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The Influence of Infant Massage on the Sleep Duration of Infants Aged 6-12 Months in TPMB X, Jagakarsa Sub-District, Srengseh Sawah Village

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Abstract---*The infancy period is a critical phase in the growth and development of babies, thus requiring special attention. One of the factors that can influence infant growth and development is sleep and rest. Massage can help reduce muscle tension, resulting in babies feeling more relaxed and experiencing deeper sleep. Based on a preliminary study conducted in the Integrated Health Post (Posyandu) of TPMB X's working area, it was found that 11 out of 26 infants (approximately 42.3%) experienced sleep disturbances. Furthermore, interviews with 10 mothers revealed that 7 of them (70%) were not aware of infant massage. Objective: To determine the influence of infant massage on the sleep duration of infants aged 6-12 months in TPMB X, Jagakarsa Sub-District, Srengseh Sawah Village. Methodology: This study employed a quasi-experimental design with the one-group pretest-posttest design. The population consisted of 35 infants aged 6-12 months, and a total sampling technique was utilized. The instrument used was a questionnaire that had been tested for validity and reliability. Data analysis was conducted using the Paired Samples Test. Results: The average sleep quality of infants before receiving infant massage was 12.714, while the average sleep quality after receiving infant massage was 14.086. Bivariate analysis showed a p-value of $0.000 < 0.05$. Conclusion: There is an influence of infant massage on the sleep duration of infants aged 6-12 months. Recommendation: It is recommended that mothers continue massaging their children by learning infant massage techniques to be able to massage their babies regularly and consistently at home, thereby preventing sleep disturbances and promoting optimal growth and development.*

Keywords---*infants aged 6-12 months, massage, sleep duration.*

1 Introduction

Infants are children under one-year-old who are entering the early stages of life characterized by rapid development. One of the factors influencing infant development is rest or the duration of sleep. The infant's body will produce growth hormones during sleep, so infants need sufficient sleep time to achieve optimal development (Permata, 2017). Sleep is one form of adaptation for infants to their environment. Infants aged 0-5 months will spend 80-90%

of their time sleeping. A newborn baby up to about 3 months old will spend about 15-17 hours sleeping, with 8 hours allocated for daytime sleep and 9 hours for nighttime sleep. As the baby grows older, the duration of sleep decreases. When reaching 6 months of age, babies require about 14 hours of sleep per day. Typically, this duration will be divided into 3 hours for daytime sleep and 1 hour for nighttime sleep (Syaukani, 2015).

According to WHO data in 2012 published in the Pediatrics journal, 33% of infants experience sleep disturbances (Collins, 2020). In Indonesia, based on a study by Sekartini in 2004, 44.2% of children under 3 years old experience sleep disturbances (Nugraheni & Ambarwati, 2018). In the Yogyakarta region in 2018, 13.6% of babies who did not regularly receive massage therapy experienced sleep problems (Fauziah & Wijayanti, 2018).

The implementation of infant massage needs to be carried out in healthcare facilities following the Minister of Health Regulation Number 37 of 2017 concerning Traditional Health Services Integration. Therefore, there is a need to increase the capacity of healthcare workers, namely midwives, to provide infant massage services. The initial step in organizing this is to develop a curriculum and training module for midwives in providing infant massage services for child development in Healthcare Facilities (Fasyankes).

Data on infants experiencing sleep problems in Srengseng Sawah Village are not yet known for certain. Based on a preliminary study conducted in the working area of TPMB X, it was found that there are 8 integrated health posts (Posyandu) with a total of 26 infants aged 6-12 months as of January 2023. After conducting a survey on Posyandu groups in the working area of TPMB X, it was found that 11 out of 26 infants (approximately 42.3%) experienced sleep disturbances. From these results, infants sleep less due to sleep disturbances complained by their parents such as frequent waking up at night, frequent crying, and restlessness, resulting in a lack of sleep fulfilment for the infants. Interviews with midwives at the Delima Integrated Health Post revealed that there is no infant massage service available, while at TPMB X, the interest of parents in infant massage is very high. From interviews with 10 mothers asking the question "Do you know about infant massage?" 7 mothers (70%) said they have long been familiar with infant massage. If the baby experiences difficulty sleeping, restlessness, and crying, they take the baby to a traditional massage therapist because so far, the mothers are not familiar with the correct infant massage techniques, so they are afraid to massage the baby themselves (Field et al., 2010; Li et al., 2016).

