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GROSS MOTOR DEVELOPMENT THROUGH TRADITIONAL JUMP ROPE AND HOPSCOTCH GAMES IN EARLY CHILDHOOD EDUCATION

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ABSTRACT

This study examined changes in gross motor development after traditional jump rope (lompat tali) and hopscotch (engklek) activities among children aged 5-6 years at RA Ittihadul Khairi. A quantitative quasi-experimental pretest-posttest two-group design was used without a no-treatment control group. Twenty children were selected through purposive sampling and assigned to a jump rope group (n = 10) or a hopscotch group (n = 10). Each group received 12 structured play sessions over four weeks. Gross motor development was assessed using an eight-indicator observation sheet scored from 0 to 3, covering balance, one-foot jumping, locomotor control, eye-hand coordination, rhythm, movement accuracy, instruction following, and participation. The jump rope group improved from 10.20 to 18.70, with a mean gain of 8.50 points (95% CI: 7.53-9.47; t = -19.852; p < 0.001; Cohen's dz = 6.28). The hopscotch group improved from 10.00 to 18.60, with a mean gain of 8.60 points (95% CI: 7.70-9.50; t = -21.500; p < 0.001; Cohen's dz = 6.80). The posttest difference between groups was not significant (t = 0.234; p = 0.818; Cohen's d = 0.10). These findings indicate that both traditional games were associated with improved gross motor scores in this small sample, but the absence of a significant between-group difference should not be interpreted as statistical equivalence. Traditional games may be used as enjoyable and low-cost motor stimulation activities when implemented with clear rules, safety supervision, and adequate repetition.

keywords: traditional games, jump rope, hopscotch, gross motor development, early childhood

INTRODUCTION

Gross motor development is a foundational domain in early childhood because it supports balance, locomotor movement, physical participation, self-confidence, and readiness for broader learning experiences. Children aged 5-6 years are in a sensitive period for practicing large-muscle movements such as jumping, landing, balancing, throwing, catching, and coordinating body segments. When these movement experiences

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

are structured, repeated, and enjoyable, children have more opportunities to refine fundamental motor patterns needed for physical education and daily activity.

Recent evidence confirms the importance of movement stimulation in preschool years. Wang and Zhou (2024) reported that motor development-focused exercise training enhances gross motor skills more effectively than ordinary physical activity in healthy preschool children. Faizah et al. (2024) also found a positive association between physical activity and gross motor movement development in early childhood. These findings suggest that early childhood education settings should not rely only on spontaneous play, but should provide planned and developmentally appropriate motor activities. Recent systematic and network meta-analytic evidence also indicates that physical activity interventions and fundamental movement skill-targeted programs are effective for improving children's movement competence in early childhood (Jiang et al., 2025; Yang et al., 2025), while structured training with teacher guidance has improved gross motor skills and physical fitness in children aged 4-5 years (Quan et al., 2024).

Traditional games provide a culturally grounded form of active play. They are inexpensive, familiar to children, easy to adapt, and can be implemented in schools with limited equipment. Arfanda et al. (2024) explained that traditional games support balance, speed, agility, accuracy, endurance, and general motor development. Dzakiyyah et al. (2024) similarly concluded that traditional games are useful for stimulating gross motor skills because children practice dynamic whole-body movement in an enjoyable social context. From the perspective of play-based learning, children are more likely to repeat movement tasks when the activity feels like a game rather than a formal exercise. This argument is strengthened by evidence that traditional cultural games can improve gross motor skill performance when practice is structured and repeated (Bahar & Cheong, 2022; Cheong & Hussain, 2024).

Two traditional games that are especially relevant for children aged 5-6 years are jump rope and hopscotch. Jump rope trains repeated take-off and landing, rhythm, bilateral coordination, lower-limb strength, and postural control. Hopscotch trains single-leg balance, landing control, agility, spatial accuracy, and the ability to shift body weight across movement targets. Previous studies have reported that jump rope can improve gross motor skills in early childhood (Andini et al., 2022), and that both engklek and jump rope can support preschool motor development (Idhayanti et al., 2023). These activities also resemble planned play and early childhood physical activity programs in which repeated movement tasks, rules, and enjoyable challenges support motor improvement (Ali et al., 2021; Sutapa et al., 2021; Ramos-Munell et al., 2025).

