

ORIGINAL ARTICLE

Difference in Sleep Quality Between Infants Aged 3-6 Months With Baduta Massage Stimulation and Infant Massage: Experiment Study

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ABSTRACT

Introduction: Infant massage is one of the non-pharmacological treatments for sleep issues. This study aimed to determine differences in the quality of sleep between infants aged 3-6 months with Baduta Massage Stimulation and Infant Massage at the East Jakarta Independent Midwife Practice. **Materials and methods:** This was a quantitative interventional/experimental study using two group pretest-post test design conducted from November 7 to November 28, 2022. The study samples were 140 infants aged 3-6 months recorded of age who were assigned into Intervention Group Baduta massage stimulation group consisted of 70 infants and Control group the Infant massage group consisted of 70 infants. The study samples were selected using nonprobability sampling with purposive sampling technique. Uji statisticians Wilcoxon, Uji Mann Witney dan uji Chi- Square. **Results:** The intervention group's sleep quality compared to the control group with a p value of <0.00) has the difference result where as many as 64 respondents (91.42%) within the intervention group had less sleep quality than in the control group as many as 68 respondents (97.14%). A relative risk score (RR) of 0.921 means that infants who received massage in the control group were 0.921 many times more likely to sleep quality than infants in the intervention group who were given Baduta massage stimulation. **Conclusion:** Babies who received massage in the control group had 0.921 times the likelihood of sleep quality than babies in the intervention group who were given Baduta massage stimulation. Baby massage and Baduta Massage Stimulation can improve the quality of children's sleep so that it can be used as a daily child care practice.

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Keywords: Massage, Stimulation, Midwife, Rural areas, Sleep quality, Non-pharmacological treatment, Infants aged 3-6 months, Independent midwife practice, Child care practice, Quantitative experimental study

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INTRODUCTION

According to the World Health Organization (WHO), It was found that roughly 33% of newborns experienced sleep issues (1). In Indonesia there are quite a lot of infants who experience sleep problems by around 44.2% like waking up a lot at night. Still, over 42.3% of parents believe that sleep disruptions in infants as not a problem (2). Poor quality sleep refers to certain symptoms of sleep disturbances namely sleep of less than nine hours at night, more than three awakenings,

more than an hour of waking, and the infant appears fussy all the time, crying and has difficulty to fall asleep. If such conditions often happen and become baby's sleeping habits, they will greatly affect the child's growth, both physically and psychologically. Currently, various therapies have been developed. Among the non-pharmaceuticals therapies to overcome baby sleep problems is infant massage. A baby's entire body should be massaged slowly and gently, beginning with the legs, then moving to the stomach, chest, face, hands, and back (3). However "Baduta Massage Stimulation is quite different which starts from the face, chest, stomach, hands, legs and back" (4).

In addition to enhancing sleep patterns, infant massage increase body weight (5). During the first few months of

life, one of the most challenging issues for parents and newborns was sleep disorders. An Israeli study found that two weeks of massage improved melatonin and sleep quality. Eye movements are inversely correlated with melatonin levels. This demonstrated that babies receiving massages would sleep through more restful, healing sleep (6). According to a study in Surabaya, baby massage had a major impact on the caliber of the baby's sleep (7 p. 30).

East Jakarta is in third place with the highest prevalence of malnutrition by 5.59% after Kepulauan Seribu and Central Jakarta. According to the Regulations of the Ministry of Health No. 21 of 2021 midwives are required to provide services that support infants born until the age of 2 (two) years old, including stimulation, early intervention and detection of growth development, which can be performed stimulation through stimulation massage (8 p.14). Massage stimulation for children under two years of age or 0-24 months (Baduta is a Indonesian term for children under two years old) is an activity to stimulate the ability of all aspects in basic development of the Baduta which includes stimulation of touch, motion, massage, hearing and sight by prioritizing a sense of comfort, safety, care and affection so as to encourage optimal development (9 p.4). Stimulation Massage for Children Under Two Years of Age (Baduta) is a guideline issued by the Ministry of Health as a reference for parents/families, cadres/community as well as healthcare workers in conducting safe, useful and accountable massage stimulation (9). Baduta massage stimulation is performed starting from the face, chest, stomach, arms, legs and back (4). Permenkes RI 1109/2007 A part of manual healing is massage (10 p.5). Midwives offer services to support babies up to the age of two years, including stimulation, detection, and early intervention of child growth and development, in compliance with Permenkes No. 21 of 2021 and Permenkes No. 28 of 2017. Massage stimulation is one type of stimulation that can be administered (8,11 p.13). The benefits of stimulation of Baduta Massage get direct attention from parents, as well as get multi-sensory stimulation (touch, pressure, hearing and vision). In addition, it helps to relax, make sleep better, lower stress hormones, help regulate the digestive system which affects weight gain and increases immunity (4).