Introduction to regular and sufficient sleep patterns is crucial for meeting the needs of infants to derive sufficient benefits from both nighttime and daytime sleep, enabling them to remain energetic and cheerful for activities the following day. Sufficient sleep for infants, without frequent awakenings, promotes vitality and reduces fussiness. Establishing a regular sleep pattern for infants can aid in achieving optimal growth and development. The stimulation provided to infants through massage, which is a form of healthcare, can be administered within the family environment. It is affordable, comfortable, and safe when performed correctly (Permata, 2017).

Sleep quality refers to a state where an individual's sleep results in vigor and freshness upon awakening. According to Aziz & Hidayat (2007), sleep quality is an individual's satisfaction with sleep, characterized by the absence of fatigue, ease of arousal, restlessness, lethargy, apathy, dark circles around the eyes, swollen eyelids, red conjunctiva, eye irritation, fragmented attention, headaches, and frequent yawning or drowsiness. Good sleep quality appears to occur naturally, without the need to struggle to rest or experience anxiety, and without the need for medication (Marpaung, 2013).

Infants with poor sleep quality may experience negative impacts on their development, such as decreased immunity increased emotional sensitivity and decreased concentration. Factors related to infant sleep duration include activity levels, fatigue, environment, health conditions, and nutritional intake (Mardiana et al., 2014).

Addressing sleep problems in infants can be achieved through massage therapy. Massage, as a skill, has a long history and is considered one of the oldest methods for relieving fatigue and stress. Initially, massage was believed to be one of the best ways to alleviate fatigue, stress, stiff muscles, and body aches. Infant massage coincides with the emergence of the human ability to perform massage therapy (Pados & McGlothen-Bell, 2019). Infant massage is also seen as comfortable communication between the mother and the baby. It is an expression of parental love through touch. A mother's touch and embrace are basic needs for a baby, all of which have a tremendous impact on the baby's development. The gentle touch provided during infant massage is an important stimulation in child development. Children who receive directed and regular stimulation tend to develop faster than those who receive less or no stimulation (Syaukani, 2015).

Infant massage is one form of stimulation that stimulates the development of both the structure and function of cells in the brain (Riksani, 2014). Gentle massage helps relax muscles, resulting in a calm and restful sleep for infants. The gentle touch from a mother's massage is a beautiful bonding experience between the baby and the parent, and when massaging the baby, it can induce deep sleep, leading to enhanced concentration upon waking up (Roesli, 2001).

A study conducted by Warsini & Nugraini (2016) titled "The Influence of Infant Massage on Infant Sleep Quality in Duwet Village, Wonosari Sub-District, Klaten Regency" found statistically significant effects of infant massage on infant sleep quality. The difference between this and previous studies lies in the measurement of sleep quality. While previous researchers assessed sleep quality based on the baby's appearance upon waking up, such as whether they seemed fresh and cheerful or fussy, this study measures sleep quality based on the duration of the baby's sleep and whether the baby frequently wakes up or is fussy during sleep.

Based on the above data, the researcher aims to further investigate the "Influence of Infant Massage on the Sleep Duration of Infants Aged 6-12 Months in TPMB X, Srengseng Sawah Village, Jagakarsa Sub-District, South Jakarta in 2023."

2 Research Method

The research method employed by the author is a quasi-experimental method with a pretest-posttest one-group design. Quasi-experiment is a type of research conducted to determine the effects resulting from a treatment given intentionally by the researcher (Arianto, 2012). First, a pretest was conducted on the group, followed by an intervention involving massaging the infants (X) in the group. After the intervention, a posttest was then conducted on the same group.

