JMCH Journal of Maternal and Child Health (2025), 10(03): 172-183
Masters Program in Public Health, Universitas Sebelas Maret

Meta Analysis
Open Access

Infant Massage and Its Effects on Maternal-Infant Bonding, Sleep Quality, and Jaundice Reduction: A Meta-Analysis

Dwi Wahyu Setiyarini[1)], Eti Poncorini Pamungkasari[2)], Bhisma Murti[1)]

[1)]Master's Program in Public Health, Universitas Sebelas Maret
[2)]Faculty of Medicine, Universitas Sebelas Maret

Received:06 March, 2025; Accepted: 10 April, 2024; Available online: 16 May 2025

ABSTRACT

Background: Baby massage is defined as the oldest tactile therapy practiced for hundreds of years and can affect a baby's development. Baby massage is essential for the emotional bonding process of mother and child. In terms of sleep quality, massaged babies will have better sleep quality. Baby massage is also effective in lowering blood bilirubin levels in babies with jaundice. This study aims to estimate the effect size based on the results of previous similar primary studies.
Subjects and Method: A meta-analysis was conducted on a number of primary studies with a Randomized Controlled Trial (RCT) design. The research questions were conducted in the PICO format. Population: infants aged 0-3 years, Intervention: infant massage, Comparison: no infant massage, Outcome: emotional relationship between mother and child, sleep quality, blood bilirubin level. The article search was conducted using a database of journals including PubMed, Sains direct, Google Scholar, Publish or Perish and SpringerLink Articles for the 2012-2023 period with the keywords "baby massage" or "infant massage" and "sleep quality" or "baby sleep quality" and "attachment" or " bonding" and "jaundice" or "hyperbilirubinemia" and "randomized control trial". Data analysis in this study was carried out using the Review Manager application (RevMan 5.4).
Results: This meta-analysis was conducted on 20 primary studies of Randomized Controlled Trials (RCTs), originating from Indonesia, Taiwan, Iran, Turkey, and Iceland. The total sample size is 2,043 children. The results of the meta-analysis discovered that infant massage lowered bilirubin levels (SMD = -2.07; 95% CI = -2.71 to -1.43, p<0.001). Infant massage improved sleep quality (SMD = 0.90; 95% CI = 0.44 to 1.36, p<0.001) and maternal and child emotional bonding (SMD = 9.92; 95% CI= 7.72 to 12.12, p<0.001).
Conclusion: Baby massage lowers bilirubin levels. Baby massage improves the quality of sleep and the emotional relationship of mother and child.

Keywords: infant massage, emotional relationship, sleep quality, jaundice

Correspondence:
Dwi Wahyu Setiyarini. Master's Program in Public Health, Universitas Sebelas Maret. Jl.Ir. Sutami 36A, Surakarta, 57126, Central Java. Email: dwi.wahyu.setiyarini@gmail.com. Mobile: 0812473-88227.

Cite this as:
Setiyarini DW, Pamungkasari EP, Murti B (2025). Infant Massage and Its Effects on Maternal-Infant Bonding, Sleep Quality, and Jaundice Reduction: A Meta-Analysis. *J Matern Child Health*. 10(03): 172-183. https://doi.org/10.26911/thejmch.2025.10.03.05.

BACKGROUND

Infants have rapid and unrepeatable growth and development. In the first year, the infants' brain grows tripling in size

compared to its size at birth or 80% of the adult brain (Dehghani et al., 2018). In the process of growth and development, there can be several obstacles. These obstacles can be in the form of physical or non-physical problems. For example, 44.2% of infants under 3 years of age in Indonesia have sleep problems (Nughraheni et al., 2018). Sleep problems among infants are the first challenge for parents that affects both parents and babies (Rouzafzoon et al., 2021). Non-physical problems, for example, are about the maternal and child emotional relationship. The maternal and child emotional relationship is called attachment. Attachment is defined as a series of behaviors that can make babies develop intimate relationships with the primary caregiver or mother (Salehi et al., 2019). Children who have a good emotional relationship with their mother tend to show good mental development at the age of 2 years (Chung et al., 2018).

Other physical problems, such as jaundice. Jaundice is often referred to as hyperbilirubinemia. Hyperbilirubinemia is one of the most common things found in newborns and is usually harmless (Hockenberry et al., 2017). However, high bilirubin levels can lead to dangerous complications such as mental retardation, motor and balance problems, seizures, hearing loss, speech problems and so on. Therefore, the diagnosis and early treatment of *jaundice* is very important (Namnabati et al., 2019).

