

Optimization of infant weight gain through baby spa

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Abstract

Background: Weight gain is an important indicator in assessing infant health and development. Globally, underweight affects 23.6 million children (WHO, 2022), and in Indonesia, its prevalence increased from 17% in 2021 to 17.1% in 2022. In East Java, the underweight rate reached 15%, while in Sidoarjo Regency it was even higher at 17.8% (MOH, 2022). One stimulation method believed to support weight gain is baby spa, which includes baby massage, baby gym, and baby swim. These activities help improve appetite, sleep quality, and motor development. Griya Husada was chosen as the research site due to its active baby spa services, complete infant growth data, and high patient volume.

Objective: This study aims to analyze the relationship between baby spa and weight gain in infants aged 6–7 months at Griya Husada Sidoarjo.

Methods: This was an analytical observational study with a cross-sectional approach. The sample consisted of 74 infants aged 6–7 months who received baby spa services from January 17 to February 18, 2025. Consecutive sampling was used. Data were collected through medical records, questionnaires, and weight measurements using baby scales. Data were analyzed using univariate and bivariate methods with the Chi-square test. Baby spa was the independent variable, while infant weight gain was the dependent variable.

Results: A total of 100% of infants who received baby spa at least once per month for three consecutive months experienced weight gain. Only 45% of those who underwent baby spa inconsistently and 12.5% of those who did not participate in baby spa experienced weight gain. Statistical analysis showed a significant relationship between baby spa and weight gain ($p < 0.001$).

Conclusion: Baby spa is associated with weight gain in infants aged 6–7 months. Further research is needed by controlling for external variables such as feeding patterns, health status, and socioeconomic factors.

Keywords: Baby Spa; Infant Weight; Underweight; Stimulation; Growth

1. Introduction

Infant growth is a key indicator in assessing overall health status. One of the most common nutritional problems among infants is underweight, a condition where body weight falls below the standard for age. According to data from the Indonesian Ministry of Health (2022), the prevalence of underweight in Indonesia reached 17.1%, showing an increase compared to the previous year (17%). In East Java Province, the rate stood at 15%, while in Sidoarjo Regency it was even higher, at 17.8%.

Underweight in infants should not be taken lightly, as it may have serious impacts on a child's growth and development, including delayed motor skills, cognitive impairments, and weakened immune function. If left unaddressed, this

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condition may persist into early childhood and negatively affect long-term quality of life. Therefore, effective and easily accessible approaches are needed to help increase infant weight in a natural and safe way.

One increasingly popular method is baby spa, which combines baby massage, baby gym, and baby swim to stimulate infant growth and development. Baby spa is believed to improve blood circulation, stimulate appetite, enhance sleep quality, and increase the efficiency of nutrient absorption. Indirectly, these benefits may contribute to better weight gain in infants. Considering the high prevalence of underweight in Sidoarjo and the potential benefits of baby spa, it is important to examine the relationship between the two more deeply.

This study aims to highlight the importance of non-pharmacological approaches in addressing the risk of underweight in infants. The researchers hypothesize that baby spa is positively associated with weight gain in infants aged 6–7 months. The selection of Griya Husada Sidoarjo as the research site was based on the high utilization of baby spa services by the local community. This study is expected to provide scientific evidence regarding the effectiveness of baby spa in supporting infant growth and serve as a reference for healthcare providers and parents in choosing appropriate physical stimulation methods to promote optimal child development.

2. Materials and methods

This study was analytical observational research using a cross-sectional approach. The aim of the study was to analyze the effect of baby spa on weight gain in infants aged 6–7 months. The population consisted of all infants who received services at Griya Husada Sidoarjo, during January 2025. The sample included infants aged 6–7 months who met the inclusion and exclusion criteria. Inclusion criteria were: infants who were exclusively breastfed, parents who provided written informed consent, and infants with recorded weight data over the past three months. Exclusion criteria included: infants with physical or mental disabilities, and infants who were currently ill. The total required sample was 74 infants. Sampling was conducted using a consecutive sampling technique. Independent variable is baby spa (comprising baby massage, baby gym, and baby swim). Dependent variable is Infant weight gain over the past three months. This study received ethical approval from the Ethics Committee of the Faculty of Medicine, Universitas Airlangga, with approval number: 24/EC/KEPK/FKUA/2025.

