

# Effect of Baby Massage on Baby's Sleep Quality (Based on Baby Massage Duration and Frequency)

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**Abstract**—Baby's sleep quality gives an influence on baby growth and development. One problem mothers often encounter is that their babies have trouble falling asleep. One of efforts to improve baby's sleep quality and quantity is giving a massage. Massage can stimulate the production of endorphins, making possible to relieve pain, and thereby causing babies to calm down and their crying frequency to reduce. The present research seeks to find out the effectiveness of baby massage to improve baby's sleep quality viewed from baby massage duration and frequency. A quasi-experimental design was applied in the research. The independent variable includes baby massage therapy, the dependent variable covers baby's sleep quality. The research samples are 3-6 month old babies. The analysis was carried out in two stages. Phase I is the normality test using the Kolmogorov Smirnov method and homogeneity test using the Levene's test method. Phase II is the Influence Test used is Two Way Anava. There is an actual difference of influence between a baby group given 15 minute massage and that given 30 minute massage ( $p=0.041<0.05$ ); there is a difference in baby's sleep quality based on massage frequency in a week (once, three times, and six times) with  $p=0.005<0.05$  and there is a significant interaction between massage duration and frequency towards baby's sleep quality ( $p=0.001<0.05$ ). Baby massage was effective to improve the quality of baby sleep. Baby massage that is getting more frequent and long, can improve the quality of baby's sleep better.

**Keywords**—Baby, Massage, Sleep

## I. INTRODUCTION

Sleep is the main priority for a baby since during sleep neuro brain is repaired and approximately 75% of growth hormone is produced [1]. Babies spend average sleep times of about 60% [2]. The sleep-wake cycle pattern is evident at the age of 3-4 months, where the proportion of sleep starts more at night [3]. During the infant phase, the growth of nerve cells is not perfect, so a longer sleep time is needed for nerve development, synapse formation and so on [4]. The baby's brain grows three times bigger than they were at birth, or 80% of the adult human brain in the first year. This condition only occurs once in a lifetime [5]. Baby sleep needs should be fulfilled to avoid negative effects on their growth [6]. Baby's sleep quality exerts an influence on baby's growth and development. When a baby is sleeping, brain cell repair occurs and growth hormone is produced [7]. Sleep has a great effect on mental, emotional, and physical health, as well as body's immune system [8]. Babies who lack sleep are more prone to grow with signs of intelligence disorders, such as difficulty concentrating, weak memory and loss of creativity. They will feel very anxious and have difficulty developing independence and self-confidence [9]. Baby's sleep quality can be seen from the way a baby sleeps, sleep comfort, and sleep pattern [10]. One problem mothers often encounter is that their babies have trouble falling a

sleep [11]. One of efforts to improve baby's sleep quality and quantity is giving a massage [12]. Massage can stimulate the production of endorphins, making possible to relieve pain, and thereby causing babies to calm down and their crying frequency to reduce. Clearly, massage leads to the improvement of baby's sleep quality and quantity [13]. Several hospitals in the US, China, Philippines, and Hong Kong have included baby massage in the baby health service [14]. Baby massage is believed to be a stimulus of touch which helps optimize baby's growth and development [15]. A research conducted by Field from Miami University of the US revealed that 30 minute massage a day can reduce depression and anxiety so babies sleep more peacefully. A 15 minute baby massage therapy for six weeks can increase the baby's alertness and reduce baby's crying. Such condition will be followed by an increase in baby's sleep duration, better psychological condition, a decline in stress hormone levels, and an increase in serotonin levels [16]. Baby massage should be given by parents, particularly to babies in the first of three years twice a day in a comfortable situation. It is regarded as parenting instead of therapy [17]. Giving baby a massage is a great fun and is simple to; it is a good way for mothers to express their affection, understanding, and attention [18]. Baby massage can relieve pain and other disease symptoms, increase relaxation, and calm crying babies, and therefore it enables babies to sleep tighter and longer [19]. The research problem is 'How is the effectiveness of baby massage on baby's sleep quality?'. According to theory, baby massage helps improve baby's sleep quality and quantity by the production of endorphins, making possible to relieve pain, and thereby causing babies to calm down and their crying frequency to reduce. The present research seeks to find out the effectiveness of baby massage on baby's sleep quality viewed from baby massage duration and frequency.

