THE INFLUENCE OF INFANT MASSAGE TO WEIGHT GAINS IN LOW BIRTH WEIGHT (LBW) INFANT : A SYSTEMATIC REVIEW

Atika[1], Lilik Djuari[1], Hafizh Al Ghifari Manaf[2], Annisa Maya Sabrina[2], Naufal Agus Ismahendra[2], Mochammad Ridhwan Soediono[2], Daffa Ardhi Bachtiar[2], Sitti Khofifah Yuliana[2], Muhammad Farraas Razaan[2], Yustika Ayustira Karim[2]

[1]Department of Public Health and Preventive Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[2]Medical Program, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

Growth and development is a significant phase that cannot be replicated, underscoring the need for meticulous attention, particularly for those born with low birth weight (LBW). LBW can be stimulated using infant massage. This research aimed to evaluate the impact of infant massage on weight gain among LBW infants. This is a systematic review using PICOS framework, investigating studies from 2018 to 2023 in databases including Cochrane, PubMed, ScienceDirect, and Scopus. The inclusion criteria involved full-text access and the keywords low birth weight, weight gain, and massage. The initial search yielded 1913 literature, which were screened based on publication year and type, resulting in 122 articles. After being examined, 119 articles were excluded due to duplication, using non-English language, involving non-LBW, different outcomes, and non-RCT, leaving three articles. The assessment of literature quality was conducted using the JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses. The results of outcome measurements and group comparisons across the three studies exhibited congruence. In conclusion, the finding indicated that infants who underwent massage intervention exhibited weight gain, as did those who did not undergo such intervention. Furthermore, infants who received massage intervention experienced a more pronounced increase in weight compared to their counterparts who did not undergo massage intervention.

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Corresponding author
Atika
✉ atika@fk.unair.ac.id
Department of Public Health and Preventive Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

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INTRODUCTION

Infants with low birth weight (LBW) are characterized as newborns whose birth weight is below 2,500 grams, irrespective of their gestational age. Low birth weight constitutes a significant contributor to heightened rates of mortality, morbidity, and disability among neonates, infants, and children, imparting lasting effects on their future well-being. Potential

enduring consequences stemming from LBW encompass developmental disorders, visual impairments (retinopathy), hearing deficits, chronic lung conditions, elevated morbidity rates, heightened occurrence of congenital anomalies, and necessitate specialized medical interventions [1-7].

Infants with low birth weight (LBW) face an elevated susceptibility to morbidity, hindered growth, impaired cognitive development, reduced adult stature, and an amplified likelihood of developing chronic illnesses during their later years. The progression of growth and development in infants and toddlers is profoundly impacted by the satisfaction of their fundamental requirements. These primary needs are often referred to as the "triple A" – encompassing the imperative necessities for nourishment, emotional connection, and early cognitive stimulation[1,8-11]. Parents have the opportunity to provide effective growth and development stimulation to their children right from infancy. Through positive interaction and appropriate activities, parents can offer beneficial stimulation that aids in unlocking their children's full potential and fostering optimal development[12,13].

A form of stimulation that the community has embraced is infant massage. Massage holds a historical lineage as one of the oldest therapeutic practices globally. Serving as an artistic facet of healthcare and medicine, massage can alleviate stiff joints and establish a harmonious connection among the body's organs through tactile engagement. Through the application of massage techniques to circulatory muscle tissue, the potential for enhancing muscle condition and restoring proper muscle positioning arises. This, in turn, can contribute to the optimization of organ function within the body, allowing for improved overall bodily functionality[14-16].

Multiple research has demonstrated a notable impact of infant massage on the weight of infants aged 3 to 6 months, substantiated by statistical test outcomes[17-29]. Research by Majid also indicated that baby massage is linked to weight gain in infants[30]. Nevertheless, these outcomes diverge from the observations made in the study conducted by Fauziyah[31]. The study by Fauziyah, in contrast, reported no discernible impact of administering baby massage on fluctuations in infant weight. These divergent findings between the two studies prompted the current research, aimed at meticulously analyzing the influence of baby massage on body weight in infants with low birth weight (LBW).

MATERIALS AND METHODS

The electronic database was searched through four sites, the Cochrane, PubMed, Science Direct, and Scopus. Based on the keywords (Low Birth Weight OR Infant Low Birth Weight OR Neonates LBW) AND (Weight gain OR Increase Weight OR Weight gain) AND (Massage OR Infant Massage OR Developmental Care Massage) we obtained 1,913 records. These results were then screened using the year criteria and obtained 122 articles. We excluded 119 records as 7 of them were duplicated articles, 1 article not in English, 50 articles with subjects other than infant low birth weight, 47 articles discussing different outcomes, and 14 articles with research designs other than the Randomized Controlled Trial. Three full-text articles were finally obtained and analyzed in this systematic review.

