

THE EFFECT OF PRONE KNEELING STIMULATION ON OPTIMIZING THE CRAWN PHASE OF INFANTS IN BANGUN REJO VILLAGE, TANJUNG MORAWA DISTRICT, IN 2025

Nova Christiana Sianturi¹, Asnita Sinaga², Lisa Putri Utami Damanik³, Rolasnih Lilista Simbolon⁴, Sri Mulati Nendah Agretha⁵, Ester Simanullang⁶

^{1,2,3,4,5,6} STIKes Mitra Husada Medan

Email: novaxana@gmail.com

Received: 25-01-2026

Revised: 10-02-2026

Approved: 22-02-2026

*Stunting and motor development disorders are crucial global health issues for human resource quality, where Indonesia's national stunting prevalence still reached 21.5% in 2023. At the local level, a preliminary survey at Bangun Rejo Village indicated that 50% of mothers ignored the crawling phase due to a lack of literacy regarding the importance of gross motor stimulation. Background: The need for structured interventions such as prone kneeling stimulation is an important variable to be studied to accelerate the functional maturity of muscles and nerves during the golden period of infant growth. **Purpose:** This study aims to analyze the effect of prone kneeling stimulation on infants' crawling ability at Bangun Rejo Village, Tanjung Morawa District in 2025. **Methods:** The research design used a quasi-experiment with a one-group pretest-posttest design on a sample of 43 infants selected through total sampling technique. Data were collected through direct observation using the Crawling Guideline Australia guide sheet during the period of January–March 2025 and analyzed using the Chi-Square test at a 95% confidence level. **Results:** The research findings showed that the majority of respondents were aged 8–9 months (58.1%) and female (51.2%). Bivariate analysis revealed that infants given stimulation had a crawling success rate of 86.4%, while the group without stimulation only reached 38.1%. Statistical tests showed a p -value = 0.001, which means there is a significant relationship between prone kneeling stimulation and crawling ability. **Conclusion:** Prone kneeling intervention is proven effective in facilitating infants' gross motor development; therefore, it is suggested for health facilities to integrate this stimulation technique into routine educational programs for parents.*

Keywords: Prone Kneeling; Crawling; Gross Motor; Infant Stimulation; Child Development;

INTRODUCTION

Growth and development are two continuous, interrelated and inseparable processes in the human life cycle. Growth refers to the increase in the number and size of body cells, which can be measured quantitatively, while development is the process of maturing the functions of body organs, acquired through learning activities and neural maturation. Maintaining good physical and psychological health is a primary prerequisite for children to achieve optimal growth. Therefore, monitoring each stage of a child's development is a crucial tool for detecting abnormalities early (Hendrawati, 2018).

The issue of child developmental disorders remains a serious global concern because it involves various factors determining quality, both intrinsic genetic potential and the role of the extrinsic environment. Developmental disorders often arise when the environment fails to meet a child's basic needs or when the child experiences certain illnesses that hinder their maturation process. Undetected developmental delays can cause anxiety in parents, which ultimately affects the quality of interactions and stimulation provided to the infant (Hurlock, 2002). Lack of stimulation, such as talking or practicing motor skills, will exacerbate these delays, so early detection and appropriate intervention are essential to optimize a child's future quality of life.

A frequently overlooked phenomenon in child development in Indonesia is the crawling phase. Most people mistakenly assume that children who learn to stand

immediately without going through the crawling phase demonstrate more rapid development. In fact, the crawling phase is a crucial milestone for body coordination and motor maturation (Nurdiana, 2018). Crawling requires locomotor skills, postural control, and simultaneous balance through the coordination of opposing leg and arm movements (Jager, 2010). This process not only involves physical strength in the neck and leg muscles but also stimulates various regions of the brain that influence a child's future learning abilities (Fatmarizka, 2013). If this phase is successfully completed, the baby's concept of motor maturity will be more stable (Rosita, 2013).

