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Parental Parenting Styles and Gross and Fine Motor Development in Preschool Children: A Cross-Sectional Analytical Study

Mediatrix Santi Gaharpung[1], Maria Kornelia Ringgi Kuwa[2], Agustinus Beni Fanto[3], Kristoforus Samson[4]

[1-4]STIKes St. Elisabeth Keuskupan Maumere, Nusa Tenggara Timur, Indonesia

Corresponding author:
Name: Mediatrix Santi Gaharpung
E-mail: santigaharpung13@gmail.com

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Abstract

Background: Parental parenting style influences the quality of motor stimulation that supports gross and fine motor development in preschool children. However, evidence from rural Indonesian preschool settings remains limited.

Objective: To examine the association between parental parenting styles and gross and fine motor development among preschool children.

Methods: A cross-sectional analytical study was conducted from January to February 2024 at TK Negeri 05 Mentari Nangahale, East Nusa Tenggara, Indonesia. Total sampling yielded 31 parent–child pairs. Parenting styles were assessed using an adapted structured questionnaire with good internal consistency (Cronbach's alpha = 0.82). Children's motor development was evaluated using a KPSP-based motor development checklist. Data were analyzed using the Chi-square test (α = 0.05), and effect size was calculated using Phi/Cramer's V.

Results: Democratic parenting was predominant, with 68% classified as very good and 32% as good. A significant association was found between parenting style and motor development (χ^2 = 10.94, df = 1, p = 0.001). Children exposed to democratic parenting predominantly showed age-appropriate motor development (95.2%), whereas authoritarian parenting was associated with a higher prevalence of developmental delay (60.0%). The association was strong (Phi/Cramer's V = 0.62).

Conclusion: Parental parenting style is significantly associated with preschool children's gross and fine motor development. Democratic parenting is linked to more favorable motor outcomes, supporting the role of physiotherapist-led parental education to enhance home-based motor stimulation and prevent early motor delays.

Keywords
Physical Therapy; Gross and Fine Motor Development; Child Development; Parenting Style; Preschool Children

Introduction

Gross and fine motor development during the preschool period represents a fundamental foundation for children's functional independence, participation in daily activities, and readiness for formal learning. Early motor competence supports postural control, coordination, balance, and object manipulation, which are essential for both physical activity and cognitive engagement in early childhood.[1] Adequate motor development is largely shaped by repeated movement experiences, environmental stimulation, and the quality of caregiver–child interactions during the early years of life.[2]

Globally, developmental risks in early childhood remain substantial. The latest joint estimates from the World Health Organization (WHO), UNICEF, and the World Bank indicate that in 2022 approximately 148.1 million children under five years of age were affected by stunting and 45.0 million by wasting, conditions that may compromise muscular strength, endurance, and opportunities for motor exploration.[3] These nutritional and developmental challenges are closely intertwined with motor delays, particularly in low- and middle-income countries where environmental stimulation and early developmental monitoring may be limited.[4]

In Indonesia, the burden of developmental risk remains a major public health concern. The Indonesian Nutrition Status Survey (Survei Status Gizi Indonesia, SSGI) reported a stunting prevalence of 24.4% in 2021, decreasing to 21.6% in 2022 and 21.5% in 2023.[5] Although this downward trend reflects national progress, the prevalence remains above global targets, underscoring the continued importance of early detection and prevention of developmental delays, including motor development. Early childhood education settings, particularly kindergartens, play a crucial role in identifying motor difficulties and supporting optimal child development through structured activities and collaboration with families.[6]

Beyond biological and nutritional factors, family-related determinants—especially parenting style—have been recognized as key influences on children's developmental trajectories. Parenting style reflects a constellation of attitudes, behaviors, and interaction patterns that parents use in raising their children, commonly categorized as democratic (authoritative), authoritarian, and permissive.[7] Democratic parenting, characterized by warmth, responsiveness, and clear but flexible boundaries, has consistently been associated with positive developmental outcomes, including better emotional regulation, social competence, and adaptive behavior.[8] In contrast, authoritarian parenting emphasizes rigid control and limited autonomy, while permissive parenting is marked by low structure and inconsistent guidance, both of which may restrict children's opportunities for guided motor exploration and skill practice.[9]