One of the solutions to the above problems is baby massage. Baby massage is defined as the oldest tactile therapy practiced for hundreds of years and is believed to affect the development of babies (Hartati et al., 2020). Providing tactile stimulation in the form of massage or touching to the baby can improve the baby's development (Rafii et al., 2020). During the massage, usually the positions are facing each other so that eye contact will occur, the baby observes the face and looks into the mother's eyes. Touching is essential for the emotional bonding process of mother and child (Kellett, 2020). In terms of sleep quality, infants who are massaged will have more restorative sleep (Field, 2018). Then for jaundice problems, reflexology and body massage are effective in improving the condition of physical indicators and blood bilirubin levels (Jazayeri et al., 2021)

From this background, due to the many cases of sleep problems, maternal and child emotional relationships, and jaundice in babies, the author wants to bring up a study on the effect of infant massage in improving the maternal and infant emotional relationship, improving sleep quality, and reducing jaundice: a meta-analysis.

SUBJECTS AND METHOD

1. Study Design

This study was conducted using a systematic review with a meta-analysis study design. Using the PRISMA diagram guidelines. Articles search was conducted using databases of journals including: PubMed, Science Direct, Google Scholars, Publish or Perish and SpringerLink Articles for the 2012-2023 period with keywords ("baby massage" or "infant massage") and ("sleep quality" or "baby sleep quality") and ("attachment" or "bonding") and ("jaundice" or "hyperbilirubinemia") and "randomized controlled trial".

2. Steps of Meta-Analysis

1) Formulate problems using the PICO (Population, Intervention, Comparison, and Outcome) model.
2) Search for major study articles through databases such as PubMed, Science Direct, Google Scholars, Publish or Perish and SpringerLink.

3) Determine inclusion and exclusion criteria, conduct screening and critical assessment of primary studies.
4) Data extraction and entering data into RevMan 5.3
5) Interpreting values and drawing conclusions

3. Inclusion Criteria

The inclusion criteria of the study include: full-length papers with randomized controlled trial (RCT) study designs, articles published in Indonesian and English. The measure of the relationship used was mean SD. The intervention provided was infant massage. The study subjects were infants aged 0-3 years.

4. Exclusion Criteria

The exclusion criteria of the study include: infants who had fever or infection problems, had heart problems, motor problems, and often had seizures.

5. Operational Definition of Variables

The maternal and child relationship is the emotional bond of mother and child.

Jaundice is a symptom observed when unconjugated bilirubin accumulates in the skin.

The quality of sleep studied is the duration of sleep

Infant massage is a tactile therapy that mothers do to infants.

6. Study Instruments

The measuring instrument used to measure sleep quality was BISQ (brief infant sleep questionnaire). To measure maternal and child relationships the study used maternal attachment scale. And to measure jaundice, the study used blood bilirubin levels.

7. Data Analysis

Data analysis in this study was carried out using the Review Manager application (RevMan 5.4). The Review Manager (RevMan) is used to calculate the overall mean difference, describing a 95% confidence interval (CI) using an effects model, and I2 or data heterogeneity. Data were analyzed based on variations between studies by determining the use of an analysis model, called fixed effect. Fixed effect assumes that there is a treatment effect that is common to all studies (there is no variation between studies), differences between effect sizes (standardized mean difference, log odds ratio, log relative risk), correlation coefficients and Fisher's z transformations) observed due to sampling errors. The p-value on the heterogeneity test was greater than 0.05 and I^2 is small.

RESULTS

1. Study Characteristics

The researches of the primary study included 20 articles with a total sample of 2,043 participants, 996 participants in the treatment group and 1,047 participants in the control group. The assessment of the quality of the study used Critical Appraisal (Murti, 2023) which can be seen in Table 1. The purpose of Critical Appraisal is to evaluate selected scientific articles so that the feasibility of these articles can be determined as research samples. Critical Appraisal is very important because the feasibility of the article is the basis for analysis, so that the results of the analysis can show valid data.

There were 14 questions to be answered with a choice of yes, no, or indefinite answers. The quality assessment of the article was carried out carefully and systematically by 2 assessors. The assessment was carried out by 2 people to minimize bias. Researchers do not know the results of each other's answers. The results of the quality assessment of the articles used in this study are presented in Table 1. Based on the results obtained from the article quality assessment, the total score of the selected articles was around 25 to 26, which indicated that the articles were suitable for

meta-analysis.

Figure 1 show that the process of selecting articles from a total of 335 articles. Then after the study assessment was carried out, 20 articles were obtained that could be used for meta-analysis research.

