



Effects of Ribbon-Based Rhythmic Gymnastics on Gross Motor Skill Development in Kindergarten Children



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ABSTRACT

Penelitian kuasi-eksperimental ini meneliti pengaruh senam ritmik dengan media pita terhadap keterampilan motorik kasar anak usia 5–6 tahun di TK Harindah. Dua puluh anak dibagi menjadi dua kelompok: kelompok eksperimen dan kelompok kontrol. Kelompok eksperimen mengikuti dua belas sesi senam ritmik dengan media pita, sementara kelompok kontrol melakukan aktivitas motorik biasa. Keterampilan motorik kasar dinilai sebelum dan sesudah intervensi melalui observasi dan tes kinerja yang tervalidasi, yang berfokus pada keterampilan lokomotor, non-lokomotor, dan manipulatif. Hasil menunjukkan peningkatan signifikan keterampilan motorik kasar pada kelompok eksperimen (rata-rata meningkat dari 14,90 menjadi 32,70), dibandingkan dengan kelompok kontrol yang mengalami peningkatan kecil (17,00 menjadi 18,90). Uji Wilcoxon Signed-Rank mengonfirmasi adanya peningkatan yang signifikan secara statistik. Temuan ini menegaskan nilai senam ritmik dengan media pita sebagai pendekatan yang efektif, menarik, dan sesuai dengan tahap perkembangan anak usia dini. Penelitian ini merekomendasikan integrasi aktivitas bermain multisensori seperti ini ke dalam kurikulum TK untuk mendukung perkembangan anak secara holistik.

This quasi-experimental study investigates the influence of rhythmic gymnastics using ribbon media on the gross motor skills of children aged 5-6 years at Harindah Kindergarten. Twenty children were divided into experimental and control groups. The experimental group participated in twelve rhythmic gymnastics sessions incorporating ribbon media, while the control group engaged in regular motor activities. Gross motor skills were assessed pre- and post-intervention using validated observation and performance tests focusing on locomotor, non-locomotor, and manipulative skills. Results indicate a significant improvement in gross motor abilities in the experimental group (mean increase from 14.90 to 32.70) compared to a minor increase in the control group (17.00 to 18.90). Wilcoxon Signed-Rank Tests confirmed statistically significant gains attributable to the intervention. These findings highlight the value of rhythmic gymnastics with ribbon media as an effective, engaging, and developmentally suitable approach for enhancing motor skills in early childhood. The study recommends integrating such multisensory play-based activities in kindergarten curricula to support holistic child development.

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1. Introduction

Early childhood is widely recognized as a crucial period for physical, cognitive, and social-emotional development, often referred to as the golden age because of its profound impact on lifelong growth. Among the various developmental domains, gross motor skills, which involve coordinating large muscles for movements such as walking, running, jumping, and balancing, are essential to children's health, independence, and social participation (Yuniantika, 2019; Munawwirah dkk., 2021). Mastering these skills at ages 5–6 lays the foundation for more complex physical activities and is associated with greater confidence and emotional stability (Aida Farida, 2016). Facilitating optimal gross motor skill development in childhood is therefore a primary concern for educators and caregivers.

Rhythmic gymnastics, which combines body movements with musical rhythm and apparatus such as ribbons, has emerged as an engaging and effective physical activity for promoting children's gross motor skills (Kristiana, 2021). These exercises enhance physical fitness and stimulate neuromuscular coordination, balance, agility, and rhythm regulation, all important components of motor development (Rovendra dkk., 2023). Moreover, play-based activities such as rhythmic gymnastics align with children's natural inclination toward exploration and enjoyment, making them particularly suitable for early childhood education (Sari & Sinaga, 2020). However, motor development programs in many kindergartens often lack variety and fail to engage children sufficiently, limiting their effectiveness (Nasirun & Syam, 2016).

A major challenge in early childhood education is ensuring that motor development activities are both developmentally appropriate and sufficiently stimulating to sustain children's interest and participation (Puspitasari & Habibah, 2022). Although general physical exercises are frequently implemented, they often lack the creative or social elements essential to children's holistic development (Meisarah & Rangkuti, 2023). Rhythmic gymnastics using ribbons introduces a multisensory experience combining movement, music, and visual stimulation, providing a richer context for motor skill acquisition and cognitive engagement (Lena dkk., 2023). Research indicates that such integrative approaches enhance children's motivation, motor coordination, and social interaction (Maghfiroh, 2020).