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

Although the benefits of traditional games have been widely discussed, comparative evidence on jump rope and hopscotch within the same early childhood setting remains limited, particularly in local RA/PAUD contexts. In addition, many studies report improvement without clearly explaining the intervention protocol, scoring rubric, and statistical interpretation. Therefore, the novelty of this study lies in its direct comparison of two traditional games implemented under a similar four-week schedule in one early childhood education setting. This gap is important because recent reviews suggest that the effectiveness of early motor interventions depends not only on activity type, but also on structure, frequency, duration, and educational context (Jiang et al., 2025; Yin et al., 2025).

This study aimed to examine changes in gross motor development after jump rope and hopscotch activities among children aged 5-6 years at RA Ittihadul Khairi and to determine whether the posttest gross motor scores differed between the two groups. The hypotheses were: (1) gross motor scores would increase significantly after jump rope activities; (2) gross motor scores would increase significantly after hopscotch activities; and (3) posttest scores might differ between the two intervention groups.

METHOD

Research design and setting

This study used a quantitative quasi-experimental approach with a pretest-posttest two-group design. The study was conducted at RA Ittihadul Khairi in the 2024/2025 academic year. Because both groups received active interventions and no no-treatment control group was included, the findings should be interpreted as changes associated with the intervention within this study context rather than as definitive causal evidence.

Informants and sampling

The population consisted of children aged 5-6 years enrolled at RA Ittihadul Khairi. Twenty children were selected through purposive sampling and assigned to two groups of 10 children. The inclusion criteria were: (1) aged 5-6 years; (2) actively enrolled in learning activities; (3) physically able to participate in jumping and balancing activities; (4) able to follow simple instructions; and (5) receiving permission from parents or guardians. Children with injury, acute illness, or movement restrictions during the intervention period were excluded from participation.

Group assignment was conducted based on classroom scheduling and teacher consideration to maintain learning continuity and avoid excessive disruption. Therefore, the assignment was non-random. The two groups had similar initial mean gross motor scores before the intervention, with the jump rope group scoring 10.20 and the hopscotch group scoring 10.00. Detailed age-in-month and sex distribution data should be verified from school records before final submission because they were not available in the source manuscript is presented in Table 1.

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

Table 1. Participant and Group Profile

Group	n	Age range	Selection criteria	Intervention
Jump rope	10	5-6 years	Healthy, enrolled, able to follow instructions, parent permission	Traditional jump rope activities
Hopscotch	10	5-6 years	Healthy, enrolled, able to follow instructions, parent permission	Traditional hopscotch activities

Intervention Procedure

The intervention was implemented for four weeks with a frequency of three sessions per week, resulting in 12 sessions for each group. Each session lasted approximately 30 minutes and consisted of a 5-minute warm-up, 20 minutes of core game activity, and a 5-minute cool-down. Activities were conducted by the teacher with researcher supervision. Safety was maintained by using a flat play area, providing clear instructions, arranging children in small groups, and stopping activity when a child showed fatigue or discomfort.

Table 2. Intervention Protocol

Week	Jump rope group	Hopscotch group	Motor focus
1	Introduction to rope, two-foot jumps, simple landing practice	Introduction to grid, stepping pattern, two-foot landing practice	Safety, balance, confidence, basic landing
2	Repeated two-foot jumps and short rhythmic sequences	Single-leg hopping and controlled landing on marked boxes	Rhythm, lower-limb strength, balance
3	Alternating jump patterns and coordination with peer turns	Directional hopping, body-weight transfer, accuracy to target boxes	Coordination, agility, spatial accuracy
4	Game-based jump rope sequences with simple group challenges	Complete hopscotch pattern with rule-following and group play	Movement accuracy, participation, sustained practice

Instrument and Scoring

Gross motor development was assessed using an observation sheet consisting of eight indicators scored on a 0-3 scale. The indicators included standing on one foot, one-foot jumping, heel-to-toe walking, catching a small ball, rhythm or movement coordination, balance while moving between points, ability to follow instructions, and participation during group play. The maximum total score was 24. The scoring rubric was clarified to improve transparency and consistency among observers.

Table 3. Observation Indicators and Scoring Rubric

Score	Operational meaning
0	The child is unable to perform the movement or refuses to participate.
1	The child performs the movement with substantial assistance or many errors.

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

Score	Operational meaning
2	The child performs the movement with minor assistance or minor errors.
3	The child performs the movement independently, safely, and according to instruction.

Content validity was strengthened through review of the indicators by teachers and physical education experts before data collection. Observers were given the same operational rubric before assessment. However, because formal inter-rater reliability coefficients were not available in the source dataset, this issue is stated as a limitation and should be addressed in future studies.