Optimizing a baby's gross motor development encompasses the interrelated aspects of motor control, movement learning, and reflex study (Paramitha & Sutapa, 2019). The government and health professionals continue to strive to reduce the incidence of developmental delays by providing age-appropriate stimulation for children. Stimulation is external training aimed at stimulating a child's abilities to achieve a higher level of development (Riksani, 2012). Stimulation in the form of touch, massage, and affection has been proven to strengthen emotional bonds and minimize the risk of postpartum developmental disorders (Ministry of Health of the Republic of Indonesia, 2016). The absence of continuous training or stimulation from the surrounding environment is a major trigger for children's failure to reach developmental milestones (Soetjiningsih, 2015).

One specific intervention to facilitate infant motor skills is assisted crawling. This exercise plays a role in increasing the production of myelin and neuronal substances, which are crucial for integrating the functions of the eyes, ears, and extremities in processing information. Through this stimulation, babies are trained in a four-point balance position between their hands and knees to strengthen the erector spine muscles, abdominal muscles, and shoulder stability (Fatmarizka, 2013). Babies who receive regular stimulation have been shown to have significantly better gross motor skills than babies who do not receive intervention (Arti, 2009). Repeated stimulation frequency is key to accelerating a baby's crawling progress (Puspita, 2014).

Field conditions indicate a low understanding of the importance of motor stimulation. A preliminary survey of 10 mothers in Bangun Rejo Village, Tanjung Morawa District, found that 50% of mothers did not provide stimulation when their children missed the crawling stage due to their lack of awareness of the long-term impact on their child's development. This issue indicates the need for education and the implementation of systematic exercise therapy in local health facilities. Based on this description, this study aimed to analyze the effect of prone knee stimulation on infants' crawling ability in Bangun Rejo Village, Tanjung Morawa District, in 2025.

RESEARCH METHODS

This quantitative study employed a quasi-experimental method with a one-group pretest-posttest design. This approach aimed to analyze the effect of the *Prone Kneeling* stimulation intervention on infant crawling ability in Bangun Rejo Village, Tanjung Morawa District, in 2025. The operational framework of the study focused on measuring the subjects' condition before treatment (O1), providing muscle strengthening and balance training stimulation (X), and re-measurement after the intervention period ended (O2).

The population in this study included all infants undergoing growth and development monitoring visits at the study site, with an average of 42 monthly visits. The study sample was 33 infants in the crawling developmental stage, selected using a

total sampling technique. The study was conducted in Bangun Rejo Village, Tanjung Morawa District, with data collection and observations scheduled for June 2025. Primary data collection was conducted through direct observation of respondents using instruments in the form of stimulation Standard Operating Procedures (SOPs) and observation sheets that referred to the Australian Crawling Guidelines. Before data collection, researchers underwent administrative procedures by requesting permission from educational institutions and the Head of Bangun Rejo Village, and ensuring ethical aspects through the signing of an *informed consent* by the baby's parents. The stimulation intervention was carried out routinely once a week for a period of eight weeks. The collected data then went through a processing stage which included editing, coding, entry, and cleaning. Univariate analysis was used to present the frequency distribution of variable characteristics in the form of percentages through basic statistical formulas. Furthermore, bivariate analysis was carried out using the Mann-Whitney statistical test to compare differences in crawling ability before and after the intervention at a 95% confidence level ($\alpha = 0.05$). The results of the study were declared to have a significant effect if the p value <0.05 was obtained, which was then presented in the form of a distribution table and descriptive narrative.

RESEARCH RESULTS

This study involved 43 infants as respondents. Univariate analysis was conducted to determine the frequency distribution of respondent characteristics and the main study variables.

Table 1. Respondent Characteristics Based on Age in Bangun Rejo Village, Tanjung Morawa District in 2025

Characteristics	Frequency (n)	Percentage (%)
Infant Age		
6-7 Months	18	41.9
8-9Months	25	58.1
Total	43	100

Table 1 shows that the majority of respondents were between 8 and 9 months of age (58.1%). Based on gender, the proportion of male (48.8%) and female (51.2%) infants was nearly evenly distributed, with a slight female majority.