RESULTS

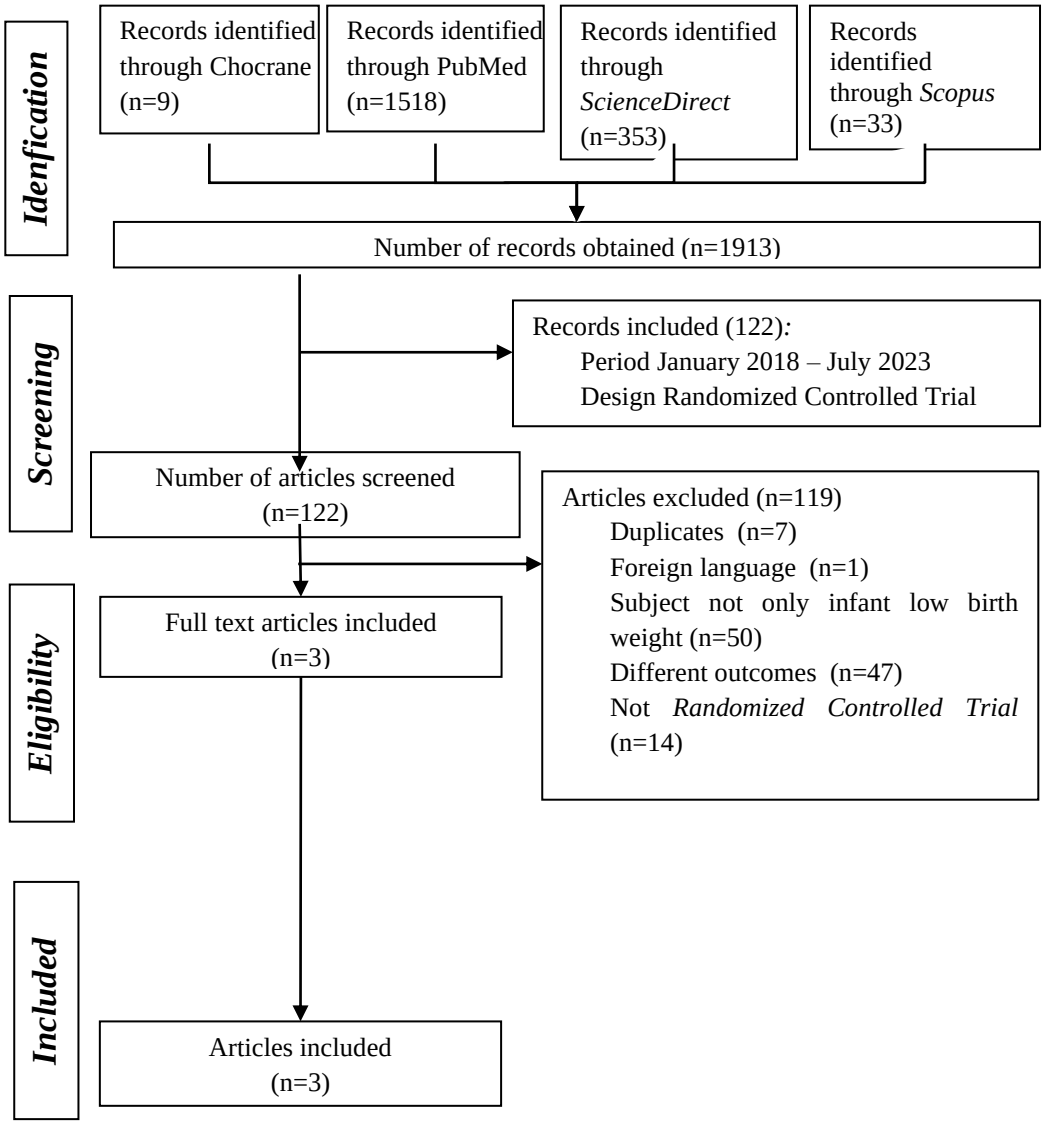

Figure 1. PRISMA Flow Diagram

Table 1. JBI critical appraisal

Question	Reference		
	Montaseri et al., (2020)[32]	Liao et al., (2021)[33]	Naseh et al., (2023)[34]
Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups)	Yes	Yes	Yes
Was appropriate statistical analysis used?	Yes	Yes	Yes
Were outcomes measured in a reliable way?	Yes	Yes	Yes
Were outcomes measured in the same way for treatment groups?	Yes	Yes	Yes
Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	Yes	No	Yes
Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	Yes	No	Yes
Were treatment groups treated identically other than the intervention of interest?	Yes	No	Yes
Were outcomes assessors blind to treatment assignment?	Yes	Yes	Yes
Were those delivering treatment blind to treatment assignment?	No	Yes	No
Were participants blind to treatment assignment?	No	Yes	No
Were treatment groups similar at the baseline?	Yes	Yes	No
Was allocation to treatment groups concealed?	Yes	Yes	Yes
Was true randomization used for assignment of participants to treatment groups	Yes	Yes	Yes
Score of Yes	13	10	10

We assessed the quality of the literature with the JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses. The three obtained articles have met the inclusion criteria, the research design was appropriate as they used Randomized Controlled Trials and there was a standard deviation from this RCT design. The statistical analysis had been carried out correctly, and also the results from the outcome and group comparisons of these three studies agreed. In the article by Montaseri et al.,(2020)[32] there were 13 checklists of yes, in the article by Liao et al.,(2021)[33] there were 10 checklists of yes, and the article by Naseh et al.,(2023)[34] found 10 checklists of yes (Table 1).