Considering the outcomes of a preliminary research, it was discovered that there were 30 infants who had massages in one week. Based on interviews with four mothers who brought their infants for massage, they had complaints that their infants were often fussy and did not sleep well. Based on the background described, there has been no research comparing Baduta Massage Stimulation and Infant massages. Therefore, this study aimed to find the difference in quality of sleep between infants aged 3-6 months with baduta massage stimulation and infant massage at East Jakarta Private Practice Midwives.

MATERIALS AND METHODS

Research design

This was a quantitative interventional/experimental study using two group pretest-post test design. There are two groups that are randomly selected conducted from November 7 to November 28, 2022. The design used an intervention group and a control group. Where both the groups were given a pretest to determine the quality of sleep and after four times treatments in four weeks and afterwards they were given a post test. After Furthermore, the research subjects were given treatment in the form of Baduta massage stimulation and baby massage. After that, a posttest done after 4 times was carried out on the research subjects to be able to assess the level of sleep in infants after being given treatment. There were 3 criteria for sleep quality namely Moderate (56-75%), Poor (<56%), and Good (76-100%). Therefore, the results of A and B can be compared to be able to see the comparison of both pretest and posttest to research subjects. The mothers who participated in this study were those who had infants aged 3-6 months at two Private Practice Midwives namely Anny Rahardjo and Ros Budiman. The sample is obtained by hypothesis test with proportion difference test. Sample calculation using Lamesshow et.all formula. Sample technique using cluster random sampling. Baduta massage stimulation was a form of touch based on the baduta massage stimulation guidelines (children under 2 years old) issued by the Ministry of Health, This massage can be a reference for parents, health workers and the community in learning and implementing massage stimulation in children under two years old (baduta) (9). Baby massage is a form of child's massage touch based on the Certified Infant Massage Instructor (CIMI). The study's inclusion criteria were Intervention and control groups (1) All infants aged 3-6 months who were willing to do massage (2) All infants aged 3-6 months whose parents were willing to have their babies as respondents (3) Babies are born full term (4) Babies are not in a state of not being hungry (5) Safe and comfortable conditions in sleep Exclusion criteria (1) Infants with congenital abnormalities from birth (2) All infants aged 3-6 months who are ill (3) Infants who do not follow at least one of the series of interventions.

Data Collection

This data collection was carried out on babies three to six months old, the intervention group was carried out Baduta Massage Stimulation while the control group was completed Baby Massage with midwives certified CIMI (Certified Infant Massage Instructure) from IAIM (International Association of Infant Massage), for the procedure is clearly visible in Figure 1. The Baduta Massage Stimulation intervention group was carried out by competent (trained) midwives who had baby massage certificates. The Control Group was carried out by competent (trained) midwives and had CIMI baby massage certificates. Sleep quality was conducted

by the researcher interview method to parents using a questionnaire (BISQ) with the results of measuring the quality of sleep Good, Sufficient and Less. Baby massage procedure using SOP. The instrument used in this study was using the Brief Infant Sleep Questionnaire instrument (BISQ). Dr. Avi Sadeh developed BISQ initially, and it has been administered to over 150,000 babies and toddlers. Its original form has been revised and expanded upon, and it is now widely used in research worldwide. Age-based norm reference scores have been created. Currently, these standards are based on US data, with the intention of creating standards in other nations. This questionnaire has been validated (12). The sleep quality questionnaire adopts from a previous study by Sendi (13) entitled Differences in the Effects of Mozart's Classical Music and Baby Massage on Infants' Body Weight and Sleep Quality, Ages 3-6 Months which have been put through reliability and validity tests. Study information was obtained by interviews utilizing a sleep quality questionnaire among mothers who had infants who came for massage. The research protocol used the SOPs for Infant Massage techniques by Baduta Massage Stimulation and Infant Massage. This questionnaire is used for retrospectives with parents/caregivers. Apart from the length of sleep, we looked at questions about BISQ related to the latency of sleep "How much time does it take to tuck your infant into bed? at night?" and continuity of sleep "How long does your baby stay awake after going to sleep?" at night until waking up the next morning?" and "How much does your child wake up on average per night?" used the Guttman scale For positive statements when answered yes the value is 1 and for not the value is 0, while for negative statements when answered yes the value is 0 and the answer is not 1. This BISQ questionnaire has 33 questions. Instrument was filled in during the pre-test before the infant massage and the a post-test was administered four times of Baby massage. There were 3 criteria for sleep quality namely Moderate (56-75%), Poor (<56%), and Good (76-100%). The researcher gave the treatment four times once a week both in the intervention group and the control group for a long time, massage each group took every 30 minutes.

