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Comparison Effectiveness Of Swing And Massage On Sleep Quality In Infants : A Scoping Review

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ABSTRACT

Background *Babies need quality sleep to support rapid physical growth and neurological development during the first year of life. Babies who experience sleep disturbances often show symptoms of fussiness, eating disorders, and even a higher risk for developmental disorders in the future. The rhythmic motion of a swing can stimulate the baby's vestibular system, helping them feel calmer and fall asleep faster. Massage helps babies relax by stimulating the parasympathetic*

*nervous system. The gentle touch during massage releases the hormone oxytocin, which can improve sleep quality.**Aim** Explore the comparative effectiveness of swing and massage on the sleep quality of infants. **Methods** This study was conducted using the scoping review method with the PRISMA-ScR framework for reporting transparency. Article searches were conducted on indexed databases such as PubMed, Science Direct, Wiley, and others. A total of 20 articles were selected based on inclusion and exclusion criteria, with critical appraisal using the Joana Briggs Institute (JBI) checklist. **Results** showed that swinging effectively accelerated infants' sleep transition to deep sleep phase (NREM) and prolonged sleep duration. On the other hand, massage increased sleep duration, reduced the frequency of awakenings, and provided physiological benefits such as increased oxygen saturation and stress reduction. The combination of massage with certain oils, such as medium-chain triglyceride oil, showed higher effectiveness. **Conclusion** Both swinging and infant massage effectively enhance sleep quality in infants, albeit through different mechanisms. Massage provides additional advantages by promoting physiological and emotional well-being, while swinging significantly benefits sleep duration.*

Keywords: *Baby swing, infant massage, baby sleep quality*

INTRODUCTION

Infancy is a critical stage in sleep development as infants begin to develop more regular sleep patterns compared to the neonatal period. Quality sleep in infants is essential for physical, emotional, and cognitive development. Sleep supports processes like memory formation, emotion regulation, and immune function. Conversely, sleep disturbances can negatively impact an infant's growth and well-being, as well as lead to increased stress and fatigue in parents, affecting overall family dynamics (Adams et al., 2019; Butler et al., 2024; Baglioni et al., 2022). During sleep, growth hormones are released, aiding in cell regeneration, muscle strengthening, and the formation of brain synapses, which are fundamental for learning and memory. Infants experiencing sleep disturbances often exhibit symptoms such as fussiness, feeding issues, and a higher risk of future developmental disorders (Wang et al., 2024). These challenges underline the importance of interventions that can enhance infant sleep quality. Traditional methods like swinging and infant massage have been widely used to improve sleep. Swinging involves rhythmic movements that mimic the intrauterine environment, calming infants and helping them fall asleep faster. It also alleviates discomfort from conditions like colic or gas (Oyedokun et al., 2021. Infant massage, on the other hand, focuses on tactile stimulation and relaxation, stimulating the release of oxytocin and reducing cortisol levels. Studies indicate that massage is particularly effective in extending sleep duration and reducing anxiety levels in infants (Mrljak et al., 2022). Baby massage is better done by the baby's parents. Babies who are massaged for approximately 15 minutes will feel more relaxed, sleep more soundly, their development and growth will be better (Manurung, 2020). In Indonesia, swinging is a common practice, especially in rural areas, using traditional tools like kain gendong (Rahmawati et al., 2022). Meanwhile, infant massage has gained popularity due to increasing awareness of its benefits (Sinabariba et al., 2022). While both methods have proven benefits, research suggests that massage shows more significant outcomes in improving sleep quality and reducing crying intensity compared to swinging. However, direct comparative studies between these methods remain limited (Nahidi et al., 2017).

METHOD

This research was prepared using the scoping review method. The framework as a guide for conducting a scoping review adapts from Munn et al., 2018. Formulating a 5-step scoping review (1) Formulating review questions, (2) Selecting research articles, (3) Article Selection, (4) Extracting and mapping themes, (5) and Summarizing results. Determine relevant data to extract with the use of tools, such as the PRISMA-ScR guide for reporting transparency.

A. Formulating Review Questions

The PICO framework was used to identify scoping review questions. A well-formulated research question should include the components of problem, intervention, comparison, and outcome. The PICO scheme can be used universally for any scientific endeavor in any discipline with any study design. The argument is drawn from four abstract components that are common to any research, namely the object of research, theory/method, hypothesis (zero), and the goal of generating knowledge.

Table 1
Framework Research Question

Population	*Intervention*	*Comperation*	*Outcome/Study Design*
Baby OR Infant	*Swings*	*Massage*	*Sleep Quality*

B. Identifying Relevant Articles

Identifying significant research and formulating a plan for where to explore, what terms to search, which references to seek, the time span, and language choices are all included in this stage. Thoroughness and scope are crucial during the search for suitable articles in this scoping review. Therefore, setting the inclusion and exclusion criteria in accordance with the framework created is the first stage, ensuring that the data collected remains focused on the intended context. The incorporation and prohibition criteria for this scoping review are as takes after:

Table 2
Identify Relevan Arcticle

Inclusion Criteria	Exclusion Criteria
1. Relevant articles that discuss the effectiveness of swings and massage on sleep quality in infants 2. Articles published in 2014 - 2024 3. Articles published in English 4. Primary research or original articles 5. Full text	1. Articles that contain opinions 2. Book review/article review 3. Manuscript publication

This scoping review includes articles from the last ten years, focusing on original research published in English, excluding opinion/commentary articles, book reviews, and manuscripts. The search keywords were determined using MESH and Boolean terms: “Effectiveness AND Baby OR Infant AND Swings AND Massage AND Sleep Quality.” These keywords were then used to search the PubMed, Science Direct, Wiley, Crossref, Cochrane, and Google Scholar databases, all indexing health science articles.