Empirical evidence suggests that supportive parenting environments facilitate children's engagement in physical activity and motor learning by providing encouragement, structured routines, and safe opportunities for movement.[10] Studies have demonstrated that children raised in democratic or authoritative households tend to exhibit superior gross and fine motor skills compared to those exposed to more restrictive or inconsistent parenting approaches.[11] These findings highlight the importance of parenting practices as modifiable factors that can be targeted through family-centered and community-based interventions.

From a physiotherapy perspective, early motor development is a critical domain for preventive and promotive interventions. Physiotherapists play an important role in early childhood settings by supporting motor screening, educating parents about age-appropriate motor stimulation, and promoting active play to prevent developmental delays.[12] Parent education programs led by physiotherapists have been shown to improve caregivers' understanding of motor milestones and enhance the quality of home-based motor stimulation.[13] However, the effectiveness of such interventions depends on an accurate understanding of family dynamics, including prevailing parenting styles.

Despite the growing body of international literature, empirical data examining the relationship between parenting styles and motor development in rural Indonesian preschool settings remain scarce. Most existing studies have been conducted in urban areas or high-income countries, limiting their generalizability to rural communities with different socioeconomic, cultural, and educational contexts.[14] At TK Negeri 05 Mentari Nangahale, preliminary observations by teachers indicated noticeable variations in children's abilities related to balance, jumping, object manipulation, drawing, and participation in physical activities, with approximately 22.6% of children exhibiting mild motor delays. These observations suggest that contextual family factors, particularly parenting practices, may contribute to differences in motor development outcomes in this setting.

The lack of localized observational evidence addressing parenting styles and motor development in rural Indonesian kindergartens represents a critical research gap. Understanding this relationship is essential to inform context-specific, family-centered strategies for early motor stimulation and physiotherapy-led education programs. Therefore, this study aimed to examine the association between parental parenting styles and gross and fine motor development among preschool children at TK Negeri 05 Mentari Nangahale using a cross-sectional analytical approach.

Methods

This study employed a cross-sectional analytical design to examine the association between parental parenting styles and gross and fine motor development among preschool children. The research was conducted from January to February 2024 at TK Negeri 05 Mentari Nangahale, East Nusa Tenggara, Indonesia. The kindergarten serves children predominantly from rural communities with diverse socioeconomic backgrounds, providing a relevant context for examining parenting practices and child developmental outcomes.

The study population consisted of all parents or legal guardians and their preschool children enrolled at TK Negeri 05 Mentari Nangahale during the study period. A total sampling approach was applied, resulting in the inclusion of 31 parent–child pairs. Parents or legal guardians were eligible to participate if they had a child enrolled in the preschool, were willing to participate, were able to read and understand the questionnaire, and provided written informed consent. Parents who were absent during data collection or returned incomplete questionnaires were excluded from the study.

The exposure variable in this study was parental parenting style, which was categorized into democratic (authoritative), authoritarian, and permissive styles. The outcome variable was children's motor development, classified as either age-appropriate development or developmental delay. Several potential confounding variables were considered, including parental age, sex, educational level, and occupation, as these factors may influence both parenting practices and child developmental outcomes. However, due to the limited sample size, statistical adjustment for confounders was not performed, and this limitation was acknowledged in the interpretation of the findings.

Parental parenting style was assessed using an adapted structured questionnaire consisting of 27 items representing democratic, authoritarian, and permissive dimensions. The questionnaire was culturally adapted and translated into the local language to ensure respondent comprehension. Internal consistency reliability testing demonstrated good reliability, with a Cronbach's alpha coefficient of 0.82, indicating acceptable internal consistency of the instrument. Responses were scored and categorized according to predefined criteria to determine the dominant parenting style for each respondent.