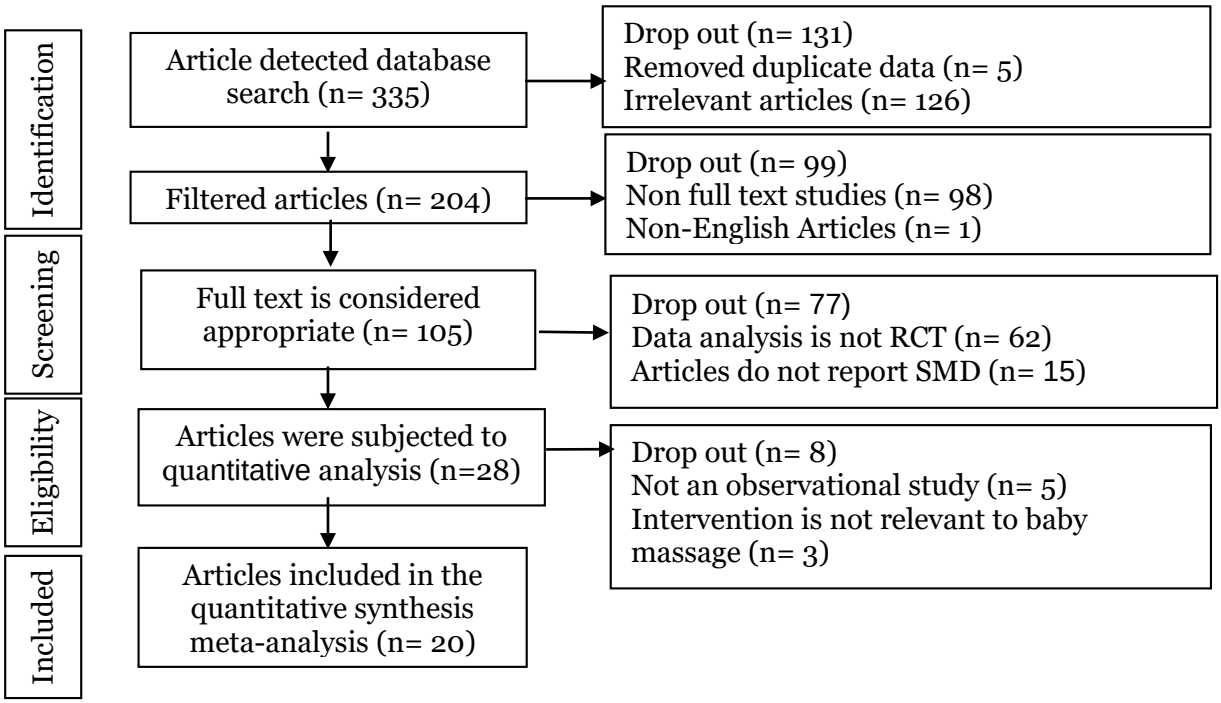

Figure 1. PRISMA flow diagram baby massage on maternal-infant bonding, sleep quality and jaundice

Table 1. Quality assessment of research articles

Article	Checklist Questions														Total
	1a	1b	1c	1d	2a	2b	3a	3b	4a	4b	4c	5a	5b	6	
Gurol et al. (2012)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Shoghi et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Hartanti et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Deghani et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Mokaberien et al. (2021)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Ercelik et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Kusumastuti et al. (2016)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Lu et al. (2018)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Rouzafzoon et al. (2021)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Ventura et al. (2022)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Rezaei et al. (2023)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Duken et al. (2023)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Seyyedrasooli et al. (2014)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Moghadam et al. (2015)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Lin et al. (2015)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Dalili et al. (2016)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Gozen et al. (2016)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Eghbalian et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Dag et al. (2019)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25
Jazayeri et al. (2021)	2	2	2	2	2	2	2	2	1	2	2	2	2	2	25

Description: 2=Yes; 1=Indefinite; 0=No

Question explanation:

1a = Is the population in the primary study equal to the population in the PICO meta-analysis?
1b = Is the operational definition of intervention in the primary study the same as the definition intended in the meta-analysis?
1c = Is the operational definition of comparison used by the primary study the same as the scheme planned in the meta-analysis?
1d = Is the operational definition of the outcome variables studied in the primary study the same as planned in the meta-analysis?
2a = Is the sample selected from the population so that the sample represents the population?
2b = Is the sample selected from the population so that the sample represents the population?
3a = Were interventions and outcome variables measured with the same instruments (measuring tools) in all primary studies?
3b = If variables were measured on a categorical scale, were the cutoffs or categories used the same between primary studies?
4a = Was double-blinding conducted, i.e. study subjects and study assistants who helped measure outcome variables without knowing the intervention status of the research subject?
4b = Is there no possibility of "Loss-to-Follow-up Bias"?
4c = Have primary study researchers made efforts to prevent or address such bias (e.g., selecting highly motivated subjects, subjects that were easy to follow, or incentivizing subjects not to drop out)?
5a = Were outcome data compared between the experimental group and the control group after the intervention?
5b = Were all data analyzed according to the randomization results?
6 = Was there no possibility of a conflict of interest with the sponsor of the study, which could cause bias in concluding the results of the study?