C. Article Selection

From the database searches (PubMed, Science Direct, Wiley, Google Scholar, Crossref, and ProQuest), 334 articles were found and saved into Mendeley. After filtering and removing duplicates (21 via Covidence), 313 articles remained. Of these, 188 were irrelevant, leaving 125 articles. After applying inclusion/exclusion criteria (e.g., wrong outcomes, patient population, intervention, etc.), 105 articles were excluded, resulting in 20 articles for the scoping review. This process is described in the PRISMA Flowchart (Page et al., 2021).

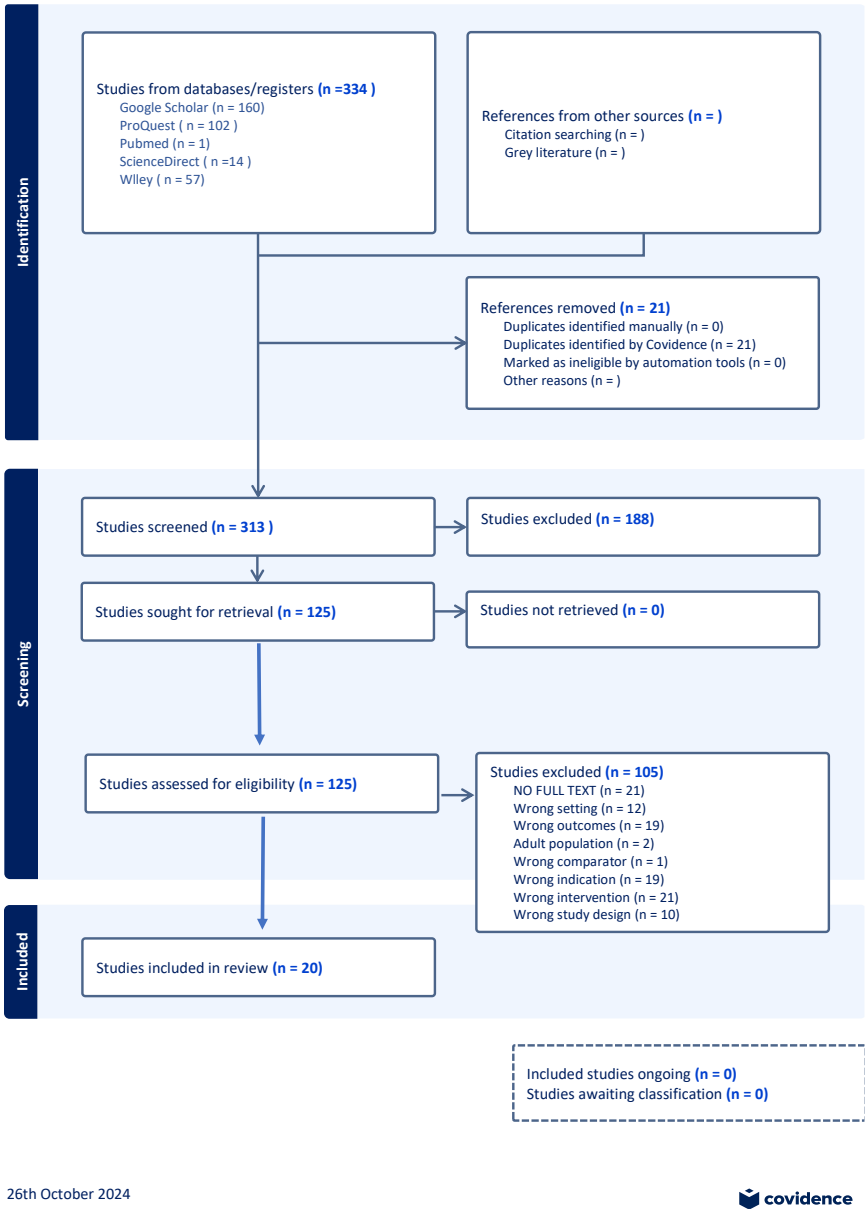

Figure 1. PRISMA

D. Critical Appraisal

The instrument utilized to evaluate the article's quality was the Joana Briggs checklist from the Joana Briggs Institute. All articles in the research method used a quantitative design of 20 articles consisting of a randomized control trial method of 10 articles, 7 articles using the Quasi Experimental Study method, 1 article using a cross sectional method and 2 qualitative study articles. There is a critical assessment checklist specific to each study approach. The Joana Briggs Institute (JBI) uses a critical evaluation method to evaluate the quality of articles since it covers a wide range of research genres. Based on the overall score from the critical evaluation, the researcher gave the piece a value. Setting the category or value criterion for each question with the following parameters serves as the researcher's guide when making key decisions:

0: No response (unanswered)
1: Answer is given, but incomplete

2: Answer is provided, but unclear or partial
3: Answer is provided, complete, and thorough
InIn the following step, researchers classify the total value according to the limits set by the researchers based on the research type, as follows:

