of sleep disorders, one of which is from the health status of the baby obtained in table 3 of the health status of illness 9(26%), so that it can affects his quality of sleep. Any disease can cause pain, physical discomfort can result in sleep problems in the baby such as pain in the teeth, ears, skin, airway, gastrointestinal tract, urinary tract, muscles or bones so that it can interfere with the baby's sleep. High physical activity can expend energy, so it requires more sleep to maintain balance. We can see this if the baby does daily activities or after doing massage so that it results in a feeling of fatigue (Uliyah & Hidayat, 2021). When the baby experiences illness, parents must be able to understand the baby's condition first before giving mass. Because babies can show happy reactions or are actually less comfortable when they are massed. Because when the baby has a fever, the baby's body tries to fight the infection so that it can be healthy again, for that the body should be rested first. Doing massage when the baby has a fever is actually believed to be able to spread the virus throughout the baby's body quickly.

Based on table 1 shows that almost half of babies aged 3-6 months (44%) experience poor quality of sleep. According to Galena (2014) considering that the amount of sleep of the baby can decrease according to his age, at the age of 2-4 months, the baby needs 14-16 hours, which is divided into the

duration of night sleep which is 9-10 hours, the number of naps is about 4-5 hours between morning and afternoon sleep. At 4-6 months of age the baby needs 14-15 hours of sleep a day, the baby will probably do one or two naps per day, that is, once in the morning and during the day, the total duration of sleep is 4-5 hours, 10 hours for a night's sleep. REM sleep occurs 90 minutes that lasts for 5-30 minutes, at this stage it is usually dreamy because Rem sleep is not as good as NREM stage sleep. The characteristics of REM sleep are that the eyes are quickly closed and open, the muscles experience small muscle spasms, large muscles immobilization, irregular breathing (sometimes with apnea), rapid and irregular pulse, increased blood pressure or fluctuations, increased gaster secretion, increased metabolism (body temperature rises), EEG is active and difficult to wake up (Rohayati, 2019).

Babies will gain great benefits if the baby is massed from the time the baby is born to the age of 6-7 months when the age of 3 months to 3 years, massage can be given by applying a little pressure to the whole movement and a longer mass time (Kurniasari et al., 2020). After birth, the first time the body contact is needed by the baby in order to get a sense of security and comfort, so as to stimulate his organs to start working on their own (Dewi et al., 2020).

It is also supported by Kurniasari's research, (2020) which obtained the results of the influence of infant mass on the length of sleep of babies aged 3-6 months. According to researchers at the age of 6 months the Baby will be easier to manage his sleep schedule, so that the baby has a good quality of sleep. Therefore, the baby's sleep needs are a concern of parents so that later the baby can get optimal growth and development.

From table 5 shows that the quality of sleep of babies in the infant mass class of RS. Muhammadiyah Gresik, which has been done by massage babies, mostly has a good quality of sleep level of 25 (74%) babies. Baby masse is a very popular form of touch, known for a long time and the oldest, which is a health care and treatment that has been practiced since the last century (Roesli, 2013). Massase is a touch therapy from the massager's hands by touching the skin using certain movements (Septiana & Jayanti, 2019). Because most of the problems with the quality of sleep of babies are caused by insufficient sleep duration. If the quality of sleep is good, the physiology/faal of the body in this case the brain cells will recover again as when they woke up. According to Gem (2017) babies who get enough sleep will fall asleep easily at night, be fit when they wake up, not fussy, have a regular daily sleep schedule, total sleep time, take a nap. This is in accordance with Sukmawati & Imanah (2020), Massage affects the hormone Beta Endorphin which can improve the growth and development of babies. Beta Endorphin is a hormone that has been produced from the cells of the body and nervous system in humans. The Endocrine Glands will secrete Beta Endorphin when there is stimulation or stimulus (Cahyanto, 2020).

Roslina's research (2007) cited by (Septiana & Jayanti, 2019) that Massage will increase the activity of the neurotransmitter serotonin which increases the capacity of receptor cells to bind to glucocorticoids (adrenaline a stress hormone) thus causing a decrease in adrenaline hormone levels and can increase the body's resistance, especially IgM and IgG. The benefits of baby massage can help sleep longer, so that adequate night's sleep can help the process of good growth and development for the baby (Barry, 2022). According to researcher Sukmawati & Imanah (2020) baby mass is effective in improving the quality of baby sleep. According to researchers that babies whose amount of sleep is good will affect their brain growth will be optimal.

From the results of the study with the Wilcoxon signed ranks test in table 4 showed the influence of differences before and after massage. The effect of baby massage on The quality of sleep of babies at the age of 3-12 months where most babies experienced an improvement in the quality of good sleep (74%) compared to before the baby's massage, namely (53%) was shown from the results of statistical tests with a significance value (α count) of (p: 0.000). This number when compared to the significant or defined meaning of the value is much smaller. This there is a significant difference or there is an influence before and after. The effect of baby massage with the quality of sleep of babies aged 3-12 months in the hospital baby massage class. Muhammadiyah Gresik. This can be proven by the results of the study listed in table 4 which shows that there is a difference between before and after treatment.

The quality and quantity of sleep is influenced by several factors. Such qualities can indicate the presence of the individual's ability to sleep and obtain the amount of rest according to his needs. Among those that can affect it are environmental factors. According to Uliyah & Hidayat (2021) a safe and comfortable environment for a person promote the shortest sleep process. This stimulates hormones secreted by the pineal gland to tell the child that it is dark outside, and give it a taste.

If nutritional needs are met, your little one will no longer wake up often at midnight. An important factor for maximizing the golden period of brain growth is the fulfillment of nutrition and the adequacy of the baby's sleep. Breast milk is proven to contain quite high alpha protein which is a smooth and easily digestible protein. Alpha protein is rich in essential amino acids that are very useful for the growth and development of babies, especially tryptophan. Tryptophan is an amino acid that plays a role in the process of neurotransmitters and lifestyle regulators (neurobehavioral) where one of its functions is to regulate sleep patterns. Babies who have difficulty sleeping or often wake up from their sleep because they feel that they are not full. Therefore, meet the needs of eating and drinking babies before bedtime. Nutritional status is very

complex because it can influence the continuation of children's lives in the future which can determine the future of the nation for that the role of parents is very important to pay attention to their nutritional status (Dari, R. D., & Suminar, 2017). According to previous research Farida (2018)stated that the baby's mass can cause the baby to be calmer and able to rest so that when the baby wakes up get enough energy so that his activity will be optimal, so that The baby will become hungry quickly so that his appetite increases. Then physical activity, fatigue due to high physical activity can require more sleep to maintain the balance of energy that has been expended. This can be seen when the baby does daily activities or after doing mass and reaches fatigue. According to researchers, given the importance of quality of sleep for its development, the sleep needs must be completely met so as not to have a bad effect. One way that can be used is to do baby massage because baby massage has good benefits for baby development, improving the quality of baby sleep.

5 CONCLUSION

Based on the results of research and discussion, the following conclusions are as follow: the quality of sleep of 18 babies aged 3-12 months before massage was a slight past half. Quality of sleep of 25 babies aged 3-12 months after was nearly three-quarter. There is a significant difference in the quality of sleep of babies aged 3-12 months before and after baby massage.

Further research involves a larger number of samples is highly suggested. As well as being able to provide training to parents on how to massage the baby properly so that it can be done at home.

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