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Enhancing Infant Gross Motor Skills through Baby Swim Therapy: A Study of Its Effectiveness and Implications in Midwifery Education

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ABSTRACT

Infancy represents a critical period for brain and motor development, where timely and effective stimulation can significantly shape a child's lifelong health and abilities. This study aimed to evaluate the impact of baby swimming therapy on gross motor development among infants aged 3–9 months at Alfarizki Beibee Care, Kota Malang. Using a pre-experimental one-group pretest–posttest design, 28 infants participated in four weeks of structured aquatic therapy, with gross motor skills assessed before and after intervention using the Kuesioner Pra-Skrining Perkembangan (KPSP). The results revealed notable improvements in key motor milestones, particularly in head control, unsupported sitting, and standing with weight bearing. Statistical analysis confirmed a significant increase in the proportion of infants achieving age-appropriate gross motor skills post-intervention ($p = 0.025$). These findings suggest that baby swimming therapy is an effective early intervention for enhancing gross motor development in infants, supporting its feasibility and benefit in community-based, midwife-led settings. This research underscores the importance of early stimulation and highlights the role of non-pharmacological interventions in optimizing infant growth and development. The study recommends integrating baby swim therapy into routine infant care and midwifery education, while future research should adopt randomized controlled designs, larger samples, and longer follow-up to strengthen evidence and generalizability.

Keywords: aquatic therapy, early stimulation, gross motor development, infancy, midwifery education

INTRODUCTION

The infant period, or "golden age," is a critical window for brain and motor development that lays the foundation for a child's future cognitive, psychosocial, and physical growth (Mildiana, 2019). During this phase, the brain undergoes rapid growth, and infants demonstrate a high degree of plasticity, which is strongly influenced by environmental stimulation (Desra Yunita & Amir Luthfi, 2019). Motor development in infancy is divided into gross and fine motor skills; gross motor skills are essential for movements involving large muscle groups such as the head, arms, legs, and trunk—enabling milestones like rolling, sitting, crawling, standing, and walking (Luar & Ramadhani, 2024). The World Health Organization (WHO) estimates that around 30% of infants globally experience some degree of developmental delay, with 27.5% of these involving gross motor functions (Retnaningsih & Purwanti, 2023). In Indonesia, the Ministry of Health reported that 13%-18% of toddlers demonstrate developmental disorders (Safitri & Maulina, 2024). Data from East Java's Health Office highlight that 3–5% of children face delays in motor development (Ruawu et al., 2019). Local findings at Alfarizki Beibee Care (November 2024) revealed that 16 out of 40 infants monitored over one month showed signs of delayed gross motor development, such as the inability to lift their head or sit independently. Such delays are often exacerbated by parents' lack of knowledge regarding effective stimulation, particularly the benefits of aquatic therapies such as baby swimming (Hartati et al., 2023). Stimulation, including tactile, emotional, and physical interaction, is vital for optimal

neuronal growth and myelination, ultimately promoting better motor development outcomes (Gallahue et al., 2012; Hadders-Algra, 2018).

Given the prevalence of gross motor delays in infants, the main research problem addressed in this study is the suboptimal motor development in infants, partly attributed to insufficient early stimulation and limited awareness among caregivers about effective interventions. This issue is particularly significant, considering that early detection and intervention can substantially mitigate the long-term impact of motor delays on overall child development (Cioni et al., 2016). A general solution widely recommended is early, structured, and multisensory stimulation. Among various strategies, aquatic activities—especially baby swimming therapy—have emerged as promising interventions that simultaneously enhance sensory integration, muscle strength, coordination, and overall gross motor abilities (Vignochi et al., 2020).