Table 3
Critical Appraisal Assessment Provisions

Research Mehod	Scale	Limitation Total	Grade	Category
RCT	0 = No 1 = Not Conduted 2 = Not Clear 3 = Yes	27-39 14-26 0 -13	A B C	Excellent Good Less Good
Quasi Eksperimental	0 = No 1 = Not Conduted 2 = Not Clear 3 = Yes	18-27 10-18 0-9	A B C	Excellent Good Less Good
Cross sectional	0 = No 1 = Not Conduted 2 = Not Clear 3 = Yes	19-24 9-18 0-8	A B C	Excellent Good Less Good
Quantitatif	0 = No 1 = Not Conduted 2 = Not Clear 3 = Yes	21-30 11-20 0-10	A B C	Excellent Good Less Good

Table 4
Critical Appraisal of RCT method

No	Questions	Article Assessment									
		1	3	7	10	11	14	15	16	17	18
1	Was randomization correctly utilized for assigning participants to the treatment groups?	3	3	2	3	3	3	3	3	3	3
2	Is the assignment to the treatment group kept confidential?	2	3	2	2	2	2	2	2	2	2
3	Are the treatment groups similar at baseline?	3	2	3	3	3	3	3	3	3	3
4	Are participants unaware of the duty of care?	2	0	0	0	0	0	0	0	0	0
5	Are those providing treatment unaware of the intervention task?	0	0	0	0	0	0	0	0	0	0
6	Does the assessor not know the outcome of the intervention task?	3	3	3	3	3	3	3	3	3	3
7	Whether the treatment groups received identical treatment, aside from the intervention being studied.	3	3	3	2	3	2	3	3	3	3
8	Is the follow-up thorough, and if not, are the differences between the bunches in the follow-up sufficiently explained and examined?	3	3	3	3	3	3	3	3	3	3
9	Are participants evaluated according to their assigned random groups?	3	3	3	3	3	3	3	3	3	3
10	Are outcomes assessed in the same manner for the treatment group?	3	3	3	3	3	3	3	3	3	3
11	Are outcomes measured consistently and reliably?	3	3	2	3	3	3	3	3	3	3
12	Was the correct statistical analysis applied?	3	3	3	3	3	3	3	3	3	3
13	Were any departures from the typical RCT design (person randomization, parallel bunches) legally addressed during the study's execution and analysis, and was the trial strategy reasonable?	3	3	3	3	3	3	3	3	3	3
Total Score		34	32	32	33	32	31	32	32	32	32
Grade		A	A	A	A	A	A	A	A	A	A

Table 5
Critical Appraisal Design Quasi Experimental Assessment

No	Questions	Article Assessment						
		A2	A4	A5	A6	A8	A 13	A 20
1	Is it clearly indicated within the inquire about what is implied by 'cause' and 'effect' (i.e., there's no disarray with respect to the arrange of the factors)?	3	3	3	3	3	3	3
2	Are the participants included in the comparison similar?	3	3	3	0	3	0	0
3	Were the participants in the comparison group given any treatment or intervention other than the one being studied?	3	3	3	1	3	1	1
4	Is there a control group included in the study?	3	3	3	3	3	3	3
5	Were outcomes measured at multiple points before and after the intervention or exposure?	3	3	3	0	3	3	5
6	Were the results of the members within the comparison gather measured reliably?	3	3	3	1	3	3	3
7	Were the results of the members within the comparison gather measured reliably?	3	3	3	3	3	3	2
8	Are the outcomes measured with reliability?	3	1	1	1	3	1	1
9	What statistical analysis is most suitable for this study?	3	3	3	1	3	3	3
Total		27	25	25	13	27	20	19
Grade		A	A	A	B	A	A	A

Tabel 6
Critical Appraisal of Crosssectional Assessment Design

No	Questions	Article Assessment
		A12
1	Are the inclusion criteria for the sample clearly specified?	3
2	Is there a detailed description of the research subjects and their settings?	3
3	Is the exposure assessed using valid and reliable methods?	3
4	Were objective and standardized criteria employed to measure conditions?	3
5	Were potential confounding factors identified?	3
6	Were strategies for addressing confounding factors discussed?	3
7	Were the results measured using valid and reliable methods?	3
8	Was the statistical analysis appropriate for the study?	3
Total		24
Grade		A

E. Data Charting

Data charting is then used to group various points or aspects of the article, such as the study title, author, year of publication, country of origin, research aims, research design, sample size, and research outcomes or findings, based on the 20 selected publications. a