Figure 2. Map of the study area of the infant massage and its effects on maternal-infant bonding, sleep quality, and jaundice reduction

1. The Effect of Baby Massage on the Maternal and Child Emotional Relationship

The primary studies included 6 RCT articles as a meta-analysis source for the effect of infant massage on the maternal and child relationship. The study time span was 2012-2023. The size of the study sample varied between 20-60 respondents. The study population ranged from newborns to 3-year-olds.

Table 2. Mean and standard deviation of of the effect of infant massage on the maternal and child emotional relationship

Author	Intervention Group			Control Group		
	Mean	SD	Total	Mean	SD	Total
Gurol et al. (2012)	90.87	10.76	57	85.1	15.5	60
Shoghi et al. (2018)	57.76	4.2	40	46.23	4.35	40
Hartanti et al. (2019)	99.6	1.15	60	88.8	2.18	60
Deghani et al. (2020)	66	9.96	54	49.7	4.75	54
Mokaberien et al.(2021)	72.26	2.96	20	64.1	1.87	20
Ercelik et al. (2023)	100.34	4.41	26	95.85	9.25	27

a. Forest Plot

The interpretation of the results of the meta-analysis can be seen from the forest plot. Figure 1 shows that as many as 6 articles related to infant massage interventions stated that infant massage can improve the maternal and child relationship compared to no infant massage intervention. The heterogeneity between studies was high (I^2= 87%, p<0.001), so the random effect model (REM) was used to analyze data in forest plots. The results of the analysis showed that infant massage interventions 9.92 times improved the maternal and child emotional relationship compared to no intervention and it was statistically significant (SMD = 9.92; 95%CI= 7.72 to 12.12; p<0.001).

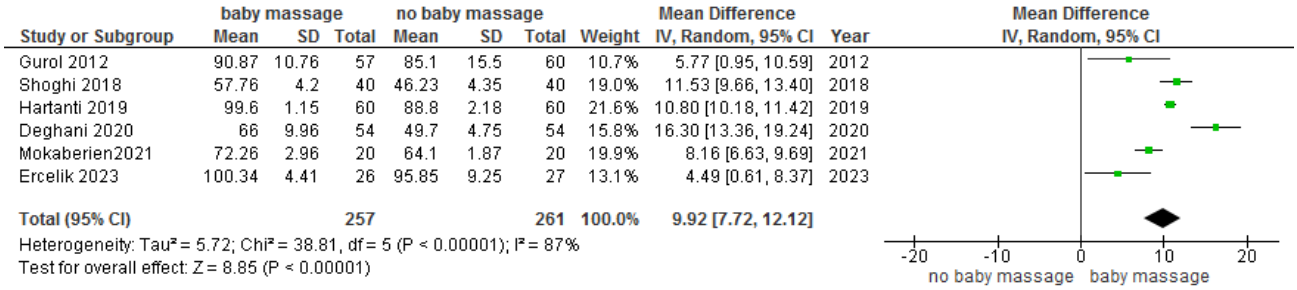

Figure 1. Forest plot of the effect of infant massage on the maternal and child emotional relationship

b. Funnel Plot

The funnel plot represents an approximate size of the effect of each study in estimating the accuracy that is usually the standard error. If the funnel plot is not symmetrical, then there is research bias, but if the funnel plot is symmetrical, it shows that there is no research bias. The funnel plot of the infant massage on the maternal and child emotional relationship is shown in figure 2. Figure 2 shows that there is no publication bias indicated by a symmetrical funnel plot between the right and left.

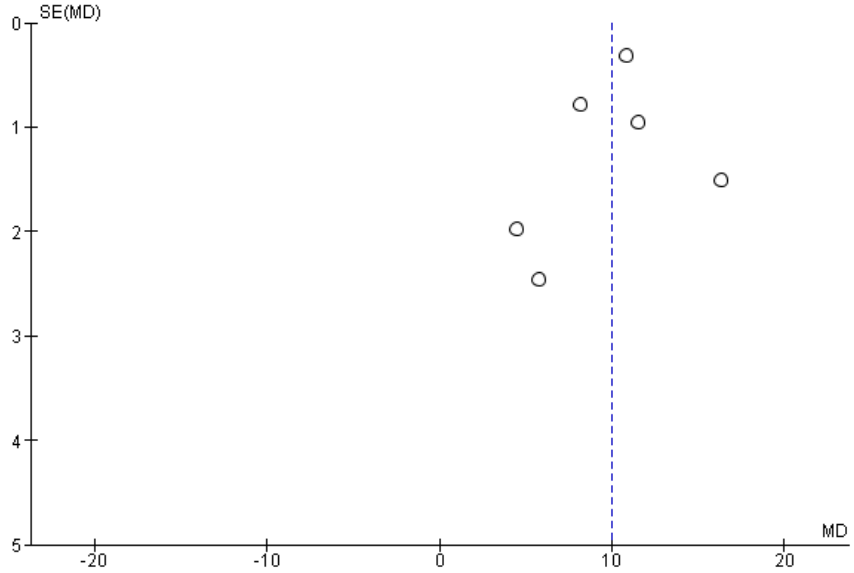

Figure 2. Funnel plot of infant massage on the maternal and child emotional relationship