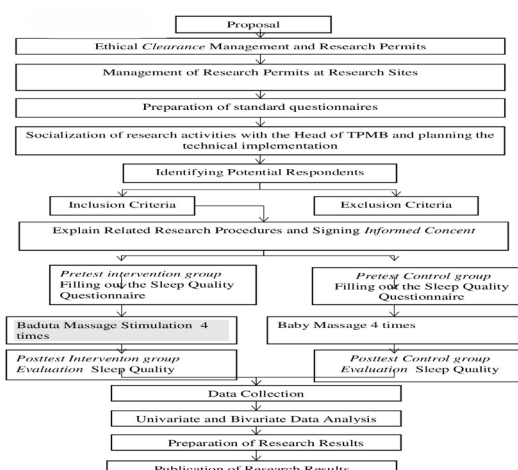


Figure 1: Research Flow

Samples

The study samples of 140 infants were assigned in both in the control group and the intervention group, with 70 samples in each group. Inclusion criteria were: (1) All newborns (3–6 months) who came for massage; (2) All newborns 3-6 month-old whose parents were ready to give their infants became respondents; (3) The babies were delivered at full term; (4) The babies slept with the mother and were not feeling peckish; (5) The infants were safe and comfortable in sleep conversely, though, the exclusion standards: (1) Infants with congenital abnormalities; (2) Every baby, three to six months old who were ill; (3) Infants who did not take part in one or more of the intervention programs. The sampling method applied was sampling without probability using purposive sampling technique. The Independent Variable was Baduta Massage Stimulation and the quality of sleep was the dependent variable.

Statistical analysis

Univariate and Bivariate data analysis applied the Wilcoxon, Mann Whitney test and Chi- Square. Confounding factors included the mother's age, gender, level of education, and employment, sleeping position, how to fall asleep.

Ethical Clearance

The Faculty of Medicine's Research Ethics Committee gave its approval for this study Padjadjaran University No: 115/1/UN6.KEP/EC/2022.

RESULTS

Characteristics of Respondents

The results of the homogeneity test in the table above demonstrated that there was no variation in the gender and maternal employment status between the two group ($p > 0.05$). Thus, it can be said that the variance of the two groups was the same or homogeneous so it was worth comparing.

Considering the Table I as can be observed, in the Stimulation Massage Baduta group, the majority of respondents were female (58.6%), aged 3 months (55.7%), maternal education level was SHS (52.9%) and the mothers were employed (91.4%). Whereas for the infant Massage group, the majority of respondents were male (64.3%), aged 3 months (55.7%), maternal education level was higher education (77.2%), and the mothers were employed (61.4%). Furthermore, There weren't any variation between the both groups regarding age of the baby and maternal employment status, while there were differences in gender and maternal education level.

Table I: Characteristics of Respondents

Characteristics of Respondents	Baduta Massage Stimulation		Infant Massage		P value
	N	Percentage	N	Percentage	
Age					
3 Months	39	55.7	39	55.7	0,000
4 Months	12	17.1	22	31.4	
5 Months	7	10	9	12.9	
6 Months	12	17.1			
Gender					
Male	29	41.4	45	64.3	0,180
Female	41	58.6	25	35.7	
Maternal Education Level					
Elementary-JHS	0	0	0	0	0,000
SHS	37	52.9	16	22.9	
Higher Education	33	47.2	54	77.2	
Maternal Employment Status					
Employed	64	91.4	43	61.4	0,306
Unemployed	6	8.6	27	38.6	

*Levene's test

Infant sleep quality before and after Baduta Massage Stimulation dan Infant Massage

Considering the Table II, it demonstrates that the caliber of sleep before the Baduta massage stimulation is good. Sleep quality is good 25.7%, moderate 17.1%, poor 57.1%. Following the Baduta massage stimulation, the baby's sleep quality was Good 97.14%, Moderate 2.86%. The infant's sleep quality prior to the baby massage was good 7.1%, moderate 10%, poor 82.9% and the caliber of sleep following the massage was good

91.4%, Moderate 8.6%.