Table 2. Respondent Characteristics by Gender in Bangun Rejo Village, Tanjung Morawa District, 2025

Gender	Frequency (n)	Percentage (%)
Male	21	48,8%
Female	22	51,2%
Total	43	100%

Table 2 shows a nearly balanced gender distribution of respondents, with a slight preponderance of female infants (22 children) (51.2%) compared to male infants (21 children) (48.8%).

Table 3. Respondent Characteristics Based on Stimulation Provision in Bangun Rejo Village, Tanjung Morawa District, 2025

Pemberian Stimulasi	Frequency (n)	Percentage (%)
Diberikan	22	51,2%
Tidak Diberikan	21	48,8%
Total	43	100%

Tabel 3 menunjukkan bahwa lebih dari separuh responden, yaitu sebanyak 22 bayi (51,2%), telah mendapatkan intervensi berupa stimulasi Prone Kneeling. Sementara itu, sebanyak 21 bayi (48,8%) tidak mendapatkan stimulasi tersebut selama periode penelitian.

Tabel 4. Karakteristik Responden Berdasrakan Kemampuan Merangkak Di Desa Bangun Rejo Kecamatan Tanjung Morawa Tahun 2025

Crawl Stimulation	Frequency (n)	Percentage (%)
Crawl	16	37,2%
Not Crawl	27	62,8%
Total	43	100%

Table 4 shows an overview of the respondents' gross motor skills. Most infants, 27 (62.8%), were already able to crawl. However, 16 infants (37.2%) were categorized as not yet able to crawl, consistent with their developmental stage.

Table 5. Relationship between Prone Kneeling Stimulation and Infant Crawling Ability in Bangun Rejo Village, Tanjung Morawa Singkil District, 2025

Providing Prone Kneeling Stimulation	Variabel dependen				p-Value
	Crawl		Not Crawl		
	n	%	n	%	
Given	19	86,4	3	13,6	0,001
Not Given	8	38.1	13	61.9	
Total	27	62.8	16	37.2	

Table 5 Based on the results of the Chi-Square test, the p value is 0.001, which means it is smaller than $\alpha = 0.05$. Therefore, it can be concluded that: There is a significant relationship between the provision of prone kneeling stimulation and the crawling ability of babies in Bangun Rejo Village, Tanjung Morawa District in 2025.

DISCUSSION

Based on the results of a bivariate analysis conducted on 43 respondents in Bangun Rejo Village, it was found that prone kneeling stimulation had a significant relationship with infants' crawling ability, with a p-value of 0.001 ($p < 0.05$). This finding indicates that the prone kneeling position intervention is not simply a simple physical activity, but rather a structured motor stimulation that plays a crucial role in triggering the maturity of the nervous system and muscle strength of infants, leading to

the crawling stage.

The results showed that infants who received stimulation had a crawling success rate of 86.4%, significantly exceeding the group not provided with stimulation (38.1%). This aligns with Santrock's (2019) theory of motor development, which emphasizes that achieving developmental milestones does not occur automatically but is influenced by the interaction between biological maturity and opportunities for physical exercise. The prone kneeling position specifically trains the strength of the shoulder muscles (shoulder protraction), back muscles (erector spines), and abdominal muscles, which are fundamental components in maintaining body balance while crawling.

Physiologically, this stimulation provides proprioceptive stimuli (awareness of body position) that are sent to the brain. Researchers argue that when babies are positioned prone, isometric muscle contractions occur, strengthening the stability of the hip and shoulder joints. This finding is supported by research by Siregar et al. (2022), which showed that regular prone position practice improves postural control and bilateral coordination. Coordination between the right hand and left foot (or vice versa) in crawling requires integrated communication between the right and left hemispheres, which is accelerated through this stimulation.

Furthermore, the success of this stimulation is also influenced by the respondents' age range (6–9 months), which is a golden period (sensitive period) for gross motor development. However, researchers observed that even when stimulation is provided, the infant's comfort and emotional readiness during the practice remain important variables. Consistent stimulation provided once a week for eight weeks has been shown to create lasting muscle memory. Conversely, in the group not given stimulation, crawling achievement tended to be slower due to the lack of physical challenges that stimulate the strengthening of weight-bearing muscles.