2. The Effect of Baby Massage on Sleep Quality

Table 3. Mean and standard deviation data of the effect of infant massage on the maternal and child emotional relationship

Author	Intervention Group			Control Group		
	Mean	SD	Total	Mean	SD	Total
Kusumastuti et al. (2016)	1.83	1.8	30	0.3	0.95	30
Lu et al. (2018)	12	1.6	63	11.5	1	63
Hartanti et al. (2019)	9.21	0.15	60	8.83	0.12	60
Rouzafzoon et al. (2021)	8.89	0.57	41	7.53	0.28	41
Ventura et al. (2022)	2.68	3.54	83	2.6	3.58	96
Rezaei et al. (2023)	8.91	0.77	140	8.7	0.95	140
Duken et al. (2023)	14.06	3.39	40	10.29	2.9	40

a. Forest Plot

The primary studies included 7 RCT articles as a meta-analysis source for the effect of infant massage on sleep quality. The interpretation of the meta-analysis results can be seen from the forest plot. Figure 3 shows that as many as 7 articles related to infant massage interventions stated that infant massage can improve sleep quality compared to no intervention. Heterogeneity between studies was high (I^2= 95%, p<0.001). Random Effect Model (REM) was used to analyze data in forest plots. The result of the analysis was that infant massage interventions 0.9 times improved sleep quality compared to no intervention, and it was statistically significant (SMD = 0.9; 95% CI= 0.44 to 1.36; p<0.001).

b. Funnel Plot

The funnel plot represents an approximate size of the effect of each study in estimating the accuracy, that is usually the standard error. Figure 4 shows the absence of publication bias, which is indicated by symmetrical funnel plot between right and left.