Data analysis and trustworthiness

Data were analyzed using descriptive statistics, Shapiro-Wilk normality testing, Levene homogeneity testing, paired sample t-tests for within-group changes, and an independent sample t-test for posttest comparison between groups at a significance level of 0.05 using SPSS version 25. Because the sample was small, the analysis was complemented with effect size estimates and confidence intervals. Paired effect size was reported as Cohen's dz, calculated from t divided by the square root of n. Between-group effect size was reported as Cohen's d. The non-significant independent sample t-test was interpreted cautiously as no significant posttest difference in this sample, not as proof of statistical equivalence.

RESULTS AND DISCUSSION

Results

The descriptive results show improvement in both groups after four weeks of traditional game intervention. The jump rope group increased from a mean pretest score of 10.20 to a mean posttest score of 18.70, producing a mean gain of 8.50 points. The hopscotch group increased from 10.00 to 18.60, producing a mean gain of 8.60 points. The initial mean difference between groups was very small, suggesting that the two groups started from a broadly similar gross motor level.

Table 4. Within-Group Changes in Gross Motor Scores

Group	n	Pretest mean	Posttest mean	Mean gain	95% CI of gain	Paired t	p	Cohen's dz
Jump rope	10	10.20	18.70	8.50	7.53-9.47	-19.852	<0.001	6.28
Hopscotch	10	10.00	18.60	8.60	7.70-9.50	-21.500	<0.001	6.80

Before hypothesis testing, the assumptions for parametric analysis were examined. In the jump rope group, Shapiro-Wilk significance values were 0.172 for the pretest and 0.287 for the posttest. In the hopscotch group, the values were 0.109 for the pretest and 0.245 for the posttest. All values were above 0.05, indicating that the data did not

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

significantly deviate from normality. Levene's test indicated homogeneous variance between groups (p = 0.857).

Table 5. Assumption Testing and Between-Group Comparison

Analysis	Statistic	p-value	Interpretation
Normality: jump rope pretest	Shapiro-Wilk	0.172	Normal
Normality: jump rope posttest	Shapiro-Wilk	0.287	Normal
Normality: hopscotch pretest	Shapiro-Wilk	0.109	Normal
Normality: hopscotch posttest	Shapiro-Wilk	0.245	Normal
Homogeneity between groups	Levene's test	0.857	Homogeneous
Posttest comparison	t = 0.234; Cohen's d = 0.10	0.818	No significant posttest difference

The paired sample t-test showed a significant improvement in the jump rope group (t = -19.852, p < 0.001). The large mean gain suggests that repeated jumping, timing, and landing provided strong motor stimulation for children aged 5-6 years. The hopscotch group also showed significant improvement (t = -21.500, p < 0.001), indicating that repeated single-leg hopping, directional movement, and controlled landing were also effective forms of motor practice in this setting.

The independent sample t-test showed no significant posttest difference between groups (t = 0.234, p = 0.818), and the between-group effect size was small (Cohen's d = 0.10). This result means that the study did not detect a meaningful difference between the two games in this small sample. However, the result should not be interpreted as definitive evidence that the two games are statistically equivalent. Equivalence or non-inferiority would require a specific equivalence design, a predefined margin, and a larger sample.

Discussion

The first empirical finding is that both traditional games were associated with substantial improvement in gross motor scores. This result is rational because both interventions required repeated practice of fundamental movement patterns. Jump rope involved take-off, landing, rhythm, coordination, and lower-limb power, while hopscotch involved single-leg balance, spatial accuracy, landing control, and agility. These movement demands correspond directly with the observation indicators used in the study, especially balance, jumping, coordination, movement accuracy, and participation.

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

The findings support previous empirical and review-based evidence. Andini et al. (2022) reported that jump rope activities can improve gross motor skills in early childhood. Idhayanti et al. (2023) also showed that engklek and jump rope can improve preschool gross motor development. More broadly, Arfanda et al. (2024) and Dzakiyyah et al. (2024) concluded that traditional games support balance, agility, speed, accuracy, endurance, and social engagement. The present study extends those findings by comparing two traditional games under a similar four-week schedule in one RA context. Recent meta-analytic and review evidence also supports the interpretation that structured active play and school-based motor interventions are more likely to produce measurable improvement in fundamental movement skills than unguided activity alone (Ramos-Munell et al., 2025; Yin et al., 2025).