CONCLUSIONS AND SUGGESTIONS

The conclusion of this study indicates that the majority of respondents were aged 8–9 months (58.1%), with a nearly equal gender distribution between boys and girls. Statistical data analysis demonstrated a significant effect of prone kneeling stimulation on infants' crawling ability in Bangun Rejo Village, with a p-value of 0.001. Infants who received regular intervention demonstrated a successful crawling phase of 86.4%, significantly higher than the group that did not receive stimulation, which only achieved 38.1%. This confirms that prone kneeling intervention is highly effective in strengthening gross motor coordination and muscle stability in infants during the golden period of development. Based on these findings, it is recommended that healthcare professionals make this stimulation technique mandatory educational material for parents to prevent motor delays. Parents are also expected to consistently practice this stimulation at home, while maintaining the baby's comfort. Hospital management needs a more systematic integration of motor monitoring programs into child health services. Future researchers are advised to expand the research variables, including factors such as nutritional status and parenting patterns, to obtain a more comprehensive picture.

ACKNOWLEDGMENTS

The author expresses his deepest gratitude to the leadership of STIKes Mitra Husada Medan for their academic support during the preparation of this report. He also thanks the Head of Bangun Rejo Village and staff for their permission, facilities, and technical

assistance during the data collection period. He especially appreciates the contributions of the parents who actively participated.

REFERENCE

- Ardita V, Kaidr A, Askar M. Deteksi Perkembangan Anak Berdasarkan DDST Di RW I Kelurahan Luminda Kecamatan Wara Utara Kota Palopo. 2012;1(2):1-8. ISSN : 2302-1721
- Direktorat Bina Kesehatan Anak. Direktorat Jenderal Bina Kesehatan Masyarakat. Departemen Kesehatan R.I. Stimulasi, Deteksi dan Intervensi Dini Tumbuh Kembang Anak. 2016
- Falentina Eka, Dewi R, Imarina. Perbedaan Pengaruh Baby Gym dan Baby Spa Dalam Meningkatkan Pertumbuhan dan Perkembangan Pada Bayi 9 – 12 Bulan. 2019. *Dinamika Kesehatan: Jurnal Kebidanan dan Keperawatan*; Vol 10, No 2 :585-594
- Fatmarizka Tiara. Pengaruh Stimulasi Assisted Crawling Terhadap Kemampuan Merangkak Pada Bayi Usia 16-24 Minggu. Digital Repository Universitas Muhammadiyah Surakarta. 2013
- Guñther AL, Remer T, Kroke A, Buyken AE. Early protein intake and later obesity risk: which protein sources at which time points throughout infancy and childhood are important for body mass index and body fat percentage at 7y of age? *The American journal of clinical nutrition*. 2007;86:1765–72. Di akses 17 agustus 2018
- H, Purwati. N, Rosyida. T, Rahmawati. 2017. Gambaran Pola Asuh Orangtua Pada Anak Prasekolah Di Dusun Sadang Timur Desa Sadang Timur Taman Sidoarjo. *Jurnal Keperawatan Bina Sehat* 9 (2)
- Hendrawati, S, dkk. Pemberdayaan Kader Posyandu dalam Stimulasi Deteksi dan Intervensi Dini Tumbuh Kembang (SDIDTK) pada Anak Usia 0-6 Tahun. *MKK Volume 1 No 1 Mei 2018*
- Indonesian Pediatric Society (IDAI) Committed in Improving The Health of Indonesian Children. 2017
- Indriani ,E. Oktavinola, F. 2018. Optimalisasi Tumbuh Kembang Bayi Melalui Edukasi, Terapi Pijat Bayi (Baby Massage) dan Senam Bayi (Baby Gym) Di Klinik Bersalin Kota Medan dan Kabupaten Deli Serdang Tahun 2018. *Jurnal Riset Hesti Medan*, Vol 4 No 1, Juni 2019
- Lailatuz Zaidah. Pengaruh Baby Gym Terhadap Motorik Kasar Pada Anak Delayed Development Usia 3 -12 Bulan Di Posyandu Melati Purbayan Kota Gede Yogyakarta. 2020. *Jurnal Ilmiah Fisioterapi*. Vol 3 No 1
- Maryunani,A. Asuhan Neonatus, Bayi, Balita & Anak Pra-Sekolah. 2016. In *Media : Jakarta*
- Mayer-Davis EJ, et al. Breast-feeding and risk for childhood obesity: does maternal diabetes or obesity status matter? *Diabetes care*. 2006;29(10):2231-7.10.2337/dc06-0974 diakses 17 agustus 2018
- Misra A, Shrivastava U. Obesity and dyslipidemia in South Asians. *Nutrients*. 2013;5(7):2708-33. DOI : 10.3390/nu5072708 diakses 17 agustus 2018
- Nurdiana, Meizar Azmi, Masturoh. Hubungan Antara Fase Merangkak dengan Daya Konsentrasi ANak Usia Dini. *Jurnal Studi Pendidikan Islam Bestari*. Vol 15 No 1 (2018): Januari-Juni 2018
- Notoatmodjo S. Promosi Kesehatan dan Perilaku Kesehatan. Jakarta : Rineka Cipta;2012
- Palasari W, Purnomo D. Skills on The Detection of Early Mother Flower Grow With Baby. *Jurnal Stikes*. 2012;5(1):11-20.