Table 6
Data Charting

No	Title	Country	Method	Population and Sample	Data Analysis	Result	Grade
1	Whole-Night Continuous Rocking Entrains Spontaneous Neural Oscillations with Benefits for Sleep and Memory (Perrault et al., 2019)	Switzerland	Random crossover design (RCT)	18 healthy adult participants (10 women and 8 men) with a mean age of 23.39 ± 1.61 years	Repeated-Measures ANOVA: To compare sleep parameters (sleep phase duration, between switched and non-switched nights). Paired t-test: To evaluate changes in sleep parameters and memory consolidation between conditions. Chi-Square Goodness-of-Fit Test: To assess the regularity of brain oscillation events triggered by swinging from a swing. Correlation: Linking increased spindles with improved declarative memory.	Swinging during a full night's sleep shortened the time to NREM sleep and prolonged the duration of sleep in the N3 (deep sleep) phase. $p = 0.0006$, indicating that swing stimulation prolonged the deep sleep phase	A
2	Rocking Promotes Sleep in Mice through Rhythmic Stimulation of the Vestibular System (Kompotis et al., 2019)	Switzerland	Experiment	Conducted on mice	Repeated ANOVA (ANOVA): To evaluate the effect of swing on sleep variables (transitions, sleep time, and EEG activity). Paired t-test: For data comparison between rocking and stationary conditions. Discrete Fourier Transform: To analyze the EEG spectrum and detect sleep-related frequency changes.	Swinging at a specific frequency (1.0 Hz) increased NREM sleep duration and reduced the frequency of waking times and accelerated the time to sleep. showed an increase in NREM sleep time by 48.4 ± 5.9 minutes or about +12% of the average time not swung ($p < 0.001$).	A
3	Failure of an electric rocking device to improve neonatal sleep (Poets et al., 2024)	Jerman	Randomised Crossover Design (RCT)	The study involved 20 premature babies or babies with certain conditions who were placed in the neonatal care unit.	Using a randomized crossover design, where infants were tested in two conditions: first in an electric swing and second without a swing	There was no critical distinction in time went through resting between the dynamic and inert swing conditions: 83% (range 22-97%) during active swing vs. 85% (range 49-96%) during inactive ($p > 0.05$).	A
4	Development of an Automatic Baby Cradle	India	Experiment	This research focuses on an	An experiment design to build and test an automated swing prototype. Algorithms used include sound	Precision technology reaches 97% accuracy, ensuring this	A

	System (Mr Hazari Naresh et al., 2024)			automatic swing system for babies.	detection, temperature, humidity, and weight of the intervening baby.	cradle works well in providing comfort for baby	
5	Embraced Separation: Exploring Methods of Breath Attunement in Speculative Infant Swings (Oyedokun et al., 2021)	Amerika Serikat	Experiment	Two participants (User A and User B) were involved in the test	This research focuses on the speculative design of a smart baby swing that uses sensorimotor synchronization (SMS) based on the rhythm of the parent's breath to create a remote emotional connection between parent and baby...	Breath-based automatic baby swings can strengthen the parent-child relationship despite physical distance.	A
6	IoT-based Smart Baby Swing with an Android Mobile Application (Ganasan & Zainal, 2023)	Malaysia	Pengembangan ayunan bayi berbasis IoT (experiment)	The population and sample were Infants (mainly cared for by caregivers or working parents in developed countries).	Real-time Notification: Users receive notifications when the baby cries. Live Monitoring: Streaming video through the ESP32 camera.	The IoT-based swing system can detect the baby's cry and send notifications to the user, and can conduct real-time surveillance through video streaming.	B
7	Infant Crying and the Calming Response: Parental Versus Mechanical Soothing Using Swaddling, Sound, and Movement (Möller et al., 2019)	Belanda	Randomize Control Trial	Population: Infants aged 0-6 months who frequently cry. Sample: 69 infants	Experiments with two conditions (parental care and mechanical swing) each consisted of three phases: baseline, supine, and soothing.	Both methods (mechanical and parental) successfully reduced infant fussiness and heart rate, suggesting that they are effective in calming infants in both parental ($B = -1.05$, $SE = 0.11$, $p < 0.001$) and mechanical swing ($B = -0.81$, $SE = 0.12$, $p < 0.001$) conditions.	A
8	Effects of Semi-Upright Swings on Vital Signs in NICU Infants (Kadakia et al., 2023)	Amerika Serikat	Prospective observational design	Population: Infants in the Neonatal Intensive Care Unit (NICU), gestational age ≥34 weeks. Sample: 65 infants.	Within-subject comparison of infant positioning in a semi-upright swing with supine positioning in a swinging bed.	There was no critical distinction in newborn child vitalsign between the semi-upright swing position and the prostrate swing position, mean oxygen saturation between swing positions (95,55%, CI 95,52–95,59%) and supine position	A

						(95,68%, CI 95,65–95,72%) (p > 0,05).	
9	The Philosophical Values of the Bapukung Tradition of the People of South Kalimantan (Rahmawati et al., 2022)	Indonesia	Qualitative Phenomenelogy	Population: Parents and infants in Tabalong region, South Kalimantan. Sample: 9 participants from different ethnicities (Banjar, Sundanese, and Javanese), who have practiced or are currently practicing the Bapukung tradition.	Observation, interviews, and direct documentation of Bapukung practices. Data Validation: Triangulation through cross-checking data from nine participants.	The tradition of swinging bapukung provides many benefits for babies, such as improving sleep quality, strengthening the neck and spine, and calming fussy babies.	A
10	The Efficacy of Massage as a Nightly Bedtime Routine on Infant Sleep Condition and Mother Sleep Quality: A Randomized Controlled Trial (Rezaei et al., 2023)	Iran	Randomize Control Trial	Population: Infants aged 15-20 days. Sample: 140 infants divided into two intervention groups with bedtime massage and a control group without massage.	Intercession: The rub gather gotten rub for 15 minutes some time recently sleep time, three times in 5-minute cycles, for two weeks. Rebellious: Brief Newborn child Rest Survey and Pittsburgh Rest Quality List for moms. Data Collection: Conducted before, during the first week, and the second week after the intervention.	Critical advancement in rest idleness, within the mediation gather with rub compared to the control bunch (p = 0.000, estimated time of arrival = 0.099).	A
11	Comparison of Massage and Prone Position on Heart Rate and Blood Oxygen Saturation Level in Preterm Neonates Hospitalized in Neonatal Intensive Care	Iran	Randomize Control Trial	Population: Preterm infants of 34-37 weeks gestational age admitted to the NICU. Sample: 75 preterm infants divided into three groups: massage (n=25), prone	Massage group: 15 minutes of massage using the Tiffany Field method (5 minutes prone, 5 minutes supine, 5 minutes prone again).	Prone position massage significantly reduced heart rate (HR) and increased oxygen saturation (SaO_2), There was a significant increase in SaO_2 among the massage and position groups compared to the control group, with the highest mean values on day five for the position (95.26 ± 1.46) and massage (94.09 ± 1.94) groups	A