Baby swimming therapy involves exposing infants to warm water environments, often with the support of neck floats, allowing free movement of limbs under professional supervision (Eka Permata Sari & Jelita Serasinta Sembiring, 2021). Multiple studies demonstrate that aquatic interventions: Improve postural control and balance (Jorgic et al., 2012), Enhance muscle tone and coordination (Silva et al., 2013), Accelerate gross motor milestones such as sitting, crawling, and standing (Sigmundsson & Hopkins, 2010). A study from the Norwegian University of Science and Technology found that infants participating in swimming programs displayed superior balance and object-reaching abilities compared to their non-swimming peers (Naufal, 2019). Furthermore, aquatic activities lower gravitational constraints, enabling infants to move their limbs more freely and safely, fostering greater muscular development and coordination (Vignochi et al., 2020; Jorgic et al., 2012). Several Indonesian studies corroborate these findings. Mildiana & Sulistyawati (2024) found that baby swim therapy led to significant improvements in independent sitting and supported standing in 9-month-old infants. Jenika Pinem et al. (2022) reported a significant effect of combined baby massage and baby swim on the developmental milestones of infants aged 3–9 months.

Despite growing evidence on the benefits of baby swimming therapy for infant motor development, several research gaps remain: Most international studies have been conducted in high-resource settings with specialized facilities, and limited research exists on the effectiveness and feasibility of baby swim interventions in local Indonesian contexts, especially in midwife-led settings (Sigmundsson & Hopkins, 2010; Silva et al., 2013). Existing literature often focuses on preterm infants or those with diagnosed developmental disorders, with less attention paid to the general population of healthy term infants (Valdivia-Moral et al., 2018). There is limited research integrating standardized developmental screening tools, such as the Kuesioner Pra-Skrining Perkembangan (KPSP), to assess the efficacy of baby swim interventions (Batlajery et al., 2021). The mechanism by which baby swim impacts specific motor milestones (e.g., rolling, sitting, standing) is not consistently described, and the role of parental engagement and socio-cultural factors in therapy uptake remains underexplored (Vignochi et al., 2020; Darsaklis et al., 2020). These gaps highlight the need for local studies using standardized outcome measures, addressing a healthy infant population, and conducted in real-world settings such as community baby care centers.

This study aims to analyze the effect of baby swimming therapy on gross motor development in infants aged 3–9 months at Alfarizki Beibee Care, Kota Malang. The novelty of this research lies in its focus on a practical, community-based intervention for healthy infants

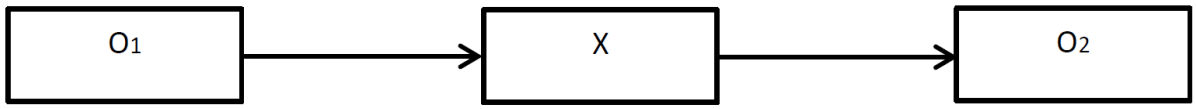
using standardized assessment tools (KPSP) in an Indonesian midwife-led care setting. Unlike previous studies, this research integrates local data and examines both parental awareness and direct infant outcomes within a routine care context. Based on empirical and theoretical evidence, it is hypothesized that structured baby swimming therapy significantly enhances gross motor development in infants aged 3–9 months compared to their baseline development (Mildiana & Sulistyawati, 2024; Jorgic et al., 2012; Silva et al., 2013; Vignochi et al., 2020). The study focuses exclusively on infants aged 3–9 months attending Alfarizki Beibee Care, evaluating their gross motor development before and after a four-week baby swim therapy program using the KPSP as the primary outcome measure.

METHOD

Research Design

This study employed a pre-experimental design with a one group pretest–posttest approach. The design was chosen because it allows for the measurement of changes in gross motor development before and after the intervention, despite the absence of a control group (Erlyana & Ressiani, 2020; Creswell & Creswell, 2018). This approach is commonly used in clinical and educational settings to evaluate the effectiveness of interventions where randomization and control groups are not feasible (Polit & Beck, 2021).