## II. METHOD

This research was conducted in Kadipiro subdistrict of Banjarsari district of Surakarta. It belongs to an experimental research with a quasi-experimental design an experimental design having a high level of precision. An experimental research is carried out to reveal the cause-effect relationship by involving control group in addition to randomly-selected experimental group [20]. The independent variable includes baby massage therapy, while the dependent variable covers baby's sleep quality. The research samples are 30 babies 3-6 month old with purposive sampling, inclusion criteria of 3-6 month old babies and exclusion criteria of sick babies. The research instrument includes an observation paper containing the observation of baby massage (frequency and duration), as well as baby's sleep quality (baby's day-night sleep duration). The analysis was carried out in two stages. Phase I is the normality test using the Kolmogorov Smirnov method

and homogeneity test using the Levene's test method. Phase II is the Influence Test used is Two Way Anava.

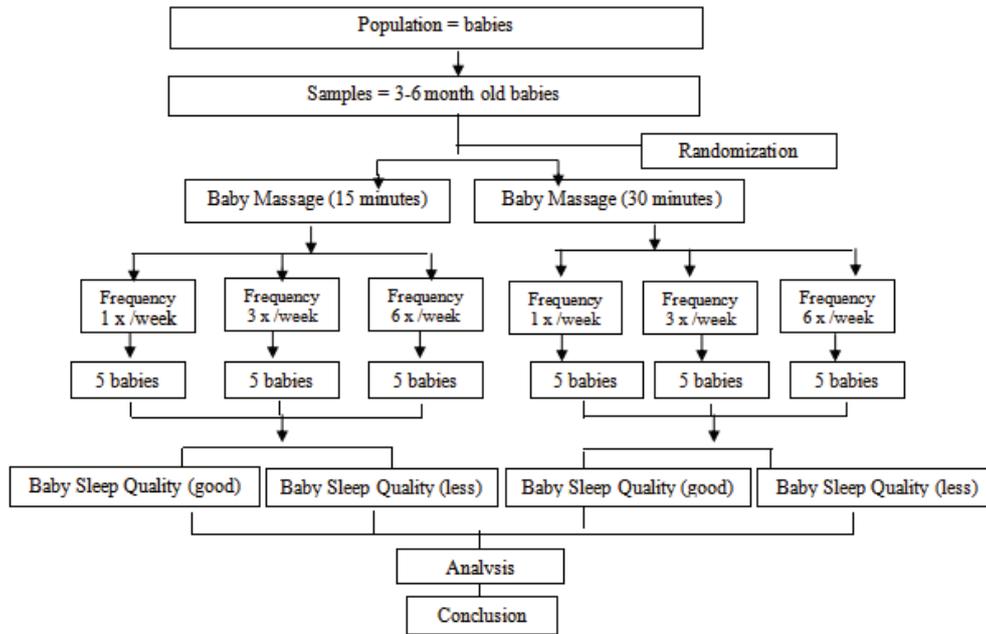


Figure 1. Research Flow Chart

Table 1. Description Baby Sleep Quality Based Baby Massage (Seen From Duration Time and Frequency Massage) and Population Normality Test Results

Duration Time	Frequency Massage	Information	Baby Sleep Quality (hour)	Significant Number	Conclusion	
15 minutes	1 x /week	Amount	68,56	0,425	Normal distribution	
		Average	13,71			
		Standard deviation	0,65			
	3 x /week	Amount	73,01			
		Average	14,60			
		Standard deviation	0,24			
	6 x /week	Amount	72,35			0,850
		Average	14,47			
		Standard deviation	0,24			
30 minutes	1 x /week	Amount	72,94	0,914	Normal distribution	
		Average	14,59			
		Standard deviation	0,23			
	3 x /week	Amount	70,31			0,805
		Average	14,06			
		Standard deviation	0,49			
	6 x /week	Amount	75,11			0,870
		Average	15,02			
		Standard deviation	0,09			

Table 2. Homogeneity Test Results

F	df1	df2	Sig.
1,864	5	24	0,138

Effectiveness of baby massage based on duration on baby sleep quality

Table 3. Summary of Analysis Variance For Baby Massage Therapy with Combination of Massage Duration

source of Variation	df	Sum of squares (SS)	Mean squares (MS)	F	p
A	2	0,651	0,651	4,653	0,041
Mistake	24	3,359	0,140		

