

An overview of the use of baby walkers on gross motor development in children

Ni Putu Intan Sekarini^{1,*}, I Putu Yudi Pramana Putra², Ari Wibawa²

¹Bachelor and Professional Program of Physiotherapy, Faculty of Medicine, Universitas Udayana, Bali, Indonesia

²Department of Physiotherapy, Faculty of Medicine, Universitas Udayana, Bali, Indonesia

ABSTRACT

Background: Gross motor skills involve large muscles essential for children's growth and development. These skills enable children to perform activities independently, including using a baby walker. This study aimed to determine the description of the use of baby walkers on gross motor development in children aged 12-18 months.

Methods: The study used a literature review method, analyzing secondary data from journals on the impact of baby walker use on children's gross motor development. Literature searches were conducted in the PubMed and Google Scholar databases using the keywords "baby walker" and "gross motor development". Five relevant journals were selected. Inclusion criteria required publication by credible institutions, while exclusion criteria omitted literature unrelated to baby walkers, gross motor skills, or the specified age range.

Results: The five literature reviews found that proper baby walker use provides positive stimulation for walking, while misuse leads to adverse effects. Likewise, learning to walk without a walker requires careful guidance, as poor balance increases the risk of falls.

Conclusion: This study concluded that the used of a baby walker might be ineffective if it was not done correctly. But, it could improve walking development when used correctly.

Keywords: baby walker, children, gross motor development, motor skills, stimulation

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***Corresponding Author:** Ni Putu Intan Sekarini, Bachelor and Professional Program of Physiotherapy, Faculty of Medicine, Universitas Udayana, Bali, Indonesia;
Email: intansekarini2022@gmail.com

Introduction

The motoric skill is the entire process of controlling and regulating the functions of organs, both physiologically and psychologically, that cause movement.^{1,2} These unobservable latent events include, among others, the reception of information/stimulus giving meaning to information, processing information, and the urge to perform various forms of motor actions. Gross motor skill is a movement skill that involves large muscles as the main driver, such as jumping, walking, and running.³ Gross movement skills are needed in children because they are part of growth and development, and these gross movement skills allow children to do activities without the help of others.⁴ People who lack gross motor skills are usually due to stability or certain diseases that interfere with muscle function.^{5,6}

Development is a maturing process that includes human psychological processes that cannot be evaluated, such as skill acquisition. Preschool children exhibit religious and moral growth and socio-emotional, cognitive, linguistic, and gross and fine motor skills.^{7,8} When entering the 6th month,

children begin learning activities to develop their motor nerves by moving on the floor. Children learn to sit, crawl, and move their body muscles.⁹ There are many ways for parents to train their babies when they learn to stand and walk, namely by guiding children to walk with both hands (non-walkers).⁵

Development is challenging to study, as each child has a unique phase. However, the early stages of development begin with motor skills, especially when the child starts to take steps. The stepping phase in children naturally begins with standing, so babies need early stimulation for optimal development. Parents worldwide, including in Indonesia, often stimulate their children to stand, step, and walk more quickly using a baby walker.¹⁰

Baby walkers promote movement, exposing newborns to dangerous circumstances, including falls down stairs. A study on hospital admission records suggests a link between baby walker use and child accidents or injuries.¹¹ The proper use of baby walkers in children will help develop their gross motor processes.³ Baby walkers can help children strengthen their lower extremity muscles and boost their motivation in

walking, leading to improved gross motor development during the learning process.¹² Muscles are the cause of contractions, and if trained, they can increase gross motor development in children.¹³

A previous study found that babies who used baby walkers caused them to crawl and walk more slowly than children who did not.¹ The use of a baby walker can cause a delay in a baby's ability to walk because the baby walker does not strengthen the upper leg and hip muscles necessary for walking.^{3,14} Motor activities that occur when children use baby walkers only involve some motor fibers. Meanwhile, The European Child Alliance proves that the proper use of baby walkers can improve the gross motor skills of developing children.¹³ The accuracy of using a baby walker can also increase the number of motor units, namely with a maximum of 5 hours per day, which is about 2 to 5 months.⁹

After reviewing several journals, I found varying perspectives on using baby walkers in children. Some studies highlight potential benefits, while others emphasize the risks associated with their use. These differing viewpoints piqued my interest, prompting me to conduct a deeper investigation into the effects of baby walkers on children's development.

Methods

This study employed a literature review method, utilizing secondary data from previously published journals. Scientific journals describing the use of baby walkers and their impact on gross motor development in children aged 12-18 months were accessed online through PubMed and Google Scholar, using the keywords "baby walker" and "gross motor development." The selected literature was reviewed based on inclusion and exclusion criteria.