3 Result and Discussion

Univariate analysis

Table 1
Frequency Distribution of Respondents Based on Age at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023

Baby's Age	Frequency	Percentage (%)
6 Months	3	8,5
7 Months	8	22,9
8 Months	8	22,9
9 Months	7	20,0
10 Months	5	14,3
11 Months	4	11,4
Total	35	100

Table 1 shows that out of 35 respondents, there were 3 respondents (8.5%) aged 6 months, 8 respondents (22.9%) aged 7 months, 8 respondents (22.9%) aged 8 months, 7 respondents (20.0%) aged 9 months, 5 respondents (14.3%) aged 10 months, and 4 respondents (11.4%) aged 11 months.

Table 2
Frequency Distribution of Respondents Based on Gender at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023

Gender	Frequency	Percentage (%)
Male	16	45,7
Female	19	54,3
Total	35	100

Table 2 shows that out of 35 respondents, there were 16 respondents (45.7%) male and 19 respondents (54.3%) female.

Table 3
Frequency Distribution of Respondents Based on Health Status at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023

Health Status	Frequency	Percentage (%)
Healthy	35	100
Sick	0	0
Total	35	100

Table 3 indicates that out of 35 respondents, all 35 respondents (100%) were in good health.

Table 4
Frequency Distribution of Respondents Based on Sleep Duration Before Massage at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023

Sleep Quality	Frequency	Percentage (%)
Insufficient (<14 hours)	27	77,1
Good (\geq 14 hours)	8	22,9
Total	35	100

Based on the above table, out of 35 respondents, 27 respondents (77.1%) experienced insufficient sleep duration, and 8 respondents (22.9%) experienced good sleep duration.

Table 5
Frequency Distribution of Respondents Based on Sleep Duration After Massage at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023

Sleep Quality	Frequency	Percentage (%)
Insufficient (<14 hours)	11	31,4
Good (\geq 14 hours)	24	68,6
Total	35	100

Based on Table 5, out of 35 respondents, 11 respondents (31.4%) experienced insufficient sleep duration, and 24 respondents (68.6%) experienced good sleep duration.

Bivariate analysis

Table 6
Results of the Normality Test

	N	p-value
Pre-Test	35	0,107
Post-Test	35	0,073

Based on the above table, it is known that the p-value for all data is > 0.05 , indicating that the research data is normally distributed. Therefore, the data analysis used is a parametric test, namely the Paired Samples Statistics test, with the following analysis:

Table 7
Difference in Sleep Duration Scores Before and After Infant Massage at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023

	Mean	Std. Dev	Difference	<i>p</i>	N
Pre-Test	12,714	1,2265	1,372	0,000	35
Post-Test	14,086	1,1146			

Table 7 shows the observation results of the baby's sleep duration before infant massage (pretest) with a mean of 12.714 hours, indicating that the average respondent experienced insufficient sleep duration before infant massage. Whereas, the average sleep duration of babies after infant massage was 14.086 hours, indicating that the average respondent experienced good sleep duration after infant massage. Based on the average sleep duration of babies before and after infant massage, there was an average difference of 1.372 hours, indicating an increase in the average sleep duration of babies after infant massage. Based on the statistical test results, a p-value of $0.000 < 0.05$ was obtained, indicating a difference in the average sleep duration of respondents before and after infant massage. Therefore, it can be concluded that there is an influence of infant massage on the sleep duration of babies aged 6-12 months at TPMB X Srengseng Sawah Sub-District Jagakarsa District South Jakarta in 2023.

Respondent characteristics

Based on the research results, it can be observed that out of 35 respondents, 3 respondents (8.5%) were 6 months old, 8 respondents (22.9%) were 8 months old, 7 respondents (20.0%) were 9 months old, 5 respondents (14.3%) were 10 months old, and 4 respondents (11.4%) were 11 months old. Furthermore, the characteristics of respondents based on gender can be determined from 35 respondents, with 16 respondents (45.7%) being male and 19 respondents (54.3%) being female. Based on health status, it is evident that out of 35 respondents, all 35 respondents (100%) were in good health.

Sleep is an unconscious state that is relatively more responsive to internal stimuli. The difference between sleep and other unconscious states lies in the predictability of sleep cycles and the reduced responsiveness to external stimuli. The brain gradually becomes less responsive to visual, auditory, and other environmental stimuli. Sleep is considered a passive state that begins with sensory input, although active initiation mechanisms also influence the sleep state (Nugraheni & Ambarwati, 2018).