	Unit: A Randomized Controlled Trial (Elsagh et al., 2019)			position (n=25), and control (n=25).		($F = 10.18$, $p < 0.001$). Overall, SaO_2 increased significantly over time ($p = 0.02$).	
12	Perspectives on Interpersonal Touch are Related to Subjective Sleep Quality (Dueren et al., 2023)	Inggris	Cross - Sectional	Population: Healthy adults in the UK. Sample: 15,049 healthy adults	Chi square To evaluate differences in the distribution of responses to specific types of touch (positive, neutral, or negative) related to sleep.	Affective touch before bedtime, such as hugs and massage, was reported to have a positive effect on sleep qualitynotable distinctions were observed between the impacts of positive, neutral, and negative touch on sleep quality for each type of touch tested ($p < 0.001$).	A
13	Effect of Massage on Behavioural Responses of Preterm Infants in an Educational Hospital in Iran (Baniasadi et al., 2019)	Iran	Quasi Experiment	Population: Preterm infants with 28-34 weeks of gestation. Sample: 45 preterm infants in NICU in Iran	Repeated ANOVA analysis to compare changes before and after the intervention.	Massage can calm and stabilize behavior and improve sleep quality after several days of therapy in premature infants in the NICU. After massage, the infants' sleep condition showed significant improvement ($F = 12.31$; $p = 0.003$), with an increase in sleep duration over the five days of intervention.	A
14	The Comparison of the Effects of Massaging and Rocking on Infantile Colic (Nahidi et al., 2017)	Iran	Randomize Control Trial	Population: Healthy infants less than 12 weeks old with infantile colic. Sample: 100 infants (50 infants in massage group and 50 infants in swing group) from a pediatrics clinic in Iran.	Data were analyzed using t-test, Chi-square, and repeated ANOVA ($P<0.05P<0.05P<0.05$). Crying patterns (number, duration, and severity of crying) were recorded by parents using a daily observation sheet. Infant sleep duration was also recorded.	Massage group: Increased from 9.22 hours/day to 13.12 hours/day ($P<0.001P<0.001P<0.001$). Swing group: Increased from 12.24 hours/day to 12.40 hours/day ($P<0.001P<0.001P<0.001$).	A
15	Comparative Effect of Mother's Hug and Massage on Neonatal Pain Behaviors Caused	Iran	Randomize Control Trial	Population: Healthy full-term infants aged 4-6 days who underwent blood	o compare variables among the three groups, the Kruskal-Wallis test was utilized (maternal hug, massage, and control).	Compared to massage (2.02 minutes) and control (2.64 minutes), the maternal hug group's sobbing time was	A

	by Blood Sampling: A Randomized Clinical Trial (Roshanray et al., 2020)			tests to screen for hypothyroidism. Sample: 135 infants, with 45 infants divided into maternal hug, massage, and control groups.	Assess pain based on changes in facial expressions, breathing patterns, movements with hands and feet, level of consciousness, and crying with the neonatal pain scale (NIPS/Neonatal Infant Pain Scale).	shorter (1.58 minutes) ($p<0.001$).	
16	Efficacy of Medium-Chain Triglyceride (MCT) Oil Massage on Growth in Preterm Infants: A Randomized Controlled Trial (Liao et al., 2021)	Taiwan	Randomize Control Trial	Population: Preterm infants with birth weight between 1500-2000 grams. Sample: 48 preterm infants divided into three groups: - Group 1 (Massage with MCT oil): 16 infants. - Group 2 (Massage without oil): 16 infants. - - Group 3 (No intervention): 16 infants	Data were analyzed using mixed effects method to evaluate changes in body weight, height, and head circumference.	The massage group with MCT oil had a significant weight gain compared to the group without intervention ($P<0.05P<0.05P<0.05$).	A
17	Comparison of the Effect of Foot Reflexology and Body Massage on Physiological Indicators and Bilirubin Levels in Neonates Under Phototherapy	Iran	Randomize Control Trial	Population: Infants with hyperbilirubinemia undergoing phototherapy. Sample: 51 infants (17 infants per group): - Reflexology group:	Using Chi-square test and Fisher's exact test to compare variables between groups. Measurements: - Physiological indicators: Pulse rate, respiration using oxygen saturation. - Serum bilirubin level: Measured photometrically from venous blood samples.	There was a noteworthy contrast within the reflexology and body rub bunches compared to the contro ($p<0.05p<0.05p<0.05$). Mean value of bilirubin level after intervention: - Reflexology: 9,46 ± 1,094. - Body Massage: C: 10,42 ± 1,202.	A