Table II: Distribution of Infant sleep quality before and after Baduta Massage Stimulation dan Infant Massage

Sleep Quality	Pretest-Baduta Massage Stimulation		Posttest Baduta Massage Stimulation		Pretest Infant Massage		Posttest Infant Massage	
	n	%	n	%	n	%	n	%
Good	18	25.7	68	97.14	5	7.1	64	91.4
Moderate	12	17.1	2	2.86	7	10	6	8.6
Poor	40	57.1	-		58	82.9	-	
Sleep Position								
Prone position	20	28.6	13	18.6	8	11.4	8	11.4
Side position	18	25.7	15	21.4	24	34.3	18	25.7
Supine position	32	45.7	42	60	38	54.3	44	62.9
Way to Fall Asleep								
Fall asleep while being breastfed	27	38.6	32	45.7	20	28.6	33	47.1
Fall asleep alone in bed	8	11.4	8	11.4	27	38.6	9	12.9
Fall asleep when rocked	10	14.3	11	15.7	7	10	21	30
Asleep in mother's arm	25	35.7	19	27.1	16	22.9	7	10

Characteristics of Sleep

Based on Table III, in the Baduta massage stimulation group, most of respondents (87.14%) slept in the same bed with their parents, required time by the infant to slumber was 21.11 minutes, time needed to make the baby fall asleep was 40 minutes, number of awakening per night was 3-4 times, awake duration was 32.71 minutes, total sleep duration was 13,90 hours and 94.28% parents considered the child's sleep to be no problem. On the other hand, in the Baby massage group, most infants slept with their parents (68.57%), required time by the infant to slumber was 19.10 minutes, time needed to make the baby fall asleep was 33 minutes, number of awakening per night was 2-3 times, awake duration was 29.64 minutes, total sleep duration was 14.26 hours and 91.42% parents considered the child's sleep to be no problem.

Table III: Characteristics of Sleep

Characteristics of Sleep	Group	
	Baduta Massage Stimulation	Infant Massage
Sleep settings, n (%)		
In a separated room	1 (1.42)	2 (2.86)
In his own bed	4 (5.72)	11 (15.71)
In the parents' room	4 (5.72)	9 (12.86)
The same bed with parents	61 (87.14)	48 (68.57)
In his own bed in the same room as another sibling	0	0
Time needed by the baby to fall asleep; Mean (minute)	21.11	19.10
(min-max)	10.00- 30.00	15.00-45.00
Time needed to make the baby fall asleep; Mean (minute)	40.21	33.21

CONTINUE

Table III: Characteristics of Sleep

Characteristics of Sleep	Group	
	Baduta Massage Stimulation	Infant Massage
Sleep settings, n (%)		
(min-max)	10.00-70.00	30.00-60.00
Number of awakening per night; Means; Mean	3.64	2.74
(min-max)	3-4	2-3
Awake duration; Mean (minute);	32.71	29.64
(min-max)	10.00-40.00	5-35
Night sleep duration; Mean (hour);	11,71	12,27
(min-max)	(8-14)	(12-15)
Nap duration; Mean (hour);	1,70	1,99
(min-max)	(1-5)	(1-2)
Total sleep duration ; Mean (hour)	13,90	14,26
Do parents assess child's sleep as a problem? n (%)		
Very serious problem	0	0
Moderate problem	1 (1.42)	2 (2.85)
Non serious problem	3 (4.28)	4 (5.71)
No problem at all	66 (94.28)	64 (91.42)

Differences in the Characteristics on Sleep Quality in the Infant Massage Group

Table IV showed that there was no differences in age, employment status, gender and sleeping position on sleep quality after infant massage.

	Sleep Quality									
	Pre-test					Post-test				
	G	%	M	P	%	P value*	G	%	M	RR
Age										
3 months	5	12.8	4	10.3	30	42.9	33	47.1	6	8.6
4 months	0	0	0	22	31.4	0	22	31.4	0	0
5 months	0	0	3	4.3	6	8.6	9	12.9	0	0
Education										
SHS	5	7.1	4	5.7	45	64.3	48	68.6	6	11.1
University	0	0	3	4.3	13	18.6	16	22.9	0	0
Employment Status										
Employed	3	4.3	3	4.3	39	55.7	39	55.7	6	8.6
Unemployed	2	2.9	4	5.7	19	27.1	25	35.7	0	0
Gender										
Male	2	2.9	7	10	36	51.4	39	55.7	6	8.6
Female	3	4.3	0	22	31.4	0	25	35.7	0	0