3. Results and analysis

This study was conducted at Griya Husada Sidoarjo, a maternal and child healthcare facility located in D'Gardenia City Residential Area, Sidoarjo, East Java. The facility offers baby spa services, including baby massage, baby gym, and baby swim, aimed at supporting optimal infant growth and development. The study participants were infants aged 6–7 months who met specific inclusion criteria. The observed characteristics included infant data (gender, birth weight, birth length, birth order) and parental data (educational background and occupation).

Table 1 Characteristics of infant and parents

	Parameter	Frequency(n)	Percentage (%)
Infant Gender	Male	39	52,4
	Female	35	47.6
Birth weight	Above	7	9.5
	Normal	64	86.5
	Low	3	4
Birth Length	Above	3	4
	Normal	70	94.6
	Below	1	1.4
Age	≤ 6 months	52	70,3
	> 6 months	22	29,7
Complementary Feeding	Not yet given	52	70.3

	Already given	22	29.7
Birth order in the family	First child	35	47.3
	Second child	24	32.4
	Third child or more	15	20.3
Mother's education	Junior high school	3	4.1
	Senior high school	39	52.7
	College	32	43.2
Father's education	Junior high school	11	14,9
	Senior high school	51	69,1
	College	12	16
Mother's occupation	Civil servant	9	12.1
	Entrepreneur	7	9.5
	Privat employee	29	39.2
	Housewife	29	39.2
Mother's occupation	Civil servant	19	25.6
	Entrepreneur	7	9.5
	Privat employee	48	64.9

3.1. Analysis of the Relationship Between Baby Spa and Weight Gain

Table 2 Relationship between baby Spa and weight Gain

Baby Spa	Peningkatan Berat Badan			Nilai P
	Weight Gain	No Weight Gain	Total	
	Frequency (n)	Frequency (n)	Frequency (n)	
Reguler Baby Spa	36 (100%)	0 (0%)	36 (100%)	< 0,001
Infrequent Baby Spa	10 (45%)	12 (55%)	22 (100%)	
No Baby Spa	2 (12,5%)	14 (87,2%)	16 (100%)	

Chi-square analysis showed a significant relationship between the frequency of baby spa sessions and weight gain in infants ($p < 0.001$). Infants who regularly participated in baby spa sessions experienced a 100% increase in body weight compared to those in the infrequent and non-baby spa groups. This study indicates a significant association between the frequency of baby spa interventions and weight gain in infants aged 6–7 months ($p < 0.001$). Infants who underwent baby spa regularly experienced greater weight gain than those who participated infrequently or not at all. These findings align with previous studies highlighting the benefits of sensory and motor stimulation in promoting infant growth. Baby spa, which includes baby massage, baby swimming, and hydrotherapy, has been shown to stimulate the autonomic nervous system, improve blood circulation, and enhance infants' sleep and feeding patterns, which indirectly contribute to weight gain.

According to research by Dewi et al. (2021), baby massage can increase the secretion of digestive enzymes, thereby enhancing appetite and nutrient absorption in infants. Furthermore, baby spa helps strengthen muscle tone and motor coordination, making infants more active and improving their sleep patterns. High-quality sleep is closely associated with the optimal release of growth hormones, which also contributes to infant weight gain (Sari et al., 2020). The researcher assumes that stimulation through baby spa supports weight gain in infants aged 6–7 months through physiological mechanisms such as improved appetite, nutrient absorption, sleep quality, and growth hormone secretion.