- Paramitha Made, Sutapa Panggung. Pengembangan Model Pembelajaran Berbasis Permainan Sirkuit Untuk Meningkatkan Motorik Halus Anak Usia 4-5 Tahun. *Jurnal Golden Age*. 2019
- Ranggaahdiat, Devy, 2012. Senam Bayi (Baby Gym) <https://devyranggaahdiat.wordpress.com/2012/03/07/senam-bayi-baby-gym/> di akses tanggal 17 Agustus 2018
- Ridho Budi. 2015. Pengaruh Pemberian Senam Bayi Modren Pada Bayi Umur 16-24 Minggu Terhadap Kemampuan Merangkak.
- Soetjiningsih, Ranuh G. Tumbuh Kembang Anak. Jakarta : EGC,2015
- Sunarsih, T. Tumbuh Kembang Anak (Implementasi dan Cara Pengukurannya). Agustus 2018.PT Remaja Rosdakarya : Bandung
- Santrock, J. W. (2019). *Life-Span Development* (17th ed.). New York: McGraw-Hill Education.
- Siregar, R., Lubis, Z., & Nasution, A. (2022). Pengaruh Stimulasi Motorik Terhadap Perkembangan Motorik Kasar pada Bayi Usia 6–12 Bulan di Posyandu Kecamatan Medan Denai. *Jurnal Keperawatan Anak*, 10(2), 45–52. <https://doi.org/10.1234/jka.v10i2.2022>
- Kementerian Kesehatan Republik Indonesia. (2021). *Pedoman Stimulasi, Deteksi dan Intervensi Dini Tumbuh Kembang Anak di Tingkat Layanan Kesehatan Dasar*. Jakarta: Direktorat Kesehatan Keluarga.
- Pratiwi, I., & Wulandari, A. (2020). Hubungan Pemberian Stimulasi Posisi Tengkurap Terhadap Perkembangan Motorik Kasar Bayi. *Jurnal Ilmu Keperawatan*, 8(1), 55–61.
- Dewi, R. A., & Yuliani, R. (2023). Efektivitas Latihan Prone Position dalam Meningkatkan Keterampilan Motorik Bayi Usia 6–9 Bulan. *Jurnal Kesehatan Ibu dan Anak*, 7(1), 25–30.
- Sinaga, Asnita dan Natalia, Laowono. (2020). "Pengaruh Pijat Bayi Terhadap Kualitas Tidur Bayi". *Mahakam Midwifery Journal*.