Table 2. Changes of Infant Body Weight and Massage Intervention in Three Obtained Articles

No	Article	N	Group	Initial weight		Final weight		Weight change		Period of intervention	Intervention
				Mean	SD	Mean	SD	Mean	SD		
1	(Montaseri *et al.*, 2020)[32]	15	Control	2049.0	157.6	2195.8	335.9	146.8	327.4	5 Days (2 x 15‘)	Babies in the massage group were massaged in the morning and afternoon after feedings. Massage was done 15 minutes for 5 consecutive days.
		15	Intervention	2087.3	196.2	2547.3	515.2	460.0	418.2		
2	(Liao *et al.*, 2021)[33]	16	Control	1739.8	151.9	-	-	95.0	-	7 Days (3 x 10’)	The standard massage intervention consisted of two 5-minute phases, including tactile and kinesthetic stimulation, which were given three times daily for 7 consecutive days.
		16	Intervention	1810.9	155.9	-	-	92.0	-		
3	(Naseh *et al.*, 2023)[34]	31	Control	1804.5	496.5	1830.8	452.7	26.3	77.1	5 Days (2 x 15’)	Massage intervention 15 minutes twice a day for 5 days at 9 am and also at 1 pm.
		30	Intervention	1663.5	424.7	1690.7	399.7	27.2	65.8		

In Montaseri et al.'s (2020) [32] results after the 5th day of intervention, it was found that the group given the massage intervention gained weight compared to the control group with an average weight gain of 460.0 grams. Liao et al., (2021) [33] results showed that after the intervention was carried out for 7 consecutive days, compared to the first day, the weight gain of premature infants who received massage intervention was the same compared to the control group. These results indicated that the effect of the massage intervention on weight gain did not increase significantly. Naseh et al.,(2023)[34] showed no statistically significant differences between all groups for weight gain.

DISCUSSION

In Montaseri et al.(2020)[28] study, based on the results there was an increase in body weight in infants who were given an intervention of 22% of initial body weight, while those who were not given an intervention only increased by 7% of initial body weight, with a fairly high standard deviation that could be due to the large variation in data. Subjects were classified into three groups, the first was infants who were given massage, the second was infants who were given massage accompanied by exercise, and the third was infants who were not given massage. The three groups were similar in terms of birth weight, gestational age, and newborn age. After the 5th day of the intervention, the results of the two groups that were given massage and exercise massage were compared with the group that was not given massage. It was observed that both groups gained weight compared to the non-administered group. Infants were given massage in the morning and afternoon after feeding for 15 minutes and repeated for five consecutive days. The exercise-massage group received extension and flexion for five minutes after the massage. Liao et al. (2021) [33] study divided the subjects into three groups. The first group of 16 LBW infants were given with oil massage, the second group of 16 LBW infants were only given massage without oil, and 16 LBW infants in the control group who were not given massage. Based on the results, there was an increase in body weight in infants who were given an intervention of 5% of the initial weight, the same as the control group. Naseh et al. (2023)[34] found that the increase in body weight in the intervention group of 30 LBW infants was 1.5% (27±66 grams/day) and in the control group of 31 LBW infants was 1.5% (26±77grams/day). In the intervention group, massage therapy was performed twice a day for five days at 9 am and 1 pm for 15 minutes. This study had limitations. Statistical differences between the groups did not reach significance. This could be due to the small sample size, which could be the cause of large variations in the data.

The three studies mentioned above have different results in several variables. They also have some similarities. For example, studies by Liao et al. (2021) [33] and Naseh et al. (2023)[34] have similar results with the same percentage of body weight increase between the intervention and control groups. On the other hand, the study by Montaseri et al.(2019)[32] is different from these two studies in that the intervention group experienced a significant increase in body weight. In contrast, Alvarez et al (2019) reported an average daily weight gain of 26.7 g (SD=6.7) among 54 LBWs examined[35]. The Kumar et al. (2013) study reported less than the Alvarez et al. (2019) study. Kumar et al. (2013) reported only 17

grams per day in the infant massage group[25]. This was in contrast to a study by Soriano et al. (2000), who found that the oil massage group gained significantly more weight over 30 days than the control group (703±129g vs. 576±140g)[27]. The research by Jamshaid et al. (2021)[22] was also consistent with Montaseri et al.(2019)[32] with a fairly high standard deviation of 276.3, which could be due to the long data collection period, so there was a lot of data variation, which was also related to the lack of control group data.

CONCLUSION

There was weight gain in both babies who received massage and those who did not. For the babies who received massage the weight gain was higher but not significant.

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CONFLICT OF INTEREST

All authors have no conflict of interest

AUTHOR CONTRIBUTION

All authors have contributed to all processes in this research, including preparation, data gathering, analysis, drafting, and approval for publication of this manuscript.

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