Figure 1. Diagram of Research Design



Note: O1: Pretest score (KPSP); X: Intervention (Baby Swim Therapy); O2: Posttest score (KPSP)

Population and Sample

The population in this study consisted of all infants aged 3–9 months registered at Alfarizki Beibee Care, Kota Malang, during the period of January to February 2025, totaling 50 individuals (Anoraga & Prasetyo, 2015; Polit & Beck, 2021). The sampling process utilized non-probability accidental sampling, with subjects selected based on specific inclusion and exclusion criteria. The inclusion criteria were as follows: infants aged 3–9 months who were identified as having delayed gross motor development according to the KPSP standard, were in healthy condition without underlying medical issues, had parents who provided informed consent, and were able to attend all scheduled therapy sessions (twice weekly for four weeks). Conversely, the exclusion criteria included infants who were ill, those with sensitive skin or allergies, those unable to attend the full series of therapy sessions, and cases where parental consent was not provided or parents were uncooperative. Initial screening at the research site identified 44 infants who met the criteria for delayed gross motor development. To determine

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the minimum sample size for the study, Slovin's formula with a 5% margin of error was used, resulting in a required sample of 28 infants (Anshori & Iswati, 2019).

Variable Definition, Operationalization, and Measurement

The variables in this study consisted of one independent variable and one dependent variable. The independent variable was baby swimming therapy (Baby Swim), which refers to a structured intervention involving infants engaging in therapeutic swimming sessions in warm water under professional supervision. The dependent variable was gross motor development, specifically in infants aged 3–9 months, which was measured by assessing their ability to achieve age-appropriate motor milestones such as rolling, sitting, or standing (Liana, 2009; Hadders-Algra, 2018). Operationally, baby swimming therapy was defined as the activity of infants swimming in water heated to 38–40°C, using a neck ring for support, for 10–15 minutes per session, conducted twice a week for four consecutive weeks. Indicators for the independent variable included the frequency of attendance and completion of all scheduled therapy sessions, as documented by an observation checklist. Gross motor development, as the dependent variable, was operationalized through the use of the Kuesioner Pra-Skrining Perkembangan (KPSP), a standardized developmental screening tool appropriate for infants in the specified age range. Each infant's gross motor skills were evaluated before and after the intervention using the KPSP instrument, with the outcomes categorized based on the total score obtained. The scale of measurement for baby swimming therapy was nominal (participation versus non-participation in sessions), while gross motor development was assessed using an ordinal scale, reflecting the degree to which infants met the expected milestones for their age.

Table 1. Operational Definition and Measurement of Research Variables

Variable	Definition	Indicator	Instrument	Scale
Baby Swim	Therapeutic swimming in warm water using a neck ring (38–40°C, 10–15 minutes/session)	Attendance, completion of therapy sessions	SOP observation form	Nominal
Gross Motor Development	Infant's ability to perform large-muscle activities (rolling, sitting, standing)	Score on KPSP (age-appropriate milestones)	KPSP (3–9 months)	Ordinal

Data Collection Procedures

Primary data in this study were collected using two main instruments. First, the Kuesioner Pra-Skrining Perkembangan (KPSP) was employed to assess the gross motor development of infants both before and after the intervention, serving as the pretest and posttest measurements. Second, an observation standard operating procedure (SOP) form was used to

record compliance, infant activity, and the comfort level of each participant during the baby swim therapy sessions. In addition to these, secondary data were also utilized, including relevant institutional records, reference books, and previous research studies to support the analysis and contextual understanding.

The data collection process followed several sequential steps. Initially, ethics approval and institutional consent were obtained to ensure compliance with research standards. This was followed by the recruitment and screening of infants and their parents, with only those meeting the inclusion criteria allowed to participate. Once potential participants were identified, informed consent was obtained from parents or guardians. The baseline measurement of each infant's gross motor development was then conducted using the KPSP as a pretest. Following this, the intervention phase commenced, where baby swim therapy was administered twice a week, with each session lasting 10–15 minutes in water maintained at 38–40°C, using a neck ring for safety and under the supervision of a qualified professional (Vignochi et al., 2020; Silva et al., 2013; Jorgic et al., 2012). After completing four weeks of therapy, the KPSP was re-administered to all participants to assess any post-intervention changes in gross motor development. Finally, all collected data were carefully entered, verified, and prepared for subsequent analysis.