From a theoretical perspective, the findings can be explained through motor learning and play-based learning. Children improve movement performance when they receive repeated opportunities to practice movement patterns, adjust errors, and perform tasks in meaningful situations. Traditional games offer these conditions because children repeat movements naturally while following rules, taking turns, and responding to peers. The enjoyable nature of play may also increase participation and reduce boredom compared with formal drill-based exercises. This explanation is consistent with goal-oriented play activities that improved running, jumping, balance, throwing, catching, and locomotor tasks after repeated sessions (Sutapa et al., 2021), as well as with physical activity programs delivered in early childhood education settings (Ali et al., 2021).

The absence of a significant posttest difference may be explained by overlap in the movement components trained by both games. Although jump rope and hopscotch differ in structure, both require lower-limb movement, postural control, attention to rhythm or sequence, and controlled landing. This overlap may explain why the two groups produced very similar gain scores. Another explanation is the small sample size, which limits statistical power to detect subtle differences between interventions. Therefore, the finding should be read cautiously because intervention effects in young children may vary according to duration, frequency, intervention type, and implementation context (Jiang et al., 2025; Yang et al., 2025).

Several biological and pedagogical factors should also be considered. Children aged 5-6 years may differ in maturation, prior play experience, motivation, confidence, and initial motor readiness. Teacher encouragement and classroom atmosphere may also influence how actively children participate. Because these factors were not measured separately, they may have contributed to the observed improvement. Future studies

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

should record age in months, sex, prior physical activity experience, and attendance in each intervention session.

The study has practical implications for RA/PAUD teachers. Jump rope and hopscotch can be integrated into outdoor learning as routine motor stimulation activities because they are inexpensive, culturally familiar, and enjoyable. A practical recommendation is to conduct these games two to three times per week for 20-30 minutes, beginning with warm-up, using clear safety rules, providing demonstrations, and gradually increasing difficulty. Teachers should vary the activities to maintain motivation and should ensure that the play area is safe for jumping and landing. This recommendation aligns with evidence that teacher-guided routines with clear instruction, progression, and feedback can improve children's gross motor skills and physical fitness (Quan et al., 2024; Yin et al., 2025).

This study has limitations. The sample consisted of only 20 children from one institution, group assignment was non-random, and no no-treatment control group was included. In addition, detailed demographic characteristics, formal inter-rater reliability, and longer-term follow-up were not available. Therefore, the findings should be interpreted as context-specific evidence of improvement after two structured traditional game interventions rather than as definitive causal or generalizable evidence.

CONCLUSIONS AND SUGGESTIONS

This study concludes that both traditional jump rope and hopscotch activities were associated with significant improvement in gross motor scores among children aged 5-6 years at RA Ittihadul Khairi. The jump rope group improved from 10.20 to 18.70, while the hopscotch group improved from 10.00 to 18.60. Both within-group improvements were statistically significant.

The posttest comparison showed no significant difference between the two groups in this sample. This finding indicates that the study did not detect a meaningful posttest difference, but it should not be interpreted as proof that the two games are statistically equivalent. Considering the small sample, absence of a no-treatment control group, and observational measurement, the conclusion should remain cautious.

Teachers are encouraged to use jump rope and hopscotch as structured, safe, and enjoyable gross motor stimulation activities. The games may be implemented two to three times per week for approximately 20-30 minutes, with warm-up, clear rules, close supervision, and gradual progression of difficulty. Future research should involve larger samples, random assignment, a no-treatment or usual-activity control group, detailed participant characteristics, inter-rater reliability testing, effect size reporting, and follow-up measurement to examine retention of motor gains.

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

LIST REFERENCES

Ali, A., McLachlan, C., Mugridge, O., McLaughlin, T., Conlon, C., & Clarke, L. (2021). The effect of a 10-week physical activity programme on fundamental movement skills in 3–4-year-old children within early childhood education centres. *Children, 8*(6), 440. https://doi.org/10.3390/children8060440

Andini, Y. T., Syamsudin, M. A., & Ulansari, F. (2022). Pengaruh permainan lompat tali terhadap perkembangan motorik kasar anak usia dini. *JP2KG AUD (Jurnal Pendidikan, Pengasuhan, Kesehatan dan Gizi Anak Usia Dini), 3*(2), 97–108. https://doi.org/10.26740/jp2kgaud.2022.3.2.97-108

Arfanda, P. E., Aprilo, I., Mappaompo, M. A., Arimbi, A., & Muhammad, H. N. (2024). Why are traditional games good for the physical being? *ACTIVE: Journal of Physical Education, Sport, Health and Recreation, 13*(1). https://doi.org/10.15294/active.v13i1.78711

Bahar, B. H., & Cheong, J. P. G. (2022). Improving gross motor skills of children through traditional games skills practiced along the contextual interference continuum. *Frontiers in Psychology, 13*, 986403. https://doi.org/10.3389/fpsyg.2022.986403