	(Jazayeri et al., 2021)			Massage on the foot area for 15 minutes. - Body Massage Group: Massage the whole body in a circular motion for 15 minutes. - - Control Group: Did not receive any intervention.		- Control: 11,92 ± 0,953.	
18	Effectiveness of Infant Massage on Strengthening Bonding and Improving Sleep Quality (Hartanti et al., 2019)	Indonesia	Randomize Control Trial	Population: Infants aged 3-6 months in the Ponorogo region, East Java. Sample: 120 mothers and infants, divided into 60 infants in the massage group (treatment) and 60 in the control group (no massage).	Comparison before and after intervention using Mann-Whitney Test. Massage group: Mothers were trained in infant massage for 15 minutes, performed twice a day for 30 days. - Control group: No intervention. Measurements: - Infant sleep quality: Using the Brief Infant Sleep Questionnaire (BISQ). - Mother-infant bonding: Using the Maternal Attachment Inventory (MAI). - - Data were collected before and after the intervention.	The massage group had a considerable improvement in sleep duration ($p<0.001p<0.001p<0.001$; effect size = 2.79). Mean sleep duration after intervention: - Massage group: 9.21 ± 0.15 hours. - Control group: 8.83 ± 0.12 hours. - Night waking frequency was significantly reduced in the massage group ($p < 0.001$; effect size = -2.78). - The duration of night waking was significantly reduced in the massage group ($p = 0.001$; effect size = -0.80).	A
19	Mothers' Experience of infant massage in Child Health	Swedia	Kualitatif deskriptif	The sample was 11 mothers with infants aged 2-6 months who lived	Interviews were conducted online using Zoom. Data analysis using qualitative content analysis method	Improved relationship with their child, emotional benefits, and help to cope with issues such as	A

	Care: A qualitative interview Study (Danielsson et al., 2024)			in Sweden and attended infant massage training at a pediatric health service.		digestive discomfort like contipation	
20	The Effect of Infant Massage on The Quality of Sleep of Infants Aged 0–12 Months (Manurung, 2020b)	Indonesia	PreExperiment one group	Population: Infants aged 0-12 months at Imelda Workers General Hospital, Medan, Indonesia. Sample: 30 infants (12 boys, 18 girls), selected by Accidental Sampling technique.	Analysis using One Group Pre-Test - Post Test. Measurement: - Infants' sleep quality was measured before and after massage using a 15-question questionnaire including sleep duration, frequency of night wakings, and comfort level of infant sleep. - Data analysis using Wilcoxon Signed Rank statistical test	Most infants had good sleep quality (66.7%), while 23.3% had fair sleep quality, and only 10% had poor sleep quality.	A

F. Summarizing Results

In this stage, the author took a three-phase approach to compiling, summarizing, and announcing the comes about, which to begin with included dispersing article characteristics by nation, article review as well as investigate strategy. Moment, mapping based on sub-sub topics assembled into subjects. The ultimate stage was a audit of the suggestions of the discoveries in terms of future inquire about, hone and approach.

RESULTS AND DISCUSSION

A. Result

1. Article Characteristics by Country

Articles used for the scoping review were taken from developed and developing countries. Articles from developed countries include 9 articles, 2 articles from Swezerland, 2 articles from the United States, 1 article from Germany, 1 article from the Netherlands, 1 article from the United Kingdom, 1 article from Taiwan and 1 article from Sweden, and developing countries include 11 articles, 6 articles from Iran, 3 articles from Indonesia, 1 article from Malaysia, 1 article from India.

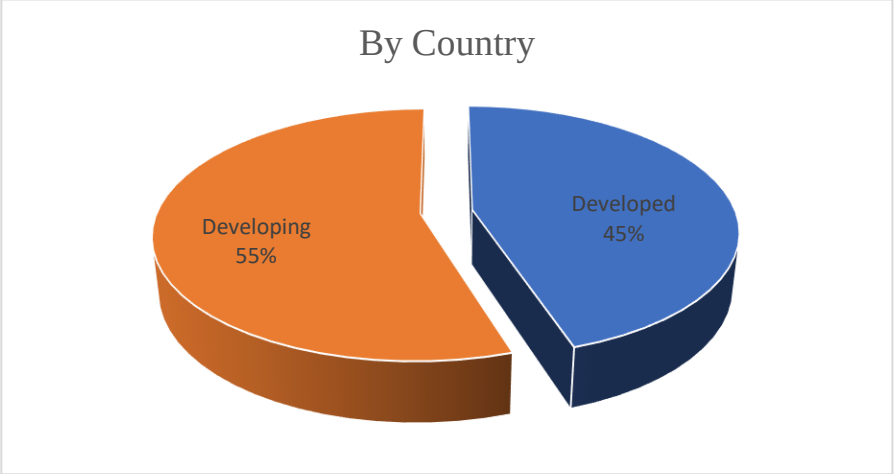

Figure 2. Diagram by Country of Origin

2. Article Characteristics by Study Design

The research design consists of quantitative research design as many as 18 articles consisting of quasi experiment 7 articles, Randomize Control Trial 10 articles, Cross Sectional 1 article, and qualitative research design 2 articles.