Effectiveness of baby massage based on frequency on baby sleep quality

Table 4. Summary of Variance Analysis for Frequency Massage

source of Variation	df	Sum of squares (SS)	Mean squares (MS)	F	p
B	2	1,876	0,938	6,702	0,005
Mistake	24	3,359	0,140		

Interactions between duration and frequency of massage on baby sleep quality

Table 5. Summary of Variant Analysis Results for Two Factor

source of Variation	df	Sum of squares (SS)	Mean squares (MS)	F	p
Average treatment					
A	2	0,651	0,651	4,653	0,041
B	2	1,876	0,938	6,702	0,005
AB (interaction)	2	2,747	1,373	9,813	0,001
Mistake	24	3,359	0,140		
Amount	30	6238,65			

### III. RESULT

The results of the study show the normality test was carried out using the Kolmogorov Smirnov method, the results obtained are  $p > 0.05$ , concluded that the data for each group are normally distributed. The homogeneity test was carried out using the Levene's test method, the results obtained were  $p = 0.138 > 0.05$ , concluded that the two groups had the same variant. The homogeneity test was carried out using the Levene's test method, the results obtained were  $p = 0.138 > 0.05$ , concluded that the two groups had the same variant. The research results also reveal that there is a difference in baby's sleep quality based on massage frequency in a week (once, three times, and six times) with  $p = 0.005 < 0.05$ . The research demonstrates that there is a significant interaction between baby massage duration and frequency towards baby's sleep quality. It is proven by analysis results of variance of two factors ( $p = 0.001 < 0.05$ ).

#### A. Discussion

Based on the results of the study, babies given 30 minute massage have longer sleep duration (14.56 hours) than those given 15 minute massage (with average sleep duration of 14.26 hours). The fact shows that that longer massage duration is proven to be more effective in improving baby's sleep quality. Massage can increase the levels of serotonin which produce melatonin, a hormone which plays role in making sleep longer [18]. This statement is supported by Field's research indicating that 30 minute massage therapy a day can reduce depression and anxiety so

babies sleep more peacefully. A 15 minute massage therapy for six weeks for 1-3 month old babies enables to increase their alertness and reduce their crying [16]. Such condition will be followed by weight gain, better psychological condition, a decline in stress hormone levels, and an increase in serotonin levels [21]. The average sleep durations of one time massage, of three time massage, and of six time massage are 14.15 hours, 14.33 hours, and 14.75 hours, respectively. This finding indicates that the massage frequency increases baby's sleep quality; more frequencies lead to better baby's sleep quality. It is in accordance with a research conducted by Touch Research Institute of America showing that babies given 2x15 minute massage during 5 weeks can sleep tighter due to declining alpha wave and increasing both beta and theta waves [22]. Clearly, baby massage contributes to an increase in sleep pattern, tighter sleep, sufficient sleep, relaxation, and reduction of crying frequency [23]. Further test outlines difference in mean scores of the groups, as shown by table of multiple comparisons (15 groups are identified). There are 4 groups with significant difference and 11 groups with no significant difference. This proves that the combination of baby massage duration and frequency exerts an influence on baby's sleep quality. Research that has been done to premature babies, proves that massage is done for 15 minutes, 3 times a day for 5 days, every 15 minutes massage can improve sleep patterns, decrease fuss, anxiety and cry. Massage performed on premature babies before going to bed, the baby will fall asleep faster, sleep more soundly with sufficient sleep fulfilled. This proves that babies who get massage experience a decrease in snoring, improve sleep

quality and wakefulness [24]. Massage will increase the activity of the neurotransmitter serotonin, which increases the capacity of receptor cells that function to bind glucocorticoid (adrenaline, a stress hormone). This process will cause a decrease in the levels of adrenaline (stress) hormones. This decrease in stress hormone levels will increase the body's resistance, especially IgM and IgG [25].

#### IV. CONCLUSION

Concludes of this research, there is a significant interaction between massage duration and frequency towards baby's sleep quality. Baby massage was effective to improve the quality of baby sleep. Baby massage that is getting more frequent and long, can improve the quality of baby's sleep better.

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