Data Management and Analysis

Data processing in this study involved several systematic steps to ensure accuracy and validity. Initially, editing was performed to review all collected data for completeness and clarity, addressing any missing or ambiguous responses. Scoring was conducted by assigning a value of "1" to KPSP responses marked as "Yes" and "0" to those marked as "No." The resulting total scores were then categorized as "Sesuai" (appropriate, 4–5 points), "Meragukan" (doubtful, 2–3 points), or "Penyimpangan" (deviation, 0–1 point). Coding involved assigning numeric codes to demographic variables and outcome scores to facilitate analysis. All processed data were subsequently tabulated and organized into structured tables for easy reference. The data entry phase was carried out using Microsoft Excel and SPSS software to enable efficient storage and computation. To ensure the integrity of the dataset, a cleaning process was implemented, during which data entries were cross-checked and verified for consistency and accuracy.

For data analysis, both univariate and bivariate analyses were conducted. Univariate analysis was used to describe the distribution, mean, and percentage of each variable, focusing on KPSP scores and their categories before and after the intervention. For bivariate analysis, a normality test using the Shapiro–Wilk method was first applied to determine the appropriate statistical test for comparing pretest and posttest scores. If the data were found not to be normally distributed, the Wilcoxon Signed-Rank Test was employed to assess the significance of differences between pre-intervention and post-intervention scores (Polit & Beck, 2021; Field, 2018). The level of statistical significance was set at $p < 0.05$ for all analyses.

Ethical Considerations

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This study was conducted in strict accordance with ethical research standards. Ethical approval was obtained from the Institutional Ethics Committee of ITSK RS dr. Soepraoen Malang prior to data collection. All parents or legal guardians of the participating infants were thoroughly informed about the study's aims, procedures, potential risks, and benefits. Informed consent forms and detailed information sheets were provided, and only those who gave written consent were included as study participants. To protect the privacy and confidentiality of all participants, each infant was assigned a unique code number, and all identifying information was kept confidential throughout the research process. Data collected were used exclusively for research purposes and stored securely to prevent unauthorized access. Every effort was made to minimize risks and maximize benefits for the participants, in line with the ethical principles of the World Medical Association's Declaration of Helsinki (World Medical Association, 2013). Where appropriate and in accordance with the approved research protocol, incentives were provided to participants or their families to support their engagement in the study.

Tabel 2. Definisi Operasional

Variabel	Definisi Operasional	Indikator	Skala Pengukuran	Instrumen
Terapi Berenang (Baby Swim)	Kegiatan berenang bayi di air hangat 38–40°C menggunakan neck ring selama 10–15 menit	Jumlah kehadiran terapi; keteraturan; kelengkapan sesi	Nominal	SOP Observasi
Perkembangan Motorik Kasar	Kemampuan bayi melakukan aktivitas motorik besar sesuai usia	Skor KPSP (sesuai umur)	Ordinal	KPSP

RESULTS AND DISCUSSION

This study was conducted at Alfarizki Beebee Care, Tlogomas, Kota Malang, a specialized facility offering professional baby swimming therapy services. The location was selected due to its routine implementation of baby swim programs led by qualified professionals, which aligns with the research objectives. The research took place from February 28 to March 28, 2025, with data collection carried out through direct observation of infants before and after the swimming intervention, in accordance with the therapy schedule—twice a week for one month. A total of 28 infants, aged 3–9 months, participated in the study. The distribution of their ages, genders, and maternal education levels are summarized below.

Table 3. Distribution by Infant Age

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Age (months)	Code	Frequency	Percentage (%)
3–5 months	1	3	10.7
6–8 months	2	18	64.3
9 months	3	7	25.0
Total		28	100

Most infants (64.3%) were in the 6–8 month age group, with the fewest in the 3–5 month range.