Based on the age of respondents, in this study, the respondents were aged 6-12 months. During this period, babies require 14 hours of sleep per day when they reach 6 months up to 12 months old. Typically, this duration will be divided into 3 hours for daytime sleep and 11 hours for nighttime sleep. One of the factors that can influence a baby's sleep is their health status. Someone in good health condition is likely to sleep soundly, whereas someone who is less healthy (sick) and experiencing pain may have disrupted sleep. In this study, all respondents were in good health.

Sleep duration of infants aged 6-12 months before infant massage

Sleep plays a crucial role in boosting a baby's immune system against infections. If sleep is disrupted, the white blood cell count in the body will decrease, and the effectiveness of the baby's immune system will also decrease. As a result, the baby becomes susceptible to illness, and their growth is disrupted. Babies with insufficient sleep experience hindered physical growth compared to those with adequate sleep. This is because, during sleep, a baby's physical growth is stimulated, closely related to increases in weight, height, and overall physical health (Mutyah & Anggraeni, 2017). Based on the research results, out of 35 respondents, 27 respondents (77.1%) experienced insufficient sleep duration, while 8 respondents (22.9%) experienced good sleep duration.

These research findings are consistent with a study conducted by Ni Gusti Ayu Pramita Aswitami (2019). Based on the research conducted at BPM Ida Ayu Putu Suartika, Amd. Keb, it was found that before receiving infant massage, there were 35 babies (83.33%) with insufficient sleep duration and 7 babies (16.67%) with good sleep duration. Sleep plays a crucial role in boosting a baby's immune system against infections. If sleep is disrupted, the white blood cell count in the body will decrease, and the effectiveness of the baby's immune system will also decrease. As a result, the baby becomes susceptible to illness, and their growth is disrupted. Babies with insufficient sleep experience hindered physical growth compared to those with adequate sleep. This is because, during sleep, a baby's physical growth is stimulated, closely related to increases in weight, height, and overall physical health (Khasanah, 2017).

The introduction of regular and sufficient sleep patterns is crucial for meeting the needs of infants to derive sufficient benefits from both nighttime and daytime sleep, enabling them to remain energetic and cheerful for activities the following day. Sufficient sleep for infants, without frequent awakenings, promotes vitality and reduces fussiness. Establishing a regular sleep pattern for infants can aid in achieving optimal growth and development. The stimulation provided to infants through massage, which is a form of healthcare, can be administered within the family environment. It is affordable, comfortable, and safe when performed correctly (Permata, 2017).

A baby is said to experience sleep disturbances if their nighttime sleep is less than 9 hours, they wake up more than 3 times, and their wakefulness lasts more than 1 hour. During sleep, the baby appears restless, cries, and struggles to fall back asleep (Nudesti & Sulastri, 2020).

Considering the importance of adequate sleep time for infant development, their sleep needs must be fully met to avoid adverse effects on their development. Adequate sleep time for infants not only affects their physical development but also their demeanor the following day. Babies who sleep sufficiently without frequent awakenings are more energetic and less fussy (Itani et al., 2017; Nevarez et al., 2010).

Sleep duration of infants aged 6-12 months after infant massage

Based on the research results, it is shown that out of 35 respondents, 11 respondents (31.4%) experienced insufficient sleep duration, while 24 respondents (68.6%) experienced good sleep duration. Infants with poor sleep quality will experience negative impacts on their development such as decreased immunity, increased emotional sensitivity, and decreased concentration. Factors related to infant sleep duration include activities, fatigue, environment, health conditions, and nutritional intake (Mardiana et al., 2014). Babies who sleep sufficiently without frequent awakenings are more energetic and less fussy. A baby is said to experience sleep disturbances if their nighttime sleep is less than 9 hours, they wake up more than 3 times, and their wakefulness lasts more than 1 hour. During sleep, the baby appears restless, cries, and struggles to fall back asleep (Goleman et al., 2018).