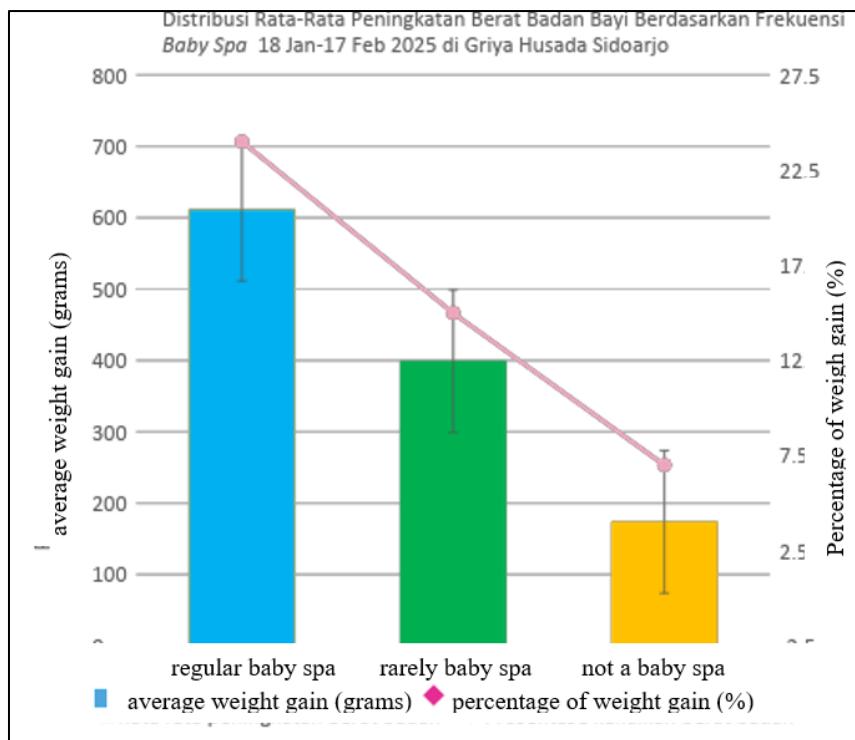


Figure 1 Distribution of average increase in baby weight

The average weight gain presented in the table was calculated based on the total increase over a three-month period, then averaged per month. The table shows that, in this study, infants who regularly received baby spa services demonstrated more optimal weight gain compared to those who only occasionally or never participated in baby spa sessions. The highest weight gain was observed in infants who consistently received monthly stimulation during the observation period. Conversely, infants who did not undergo baby spa, or did so irregularly, tended to exhibit lower weight gains. Furthermore, the variation or deviation within each group was relatively small, indicating that the baby spa intervention had a stable effect on infant weight gain.

In this study, all infants who regularly received baby spa experienced weight gain. Previous studies have found that infants who consistently received baby massage demonstrated significantly higher weight gain than those who did not receive the therapy. This may be attributed to baby massage reducing stress hormone (cortisol) levels and increasing oxytocin levels, which play a role in regulating metabolism and maintaining energy balance in infants (Nugroho, 2022). The researcher assumes that regular baby spa—particularly the baby massage component—contributes to weight gain in infants through the mechanisms of reduced stress hormones and increased oxytocin levels, supporting metabolic regulation and energy balance.

This study found that infants who regularly underwent baby spa showed higher weight gains than those who did so irregularly or not at all. These findings suggest that consistency in implementing baby spa has a positive impact on infant weight growth. This aligns with a study by Putri et al. (2019), which stated that stimulation in the form of baby massage administered consistently over several consecutive weeks can result in more optimal weight gain in infants compared to those who did not receive such interventions. The researcher assumes that the routine implementation of baby spa provides consistent stimulation to the infant's physiological systems, thus contributing positively to weight gain.

The study also found that some infants who did not receive baby spa still experienced slight weight gains. Nonetheless, the findings reinforce the understanding that infant weight gain is influenced by multiple factors, including nutritional intake, breastfeeding frequency, and genetic factors. Wijaya et al. (2023) emphasized that baby spa acts as a supportive factor, not a primary determinant, in infant weight growth. Nutrition and exclusive breastfeeding remain the fundamental components of holistic infant development. The researcher assumes that infant weight gain is influenced by a combination of factors, including nutritional intake, breastfeeding frequency, genetic predisposition, and supportive stimulation such as baby spa.

A notable strength of this study lies in its integrative approach, combining the three core elements of baby spa—baby massage, baby gym, and baby swim—into a single intervention package. Unlike previous studies that generally investigated only one type of stimulation in isolation, this study presents a comprehensive evaluation of the baby spa as a unified program. The combination of these components is believed to produce a synergistic effect stronger than when each is administered separately. This holistic stimulation, which includes sensory, gross motor, and vestibular input through swimming and hydrotherapy, can maximize infants' physiological responses during growth, including weight gain.

This study aligns with research by Sumiyati et al. (2023), which also examined the effect of baby spa interventions on infant weight gain. Both studies indicate that stimulation provided through baby spa can positively impact infant growth, particularly weight gain. A commonality between the two studies is the inclusion of baby massage and baby swim as key components, both of which have been shown to stimulate the autonomic nervous system, improve blood circulation, and enhance infants' eating and sleeping patterns. However, a key difference lies in the type and frequency of intervention. The study conducted at Klinik Cinta included only two components—baby massage and baby swim—but was performed weekly. In contrast, the present study offered a complete baby spa intervention comprising baby massage, baby swim, and baby gym, administered only once a month. The inclusion of baby gym aimed to enhance gross motor stimulation and muscular coordination more comprehensively, thereby potentially strengthening the overall impact on infant weight gain. Nevertheless, the less frequent implementation may serve as a limiting factor.