Previous studies of rhythmic gymnastics in early childhood education have reported positive outcomes in balance, coordination, and agility (Kristiana, 2021; Rovendra dkk., 2023). Ozer (2024) found that a 12-week gymnastics program significantly improved muscular strength and flexibility among children aged 5–7. Another study showed that eight weeks of physical activity such as rhythmic gymnastics effectively improved gross motor skills among children aged 4–5, including mobility, manipulation, and balance (Zhao 2024). However, much of the literature focuses on primary-school-aged or older children, leaving a research gap concerning the effectiveness of rhythmic gymnastics among kindergarten children, particularly when ribbons are used (Puspitasari & Habibah, 2022). Furthermore, variations in implementation methods and educational settings limit the generalizability of findings, highlighting the need for contextual research that considers cultural and institutional factors (Rovendra dkk., 2023).

This study addresses that gap by examining the influence of rhythmic gymnastics using ribbons on the gross motor skills of children aged 5–6 at a kindergarten in Makassar, Indonesia. It aims to determine whether integrating ribbon-based rhythmic gymnastics into the physical activity curriculum can significantly improve gross motor skills compared with regular gross motor development activities. The study also seeks to provide new insights into culturally relevant and pedagogically effective motor development interventions for young children.

The study is expected to inform educators, caregivers, and policymakers about the benefits and practical implementation of rhythmic gymnastics in early childhood settings and provide evidence-based recommendations for enhancing holistic child development. It hypothesizes that playful rhythmic gymnastics using ribbons has a significant positive influence on the gross motor skills of children aged 5–6, thereby supporting more innovative and engaging physical education programs in kindergartens.

2. Methods

This study employed a quantitative approach with a quasi-experimental *design*, specifically a *Nonequivalent Control Group design*, to evaluate the influence of rhythmic gymnastics using ribbons on the gross motor skills of children aged 5–6 at TK Harindah. This design was selected because of practical constraints on randomization and to allow comparison between an experimental group receiving the intervention and a control group engaging in regular motor activities without the intervention (Sugiono, 2015).

The research population comprised 32 children enrolled in Class B at TK Harindah. *Purposive sampling* was used to select 20 children aged 5–6 who met inclusion criteria relevant to the study objectives. The sample was divided equally into an experimental group (n=10), which received rhythmic gymnastics using ribbons, and a control group (n=10), which continued the regular gross motor activities normally provided by the kindergarten.

The independent variable was rhythmic gymnastics using ribbons (X), while the dependent variable was children's gross motor ability (Y). Gross motor ability was operationally defined as the capacity to perform coordinated movements involving large muscle groups, including locomotor, non-locomotor, and manipulative movements such as walking, jumping, balancing, and throwing (Sulistyo dkk., 2021).

Data were collected using two main instruments: observation sheets and performance tests. The observation sheet contained a checklist of nine gross motor ability indicators divided into three categories: locomotor, non-locomotor, and manipulative skills. Each item was rated on a four-point scale from Not Yet Able (1) to Highly Able (4), allowing quantitative assessment. The instrument was validated by experts in early childhood motor development through several review stages to ensure content validity and age appropriateness.

The study lasted approximately one month and involved several stages. Pre-test: Both groups' initial gross motor skills were assessed using performance tests, including activities such as throwing and catching a ball. Intervention: The experimental group participated in 12 rhythmic gymnastics sessions using ribbons over several weeks. Each session included a warm-up, core rhythmic gymnastics activities with ribbon movements synchronized to music, and a cool-down. The control group participated in standard motor development activities, such as kindergarten gymnastics and free play. Post-test: After all intervention sessions were completed, changes in both groups' gross motor ability were measured using the same tests as in the pre-test.

Descriptive and inferential statistics were used to analyze the data. Descriptive statistics summarized the means, minimum and maximum scores, and standard deviations of gross motor skills before and after the intervention for both groups. Inferential analysis used the Wilcoxon *Signed-Rank Test*, a non-parametric test suitable for small samples and ordinal data, to assess the significance of differences between pre-test and post-test scores (Sugiono, 2015).