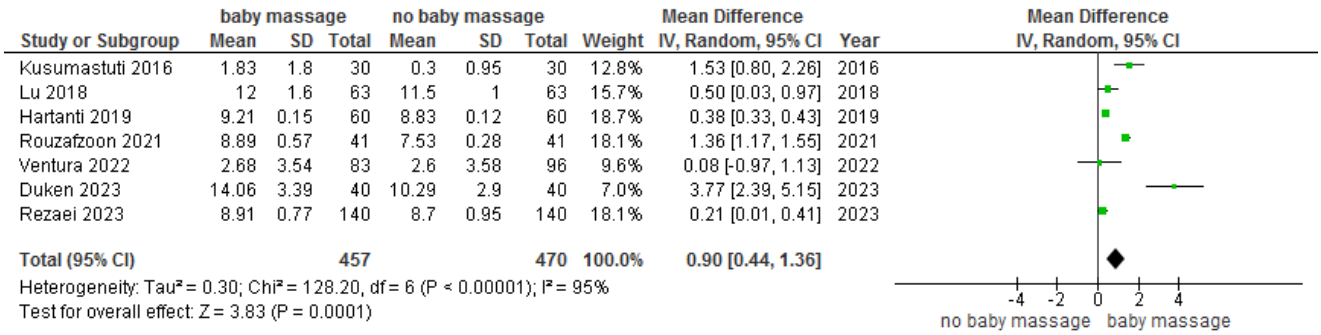

Figure 3. Forest plot of the effect of infant massage on sleep quality

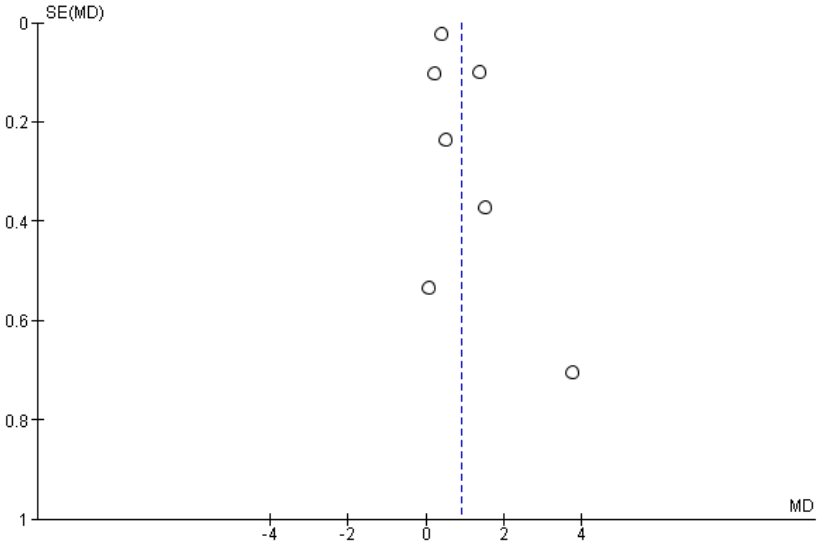

Figure 4. Funnel plot of the effect of infant massage on sleep quality

3. The Effect of Infant Massage on Jaundice

a. Summary Source

Author	Intervention Group			Control Group		
	Mean	SD	Total	Mean	SD	Total
Seyyedrasooli et al. (2014)	6.25	3	18	8.2	5.4	25
Moghadam et al. (2015)	4.79	1.84	40	7.56	1.36	40
Lin et al. (2015)	10.8	0.9	15	12.2	1.8	11
Dalili et al. (2016)	9.2	1.4	25	11.06	1.5	25
Gozen et al. (2016)	3.02	2.16	44	3.81	2.41	46
Eghbalian et al. (2017)	6.94	0.59	8	9.36	1.41	21
Dag et al. (2019)	3.82	1.78	35	7.62	2.54	35
Jazayeri et al. (2021)	10.45	1.202	17	11.92	0.953	17

b. Forest plot

The primary studies included 7 RCT articles as a meta-analysis source for the effect of infant massage on Jaundice.

The interpretation of the meta-analysis results can be seen from the forest plot. Figure 5 shows that as many as 8 articles related to intervention stated that infant massage can reduce jaundice compared to no intervention. Heterogeneity

between studies was 74% (I^2= 74%, p<0.001). Random Effect Model (REM) was used to analyze data in forest plots. The result of the analysis was that the infant massage intervention reduced jaundice 2.07 times compared to no intervention and it was statistically significant (SMD= -2.1; 95% CI= -2.71to 1.43; p<0.001).

c. Funnel plot

The funnel plot represents an approximate size of the effect of each study in estimating the accuracy, which is usually the standard error. Figure 8 shows the absence of publication bias indicated by symmetrical funnel plot between right and left.