The inclusion criteria required that (1) credible institutions publish the literature and (2) the content be relevant to baby walker use, gross motor skills, and the specified age range. The exclusion criteria omitted literature unrelated to these topics and age groups. All literature used in this review met the inclusion criteria established by the author.

Results

This study found six articles that were used variables of baby walker and gross motor development (Table 1).

Hanum et al. (2024) stated that children who were given the use of baby walkers appropriately would have very appropriate gross motor development as many as 13 children (65%), while children who were given the use of baby walkers inappropriately had 24 children (75%) who had quite dubious gross motor development. The results of the Chi-Square test show a p -value of 0.001.³

Chagas et al. (2020), At the age of acquisition, gait is not much different between the baby walker user group (BWG), which has a considerably lower gait velocity (specifically in the first, third, fourth, and fifth months after the gait acquisition) and a relatively longer phase duration for standing and swinging than the non-user group (BWNG).⁵

Bezgin et al. (2021), Twenty-nine infants who used infant walking aids were included in the study group, and 19 infants who did not use baby walkers were included in the control group. The total trunk balance score of infants using the device as a walker is significantly lower than infants who do not use Baby Walker ($p < 0.05$).¹

Arnaya et al. (2021), In this study, the value of $p = 0.000$ ($p < 0.05$) was obtained. The more appropriate the way a child uses a baby walker, the more his motor development will be following his age because the use of a very appropriate baby walker can cause lower extremity muscles and core stability muscles in children, so if the child's muscles become strong, his motor development will also be better and following the age of the child.⁴

Casman et al. (2021) State, "that more than 50% to 98% of parents say that they use baby walkers on their children. There is a primary reason why parents use baby walkers, which is to speed up their children so that they can walk. Most of the reasons parents do not use baby walkers are because of fear of injuring the baby's vital organs (30.5%), advice from doctors (20.7%), unnecessary (18.3%), and fear of having adverse effects on the baby's development by 17.1%.¹³

Discussion

Gross motor skills are the ability of children to move, which involves large muscles.⁴ Motor development is an essential ability for children's growth and development.⁵ If the child has a developmental disorder, it will significantly affect other developments. In children aged 12-18 months, most of 65% of children who use baby walkers correctly can develop their gross motor skills where the muscles of the lower extremities will become strong and support the weight.⁴ This baby walker is said to be very safe in caring for children while learning to walk.⁵

The proper use of baby walkers can improve motor development, which is quite impactful in enhancing gross motor performance in children. In addition to increasing the muscle contractile protein, it can also increase the concentration of ATP-PC and glycolysis enzymes. Good use of a baby walker is 5 hours a day for 2 to 5 months when you first use it.^{1,3} When a baby regularly uses a walker, an adaptation process occurs in the motor cortex, located in the brain's frontal lobe. This is due to the repetitive motion stimuli and movement patterns. As a result, the cerebral cortex receives and processes the motion stimuli, recording the movement in the frontal lobe, specifically in the prefrontal cortex, as long-term memory.¹⁵

Judging from the European Child Safety Alliance's study, children who learn to walk using a baby walker will have gross motor development compared to children who learn to walk without a baby walker.⁹ Therefore, the United States prohibits using baby walkers to train children to walk and suggests teaching children to walk without using baby walkers.¹³ Other studies cited in international journals the effect of baby walkers on the development of walking skills. This study concluded that using a baby walker does not alter

Table 1. Results summary overview of the use of baby walkers on gross motor development in children