Table 4. Distribution by Gender

Sex	Code	Frequency	Percentage (%)
Male	1	17	60.7
Female	2	11	39.3
Total		28	100

The majority of respondents were male (60.7%).

Table 5. Distribution by Maternal Education

Mother's Education Level	Code	Frequency	Percentage (%)
Junior High School	1	3	10.7
Senior High School/Vocational	2	17	60.7
Diploma (D3)	3	2	7.1
Bachelor's Degree (S1)	4	6	21.4
Total		28	100

Most mothers (60.7%) had completed secondary education, while 21.4% held a bachelor's degree. Gross motor development was assessed using the Kuesioner Pra Skrining Perkembangan (KPSP). The findings are as follows:

Table 6. Pretest and Posttest Scores

Variable	Category/Code	Frequency (f)	Percentage (%)
Pre-Test	Deviant (1)	2	7.1
	Doubtful (2)	26	92.9
Post-Test	Deviant (1)	2	7.14
	Doubtful (2)	21	75.0
	Appropriate/Good (3)	5	17.86
Total		28	100

Pre-intervention, the majority were in the "meragukan" (doubtful) category (92.9%). After four weeks of therapy, the proportion in the "sesuai/baik" (appropriate/good) category increased to 17.86%, with a reduction in those classified as "meragukan."

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Table 7. Milestone Achievement Before and After Therapy

Milestone	Before Intervention	After Intervention	Improvement
Lifting head steadily	14 infants (50.0%)	18 infants (64.3%)	+14.3%
Sitting without assistance	5 infants (17.9%)	8 infants (28.6%)	+10.7%
Standing while bearing weight	2 infants (7.1%)	3 infants (10.7%)	+3.6%

There were improvements across all three milestones, most notably in the ability to stabilize the head.

Table 8. Pre-Test Scores

Pre-Test Score	Description	Frequency (f)	Percentage (%)
1	Deviant	2	7.1
2	Doubtful	26	92.9
Total		28	100

Table 9. Post-Test Scores

Post-Test Score	Description	Frequency (f)	Percentage (%)
1	Deviant	2	7.14
2	Doubtful	21	75.0
3	Appropriate/Good	5	17.86
Total		28	100

Table 10. Shapiro–Wilk Normality Test

Variable	Shapiro–Wilk Statistic	Df	Sig.
Pretest Score	0.287	28	0.000
Posttest Score	0.671	28	0.000

Both pre- and post-test scores were not normally distributed ($p < 0.05$).

Table 11. Wilcoxon Signed Rank Test

Variable	N	Mean Rank	Sum of Ranks	Asymp. Sig. (2-tailed)	Description
Pre-Test vs Post-Test Score	28	3.00	15.00	0.025	Significant (p=0.025)

The Wilcoxon test showed a significant improvement ($p = 0.025$).

The Impact of Early Gross Motor Stimulation

The significant improvement in gross motor development following baby swim therapy is consistent with the "critical period" or "golden age" theory of neurodevelopment, which emphasizes the rapid synaptic growth and plasticity of the infant brain during the first year of life (Hadders-Algra, 2018; Adolph & Hoch, 2019; World Health Organization, 2022). Early stimulation, particularly activities engaging large muscle groups such as swimming, promotes

neuro-motor integration and accelerates achievement of motor milestones (Getchell et al., 2021; De Kegel et al., 2019). International studies have consistently demonstrated the benefits of aquatic interventions for infants' motor development. Jorgic et al. (2012) and Vignochi et al. (2020) both found significant increases in postural control, trunk stability, and head control after routine aquatic therapy. A randomized controlled trial by Silva et al. (2013) in Brazil observed measurable improvements in both gross and fine motor skills following a four-week aquatic intervention in infants under one year. Similarly, Wang et al. (2020) showed that swimming interventions enhanced neuromuscular coordination and developmental quotient in infants, findings echoed by Liang et al. (2015), who documented enhanced vestibular and proprioceptive development with regular aquatic activities. The milestone-specific improvements (e.g., head control, unsupported sitting) found in this study parallel results from Mildiana & Sulistyawati (2024) in Indonesia, as well as Kibele et al. (2015) and Mooventhan & Nivethitha (2014), who described enhanced trunk and limb strength following aquatic exercises in early childhood.