These research findings are consistent with a study conducted by Dwi Kurniasari (2019), titled "The Effect of Infant Massage on the Sleep Duration of Infants Aged 3-6 Months in Jemawan Village, Jatinom District, Klaten Regency". The research results show that the sleep duration of babies before massage treatment was below normal for 18 babies, while the rest had a normal sleep duration, which was the case for 14 babies. After receiving massage treatment, the majority of babies' sleep durations became normal, with 27 babies having a normal sleep duration, and 5 babies having a sleep duration of more than 15 hours.

Currently, various therapies have been developed, both pharmacological and non-pharmacological. According to Prasadja & Gaharu (2009) cited in Roesli (2001), one of the non-pharmacological therapies to address infant sleep problems is infant massage. Research conducted by Tiffany Field at the Touch Research Institute in America shows that children who are massaged for 2x15 minutes each week have better sleep, leading to improved concentration upon waking compared to before receiving massage.

Massage as a skill has a long history. Even massage is the oldest activity used by humans to alleviate fatigue and stress. In its early days, massage was believed to be one of the best ways to relieve fatigue, stress, stiff muscles, and soreness. Infant massage, of course, emerged alongside the human ability to perform massage therapy. Because infant massage is also interpreted as a comfortable communication touch between mother and baby. Infant massage is an expression of love between parents and children through touch on the skin. A mother's touch and embrace are basic needs for a baby (Sacrey et al., 2012; Moumin et al., 2023). All of this has a tremendous impact on the baby's development. The touch provided in gentle massages for babies is an important stimulation in child development. Children who receive directed and regular stimuli will develop faster than those who receive insufficient or no stimuli (Syaukani, 2015).

Babies whose muscles are stimulated by massage or rubbing will feel comfortable and sleepy. Most babies will sleep for a long time after the massage is done. In addition to duration, babies appear to sleep soundly and are not as fussy as before, indicating that babies feel calm after being massaged. When a baby sleep, they wake up refreshed, thus supporting concentration and brain function (Khasanah, 2017). According to Roesli (2001), baby massage involves rubbing or gentle touch stimulation on the skin surface, manipulation of body tissues or organs aimed at producing effects on muscle nerves, and the respiratory system, and improving blood circulation.

Infant massage is performed for 15-30 minutes using oil. Infant massage will make babies sleep more soundly and increase alertness or concentration. This is because massage can alter brain waves. This change occurs by lowering alpha waves and increasing beta and theta waves, which can be demonstrated using EEG (electroencephalogram) (Roesli, 2001).

After receiving massage, many babies now have normal sleep durations, with some sleeping for more than 15 hours. In babies whose sleep quantity exceeds 15 hours, the excess is only a few minutes and does not pose a danger to the baby. The most excess is 50 minutes and the least is 10 minutes. This is in line with Nurmalasari & Nahariani, (2017), stating that most babies will sleep for a long time once the massage is done. According to Roesli (2001), babies who are massaged will fall asleep more soundly, and upon waking, their concentration will be fuller.

Researchers assume that the sleep duration needs of babies can be increased in many ways, one of which is through infant massage. Infant massage will make babies sleep more soundly and increase concentration. This is because massage can alter brain waves. Adequate sleep time for babies not only affects their physical development but also their demeanor the following day. Babies who sleep sufficiently without frequent awakenings are more energetic and less fussy.

The influence of infant massage on the sleep duration of infants aged 6-12 months

Based on the research results, the observations show the sleep duration of infants before receiving infant massage (pretest) with an average of 12.714 hours, indicating that the average respondents experienced insufficient sleep duration before receiving infant massage. Whereas, the average sleep duration of infants after receiving infant massage was 14.086 hours, indicating that the average respondents experienced good sleep duration after receiving infant massage. Based on the average sleep duration of infants before and after infant massage, there was a difference in average sleep duration of 1.372 hours, indicating an increase in the average sleep duration of infants after receiving infant massage (Ash et al., 2019; Tham et al., 2021).

The results above illustrate that infant massage has a significant influence on improving the sleep duration of infants. This indicates that infants who receive massage can increase the production of absorption enzymes, increase serotonin neurotransmitters, and enhance body immunity, resulting in changes in brain waves that allow babies to fall asleep more soundly. Hence, the sleep patterns of infants tend to improve after receiving massages (Mamiro et al., 2004).