Authors	Titles	Methods	Results
Parida Hanum et al. (2024) ³	The Relationship between the Accuracy of Baby Walker Use and Gross Motor Development of Children Aged 12-18 Months in the Working Area of the Langsa City Health Center	This cross-sectional study targeted children aged 12–18 months in the UPTD Langsa Kota Health Center area, using purposive sampling to select 52 respondents from a total population of 108 based on specific criteria.	Of the children who used baby walkers appropriately, 13 (65%) showed appropriate gross motor development, while 24 (75%) misusing baby walkers exhibited questionable development. The Chi-Square test revealed a p-value of 0.001.
Paula S.C. Chagas et al. (2020) ⁵	Effects of baby walker use on the gait development by typically developing toddlers.	This longitudinal observational study included 32 developing infants, 16 in the baby walker user group (BWG) and 16 in the non-user group (BWNG). Participants were matched based on gender and family socioeconomic status.	Gait acquisition age showed little difference between groups. However, the BWG had significantly lower gait velocity and longer standing and swinging phases in the first, third, fourth, and fifth months post-acquisition than the BWNG.
Sabiha Bezgin et al. (2021) ¹	Evaluation of the effects of using a baby walker on trunk control and motor development	This case-control study involved 48 children (mean age 10±1 months) with typical step development: 29 walker users (14 females, 15 males) and 19 non-users (10 females, 9 males).	The study group included 29 infants using baby walkers, while the control group comprised 19 non-users. Trunk balance scores were significantly lower in walker users than non-users ($p < 0.05$).
Anak Agung Sagung Dhriti Anggita Saraswati Arnaya, et al. (2021) ⁴	The Relationship between the Accuracy of Baby Walker Use and Gross Motor Development of Children Aged 15-18 Months in East Denpasar	This cross-sectional study of 33 participants used purposive sampling. The independent variable was baby walker usage accuracy; the dependent variable was gross motor development. Age and nutritional status were controlled, while socioeconomic, genetic, and postnatal factors were treated as random variables. Data were collected via an identification questionnaire.	This study found $p = 0.000$ ($p < 0.05$), indicating that appropriate baby walker use positively influences motor development. Proper use strengthens lower extremity and core stability muscles, promoting age-appropriate motor skills.
Casman et al. (2021) ¹³	Effects of Early Stimulation Using Baby Walker and Balance Bike on Children's Motor Development	This scoping review did not require ethical approval. Articles published between 2016 and 2020 were sourced from CINAHL, ScienceDirect, ProQuest, and ClinicalKey. Inclusion criteria included English-language studies examining the relationship between baby walkers and child development.	Between 50% and 98% of parents use baby walkers to encourage early walking. Those who avoid them cite concerns such as injury risks (30.5%), medical advice (20.7%), perceived unnecessary use (18.3%), and potential developmental harm (17.1%).

the initial walking skills before its use. It also found no significant differences in motor development measured using Alberta Infant Motor Scale (AIMS) between the group that used baby walkers and the group that did not.¹⁶

Similar studies have also produced conflicting results. Two studies found that crawling and independent walking occurred significantly later in the baby walker user group. Another study reported a notable delay in developing all motor skills among baby walker users. However, despite the delayed onset of crawling, no significant difference was observed in the timing of independent walking between the two groups.^{17,18} Baby walkers can hinder the development of standard gait patterns and posture in early life, perhaps leading to idiopathic toe walking gait patterns.¹⁹

Infants who use a baby walker cannot control their movements, making them highly vulnerable to danger, especially from crashing into or being hit by objects they encounter while using the walker. If parents still choose to use a baby walker to stimulate standing, stepping, and walking, the environment should be made safe for the child. Parents must ensure that no objects could fall and injure the child if the walker collides with them. They should also secure doors and block access to stairs or swimming pools near the play area. In addition, all dangerous objects should be kept out of reach, and parents must always supervise their children using the baby walker.^{20,21}

Therefore, the child should learn to walk without a baby walker. The trick is stimulating the child by placing a toy before him to reach. This will encourage your little one to move and pick up toys. However, his parents can also hold his hands while he stands and help him walk. When learning to walk without a baby walker, the child will be able to learn to move or change his position from sitting to kneeling. From kneeling, he will learn to withdraw to stand even though he has to hold on to the object in front of him.^{3,5}

This study has several limitations inherent to its literature review methodology. First, the reliance on secondary data from published journals limits the findings to the scope and quality of existing study. The accuracy and reliability of this study are influenced by the methods and biases present in the selected journals. Second, the literature search used only two databases, PubMed and Google Scholar, which may have excluded relevant studies indexed in other academic databases or sources. Third, the use of only two keywords ("baby walker" and "gross motor development") may have limited the search results and potentially excluded studies that used alternative terms or different descriptors for similar concepts.

Additionally, the study was constrained by specific inclusion and exclusion criteria, which, while necessary for focus, may have omitted valuable studies that did not meet these parameters. Lastly, this literature review did not include data and statistical techniques, limiting its ability to provide new empirical evidence or a comprehensive synthesis of existing findings. Future studies should consider using a broader set of databases, expanding search terms,

and employing mixed-method approaches to enhance the robustness and generalizability of the results.

Conclusion

Based on the literature reviewed, two potential outcomes regarding using baby walkers exist. Proper use of a baby walker can enhance gross motor skills by strengthening the muscles of the lower extremities. Some training programs recommend using a walker for five hours daily over two to five months. However, baby walker use can also delay the walking process. It is generally recommended that children learn to walk without a walker. This can be encouraged by holding the child's hands while standing or placing a toy in front of them to motivate movement and improve balance.

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Conflict of interest

The authors of this study declare no conflicts of interest.

Author contributions

NPIS designed the study, collected the data, and wrote the manuscript, whereas IPYP and AW were responsible for gathering and revising the data.

Ethical consideration

This review study utilized publicly available papers and did not require informed consent or ethical approval.

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