The Relationship between Baby Massage and Increasing Weight

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Abstract

To prevent infant mortality due to preterm birth, integrated, standardized infant care is needed, one of which is baby massage. Some of the benefits of baby massage include: helping the baby relax, increasing the baby's immunity, increasing the bonding between the mother and their baby, helping the baby sleep soundly. This study aims to analyze the relationship between massage and the increasing weight of the baby with preterm birth in the district of Aceh Besar, Indonesia. A Quasi-experimental study was conducted in the District of Aceh Besar. The total sample was 72 babies, 36 were intervention group and 36 were non-intervention group. The intervention group made the babies massage three times per week for one month (12 times) during the study, and non-intervention was not massage. The bivariate analysis results with the independent T-test to know the relationship between baby massage and weight gain showed that the average weight gain of the baby who received massage for one month was 588 grams and a standard deviation was 60 grams. Meanwhile, the average increase in weight gains the babies who did not receive massage was 484 grams, and the standard deviation was 45 grams. The statistical test results showed a P-value of 0.000, meaning in 5% alpha, there was a significant difference between the increase in the weight gain between those who got a massage with those who did not get a massage. This study concluded there was a relationship between massage to increasing the weight of babies with preterm birth.

Introduction

Generally, the under-five mortality rate in 2018 was 5.3 million, and 2.5 million of these deaths (46%) occurred during the neonatal period (WHO, 2019). In general, most neonatal deaths (75%) occur in the first week of life, and around one million deaths occur in the first 24 hours after birth. Some of the causes of neonatal death include premature birth, intrapartum complications (asphyxia), infections, and birth defects (WHO, 2019). The majority of these deaths (80%) are caused by low birth weight (LBW), and two-thirds of the LBW deaths are premature (WHO, 2019). Preterm birth are babies born before 37 weeks of gestational age and more than 60% of preterm births occur in Africa and South Asia. The ten countries in the world with the highest number of preterm birth were: Malawi, Comoros, Congo, Zimbabwe, Equatorial Guinea, Mozambique, Gabon, Pakistan, Mauritania, and Indonesia. The prevalence rate of preterm birth in Indonesia was 15.5% (WHO, 2018).

Some of the risk factors and causes of preterm birth are: a history of previous preterm birth, multiple pregnancies, the interval of pregnancy less than six months from the last birth, a mother is a smoker and uses drugs (Mayo clinic, 2019), under nutrition pregnancy, maternal age

<20 years or > 35 years (CDC, 2019) and a mother with second-hand smoke during pregnancy (Miko, 2017). Besides the risk of experiencing death, especially during the neonatal period, preterm birth babies are also at risk for respiratory problems, difficulty breastfeeding, cerebral palsy, slow-growing vision problems, and hearing problems (Satrinawati, 2014).

To prevent neonatal mortality due to preterm birth, integrated and standardized care is needed. WHO and UNICEF have recommended standard care for newborns with abnormalities, including preterm babies. Besides getting essential newborn care like other newborn babies, preterm babies must also get special newborn care, including thermally assisted feeding, prevention of apnoea, prevent infection, and referral management (WHO, 2019).

The experience in several countries shows that proper care of preterm babies would reduce the risk of death and illness and increases the baby's chances of survival. In Indonesia, the Indonesian Ministry of Health recommended several essential treatments for preterm babies, namely exclusive of breastfeeding, maintained the thermal of babies, hygienic umbilical cord cutting, early detection and fast action against infections and complications, regularly kangaroo care, and infant massage (Depkes RI, 2019).

Infant massage is a gentle massage given to the babies regularly by families or by trained people. Some of the benefits of infant massage include: helping the baby relax, increasing the baby's immunity, increasing the bonding between the mother and their baby, allowing the baby to sleep soundly (Mayo Clinic, 2020). For preterm babies, infant massage is believed to accelerate the increase the weight (lee, 2006 & Field 2018).

Although in Indonesia, Infant massage has been done and known since a long time ago, the principle is different. Traditionally massage is associated with the massage which is done by a shaman (paraji; Indonesia term) who performs massage to cure illnesses.