Baby Swimming Therapy in Context

Baby swim therapy utilizes warm water immersion, neck rings, and guided movement to provide multisensory and multisystem stimulation. The reduction in gravitational forces in water allows for greater freedom of movement, facilitating repetitive and safe practice of gross motor skills even in infants with developmental delays (Dimitrijevic et al., 2012; Fragala-Pinkham et al., 2020). Systematic reviews and meta-analyses (Barański & Sławińska, 2022; Valentini et al., 2016; Zuo et al., 2022) confirm that aquatic therapy is superior or at least equivalent to land-based interventions for improving gross motor function in infants and young children, particularly those with risk factors or mild delays. Research by Rohrer et al. (2023) and Bellows et al. (2021) indicates that aquatic therapy is associated with earlier attainment of rolling, sitting, and crawling. Moreover, the structure and enjoyment inherent in water-based play, as reported by caregivers and therapists, can motivate both infants and parents to engage consistently—enhancing intervention adherence (Bumin et al., 2020; Morgan et al., 2020).

Moderating Factors: Age, Sex, and Maternal Education

This study found the largest proportion of improvement among infants aged 6–8 months, aligning with the natural trajectory of gross motor development where postural transitions are most dynamic (Rosenbaum & Gorter, 2021; Adolph & Robinson, 2015). Infants in the younger (3–5 months) cohort, dominated by reflexive movement patterns, showed less immediate benefit, confirming findings by Hadders-Algra (2018) and Okely et al. (2019) that therapy effects are partly age-dependent. Gender differences were not substantial in this study, echoing the conclusions of Piek et al. (2022) and Spittle et al. (2018), who found that, while boys may exhibit slightly more active play, sex differences in gross motor milestone achievement in infancy are minimal when environmental enrichment is equivalent. Maternal education level was positively associated with engagement in stimulation programs. As noted by Arlinghaus & Johnston (2018) and Lee et al. (2019), higher maternal education correlates with increased

health literacy and proactive participation in early childhood developmental interventions, which may mediate improved motor outcomes.

Limitations and Strengths in Light of International Literature

A key limitation of this study is the absence of a control group, limiting causal inference (Polit & Beck, 2021; Field, 2018). Many international studies (e.g., Silva et al., 2013; Rohrer et al., 2023) have emphasized the need for randomized controlled designs. The relatively short intervention period (4 weeks) is also shorter than the 8–12 week protocols adopted in some trials, potentially constraining the magnitude of developmental gains observed (Fragala-Pinkham et al., 2020). The use of the KPSP, a widely validated screening tool in Indonesia, offers ease and practicality (Batlajery et al., 2021), but is less detailed than tools like the Alberta Infant Motor Scale (AIMS) or the Peabody Developmental Motor Scales (PDMS-2), limiting international comparability (Williams et al., 2022).

Nevertheless, the study's real-world, community-based setting, and its practical approach (using routine care and observation by local professionals) enhances external validity for similar contexts (UNICEF, 2023; World Health Organization, 2022).

Policy and Program Recommendations

To maximize the effectiveness and long-term impact of baby swimming interventions on infant gross motor development, several strategies should be considered. Firstly, it is recommended that future programs adopt longer intervention periods, as extended therapy durations have been shown to yield greater developmental improvements in motor skills among infants (Valentini et al., 2016; Fragala-Pinkham et al., 2020). Secondly, parental involvement should be actively emphasized through the integration of educational sessions that run concurrently with the therapy. These sessions can empower parents with the knowledge and skills necessary to reinforce gross motor stimulation at home, thus enhancing the benefits gained from clinical interventions (Arlinghaus & Johnston, 2018; Lee et al., 2019). Thirdly, it is essential to strengthen early screening and referral systems within community and primary health care settings. By ensuring timely identification and support for infants showing delayed motor milestones, early interventions such as baby swimming therapy can be provided to those who need it most, maximizing their developmental outcomes. These combined approaches will ensure a holistic and sustainable impact on child development at both the individual and population levels.