3. Results and Discussion

This study examined the influence of rhythmic gymnastics using ribbons on the gross motor skills of children aged 5–6 at TK Harindah. The findings are presented as descriptive statistics, comparative analysis of pre-test and post-test results, and inferential statistical tests.

The study involved two groups: an experimental group that participated in rhythmic gymnastics sessions using ribbons and a control group that undertook regular motor activities without the intervention. Descriptive statistics for both groups' gross motor skill scores before (pre-test) and after (post-test) the intervention are summarized in Tables 1 to 4.

Table 1. Frequency Distribution of Children's Gross Motor Ability After Treatment (Post-test) in the Experimental Group

Interval	Category	Experimental	
		Frequency	Percentage
9-15	BM	0	0%
16-22	CM	0	0%
23-29	M	2	20%
30-36	SM	8	80%
Total		10	100%

Table 2. Frequency Distribution of Children's Gross Motor Ability Before Treatment (Post-test) in the Control Group

Interval	Category	Experimental	
		Frequency	Percentage
9-15	BM	1	10%
16-22	CM	8	80%
23-29	M	1	10%
30-36	SM	0	0%
Total		10	100%

Table 3. Pre-test and Post-test Analysis of Children's Gross Motor Ability in the Experimental Group

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
pretest	10	11	22	14.90	3.143
posttest	10	29	35	32.70	2.312
Valid N (listwise)	10				

Table 4. Pre-test and Post-test Analysis of Children's Gross Motor Ability in the Control Group

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
control pretest	10	12	19	17.00	2.211
control posttest	10	13	25	18.90	3.107
Valid N (listwise)	10				

Initially (pre-test), the experimental group had a mean gross motor skill score of 14.90 (SD = 3.143), with 60% of children categorized as Not Yet Able and 40% as Moderately Able. The control group had a higher mean score of 17.00 (SD = 2.211), with 20% in the Not Yet Able category and 80% in the Moderately Able category.

After the intervention (post-test), the experimental group's mean score increased significantly to 32.70 (SD = 2.312), with 80% of children classified as Highly Able and 20% as Able. In contrast, the control group showed a smaller increase to a mean score of 18.90 (SD = 3.107), with most children remaining in the Moderately Able category and none reaching the Highly Able category.

The comparison of pre-test and post-test results showed improvements in gross motor skills in both groups; however, the improvement was much greater in the experimental group. The experimental group's mean score increased by 17.8 points, compared with only 1.9 points in the control group. The frequency distribution tables support this finding. No children in the experimental group remained in low-ability categories after the intervention, whereas the control group still had children across all categories, including those classified as Not Yet Able. The Wilcoxon Signed-Rank Test was used to examine the significance of changes within each group because the data were ordinal and the sample was small.

Table 5. Wilcoxon Signed-Rank Test Results for Children's Gross Motor Ability in the Experimental Group

		N	Mean Rank	Sum of Ranks
experimental posttest - experimental pretest	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	10 ^b	5.50	55.00
	Ties	0 ^c		
	Total	10		

a. experimental posttest < experimental pretest

b. experimental posttest > experimental pretest

c. experimental posttest = experimental pretest

Test Statistics^a

experimental posttest - experimental pretest

Z	-2.820 ^b
Asymp. Sig. (2-tailed)	.005

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Table 6. Wilcoxon Signed-Rank Test Results for Children's Gross Motor Ability in the Control Group

Ranks

		N	Mean Rank	Sum of Ranks
control posttest - control pretest	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	10 ^b	5.50	55.00
	Ties	0 ^c		
	Total	10		

- a. control posttest < control pretest
- b. control posttest > control pretest
- c. control posttest = control pretest

Test Statistics^a

	control posttest - control pretest
Z	-2.877 ^b
Asymp. Sig. (2-tailed)	.004

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.

- 1) For the experimental group, the Wilcoxon test showed a significant difference between pre-test and post-test scores ($Z = -2.820$, $p = 0.005 < 0.05$), confirming that rhythmic gymnastics using ribbons significantly improved gross motor skills.
- 2) For the control group, the Wilcoxon test also showed a statistically significant difference ($Z = -2.877$, $p = 0.004 < 0.05$), indicating an improvement possibly attributable to natural maturation or routine activities, although its magnitude was relatively small.