Information: *) Fisher's Exact Test
**) Pearson Chi-Square

Differences in the Quality of Sleep in Both Groups Before and After the Intervention

Based on Table V, the average pretest quality of sleep score amid the control group and the intervention group ($p = 0.040$) so that there was a significant difference because of the p value >0.05 . There were significant differences in the average posttest sleep quality ratings comparing the control group and the intervention group ($p < 0.000$), the average pretest and posttest sleep quality scores in the group that provided intervention ($p < 0.000$), the average pretest and posttest sleep quality scores in the control group ($p < 0.000$), and the increase in the average pretest and posttest sleep quality scores in the intervention group and the control group ($p < 0.005$) due to $p < 0.05$ values. The average increase in sleep quality score of the intervention group given Baduta stimulation through questionnaires after infant massage was 10.7 (22.49%) lower than the a rise in the mean sleep quality score of the intervention group given Baduta stimulation through questionnaires after baby massage by 13.8 (29.58%).

Table V: Differences in the Sleep Quality Before and After Intervention in Both Groups

Sleep Quality		Group		Value p
		Baduta Massage Stimulation (n=70)	Infant Massage (n=70)	
Pre-test	Mean (SD)	2.31 (.86)	2.76 (.57)	0,040*
	Median	3.00	3.00	
	Range	2.00 (12-40)	2.00	
Post-test	Mean (SD)	1.0286 (.17)	1.08 (.28)	0,003*
	Median	1.00	1.00	
	Range	1.00	1.00	
P value		.000*	.000*	
Selisih Post-Pre	Mean	1,28(0,69)	1,68(0,29)	0,147**
	Median	2	2	
	Range	1(0-28)	1(0-7)	
Percentage Increase (Mean)		22,49%	29,58%	

Information :*) Wilcoxon test **) Uji Mann Whitney

Effect of Posttest Sleep Quality between the two groups Table VI shows a notable variation in the intervention group's sleep quality compared to the control group with a p value of <0.00 where as many as 64 respondents (91.42%) within the intervention group had less sleep quality than in the control group as many as 68 respondents (97.14%). A relative risk value (RR) of 0.921 means that babies who received massage in the control group were 0.921 many times more likely to sleep quality than infants in the intervention group who were given Baduta massage stimulation.

Table VI: Effect of Posttest Sleep Quality between the two groups

Group	Sleep Quality				Total		Value p*	RR
	Good		Enough					
	N	%	N	%	n	%		
Intervention	64	91,42	6	0,857	70	100,0	0,000	0,912 (0,847
Control	68	97.14	2	0.285	70	100.0		-0,982)

DISCUSSION

Characteristics of the respondents in this study included age, gender, maternal education level, maternal employment status for both groups under study. The outcomes demonstrated that there was no variation in the confounding factors of age, gender, maternal education, and maternal occupation between the Baduta Massage Stimulation group and the Infant Massage group. Thus, there was no difference in the confounding factors on sleep quality. In all, 493 kids were involved in the research “153 children (31%) experienced sleep disturbances, 79 children (16%) slept for less than nine hours at night, 62 children (12.8%) slept for more than three times at night, and 20 children (4%) stayed awake for more than an hour at night” (14 p.31).

The study's findings demonstrated that most of infants who received Baduta Massage Stimulation were female, while most of respondents who received Baby massage were male. It is also in accordance with a study conducted in Puskesmas II Sukowati that the vast majority of infants massaged were as numerous men as 17 people (56.7%) and less than half of respondents were female as many as 13 people (43.3%) (15 p.31). According a study in Italia, there was no significant effect between sleep patterns and the infant's gender. As stated earlier, baby boys are considered more restless than baby girls (16, 17). Factors influencing the length and development of sleep cycles and wakefulness include full-term or premature birth, the sex of girls active sleep periods longer than boys (18).

Sleep periods at night among infants boys suggests that during the initial half-year of life, the evolution of normal sleep rhythms in baby boys is postponed in contrast to to baby girls (19). Longer sleep duration in women suggests sex hormones affect sleep physiology (20). The new survey reports that women prefer to sleep longer than men regardless of age, suggesting that kind of sexual differences are not dependent on gonadal function. It has been demonstrated that gonadal hormone administration in adult animals does not significantly alter sleep patterns or highlight gender differences in sleep habits (21). Compared to men, women prefer to sleep longer and go to bed earlier (22), shorter sleep periods at night in baby boys and suggest that, during the first six months of age, the development of normal sleep In comparison to females, male rhythms are delayed. to infant girls (19). Our discovery that female infants seem

to sleep more soundly than male infants is in line with earlier studies showing increased sleep disturbances in male infants compared to female infants; in particular, mothers' perceptions of their infants' sleep patterns include greater nighttime awakenings and problematic crying in male infants (16, 17).