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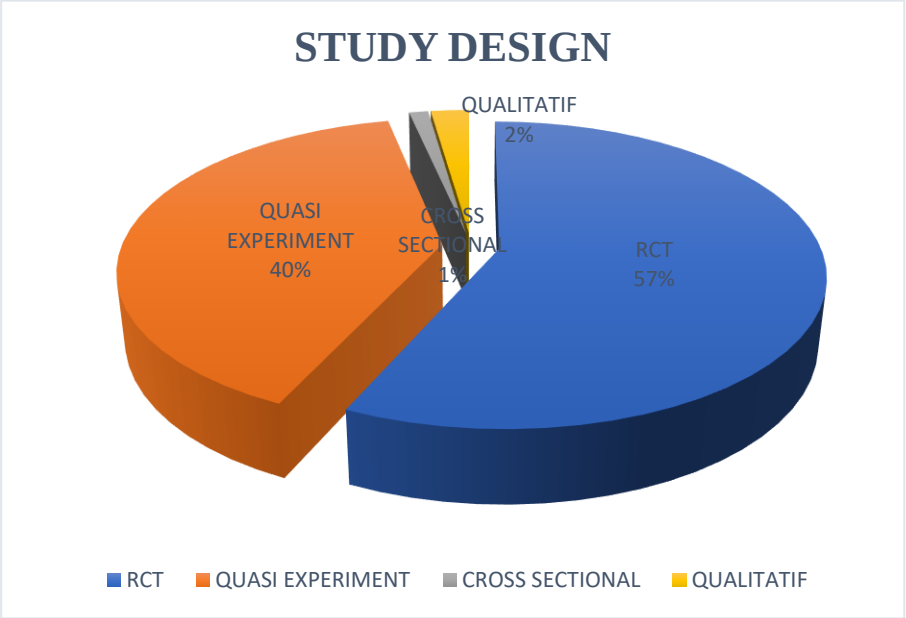

Figure 3. Study Design

3. Characteristics Based on Journal Quality

Based on the quality of articles conducted through critical appraisal using the Joana Brigs Institute (JBI), 19 articles with grade A and 1 article grade B were obtained.

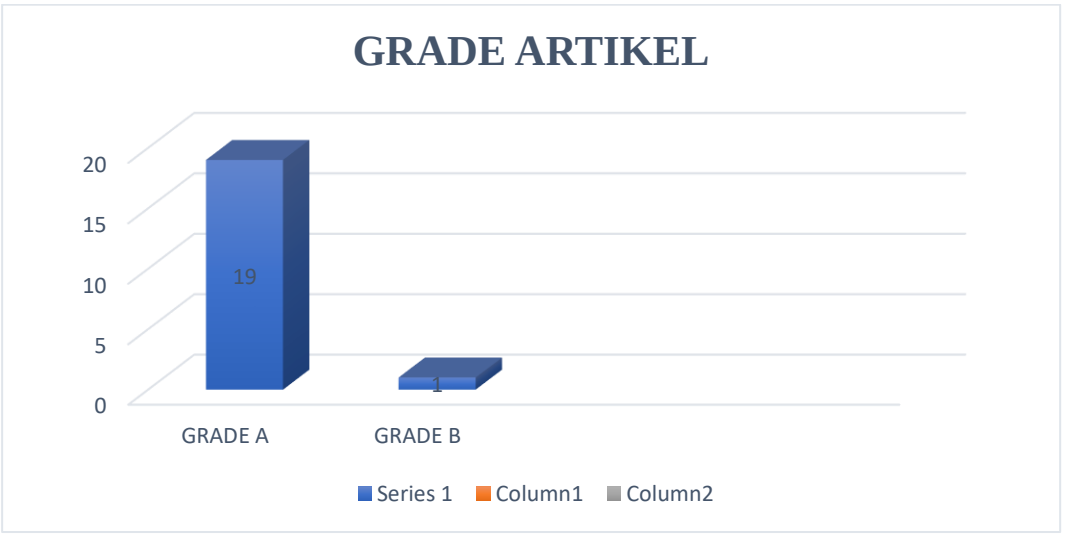

Figure 4. Grade Artikel

a. Theme Analysis

Table 7
Theme Analysis

Theme	Sub Theme	Article
Effect of swing on baby's sleep quality	a. Effect of continuous swing on sleep quality and memory benefits.	A (1,2) 3,4,5,6,7,8,9)
	b. Effectiveness of automatic swing devices on infant sleep quality	A (3,5,6,7,8)
	c. Implementation of traditional and modern swings	A (3,7,8,9)
Effectiveness of infant massage in improving infant sleep quality	a. Benefits of infant massage on infant health and maternal well-being.	A (10,11,15,16,18, 19)
	b. Psychological effects of massage on mother and baby	A (12,13,14,15,16, 17)
	c. Massage as a non-pharmacological therapeutic tool to improve infant and maternal health.	A (18,19)
Comparison of swing and baby massage in improving baby's sleep quality		A (1,2,3,4,5,6,7,8, 9,10,11,12,13,14 ,15,16,17,18,19, 20)

B. Discussion

1) The Effect of Swing on Baby's Sleep Quality

a) Effect of continuous swing on sleep quality and memory bene

Continuous swinging has been shown to enhance sleep quality and memory consolidation by promoting faster transitions to the Non-Rapid Eye Movement (NREM) phase, extending deep sleep duration, and reducing wakefulness. Studies indicate that swinging increases slow oscillations and fast spindle activity, which stabilize sleep and support memory consolidation (A1). In infants, traditional swings like Bapukung improve sleep quality by reducing restlessness and synchronizing brain oscillations, enhancing thalamocortical spindle activity and cortical slow waves, both critical for memory processes (A9). Similar effects were observed in animals, where vestibular stimulation from swinging accelerated sleep onset and increased total sleep time (Kompotis et al., 2019, A2).