In infants aged 6–7 months, weight gain is influenced by various internal and external factors. Although baby spa can provide effective stimulation to support weight gain, other influencing elements remain significant. The study found that birth order also plays a role—first-born children often receive greater attention in terms of breastfeeding and stimulation, thereby increasing their potential for weight gain. Previous research suggests that first-born infants tend to receive more focused care from parents, especially mothers. In this study, it was found that mothers with their first child were more actively engaged in caregiving and stimulation. They were more attentive to each stage of development and more disciplined in fulfilling nutritional and emotional needs (Wahyuni et al., 2021). This focused attention is often due to the mother's heightened concern with her first experience in infant care, particularly among young mothers.

Such increased attention to the first child also correlates with more time dedicated to activities like breastfeeding, exclusive breastfeeding, and stimulation through interactions such as talking, playing, and baby spa. Sujaya et al. (2020) found that young mothers with their first child showed higher levels of involvement in infant care, which contributed to enhanced physical growth, including weight gain. Similarly, Wahyuni et al. noted that greater attention to the first-born—particularly in the form of adequate breastfeeding and proper stimulation—was associated with increased weight gain and improved motor development in infants (Wahyuni et al., 2021). Thus, the additional attention given to first-borns can play a crucial role in supporting their physical growth, including weight gain and overall development.

Parental education and occupation also play an important role in supporting infant growth and development, particularly in providing optimal nutrition and appropriate stimulation. Research by Hidayah et al. (2020) showed that mothers with higher education levels were more likely to understand the importance of adequate nutrition, including exclusive breastfeeding during the first six months of life, which has a direct impact on infant weight gain. These mothers also tend to seek out information on effective parenting strategies and understand the importance of stimulation in supporting physical and cognitive development. In contrast, mothers with lower education levels may lack awareness about the importance of optimal breastfeeding and stimulation, which can affect infant growth. Furthermore, parents' occupations also influence their ability to provide intensive care. Suryani et al. (2021) found that mothers working full-time or with long working hours often had limited time for infant care. However, mothers with flexible occupations, such as entrepreneurs or remote workers, were more able to allocate time for breastfeeding and stimulation. Similarly, fathers' occupations also play a role, especially in providing emotional and financial support to ensure sufficient nutrition for the infant.

Fathers who are primarily employed as civil servants or private-sector employees contribute to family well-being, ensuring the availability of resources to support infant health. Research by Wahyuni et al. (2021) emphasized that fathers with stable jobs tend to provide sufficient economic support for nutritious food and medical care, essential for infant growth and development.

Overall, parental education and employment are closely linked to infant development and growth, particularly in terms of providing optimal nutrition, sufficient attention, and supportive stimulation. Parents with higher education levels and more flexible jobs are better equipped to support their infants' healthy development, including weight gain.

Based on the findings of this study, it can be concluded that baby spa interventions provide significant benefits in supporting the growth of infants aged 6–7 months. Therefore, baby spa can be recommended as a complementary method for monitoring and enhancing infant growth, particularly in terms of weight gain. Moreover, it is essential for healthcare providers—especially midwives and health personnel in healthcare facilities—to educate parents about the benefits of baby spa and how to apply it effectively.

This study also opens opportunities for future research to further explore the optimal duration and frequency of baby spa interventions in promoting infant growth and to examine its effects on other aspects of development, such as cognitive and emotional domains.

4. Conclusion

This study demonstrates that the regular and consistent implementation of baby spa has a significant effect on the weight gain of infants aged 6–7 months at Griya Husada Sidoarjo. Infants who received baby spa services at least once a month for three consecutive months experienced more optimal weight gain compared to those who rarely or never participated in baby spa. These findings emphasize the importance of infant stimulation through baby spa as an intervention to support holistic growth and development.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest related to this study. All authors contributed to, reviewed, and approved the final manuscript for publication.

Statement of ethical approval

This study involved human subjects and therefore received ethical approval from the Ethics Committee of the Faculty of Medicine, Universitas Airlangga, under approval number 24/EC/KEPK/FKUA/2025.

Statement of informed consent

Written informed consent was obtained from the parents or legal guardians of all infants who participated in this study, after a complete and transparent explanation of the study's objectives, procedures, potential benefits, and risks.

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