By age characteristic in this study, most of infants who were massaged by both the Baduta Massage Stimulation and Baby massages aged 3 months. According to a study conducted in Puskesmas Karang “the baby is no longer physically too weak to be massaged at the age of three to six months” (23 p.114). Since infants sleep a lot, the three to six month age range is a good time to establish sleep patterns because a baby's sleep duration will gradually decline each month. Babies at months 3 and 4 easily control their sleeping and drinking patterns, but the fine touch technique changes after six months (22).

Furthermore, regarding maternal employment stays characteristic, it was found that the majority of mothers were employed. Working mothers have the knowledge and income so they can bring their children for massages. The theory reveals that working mothers can supplement family income to meet needs, including for health costs. Education affects the level of maternal knowledge and ability to manage the information received. Basically, the greater the degree of one's knowledge, the simpler it is to receive details (25).

The study findings in the Baduta Massage Stimulation group showed that 52.1% had good sleep quality, 6.4% had moderate sleep quality and 27.1% had poor sleep quality. Meanwhile in the non-MoH infant massage, 62.1% had good sleep quality, 10.7% had moderate sleep quality and 27.1% had poor sleep quality. Such findings are in accordance with a study conducted in Puskesmas II Sukowati that in the control group during the pre-test, 60% had good sleep quality, 33.3% had moderate sleep quality and 6.7% had poor sleep quality, and during the post-test, 53.3% had good sleep quality, 40% had moderate sleep quality and 6.7% had poor sleep quality. On the other hand in the treatment group during the pre-test, 20% had good sleep quality, 66.6% had moderate sleep quality and 13.4% had poor sleep quality (15 p.29). A previous study found that infant massage could improve the caliber of sleep and improve awful and fine motor learning. In addition, routine infant massage performed before going to bed could eliminate sleep disturbances (26).

The study finding is similar to a study conducted by Tang that infant massage had a substantial impact on the quality of sleep for babies between the ages of 1-4 months.. In such study “the sleep quality among infants after massage increased, from 6.7 poor sleep quality, 60% moderate sleep quality and 33.3% good prior to receiving a massage, the quality of sleep 0% of poor sleep quality, 26.7% moderate sleep quality and 73.3%

good sleep quality after massage" (27 p.15).

The result of this study are reinforced by the result of a study conducted by Pratiwi that at Kiddie Mom and Baby "massage had an impact on the quality of sleep for infants aged one to six months. Care (p value = 0.000)" (1 p.4). The study's findings demonstrated that the mean number of awakening per night was 3-4 times, the mean night sleep duration was 7 hours 11 minutes. Based on the mean value of night sleep before Baduta Massage Stimulation and infant massages, the sleep duration was less than the optimal sleep needs. Such condition might affects growth and development because 75% of growth hormone will be released when the baby is sleeping. Poor sleep can cause imbalance problems that are both psychological and physiological. The physiological effects include a reduction in daily activity, feeling tired, weak, and diminished stamina, but psychological impacts include more unstable emotions, anxiety, lack of concentration, lower cognitive and experience incorporation abilities. Infants with sufficient sleep will be fir and not fussy when they wake up and also have optimal growth and development.

The mean duration of sleep before the Baduta massage stimulation was 11 hours/day to 13 hours/day, while before the infant massage (CIMI) it was 12 hours to 14 hours/day, which indicated an increase. According to the study conducted by Akib in 2018 "it was shown that babies before and after 3x/week massage in 1 week had the mean quantity of sleep of 12.52 hours/day and 14.43 hours/day respectively " (28 p.1). In accordance with research in "Ponorogo Effectively reducing the frequency and length of awakenings" baby massage also improved bonding attachment and sleep duration (29 p.1). Since newborns typically sleep between 14 and 17 hours, infants typically sleep between 12 and 15 hours, and toddlers typically sleep between 11 and 14 hours, any sleep duration of less than nine hours is considered a sleep problem (14 p.31).