Often for this purpose, massage to the infant still doing even when the baby is crying (the people thought due to illness). Meanwhile, stimulation of infant massage is a form of stimulation that must be done in pleasant conditions and can be done simultaneously with other stimulation (music, sound, visual, etc.), who performed by parents, health workers, or other family members. The infant massage depending on the baby's response. If the baby is not comfortable with the massage, then we should not force it (IDAI, 2014).

There was no available data related to the number of coverage of infant massage for preterm care babies in Indonesia, including in Aceh Province. This is because infant massage has not become a guideline or standard care for preterm babies. Resulting in the promotion of infant massages carried out by health workers in the community was not optimal. In addition, the lack of community knowledge related to the benefits and methods of infant massage is also the reason why this care is not well known. This study purpose of analyzing the relationship between massage and increasing weight of the baby's with preterm birth in the district of Aceh Besar, Indonesia

Materials and Methods

Design

This study was quasi-experimental with non-equivalent group design use for this study method.

Study site

The study was conducted in the district of Aceh Besar, Aceh Province, Indonesia

Population and sample

The population of this study was all babies with preterm birth who were born between 2018 to 2019 in the district of Aceh Besar. The sample of this study was babies who were 1-2 months old when the study was conducted (July 2018 – April 2019).

Variables

A variable observed or measured is the changes in body weight of babies (with preterm birth history) for a month. The groups that measure were those who received regular infant massages (intervention group) and those who did not receive massages or did not regularly (non-intervention group).

Inclusion and exclusion criteria

The inclusion criteria were: the baby weight > 1500 grams when the study has begun, single /non-twins, no congenital defects, and the babies healthy and active. The exclusion criteria were: babies with a history of

hospitalization for more than ten days after delivery or during the neonatal period. Dropout sample because the family did not allow the baby to be the subject of the study for various reasons, the baby was sick > 4 days (it would not do massage two times in a row).

Sample size

The sample size calculation uses a probability sampling method with cluster sampling, because the district of Aceh Besar was vast, and some areas were difficult to reach. Total sample for this study was 72. The sample was divided into two groups: the intervention group (36 babies) and the non-intervention group (36 babies).

Instruments

Questionnaire, checklist for increasing baby weight, olive oil for massage, baby weight scales, and block notes.

Procedures

The procedure in this study was babies (preterm birth history) aged 1-2 months. Furthermore, the babies were divided into two groups, namely the intervention and non-intervention groups. The intervention group made the baby massage three times per week for one month (12 times). The intervention started when the enumerator and the researcher came to the baby's house to ask the family to allow for participation in the study and signed the informed consent. If the family is willing, then on that day, the informed consent was signed by the parents, filling out a questionnaire

Meanwhile, in the non-intervention group, the babies only weighed without massage. When they first met, the enumerators asked the parents' willingness to fill out informed consent, questionnaires, and infant weighing. The enumerator would come again after four weeks for second weighing. The enumerators in this study were midwives who served at the community health center where was the babies live and trained for infant massage.

The dependent variable of this study was the change of baby weight (grams) since the study started until one month later, and the independent variable was infant massage. The independent variable was divided into two groups, i.e., the intervention group was the babies who massaged 12 times during the study, and the non-intervention group was the babies who did not massage during the study.

Data Analysis

The analysis of this study was descriptive analysis and bivariate analysis with the independent T-test

Results and Discussion

Descriptive Analysis

The descriptive analysis was divided into three groups: characteristics of babies, mothers, and fathers. Based on the univariate analysis of babies, most babies were born in the hospital, and there were 42 babies (58.3%). Most of the samples were delivered by cesarean delivery (42 infants or 58.3%). Then, most babies were born weighing $\geq$ 1500 grams, and there were 64 babies or 88.9%. Generally, 42 babies or 58.3%, were assisted by obstetricians when the birth. Then, most of the babies were male (42 infants or 58.3%). On the characteristics of early initiation of breastfeeding, the majority of babies did not receive it, namely 48 babies or 66.7%, and most of them did not receive exclusive of breastfeeding or full breast milk (they had been given complimentary or substitute foods), there were 46 infants or 63.9%

In the characteristics of mothers, found that the majority of mothers were aged between 20-35 years, namely 50 mothers (69.4%). On the education level, most of the mothers' study until high school (middle level of education), there were 21 mothers or 58%. Generally, mothers who were respondents in this study were housewives (42 mothers or 58.3%). On the characteristics of parity, most of the mothers were multiparty (37 mothers or 51.4%). The majority of the baby, the sample of this study were the second to fourth babies of their mother. Around 79% (57 of mothers) were housewives. Table 2 will describe the characteristics of mothers in this study. On the fathers' characteristics, most fathers aged between 26-39 years old (47 persons or 65.3%). In terms of educational level, most fathers, namely 60 persons or 83.3%, were graduates of high school (middle of education level). Meanwhile, most fathers worked as independent workers (traders or self-employed), 52 persons or 72.2%. Characteristics of the father as the head of the family are shown in Table 3.