Children's gross and fine motor development was assessed using a motor development checklist based on the Kuesioner Pra Skrining Perkembangan (KPSP), a nationally recognized developmental screening tool recommended by the Indonesian Ministry of Health. The assessment was conducted through age-appropriate observation, with assistance from classroom teachers to ensure consistency and familiarity with the children's daily functional abilities. As the KPSP is a screening rather than a diagnostic instrument, it identifies children at risk of developmental delay but does not provide a definitive diagnosis; this limitation was taken into account during data interpretation.

Data collection was carried out after obtaining institutional permission and informed consent from all participants. Parents completed the parenting style questionnaire under researcher supervision to minimize missing data and enhance response accuracy. Children's motor development assessments were conducted during school hours in a familiar classroom environment to reduce anxiety and promote cooperation. All collected data were anonymized and coded prior to analysis to maintain confidentiality.

Several potential sources of bias were identified. Information bias may have arisen from self-reported parenting practices, which are susceptible to recall bias and social desirability bias. In addition, the cross-sectional design limits temporal inference, and the relatively small sample size may have reduced the ability to detect smaller associations.

No formal a priori sample size calculation was performed, as the study employed total sampling of the available population. Based on the observed large effect size (Phi/Cramer's V = 0.62) and total sample size (N = 31), post hoc analysis indicated adequate statistical power (>0.80) to detect the observed association. Nevertheless, the limited sample size restricts generalizability and the detection of small effect sizes.

Statistical analysis was performed using statistical software with a predefined significance level of $\alpha = 0.05$. Descriptive statistics were used to summarize participant characteristics and variable distributions. The Chi-square test of independence was applied to examine the association between parenting style and motor development outcomes. Assumptions of the Chi-square test, including expected cell counts, were assessed prior to analysis. Effect size was calculated using Phi/Cramer's V to determine the strength of the observed association.

Ethical principles were upheld throughout the study. Participation was voluntary, and written informed consent was obtained from all respondents prior to data collection. Confidentiality and anonymity were strictly maintained, and participants were informed of their right to withdraw from the study at any time without consequence. The study involved non-invasive procedures and posed minimal risk to participants.

Results

Participant flow throughout the study is illustrated in Figure 1. A total of 31 parent–child pairs were assessed for eligibility during the study period. All assessed participants met the predefined inclusion criteria and provided complete data. No participants

were excluded due to incomplete questionnaires, refusal to participate, or withdrawal during data collection. Consequently, all eligible participants were included in the final analysis (n = 31).

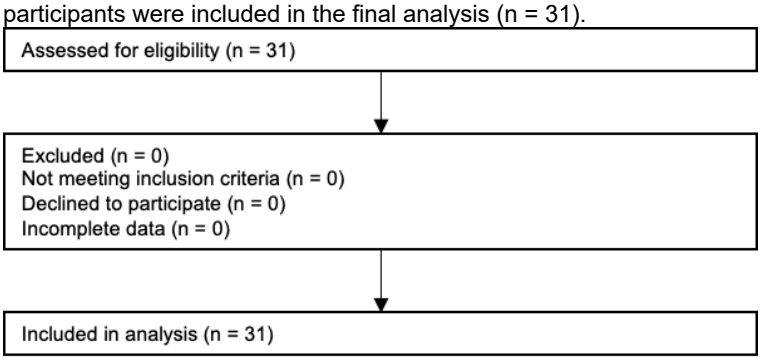

Figure 1. Flow diagram of participant selection and inclusion in the study

The baseline characteristics of parents or legal guardians are summarized in Table 1, including age, sex, educational level, and occupation.

Table 1. Baseline Characteristics of Respondents (N = 31)

Characteristic	Category	n	%
Age (years)	20–35	12	39.0
	36–55	16	52.0
	56–65	3	9.0
Sex	Male	8	26.0
	Female	23	74.0
Educational level	Elementary–Junior High	10	32.0
	Senior High School	15	48.0
	Higher Education	6	20.0
Occupation	Farmer	14	45.0
	Employee/Office Worker	9	29.0
	Teacher	4	13.0
	Others	4	13.0

As shown in Table 1**,** most respondents were aged 36–55 years (52.0%) and were female (74.0%). Nearly half had completed senior high school education (48.0%), and farming was the most common occupation (45.0%). The distribution of parenting styles and children's motor development status is presented in Table 2.