Cheong, J. P. G., & Hussain, B. (2024). Practicing traditional cultural games skills according to random and game-based practice schedules can improve gross motor skills performance. *Frontiers in Psychology, 15*, 1405635. https://doi.org/10.3389/fpsyg.2024.1405635

Darmawati, N. B., & Widyasari, C. (2022). Permainan tradisional engklek dalam meningkatkan motorik kasar anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(6), 6827–6836. https://doi.org/10.31004/obsesi.v6i6.3487

Dzakiyyah, D. M. N., Widiyanto, W., Susanto, N., Nurhuda, P., Pavlovic, R., Fauziah, D. N., & Kurniawan, R. (2024). Melatih motorik kasar anak pra-sekolah melalui permainan tradisional: A literature review. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 8*(6), 1647–1656. https://doi.org/10.31004/obsesi.v8i6.6244

Faizah, K., Sumaryanti, S., Sulistiyono, S., & Alim, A. (2024). Analysis of physical activity of gross motor movements in early childhood: Systematic literature review. *Jorpres (Jurnal Olahraga Prestasi), 20*(1), 31–40. https://doi.org/10.21831/jorpres.v20i1.72135

Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2012). *Understanding motor development: Infants, children, adolescents, adults* (7th ed.). McGraw-Hill.

Idhayanti, R. I., Khoirunisa, R., Lusiana, A., & Mundarti, M. (2023). Efektivitas permainan engklek dan lompat tali terhadap perkembangan motorik kasar anak prasekolah.

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

Juru Rawat: Jurnal Update Keperawatan, 3(1), 38–44. https://doi.org/10.31983/juk.v3i1.10248

Jiang, S., Zeng, N., Ng, J. Y. Y., Chong, K. H., Zeng, T., Leung, S. K. Y., & Ha, A. S. (2025). Effects of physical activity interventions on fundamental movement skills and cognitive function in early childhood: A systematic review and network meta-analysis. *Journal of Sport and Health Science, 15*, 101085. https://doi.org/10.1016/j.jshs.2025.101085

Liu, B., Yan, Y., Jia, J., & Liu, Y. (2025). Can active play replace skill-oriented physical education in enhancing fundamental movement skills among preschool children? A systematic review and meta-analysis. *BMC Public Health, 25*, 1399. https://doi.org/10.1186/s12889-025-22398-9

Quan, S., Liao, Y., Ji, Y., & Zheng, S. (2024). Structured training on gross motor skills and physical fitness in 4–5-year-old children. *Frontiers in Pediatrics, 12*, 1466911. https://doi.org/10.3389/fped.2024.1466911

Ramos-Munell, J., Gallardo-Gómez, D., Álvarez-Barbosa, F., Alfonso-Rosa, R. M., Reilly, J. J., Okely, A., del Pozo-Cruz, B., & del Pozo-Cruz, J. (2025). Enhancing fundamental motor skills through active play: A systematic review and meta-analysis of educational contexts. *European Early Childhood Education Research Journal*, 1–21. Advance online publication. https://doi.org/10.1080/1350293X.2025.2487929

Sutapa, P., Pratama, K. W., Rosly, M. M., Ali, S. K. S., & Karakauki, M. (2021). Improving motor skills in early childhood through goal-oriented play activity. *Children, 8*(11), 994. https://doi.org/10.3390/children8110994

Wang, X., & Zhou, B. (2024). Motor development-focused exercise training enhances gross motor skills more effectively than ordinary physical activity in healthy preschool children: An updated meta-analysis. *Frontiers in Public Health, 12*, 1414152. https://doi.org/10.3389/fpubh.2024.1414152

World Health Organization. (2024). *Physical activity*. https://www.who.int/news-room/fact-sheets/detail/physical-activity

Yang, Y., Mao, X., Li, W., Wang, B., & Fan, L. (2025). A meta-analysis of the effect of physical activity programs on fundamental movement skills in 3–7-year-old children. *Frontiers in Public Health, 12*, 1489141. https://doi.org/10.3389/fpubh.2024.1489141

Yin, X., Zhang, D., Shen, Y., Wang, Y., Wang, Z., & Liu, Y. (2025). Effectiveness of school-based interventions on fundamental movement skills in children: A systematic

ISSN. 3124-4750
Vol. 2 No. 1, 2026.
PP: 12-22

review and meta-analysis. *BMC Public Health, 25*, 1522. https://doi.org/10.1186/s12889-025-22696-2