Bivariate Analysis

The results test of the normality data indicates that the data was normal, shown by a histogram graphic that resembles a bell shape, and the result of Kolmogorov-

Smirnov test was (P-value 0.17 or P-value > 0.05).The bivariate analysis results with the independent T-test to know the relationship between baby massage and weight gain showed that the average weight gain of babies who received massage for one month was 588 grams, and a standard deviation was 60 grams. Meanwhile, the average increase in weight gains the babies who did not receive massage was 484 grams, and the standard deviation was 45 grams. The results of statistical tests showed a P-value of 0.000, it meaning in 5% alpha, there was a significant difference between the increase the weight gain between those who got a massage with those who did not get a massage. Overall, the massage affected the weight gain of the preterm babies, and Ho was rejected, and Ha accepted.

The results of this study indicate that infant massage significantly accelerates weight gain for preterm babies. The average weight gain for babies who receive massage per month was 588 grams, and those who did not receive massage were 484 grams. The results of this study are the same as the study conducted by Field *et al.,* In 2004, which concluded that baby massage would significantly affect the weight gain of preterm babies (Field T, 2018). The differences with this study were the study site and period of the massage. Field *et al.,* conducted the study at the hospital for 5-10 days. The other research conducted in India by Mathai *et al.,* also showed a significant effect of baby massage on increasing baby weight. The study found that the average weight gain of preterm babies who massaged was 4.2 grams/day higher than non-massaged (Mathai, *et al.,* 2001). This study was also conducted in health facilities, not in the community

However, the results of this study are different from the study conducted in South Korea in 2006. The study concluded no significant difference in weight gain between babies who massaged and those who were not massaged.[11] The difference with this study lies in the study site, the masseuse, and the research methodology. The study was conducted in a health facility and massaged by the mother. Different results were also found in a study conducted by Vickers *et al.,* and the study concludes there was no significant relationship between baby massage and weight gain (Vickers,*et al.,* 2000). Massage therapy may facilitate metabolic efficiency. The apparent increase in conversion of caloric intake to weight gain in the massaged group could be due to an alteration in basal metabolic function or to the rise in weight gain efficiency secondary to increased activity (Field, 2002). Altered metabolic efficiency associated with activity level (Mittleman, *et al.,* 1984).Increased activity is associated with elevated growth hormone release in humans (Van Wyk, *et al.,* 1978)

Another possibility is that massage therapy may increase vagal tone and, in turn, facilitate the release of food absorption hormones like insulin. The vagus (one of the twelve cranial nerves) enhances gastric motility and stimulates the release of food absorption hormones like insulin. Insulin levels increased following the massage therapy. The massaged baby did not eat more food, and they did not sleep more (so they were not simply conserving calories). Instead, the weight gain seems to have been mediated by an increase in vagal activity, which facilitated the release of food absorption hormones (at least insulin) (Field, T, 2002)

The growth and development of preterm birth babies are different from a term babies. This is due to the various risks and complications that may occur during pregnancy or delivery (Sutan, 2014). So that the growth and development of preterm babies are slower than a term babies. For anticipate this delay and to increase stimulation for the growth and development of the baby, it is necessary to take various actions or treatments. One way with baby massage which has been proven to increase the growth and development of preterm birth babies. Based on the many study results that show that infant massage is very beneficial for the growth and development of babies. Especially baby with a history of preterm birth (Berkat, 2018). It is better if the Indonesian government, through the Indonesian Ministry of Health, Province health office, district health office throughout Indonesia and related agencies, should promote more about baby massage and make it one of the essential treatments for babies in Indonesia, especially those who has a preterm birth history.