b) Effectiveness of automatic swing devices on infant sleep quality

Automated swing devices, such as electric swings and smart cradles, are designed to improve infant sleep by mimicking traditional swings, offering convenience for busy parents. Research

indicates these devices can reduce sleep latency through natural rhythmic patterns, although their impact on sleep quality varies depending on features like swing rhythm and intensity (A4, A6). Studies show they are generally safe, even for premature infants, but may lack significant benefits for sleep efficiency or fragmentation in certain cases (A3, A8). Potential risks, such as oxygen desaturation in semi-sitting positions, highlight the need for device modifications for infants with specific conditions (A8). While helpful, overuse could reduce vital parent-infant interaction, emphasizing the importance of combining automated devices with hands-on care for holistic development (A7).

c). Implementation of Traditional and Modern

Traditional swinging methods, such as the Bapukung technique in South Kalimantan, where babies are wrapped in cloth and swung in a sitting position, have long been associated with improved sleep quality, strengthened neck and spine, and reduced risk of illnesses like coughs and flu (A9). Modernized swings, including electric and IoT-based cradles, replicate these benefits with added features such as sound sensors, motion detectors, and smartphone integration for remote monitoring and safety, addressing risks like Sudden Infant Death Syndrome (SIDS) (Balqis & Jln, 2023; Abdulah et al., 2023; A4). Comparative studies found that the Ayun Bapukung method significantly improved sleep quality, with 79.41% of infants experiencing better sleep compared to 25.81% in regular swing groups (Ariestini et al., 2022).

2) Effectiveness of Baby Massage in improving the quality of baby's sleep

a). Benefits of baby massage for baby health and mother's well-being

Research findings reveal that infant massage plays a role in improving sleep quality, with benefits including increased sleep duration and reduced frequency of awakenings (A18). It also supports infant growth by promoting growth hormone production during sleep (A18). For premature infants, massage with medium-chain triglyceride (MCT) oil has been shown to significantly increase weight gain compared to controls (A16). Additionally, massage can alleviate colic symptoms by enhancing intestinal peristalsis and blood circulation (A14), and reduce bilirubin levels in infants with hyperbilirubinemia (A17) (Rismawati et al., 2019).

b). The Effect of Massage on Mother and Baby Psychology

Infant massage not only provides physiological benefits but also strengthens the emotional bond between parent and child. Studies show that massage enhances infant sleep quality, reduces parental anxiety, and fosters positive interactions (A18, A19, A12). Research by Yanti et al. (2021) found that massage stimulates serotonin secretion, increasing sleep depth and duration, while Putri (2024) reported improvements in sleep quality through daily 30-minute massages.

Additionally, massage helps mothers with postpartum depression by promoting oxytocin release, improving mood and bonding (A19). In premature infants, daily 15-minute massages for five days increased sleep duration and reduced restlessness (A13). Studies also found that 15-minute massages improved sleep quality in infants aged 0-12 months, with significant results ($p < 0.05$) in improving sleep patterns (A20, Gultom, 2020; Wardani et al., 2023).

c). Massage as a non-pharmacological therapy tool to improve the health of babies and mothers.

Infant massage is a widely recognized non-pharmacological intervention that enhances infant health and maternal well-being through tactile stimulation. It promotes physical growth, emotional development, and strengthens the mother-child bond (A18, A20). Studies have shown that infant massage improves sleep duration, reduces awakenings, and enhances sleep quality, with 66.7% of infants experiencing better sleep after the intervention (Manurung, 2020) (A20).

3) Comparison of baby swings and massage in improving baby sleep quality

Various methods, such as infant massage and swinging, are commonly used to improve infant sleep quality, each offering distinct benefits for infant development. Swinging, through its rocking motion, accelerates the transition to non-REM (NREM) sleep and increases deep sleep duration, supporting declarative memory consolidation and brain plasticity (A1, A2). In contrast, infant massage focuses on calming and physiological stability, improving sleep duration, weight gain, and overall well-being, especially with specific oils like medium-chain triglycerides (A10, A11). While swinging has limitations in premature infants or those with medical conditions, such as the potential for oxygen desaturation in low-birth-weight babies (A8), infant massage offers more consistent benefits, including better heart rate, oxygen saturation, and reduced physiological stress (A14, A15, A17) (Martin et al., 2024; Field, 2017). The combination of both methods may complement each other, depending on the infant's specific needs and context, to optimize development (Morse & Kothare, 2023).

CONCLUSIONS AND SUGGESTIONS

Each of the swinging and infant massage techniques has benefits for enhancing the caliber of a baby's sleep. It has been demonstrated that traditional swinging techniques, like Ayun Bapukung, significantly improve the quality of a baby's sleep, particularly by promoting declarative memory consolidation, extending the amount of non-REM (NREM) sleep, and offering comfort that mimics a mother's embrace. In contrast, baby massage provides broader physiological and psychological benefits, including decreased heart rate, increased oxygen saturation, and strengthening the emotional bond between baby and parent. In addition, It has been demonstrated that giving a baby a massage

may effectively lower physiological stress and greatly enhance the quality of their sleep, even in babies with certain medical conditions such as colic and high bilirubin. The combination of massage with medium-chain triglyceride oil further enhances its effectiveness. The health of the mother is also improved by both techniques, with infant massage enhancing the mother's sleep. Further research into combining the two methods or developing techniques for both may optimize infant sleep quality and overall well-being. In addition, innovation in swing design to ensure safety and maintain parent-infant bonding is highly recommended

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