Table 2. Distribution of Parenting Styles and Motor Development (N = 31)

Parenting Style	Age-Appropriate Motor Development n (%)	Developmental Delay n (%)	Total (n)
Democratic	20 (95.2)	1 (4.8)	21
Authoritarian	4 (40.0)	6 (60.0)	10
Total	24 (77.4)	7 (22.6)	31

As shown in Table 2, democratic parenting was the most prevalent style (n = 21). Most children raised with democratic parenting demonstrated age-appropriate motor development (95.2%), whereas a higher proportion of developmental delay was observed among children exposed to authoritarian parenting (60.0%). The association between parenting style and motor development outcomes was examined using the Chi-square test. The results of the statistical analysis are presented in Table 3.

Table 3. Chi-Square Analysis of Parenting Style and Motor Development

Statistic	Value
χ^2	10.94
Degrees of freedom (df)	1
p-value	0.001
Effect size (Phi/Cramer's V)	0.62

The Chi-square test demonstrated a statistically significant association between parenting style and motor development (χ^2 = 10.94, df = 1, p = 0.001), with a strong effect size (Phi/Cramer's V = 0.62), indicating a substantial relationship between the variables.

Discussion

This study examined the association between parental parenting styles and gross and fine motor development among preschool children in a rural kindergarten setting in East Nusa Tenggara, Indonesia. The findings demonstrated a statistically significant association between parenting style and motor development outcomes, with children raised under democratic parenting predominantly showing age-appropriate motor development. These results address the study objective and contribute context-specific evidence to the limited body of observational research in rural Indonesian preschool populations.

The observed association aligns with contemporary developmental literature indicating that democratic or authoritative parenting—characterized by warmth, responsiveness, and structured guidance—supports optimal child development across multiple domains. Democratic parenting fosters environments that encourage active exploration, guided practice, and positive feedback, all of which are critical for motor learning during early childhood.[15] Children in such environments are more likely to engage in age-appropriate physical activities that promote balance, coordination, and fine motor control, thereby enhancing overall motor competence.[16]

In contrast, the higher prevalence of developmental delay observed among children exposed to authoritarian parenting reflects findings from previous studies reporting less favorable developmental outcomes in environments characterized by rigid control, limited autonomy, and reduced emotional responsiveness.[17] Authoritarian parenting may restrict children's opportunities to explore movement freely and to learn through trial and error, which are essential mechanisms in motor skill acquisition.[18] These patterns are consistent with evidence suggesting that excessive control and limited caregiver responsiveness can negatively influence children's motivation, confidence, and engagement in physical activity.[19]

The strong effect size observed in this study indicates a substantial relationship between parenting style and motor development. However, it is important to emphasize that this finding reflects an association rather than a causal relationship, given the cross-sectional design. Parenting style and motor development were assessed simultaneously, precluding conclusions regarding temporal directionality. It is also possible that children's motor abilities influence parental behavior, resulting in reciprocal interactions between child characteristics and parenting practices.[20]

From a physiotherapy perspective, these findings have important clinical implications. Early motor development is a key target for preventive and promotive interventions, particularly in preschool-aged children. Physiotherapists working in early childhood and community settings can play a pivotal role in educating parents about age-appropriate motor stimulation and active play strategies that align with democratic parenting principles. Parent-focused education programs emphasizing structured yet flexible routines, positive reinforcement, and safe movement opportunities may help optimize motor development and prevent early motor delays.[12,21]

The findings of this study are also consistent with evidence supporting family-centered approaches in pediatric physiotherapy. Interventions that actively involve parents and caregivers have been shown to enhance the effectiveness of motor stimulation programs by improving caregiver knowledge, confidence, and engagement in daily motor activities.[22] In rural settings where access to specialized services may be limited, empowering parents through education represents a practical and sustainable strategy to support early childhood motor development.