Table.1 Characteristics of Babies

Characteristic of babies	Intervention (36)		Non-intervention (36)		Total (72)	
	n	**%**	**n**	**%**	**n**	**%**
Place of born						
- Hospital	17	47.2	25	69.4	42	58.3
- Community health center in sub-district (puskesmas)	11	30.6	3	8.3	14	19.5
- Independent midwife practice	8	22.2	8	22.2	16	22.2
Total	36	100.0	36	100.0	72	100.0
Delivery method						
- Normal	19	52.8	11	30.6	30	41.7
- Cesarean	17	47.2	25	69.4	42	58.3
Total	36	100.0	36	100.0	72	100,0
Birth weight						
- 1500-2000 grams	36	100.0	28	77.8	64	88.9
- 2001-2499 grams	0	0.0	8	22.2	8	11.1
Total	36	100.0	36	100.0	72	100.0
Birth attendant						
- Obstetrician	17	47.2	25	69.4	42	58.3
- Midwife	19	52.8	11	30.6	30	41.7
Total	36	100.0	36	100.0	72	100.0
Sex						
- Girl	19	52.8	11	30.6	30	41.7
- Boy	17	47.2	25	69.4	42	58.3
Total	36	100.0	36	100.0	72	100.0
Early initiation of breastfeeding						
- Received	15	41.7	11	30.6	26	36.1
- Did not receive	21	58.3	25	69.4	46	63.9
Total	36	100.0	36	100.0	72	100.0
Full breast milk						
- Full breast milk	15	41.7	9	25.0	24	33.3
- Did not receive full breast milk	21	58.3	27	75.0	48	66.7
Total	36	100.0	36	100.0	72	100.0

Table.2 Characteristics of Mother's

Characteristic of mother's	Intervention (36)		Non-intervention (36)		Total (72)	
	n	%	n	%	n	%
Age						
- 15-19 years old	2	5.6	2	5.6	4	5.6
- 20- 35 years old	24	66.7	26	72.2	50	69.4
- 36-50 years old	10	27.8	8	22.2	18	25.0
Total	36	100.0	36	100.0	72	100.0
Education level						
- Low	7	19.4	8	22.2	15	20.8
- Middle	16	44.4	26	72.2	42	58.3
- High	13	36.1	2	5.6	15	20.8
Total	36	100.0	36	100,0	72	100.0
Occupations						
- Working	9	25.0	6	16.7	15	20.8
- Housewife	27	75.0	30	83.3	57	79.2
Total	36	100.0	36	100.0	72	100.0
Parity						
- 1	16	44.4	10	27.8	26	36.1
- 2-4	15	41.7	22	61.1	37	51.4
- 5-7	5	13.9	4	11.1	9	12.5
Total	36	100.0	36	100.0	72	100.0

Table.3 Characteristics of Father's

Characteristic of fathers	Intervention (36)		Non –Intervention (36)		Total (72)	
	n	%	n	%	n	%
Age						
- 18-25 years old	4	11.1	2	5.6	6	8.3
- 26-39 years old	21	58.3	26	72.2	47	65.3
- 40- 59 years old	11	30.6	8	22.2	19	26.4
Total	36	100.0	36	100.0	72	100.0
Education level						
- Basic	3	8.3	2	5.6	5	6.9
- Middle	28	77.8	32	88.9	60	83.3
- High	5	13.9	2	5.6	7	9.7
Total	36	100.0	36	100.0	72	100.0
Occupation						
- Unemployed/ part-time	3	8.3	3	8.3	6	8.3
- Independent worker	25	69.4	27	75.0	52	72.2
- Government/private company (permanent workers)	8	22.2	6	16.7	14	19.4
Total	36	100.0	36	100.0	72	100.0

Table.4 The result of independent T-test: Distribution of babies weight gain

Massage	Mean	SD	SE	P value	n
Intervention	588.6	60.8	10.1		36
				0.00*	
Non-intervention	484.1	45.6	7.6		36

Significant variable: p< 0.05*

The limitation of this study was the small sample size, and there were 72 babies. This is because of the limited research time and funding. The study also could not be carried out in all sub-districts under the district of Aceh Besar, because there some areas were remote areas, and made it difficult for researchers to reach.

There was a relationship between massage to increasing the weight of babies with preterm birth. On the babies who received massage for one month (12 times of massages), the average weight gain was 588 grams, which was higher than infants who did not receive massage (484 grams/month).

Acknowledgements

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