The gentle touch of massage in babies helps reduce the tension of the baby's muscles so that a feeling of comfort and relaxation arises. In addition, longer sleep duration is triggered by the release of when you massage a baby, you release endorphins and oxytocin. Endorphins are a hormone to relieve pain and relieve discomfort, while oxytocin functions to reduce stress levels in the brain so that babies become calm and comfortable and sleep quality increases (30). When babies received massage therapy for two weeks, they slept better and had fewer wakeful nights (31).

The results of the study indicated that the mean duration of awake period at night was 32.71 minutes and 87.14% of the children shared a bed with their parents. The duration of awake period while how parents treat their children affects how well they sleep at night baby (12,32,33). Infant who doesn't sleep with their parents

in the same bed will have a shorter duration of awake. Many studies showed that sleeping in the same bed with parents (bed sharing) can put infants at risk of squeezing and choking. Co-sleeping is when parents put their infant in a separate bed but remain in the same room (12,34).

According to research in Ponorogo Jawa Timur Effectively reducing the frequency and length of awakenings "baby massage also improved bonding attachment and sleep duration" (29 p.171). The study finding showed that 38.57% of infants fell asleep while being breastfed. Similar finding was also found that 56.1% of infants slept when their mothers hugged and breastfed them. Such finding supports the notion that parental intervention can affect the baby's condition when he starts sleeping (32). After receiving massage therapy for two weeks, babies' sleep improved and they slept through fewer nights (26).

The study's findings demonstrated that 55.71 % of infants in the Baduta Massage Stimulation group fell asleep in supine position. The recommended sleeping position is supine because it does not increase the risk of aspiration or choking, particularly for infants aged less than one year. Sleeping on the side or in prone position is not recommended for children because of certain risks (35).

The study's findings demonstrated that the mean time to fall asleep was 19.00 WIB, and 196 children (39.8%) started sleeping at 18.00-19.00 (14 p.32). Additionally, baby massage improved how well term infants' circadian rhythms adjusted to their nocturnal sleep schedule (32). A regular bedtime can be used by parents to manage their child's bedtime (36). A study conducted by Francesca in 2021 among Parents stated that it required a mean time of 1.42 (SD = 1.88) hours to put their babies to sleep at night. A mean of 8.90 hours (SD = 1.44, min = 1, max = 12) at night and 2.69 hours (SD = 1.93, min = 1, max = 11) at noon were reported for the children. The majority of parents (82.4%) didn't think there was a problem with their kids' sleep. Approximately 60% of newborns slept in their parents' room, and 52.3% of them dozed off in bed close to their parents. Sleeping positions and the way to fall asleep varied among children (37).

Moreover, the study finding revealed that 94.28% of parents in the Stimulation massage group considered that the child's sleep was no problem and 5.7% considered it a problem. Nonetheless, an Indian study revealed that sleep issues were more prevalent, namely up to 10.5% among under-five children (38). However, a recent study conducted in Nepal revealed a higher prevalence of up to 19.6%, with only 5.6% of parents believing their child was experiencing sleep issues (39).

This study is consistent with Tang who demonstrated that there was a notable difference between baby massage

and infant sleep quality ($p = 0.003$) (27 p.12). According to Kamariah, 2023 Infant massage is a useful tool for enhancing the quality of sleep for infants three to six months old (40 p.11). Baby massage provides a stimulus in motor development because squeezing movements can be useful for strengthening the baby's muscles (41). Infant massage can enhance the quality of sleep as well as the development of fine and gross motor skills. Baby massage routine done before bed will eliminate sleep disorders (42). This stimulus causes the parasympathetic nervous system to become active, especially the most active role in the sleep process, namely the areas in the parasympathetic autonomic nerve nuclei rafe and the nucleus tractus solitarius, which are medulla and pons sensory regions that allow visceral sensory signals to reach the brain through the vagus nerve and glossarynx, which ultimately cause sleep states (3, 43). Babies will feel cozy and drowsy when their muscles are stimulated by massage. The majority of babies will continue to sleep after the massage. Not only does the baby appear to be sleeping through the night, but he also appears to be calmer than he was before the massage. The baby will be well-rested when he wakes up from sleep, which will support his ability to focus and function neurologically (44 p.67).

Considering how crucial sleep is to a baby's development, it is imperative that the baby's need for sleep be properly satisfied in order to prevent any negative effects on its growth (45 p.112). Babies who get massage regularly will they get a good night's sleep, and when they wake up, they have greater focus (45 p.111). For instance, when tested later at the age of five, children who regularly slept for shorter periods of time had less vocabulary knowledge (46).