During infant sleep, there is growth and maturation of brain cells and an increase in the production of growth hormone, which plays a role in the physical and psychological development of infants. Therefore, the quality and quantity of infant sleep are important for optimal development. The assessment of sleep quality in infants can be seen from how often the baby wakes up in one sleep cycle. Through infant massage, the quality and quantity of infant sleep increase. This occurs because infant massage stimulates the release of endorphins, causing the baby to relax and become calm (Prasetyono, 2013). Similar research conducted by Kusumastuti et al. (2016), stated that there is an influence of infant massage on sleep quality and motor development improvement in infants aged 1-3 months. This is due to the increased activity level of serotonin neurotransmitters produced after massage, leading to a decrease in adrenaline hormones, making the baby calm and relaxed. Another study states that infants are believed to be one of the touch stimuli that can help optimize infant growth and development. According to the research by Shofa & Yunani (2014), babies who are not massaged have poor sleep quality and quantity, making them more likely to be fussy and wake up frequently at night. This, of course, affects the suboptimal sleep duration of infants and affects their growth and development.

Based on the statistical test results, a p-value of $0.000 < 0.05$ was obtained, indicating a difference in the average sleep duration of respondents before and after receiving infant massage. Thus, it can be concluded that there is an influence of infant massage on the sleep duration of infants aged 6-12 months in PMB X, Srengseng Sawah Sub-district, Jagakarsa South Jakarta in 2023.

These results are similar to the research conducted by Sri Sudarsih and Wahyu LY (2017) titled "The Influence of Infant Massage on the Quantity of Sleep in Infants Aged 3-6 Months in Leminggir Village, Mojokerto Regency" with a p-value of 0.002, meaning there is an influence of infant massage on the sleep quantity of infants aged 3-6 months. This result is also similar to the research conducted by Pamungkas (2016), which found that infant massage has an influence on the sleep quality of infants based on the Chi-square test. It was concluded that there is an influence of infant massage on the sleep quality of infants. The Odds Ratio (OR) value of the test is 15.00, meaning that babies who receive infant massage are 15 times more likely to have good sleep quality than babies who do not receive infant massage. Supported by the research conducted by Warsini & Nugraini (2016), titled "The Influence of Infant Massage on the Sleep Duration of Infants in Duwet Village, Wonosari District, Klaten Regency," it was found that the group of babies receiving massage had a higher average sleep duration (15.90 hours/day) compared to the average sleep quantity of the group of babies not receiving massage (13.90 hours/day). This research concludes that there is an influence of infant massage on the sleep duration of infants.

This is in line with Roesli's (2001), opinion that massage can increase serotonin levels, which will produce melatonin, which plays a role in sleep and makes sleep longer and deeper at night. Serotonin also increases the capacity of receptor cells to bind glucocorticoids (adrenaline, a stress hormone). This process leads to a decrease in adrenaline hormone levels (stress hormone), making babies who receive massage treatments appear calmer and less fussy. Massage also enhances the mechanism of food absorption by the vagus nerve, increasing the baby's appetite.

According to researchers, the importance of sleep time for infant development means that their sleep needs must be met to avoid negative effects on growth and development. One way to meet the sleep needs of infants is through infant massage. When babies are massaged, serotonin secretion increases, suppressing the activity of the reticular activation system and causing drowsiness. Considering the numerous benefits of sleep for babies, regular and routine infant massage can be considered an alternative to increasing infant sleep duration (Santi et al., 2021).

4 Conclusion

There were 27 respondents (77.1%) experiencing insufficient sleep duration before receiving infant massage in PMB X, Jagakarsa Sub-district, Srengseng Sawah Village in 2023. There were 24 respondents (68.6%) experiencing good sleep duration after receiving infant massage in PMB X, Jagakarsa Sub-district, Srengseng Sawah Village in 2023. There is an influence of infant massage on increasing the sleep duration of infants aged 6-12 months in PMB X, Jagakarsa Sub-district, Srengseng Sawah Village in 2023 with a p-value of 0.000.

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