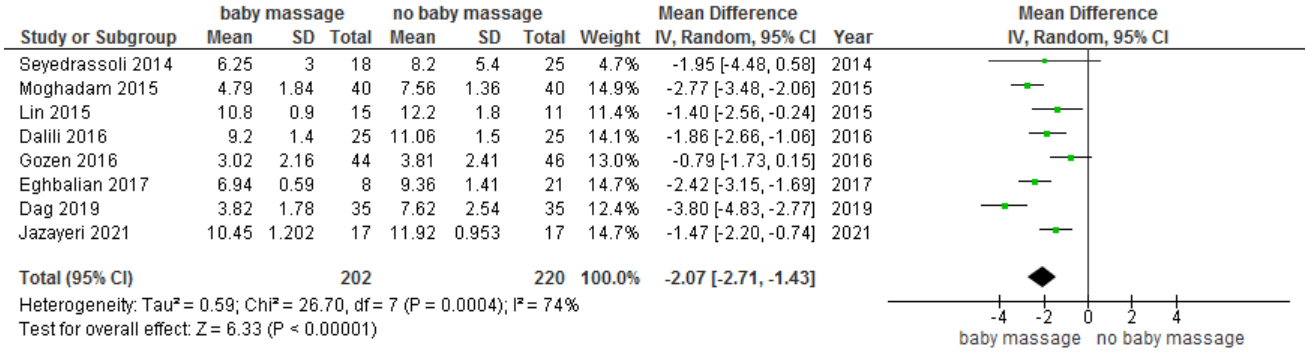

Figure 5. Forest plot of the effect of infant massage on jaundice

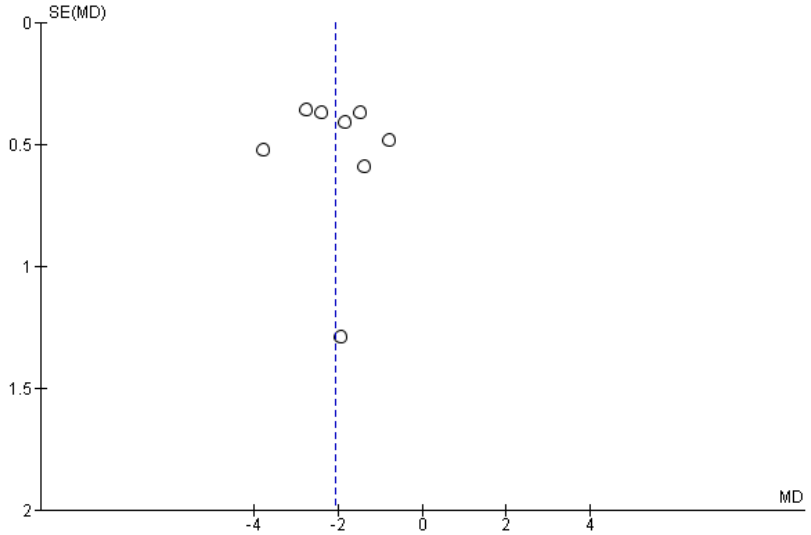

Figure 6. Funnel plot the effect of baby massage on jaundice

DISCUSSION

1. The effect of infant massage on the maternal and child emotional relationship

Every infant is expected to grow optimally. Optimal growth in infants is the result of the interaction of various interrelated factors, namely genetic, environmental, and behavioral factors as well as stimuli (Bannet et al., 2013). Infant massage provides touch to the infant's body, which is beneficial for stimulating the growth and development of the baby and one way to express parental love for the child. Several mechanisms may explain the underlying mechanisms of infant massage, including the release of beta endorphins, vagus nerve activity, and serotonin production (Moghadam et al., 2015).

A meta-analysis of 6 RCTs showed the effect of infant massage on the maternal and child emotional relationship. These results are in line with a study (Vicente et al., 2017) that states that mothers who massage infants are more confident in their abilities, receive more support from their families, and have a stronger relationship with their babies. Infant massage also reduces anxiety in mothers (Lin et al., 2023). The maternal and child emotional relationship is influenced by several factors, namely age, occupation, education, and parental income. According to the results of a study (Indriana, 2022). Age ≥25 years is mostly good behavior (51.6%) in monitoring infant growth and development. Parents of 25 years and older are considered to have a mature age. One way to improve bonding is by touch; infant massage causes an increase in the baby's weight and reduces parental stress over time in premature babies (Hwu et al., 2023).

2. The effect of infant massage on sleep quality

A meta-analysis of 7 RCTs showed that the effect of infant massage can improve sleep quality compared to the control group. A previous study by Yates et al. (2014) reports similar results that babies who are massaged fall asleep faster than those who are not massaged. Field et al. (2016) state that babies massaged using lotion have a longer total sleep duration and wake up less frequently at night. This also affects the quality of sleep of mothers, as the quality of sleep of mothers increases. Infant massage releases the hormone serotonin, so that the baby feels more relaxed and calmer and makes the quality of sleep better, especially for a longer sleep duration. In addition, babies are also easier to start sleeping and do not wake up easily at night. In addition to improving the quality of baby sleep, the quality of parental sleep also improves, so that it reduces anxiety, and in general, improves physical health (Rezaei et al., 2023). The body becomes fresher and fitter for activity. The benefits obtained when children have sufficient and quality sleep are that children become energetic in their activities, increase appetite so that weight increases, children are good-tempered, digestion is good, and increase motor and sensory intelligence.

3. The effect of infant massage on jaundice

A meta-analysis of 8 RCTs showed that infant massage reduced jaundice compared to the control group. This result is in line with a study by Lei et al. (2018) which state that infant massage can reduce total bilirubin serum and transcutaneous bilirubin levels. A study (Tubglam, 2020) states that infant massage lowers bilirubin levels and increases the frequency of bowel movements so the results of the study recommend infant massage training for mothers. Phototherapy is a common therapy for hyperbilirubinemia. Billirubin is converted into non-conjugated bilirubin so that it becomes a non-toxic product and is excreted through bile and urine (Khaliq, 2016). Massage on the infant's whole body affects the motility of the gastrointestinal tract, improves blood circulation and lymphatic flow as well as enterohepatic circulation, increases the amount of urine as a medium to excrete bilirubin. The comfort that the infant gets during the massage process greatly affects the level of serotonin in the infant and indirectly affects the function of the digestive tract. Improved digestive tract function will increase nutrient intake and elimination from the digestive tract and urine. Improved gastrointestinal function, as evidenced by increased nutrient intake, will help the bilirubin conjugation process,

while increased defecation and urine elimination will help remove conjugated bilirubin (Purnamiasih and Pamenang, 2023).

The strength of this study is that there are three variables that are investigated, so that they have a complex discussion. The effect of infant massage is biased from a physical and psychological perspective. The disadvantage of this study is the existence of language bias because in this study only articles published in Indonesian and English are used, in this study there are limitations in the search for articles and the screening process which is carried out by two individuals, which allows for human error.

The implication that can be applied from this study is that health workers are expected to provide education related to infant massage to parents so that parents can apply infant massage to improve the maternal and child emotional relationship, improve the quality of children's sleep, and reduce jaundice. In the next study, it is recommended to expand the database to reduce search bias. The next suggestion is to apply infant massage as one of the educational programs to infant patients in hospitals, cadres of integrated health posts for toddlers, and cadres of community groups.

AUTHOR CONTRIBUTION

Dwi Wahyu Setiyarini contributed to study ideas, article database searches, data analysis, and scientific writing. Eti Poncorini Pamungkasari contributed to the article review, data analysis review, and scientific writing. Bhisma Murti contributed to the article review, data analysis review, and scientific writing.