The results obtained from 10 respondents before the administration of massage showed that the baby was fussy, had trouble sleeping, often woke up at night, and the mean quality of the respondent's sleep duration was 11 hours/day. On the other hand after the massage, there was a notable distinction. where the babies became relaxed and fit when they woke up and not fussy, showed a good coping with stomach aches and good bond of affection between a mother and her child, and showed sleep quality improvement from eleven to fifteen hours per day.

As per a study that was carried out in Portugis Compared to infants in the non-massage group, those in the massage group exhibited more regular sleep cycles (47). The study's findings are consistent with previous research in Sro Paulo Brazil on 11 healthy infants in Brazil received a 15-minute massage, which changed the amount of cortisol in their saliva, which indicates possible changes in the stress system that is the hypothalamic-pituitary-adrenal axis (48). A massage can raise serotonin levels,

which in turn generate melatonin, a hormone that contributes to longer sleep. (49).

Massage stimulation is one of the manual technical skills that effectively affects the nervous system, immunity and hormones. A stimulating massage will make you feel more at ease, help you cope with stress, worry, and pain, and boost your immune system. Additionally, improved food absorption, weight gain, and gastrointestinal function are all impacted by massage stimulation. Furthermore, higher growth hormone levels will promote the best possible development and proliferation of brain cells (9 p.7).

In light of the research finding, it can be no concluded that Baby Massage (CIMI) could better improve the quality of sleep compared to Baduta Massage Stimulation since baby massage starts from the baby's legs, stomach, chest, hands, face and finally the back. Baduta Massage Stimulation can be done sequentially, depending on the infant's comfort. It is better if the massage starts from the facial area as the initial interaction between the child and the masseuse. For full-term infants and under-five children, massage stimulation is done on the face, chest, stomach, arms, legs and back and can be terminated prior to the completion of every series if the child shows discomfort (9 p.13). The main targets of the Ministry of Health Massage are parents/families, cadres/community, and finally healthcare workers. In this study, massage was performed by midwives for babies aged 3 months who already knew their mothers, and this made babies cried.

In general, massage should start from the infant's legs since they are more receptive to give the leg region a massage. By doing this, you can give the baby some time to become accustomed to the massage before moving on to other areas. As a result, when massaging an infant, begin with the legs and work your way up to the stomach, chest, arms, face, and back. Each movement at certain stage of the massage can be repeated up to six times (50).

Such technique makes the baby calm, relaxed and comfortable so that the whole massage can be performed. A calm and relaxed state causes brain waves to slow down which eventually allows a person to rest and fall asleep. Alpha waves are reduced and beta theta waves are increased as a result of the brain wave changes, which have a significant impact on the sleep process (3). Baduta Massage Stimulation massage starts from the face, chest, stomach, hands, legs and finally the back. If the baby's face is held, he or she will immediately cry so the baby cannot be relaxed and feels uncomfortable, so the sleep is not too long compared to Infant massage (CIMI). Besides that, Infant massage technique (CIMI) is considered more complete. Infant massage technique (CIMI) consists of pressing the soles of the feet, around

the back, the letter C on the feet, small presses on the circles of the hands and feet which are not available in Baduta Massage Stimulation.

Limitation of the study this study uses an experimental design with subjects limited to infants aged 3-6 months, so it is necessary to conduct trials on a wider range of subjects/groups such as children up to 5 years old in East Jakarta. Without using actigraphy or other objective methods to measure infant and toddler sleep, this study is based on parent reports. In addition, there are other variables that are not controlled, such as sleep environment, or diet, that can affect sleep quality.

It is hoped that the results of this study will provide a better understanding of the effectiveness of baby massage and baduta massage stimulation in improving the sleep quality of children at different ages, so that it can be used as a reference in daily child care practices.

CONCLUSION

In summary, there was difference in the sleep quality of the intervention group and control group. A relative risk score (RR) of 0.921 means that infants who received massage in the control group were 0.921 times more likely to sleep quality than infants in the intervention group who were given Baduta massage stimulation.

Future research is expected to be able to apply qualitative methodology to support quantitative results, especially regarding the level of sleep quality and parents' responses to interventions using infant massage and apply new variables such as the benefits of massage therapy before bed on sleep disorders, the caliber of a mother's sleep and the baby's bedtime routine including bathing. Such variables are intended to support explanation regarding any particular aspect of the bedtime routine which leads to more or less sleep.

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