These results indicate that rhythmic gymnastics using ribbons has a statistically significant and practically meaningful influence on improving the gross motor skills of children aged 5–6. The intervention group outperformed the control group in all measured domains, including locomotor, non-locomotor, and manipulative movements. These findings align with previous studies emphasizing the effectiveness of rhythmic gymnastics and play-based physical activities in early childhood motor development.

Discussion

This study aimed to investigate the influence of rhythmic gymnastics using ribbons on the gross motor ability of children aged 5–6 at TK Harindah. The findings showed significant improvements in gross motor skills among children who participated in the rhythmic gymnastics intervention compared with those who engaged only in regular motor activities. This section discusses the findings in relation to existing literature and their implications for early childhood education and development.

The significant improvement in the experimental group's gross motor skills supports the view that rhythmic gymnastics, particularly when combined with engaging apparatus such as ribbons, creates a stimulating environment for motor development. This finding aligns with Kristiana (2021) and Rovendra et al. (2023), who showed that rhythmic gymnastics improves children's balance, coordination, agility, and muscle control. Honchar (2022) also found that rhythmic gymnastics improved the movement culture of children aged 5–6 in both physical-motor and aesthetic terms. Ribbons may provide additional visual and tactile stimulation that helps improve attention, motivation, and active participation. Such multisensory engagement aligns with developmental theories emphasizing the importance of play and stimulating environments in supporting motor and cognitive growth (Piaget, Vygotsky).

Furthermore, the structure of rhythmic gymnastics, comprising a warm-up, core movements, and a cool-down, provides children with repeated and varied motor experiences.

Repetition is essential for consolidating motor skills because it strengthens neuromuscular pathways and improves movement planning and execution (Maghfiroh, 2020). The observation that children progressively mastered complex movements such as throwing and catching ribbons demonstrates the effectiveness of the intervention in promoting gross motor development, coordination, and fine motor skills. This aligns with research at TK Islam Al Bayan, which found that rhythmic gymnastics effectively and significantly improved children's gross motor ability (Dewi, 2024).

Conversely, although the control group also improved, the changes were relatively small and may have resulted from natural development or routine physical activities commonly offered in kindergarten. The absence of substantial variation and the lower overall scores compared with the experimental group emphasize the added value of a targeted rhythmic gymnastics intervention over usual practice. These findings reflect concerns in the literature about traditional motor development programs that lack variety and fail to engage children sufficiently, potentially leading to suboptimal developmental outcomes (Nasirun & Syam, 2016; Puspitasari & Habibah, 2022).

The findings also have important practical implications. First, they suggest that early childhood educators should consider integrating rhythmic gymnastics using apparatus such as ribbons into the physical education curriculum to enhance motor skill development effectively. These activities improve physical ability and may also promote social interaction, emotional regulation, and cognitive engagement through collaborative play and musical rhythm (Sari & Sinaga, 2020). Gymnastics can also help children explore movement effectively, improve postural strategies, and develop more accurate physical perceptions than traditional physical education (Anderson, 2019). Moreover, given children's enthusiasm and participation during the intervention, rhythmic gymnastics appears to offer an enjoyable and motivating form of exercise, which is important for establishing long-term physical activity habits from an early age.

However, several limitations must be acknowledged. The quasi-experimental design and relatively small sample may limit the generalizability of the results. Future randomized controlled trials (RCTs) involving larger and more diverse populations would strengthen the evidence base. Longitudinal studies examining the long-term effects of rhythmic gymnastics on motor development and other developmental domains would also provide valuable insights into the lasting benefits of this intervention.

4. Conclusion

This study concludes that rhythmic gymnastics using ribbons significantly improves the gross motor skills of children aged 5–6 at TK Harindah. The experimental group demonstrated marked improvements in locomotor, non-locomotor, and manipulative motor abilities, with a much greater increase in mean motor skill scores than the control group. These findings confirm the effectiveness of integrating ribbon-based rhythmic gymnastics into early childhood physical education as a developmentally appropriate and engaging intervention. The study provides valuable insights into motor development strategies and emphasizes the importance of incorporating creative, multisensory activities to optimize early childhood growth.

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