ACKNOWLEDGEMENT

We are very grateful to data providers such as PubMed, Science Direct, Google Scholar, Publish and Perish, and SpringerLink.

FUNDING AND SPONSORSHIP

This study was self-funded.

CONFLICT OF INTEREST

There was no conflict of interest.

REFERENCES

Bannet (2013). Cochrane Review Summary: Massage for promoting mental and physical health in typically developing infants under the age of six months. PHCR&D, 16(1): 3–4. https://doi.-org/10.1017/S1463423614000462

Dehghani M, Babazadeh R, Khadivzadeh T, Pourhoseini S A, Esmaeili H. (2018). Effect of breast Oketani-massage on neonatal weight gain: A randomized controlled clinical trial. EBCJ, 8(3), 57–63. https://doi.org/10.22038/eb-cj.2018.32347.1817

Field T, Gonzalez G, Diego M, Mindell J. (2016). Mothers massaging their newborns with lotion versus no lotion enhances mothers' and newborns' sleep. Infant Behav Dev, 45, 31–37. https://doi.org/10.1016/j.infbeh.2016 .08.004

Hartanti AT, Salimo H, Widyaningsih V (2019). Effectiveness of infant massage on strengthening bonding and improving sleep quality. IJM, 4(2), 165–175. https://doi.org/10.-26911/theijmed.2019.04.02.10

Hockenberry M J, Wilson D, Rodgers C C. (2017). Essentialsof pediatric nursing (10th ed.). Missouri. Elsevier.

Jazayeri Z, Sajadi M, Dalvand H, Zolfaghari M (2021). Comparison of the effect of foot reflexology and body massage on physiological indicators and bilirubin levels in neonates under phototherapy. Complement Ther Med, 59(September

2020), 102684. https://doi.org/10.-1016/j.ctim.2021.102684

Kellett J (2020). The little book of baby massage: use the power of touch to calm your baby (M. Lea (ed.); 1st ed.). Great Britain. Penguin Random House.

Lei M, Liu T, Li Y, Liu Y, Meng L, Jin C. (2018). Effects of massage on newborn infants with jaundice: A meta-analysis. Int. J. Nurs. Sci., 5(1), 89–97. https:-//doi.org/10.1016/j.ijnss.2018.01.004

Lin L, Yu L, Zhang S, Liu J, Xiong Y. (2023). The positive effect of mother-performed infant massage on infantile eczema and maternal mental state: A randomized controlled trial. Fpubh, 10. https://doi.org/10.3389/fpubh.-2022.1068043

Moghadam M B, Moghadam K B, Kianmehr M, Jani S. (2015). The effect of massage on neonatal jaundice in stable preterm newborn infants: A randomized controlled trial. JPMA, 65(6), 602–606.Murti B. (2023). Critical Appraisal Meta-analisis Artikel Randomized Control Trial. IKM UNS

Namnabati M, Mohammadizadeh M, Sardari S. (2019). The effect of home-based phototherapy on parental stress in mothers of infants with neonatal jaundice. J. Neonatal Nurs, 25(1), 37–40. https://doi.org/10.1016/j.jnn.20-18.09.001

Nughraheni RI, Ambarwati R, Marni. (2018). Upaya peningkatan kualitas tidur bayi usia 3-12 bulan dengan terapi pijat (Efforts to improve sleep quality in babies aged 3-12 months with massage therapy). Jurnal Keperawatan GSH. 7(1): 19–23.

Rafii F, Ameri F, Haghani H, Ghobadi A. (2020). The effect of aromatherapy massage with lavender and chamomile oil on anxiety and sleep quality of patients with burns. Burns, 46(1), 164–171. https://doi.org/10.1016/j.-burns.2019.02.017

Rouzafzoon M, Farnam F, Khakbazan Z. (2021). The effects of infant behavioural sleep interventions on maternal sleep and mood, and infant sleep: A randomised controlled trial. J Sleep Res, 30(5): 1–9. https://doi.org/10.-1111/jsr.13344

Salehi K, Taleghani F, Kohan S. (2019). Effect of attachment-based interventions on prenatal attachment: a protocol for systematic review. Reprod. Health, 16(1): 1–5. https://doi.org/-10.1186/s12978-019-0704-y

Vicente S, Veríssimo M, Diniz E. (2017). Infant massage improves attitudes toward childbearing, maternal satisfaction and pleasure in parenting. Infant Behav Dev, 49(August), 114–119. https://doi.org/10.1016/j.infbeh.-2017.08.006

Yates C C, Mitchell A J, Booth M Y, Williams D K, Lowe L M, Hall R W. (2014). The effects of massage therapy to induce sleep in infants born preterm. Pediatric Physical Therapy, 26(4), 405–410. https://doi.org/10.1097/-PEP.0000000000000081.