Several limitations of this study should be acknowledged. First, the cross-sectional design limits causal inference and the ability to determine the direction of the observed association. Second, the small sample size may limit statistical power for detecting smaller effect sizes and restrict the ability to adjust for potential confounding variables, such as child age, nutritional status, or parental education. Third, parenting style was assessed using self-reported questionnaires, which are susceptible to recall bias and social desirability bias, potentially leading to misclassification of parenting practices. Additionally, motor development was assessed using the KPSP, which is a screening tool rather than a diagnostic instrument, and may be influenced by child cooperation and observer judgment. These limitations should be considered when interpreting the findings.

Regarding generalisability, the results of this study are most applicable to preschool children in similar rural kindergarten settings with comparable socioeconomic and cultural characteristics. Caution is warranted in extrapolating the findings to urban populations or different educational contexts. Nonetheless, the study provides valuable preliminary evidence that may inform future research and intervention development in underserved communities.

Future studies should employ longitudinal or prospective designs to clarify causal pathways between parenting style and motor development and to explore potential mediating factors, such as physical activity levels, home stimulation environments, and nutritional status. Larger sample sizes and multivariable analyses are also recommended to control for confounding factors and enhance generalisability. Additionally, the use of standardized, physiotherapy-specific motor assessment tools may provide more detailed insights into motor performance and functional outcomes.

Conclusion

This study demonstrates a significant association between parental parenting style and gross and fine motor development among preschool children in a rural kindergarten setting. Children raised under democratic parenting predominantly exhibited age-appropriate motor development, whereas a higher proportion of developmental delay was observed among those exposed to authoritarian parenting. These findings highlight the relevance of parenting practices as an important contextual factor related to early motor development in preschool-aged children.

Given the observational and cross-sectional nature of the study, the results should be interpreted as associative rather than causal. Nevertheless, the evidence suggests that parenting environments characterized by warmth, responsiveness, and structured guidance are linked to more favorable motor development outcomes. This underscores the importance of considering family dynamics when addressing early motor development and identifying children at risk of motor delays.

From a clinical and practical perspective, the findings support the role of physiotherapists in early childhood and community settings as key agents in promoting optimal motor development. Physiotherapist-led parental education programs that emphasize age-appropriate motor stimulation, active play, and supportive caregiving strategies aligned with democratic parenting principles may contribute to the prevention of early motor delays. Such approaches are particularly relevant in rural and resource-limited settings, where access to specialized developmental services may be constrained.

Despite its limitations, including the cross-sectional design, small sample size, and reliance on screening-based motor assessment, this study provides valuable preliminary evidence from a rural Indonesian context where empirical data remain limited. The findings may serve as a foundation for future research and the development of family-centered, physiotherapy-informed interventions.

Further studies employing longitudinal designs, larger samples, and comprehensive motor assessment tools are recommended to clarify causal pathways, explore potential confounding factors, and strengthen the generalisability of findings across diverse early childhood settings.

Author Contribution

Mediatrix Santi Gaharpung: Conceptualization; Methodology; Formal analysis; Writing—original draft; Writing—review & editing.
Maria Kornelia Ringgi Kuwa: Methodology; Data curation.
Agustinus Beni Fanto: Writing—review & editing; Supervision.
Kristoforus Samson: Formal analysis; Writing—review & editing.
All authors have read and approved the final version of the manuscript.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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Ethics Statement

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of STIKes St. Elisabeth Keuskupan Maumere. Participation was voluntary, and written informed consent was obtained from all parents or legal guardians prior to data collection. Confidentiality and anonymity of participant data were strictly maintained throughout the study.