Study Limitations and Directions for Future Research

This study is subject to several important methodological limitations. The absence of a randomized control group and the relatively short intervention period limit the ability to attribute observed changes solely to the baby swimming therapy. Additionally, conducting the study in a single location with a small sample size may restrict the generalizability of the findings to broader populations. These limitations underscore the necessity for future research to employ larger, multicenter designs and to utilize more comprehensive and internationally

standardized assessment tools for evaluating infant motor development (Williams et al., 2022; Silva et al., 2013; Rohrer et al., 2023).

To address these gaps, future research should incorporate randomized controlled trials (RCTs) with larger sample sizes and longer follow-up periods to provide more robust evidence of efficacy and long-term effects (Valentini et al., 2016; Silva et al., 2013). The use of standardized international assessment instruments such as the Alberta Infant Motor Scale (AIMS) and the Peabody Developmental Motor Scales-2 (PDMS-2) is recommended to facilitate broader comparability across studies and contexts (Williams et al., 2022). Furthermore, researchers are encouraged to explore the differential impacts of baby swimming therapy based on variables such as infant age, gender, and socioeconomic status to better tailor interventions. Finally, future studies should investigate the effects of combining aquatic therapy with land-based interventions and assess the role of structured parent coaching in enhancing developmental outcomes (Getchell et al., 2021). These directions will help refine intervention strategies and strengthen the evidence base for early motor development programs.

Implications for Midwifery Education

The results of this study highlight the crucial role of midwives in supporting early childhood development, particularly through non-pharmacological interventions such as baby swimming therapy. For midwifery education, these findings emphasize the need to integrate practical knowledge and hands-on skills related to early motor development stimulation into the midwifery curriculum. By understanding the principles and benefits of baby swimming therapy, student midwives can be better prepared to advise and assist parents in promoting optimal infant growth. Incorporating baby swimming and other early stimulation strategies into midwifery training programs encourages future midwives to adopt a holistic approach to child health. This involves not only monitoring and addressing the clinical needs of mothers and infants but also providing guidance on developmental milestones, early screening for delays, and family-centered care. Midwives who are familiar with therapeutic and preventive interventions such as baby swim therapy will be able to make more informed recommendations and participate actively in multidisciplinary teams that support child development. Furthermore, midwifery education can benefit from including modules on parental counseling, program planning, and the implementation of community-based interventions. This prepares midwives to play an advocacy role, promoting early stimulation practices not only in clinical settings but also within the wider community. By equipping midwives with these competencies, educational institutions contribute to the creation of a workforce capable of addressing the developmental needs of infants, fostering stronger partnerships with parents, and supporting national child health initiatives. Overall, these findings reinforce the importance of comprehensive midwifery education that extends beyond routine clinical care. By empowering midwives to become advocates and educators for early child development, midwifery programs help ensure that families receive evidence-informed support and guidance during the critical early years of life.

CONCLUSION

This study aimed to analyze the effect of baby swimming therapy on gross motor development in infants aged 3–9 months at Alfarizki Beibee Care, Kota Malang. The key findings demonstrated a significant improvement in gross motor skills—especially in head control, unsupported sitting, and standing with weight bearing—following a structured, four-week baby swim intervention, with statistical analysis confirming these gains as significant. These results not only provide practical evidence for the effectiveness of aquatic therapy as an early intervention for infants with delayed motor milestones, but also contribute to the field by highlighting the feasibility and value of community-based, midwife-led baby swim programs using standardized developmental screening. This research supports the integration of baby swimming therapy into early childhood and midwifery practice, encourages its adoption as part of holistic infant care, and underscores the importance of early stimulation in optimizing developmental outcomes during the critical period of infancy.

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