References

1. Escolano-Pérez E, Herrero-Nivela ML, Losada JL. Association between preschoolers' specific fine (but not gross) motor skills and later academic competencies: educational implications. Front Psychol. 2020;11:[pages not available].
2. Lovison K, Moreira HSB, Silva J da, Scorzafave LGDS, Mello DF de. The influence of the quality in daycare environments on children's motor development between six to 15 months old. Rev Bras Saude Mater Infant. 2021;21(3):829–836.
3. Van Beekum M, Berger J, Van Geystelen J, Hondru G, Som SV, Theary C, et al. The associations between stunting and wasting at 12 months of age and developmental milestones delays in a cohort of Cambodian children. Sci Rep. 2022;12(1):17859.
4. Zhang L, Ssewanyana D, Martin MC, Lye S, Moran G, Abubakar A, et al. Supporting child development through parenting interventions in low- to middle-income countries: an updated systematic review. Front Public Health. 2021;9:[pages not available].
5. Nugroho MR, Armeidi E, Mahyuddin M. Analysis of Indonesia's nutritional status survey results 2021–2022: trend of stunting prevalence rates in the provinces of South Sumatera and Bengkulu towards a national target of 14% in 2024. Indones J Health Res Dev. 2023;1(1):1–7.
6. Scheiber B, Mildner S, Federolf P. Parental and educator perceptions of implementing standardized screenings for early detection of motor skills in preschoolers: a representative survey. Child Care Health Dev. 2025;51(4):[pages not available].
7. Tripon C. Nurturing sustainable development: the interplay of parenting styles and SDGs in children's development. Children (Basel). 2024;11(6):695.
8. Awiszus A, Koenig M, Vaisarova J. Parenting styles and their effect on child development and outcome. J Stud Res. 2022;11(3):[pages not available].
9. Vega-Díaz M, González-García H, de Labra C. Influence of parental involvement and parenting styles in children's active lifestyle: a systematic review. PeerJ. 2023;11:e16668.
10. James ME, Arbour-Nicitopoulos KP, Kwan M, King-Dowling S, Cairney J. Physical activity and motor skill development during early childhood: investigating the role of parent support. Pediatr Exerc Sci. 2025;37(2):118–127.
11. Laksmi IGAPS, Wati NMN, Lestari RTR. The role of parenting to increase gross and fine motor skills development in children aged 5–6 years. Media Keperawatan Indones. 2020;3(2):54–60.
12. Fiss AL, Håkstad RB, Looper J, Pereira SA, Sargent B, Silveira J, et al. Embedding play to enrich physical therapy. Behav Sci (Basel). 2023;13(6):440.
13. Gorgon EJR. Caregiver-provided physical therapy home programs for children with motor delay: a scoping review. Phys Ther. 2018;98(6):480–493.
14. Kusmawati II, Argaheni NB, Sukamto IS, Putri NR, Linh ND. The relationship between parenting style and the development of pre-school children. Placentum. 2023;11(1):81–88.
15. Madigan S, Prime H, Graham SA, Rodrigues M, Anderson N, Khoury J, et al. Parenting behavior and child language: a meta-analysis. Pediatrics. 2019;144(4):[pages not available].
16. Taylor N, Pringle A, Roscoe CMP. Characteristics of the outdoor environment affording physical activity, motor competence, and social interactions in children aged 3–7 years: a systematic review. Children (Basel). 2024;11(12):1491.
17. Salhi C, Beatriz E, McBain R, McCoy D, Sheridan M, Fink G. Physical discipline, deprivation, and differential risk of developmental delay across 17 countries. J Am Acad Child Adolesc Psychiatry. 2021;60(2):296–306.
18. Lewthwaite R, Wulf G. Optimizing motivation and attention for motor performance and learning. Curr Opin Psychol. 2017;16:38–42.
19. Laukkanen A, Sääkslahti A, Aunola K. "It is like compulsory to go, but it is still pretty nice": young children's views on physical activity parenting and the associated motivational regulation. Int J Environ Res Public Health. 2020;17(7):2315.
20. Samawi A, Yafie E, Astuti W. A model of physical literacy, parental involvement, and social factors on motor development in children with social development as a moderator. Retos. 2025;66:788–802.
21. Cheraghi F, Shokri Z, Roshanaei G, Khalili A. Effect of age-appropriate play on promoting motor development of preschool children. Early Child Dev Care. 2022;192(8):1298–1309.
22. Cunha RFM da, Costa KB, Morais RL de S. Family-centered care on a physiotherapy course: case reports. Fisioter Mov. 2022;35:[pages not available].