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Exploring the Impact of Parental Nutrition Literacy on Early Childhood Physical-Motor Development: A Case Study

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ABSTRACT
This study examines the impact of parental nutrition literacy on the physical-motor development of children at TK Al-Falah. Using a case study approach, data were collected through questionnaires and observations, and analyzed thematically. The findings suggest that parents with a strong understanding of nutrition are more likely to provide balanced, nutritious meals, which positively influence their children's physical-motor development. Children of parents with high nutrition literacy exhibit greater physical activity, improved balance, and enhanced fine and gross motor coordination. In contrast, children of parents with limited nutrition knowledge tend to have less balanced diets, potentially hindering their physical development. These results underscore the importance of nutrition education for parents to ensure children receive adequate nourishment for optimal physical-motor growth. It is recommended that schools and relevant organizations strengthen nutrition education initiatives to support children's overall development.

Keywords: *Nutrition Literacy, Physical Motor Development, Parents, Early Childhood*

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INTRODUCTION

The development of motor skills in early childhood represents a critical indicator of optimal health and growth (Mukarromah et al., 2022). Each child possesses a unique trajectory in motor development, encompassing both gross and fine motor skills, which are significantly influenced by a range of factors (Innes et al., 2023; Wulandari et al., 2024). Motor development includes the acquisition of abilities involving large and small muscle groups, coordination, balance, and sensorimotor integration (Kamelia, 2019). These processes occur in progressive stages, contributing not only to children's physical capabilities but also to their cognitive and socio-emotional growth (Dewi et al., 2021). Hence, well-developed motor skills serve as a foundational pillar for holistic child development.

Various determinants influence the physical and motor development of young children, including adequate nutritional intake, supportive environmental conditions, and effective parenting practices (Syafi'i & Ilmayanti, 2021).Optimal physical growth provides a solid basis for motor development (AH, 2018). Conversely, malnutrition can exert long-term negative effects on motor functioning, cognitive capacity, academic achievement, and overall quality of

life. Children who receive balanced nutrition typically exhibit healthy physical attributes, emotional stability, and greater social adaptability (Sulaiman et al., 2019). Physical well-being is demonstrated by normal somatic growth, while psychological health is reflected in intellectual acuity and emotional responsiveness. Social health, in turn, manifests in active, cheerful behavior and the ability to adapt to one's surroundings (Mukarromah et al., 2022).

Balanced nutrition plays a vital role in supporting the development of bones, muscles, and motor coordination in children (Andini et al., 2022). However, many parents lack adequate nutritional literacy. Limited knowledge of nutrition often results in poor dietary choices, which may hinder children's growth and motor development (Intan et al., 2023). Research has indicated that parents with low awareness of nutritional needs are more likely to provide unbalanced diets, thereby impairing developmental progress (Kurniawaty, 2022). In this context, parental nutritional literacy emerges as a critical factor in ensuring the fulfillment of children's nutritional requirements.

High levels of nutritional literacy enable parents to make informed decisions in selecting balanced and nutritious foods. This competence contributes significantly to the development of both gross and fine motor skills in children (Nurhayati et al., 2024; Utami et al., 2025). Moreover, nutritional literacy is associated with disease prevention, increased parental understanding of dietary health risks, and the promotion of children's long-term well-being (Amrindono et al., 2023). Enhancing nutritional literacy within family settings thus holds substantial implications for the development of a healthy and productive human capital from an early age.

As Dahlan asserts, "adequate nutrition plays a crucial role in the motor development of early childhood. Children who receive sufficient nutrition tend to possess better motor skills compared to those experiencing nutritional deficiencies." This assertion is corroborated by Ahmadi & Karamitanha, (2023), who found that children with adequate nutritional intake demonstrated faster and more optimal motor development. further observed that mothers with sound nutritional knowledge are more inclined to provide healthy meals, thereby fostering holistic physical and motor growth in their children.

Nevertheless, there remains a dearth of research that deeply explores the relationship between parental nutritional literacy and motor development in early childhood through contextualized approaches that reflect the realities of family life. This study seeks to fill this gap by employing a case study approach, which allows for an in-depth examination of how families interpret and implement nutritional knowledge in supporting their children's development. Such an approach offers an exploratory, qualitative perspective on the factors shaping nutrition-related behaviors within the household (Khorramrouz et al., 2022).

In this study, nutritional literacy is defined as the capacity of individuals to comprehend, evaluate, and apply nutritional information in daily life in order to make informed dietary decisions. The primary aim of this research is to identify and understand the relationship between parental nutritional literacy and motor development in early childhood, while also exploring the factors that influence the understanding and application of nutrition knowledge in caregiving practices. The findings of this study are expected to provide an empirical foundation for the development of more effective educational strategies aimed at enhancing parental nutritional awareness and optimizing early childhood development.

RESEARCH METHODOLOGY

Research Design

This study adopts a qualitative case study approach to explore the influence of parental nutritional literacy on the motor development of children at TK Al-Falah. The case study method enables an in-depth investigation within a real-life context, particularly focusing on families with children experiencing growth delays due to nutritional deficiencies (Apiola, 2021). The qualitative paradigm was selected to capture the nuanced understanding, perceptions, and behaviors of parents regarding nutrition and its implications for their children's developmental outcomes.

Data and Sources of Data

The data collected in this study encompass two key dimensions: (1) the level of nutritional literacy among parents and (2) the motor development of their children. Data were obtained through semi-structured interviews, participant observation, and document analysis (Avrahami, 2022). The primary sources of data included parents of six-year-old children who were identified as experiencing growth challenges potentially associated with malnutrition. These participants were selected purposively to provide relevant and contextually rich insights into the phenomenon under investigation.

Observation Indicators

Table 1. Observation Indicators of Parental Nutritional Literacy and Children's Motor Development

Dimension	Indicator	Operational Definition	Observable Behavior / Source	Expected Finding
Parental Nutritional Literacy	Understanding of balanced nutrition	Parents can explain the concept of a balanced diet based on food groups	Interview responses, nutrition talk in daily conversation	Clarity and accuracy in explaining food group categories
	Portion control knowledge	Awareness of appropriate portion sizes for children's age	Meal observation, parent narratives	Alignment with recommended dietary portions
	Identification of nutritious foods	Ability to distinguish between healthy and unhealthy food	Grocery choices, lunchbox content	Preference for fruits, vegetables, proteins
	Breakfast habits	Regular provision of breakfast for children before school	Parent statements, daily routines	Consistent breakfast habits
	Meal scheduling	Structured meal times with regular intervals	Parental routines, child's eating schedule	Predictable eating schedule
	Hydration practices	Ensuring adequate fluid intake throughout the day	Observation, parental awareness	Child carries/consumes water regularly
	Food label interpretation	Ability to read and understand nutritional labels on packaged foods	Testing with food packages, interview	Identifies sugar, fat, sodium, ingredients
	Engagement in nutrition education	Participation in formal/informal nutrition education or consultation	Certificates, group participation, referrals	Active involvement in health/nutrition programs

Motor Development of Children	Gross motor skills	Child's ability to perform physical tasks involving large muscle groups	Observation of running, jumping, climbing	Stability, coordination, balance
	Fine motor skills	Child's ability to perform tasks requiring precision and hand-eye coordination	Observation of drawing, cutting, manipulating objects	Precision, control, bilateral coordination

The indicators of children's motor development include both gross motor skills (such as body coordination and physical activity) and fine motor skills (such as hand-eye coordination and manual dexterity), observed through their daily activities and interaction with the surrounding environment.

Data Analysis Procedure

Data analysis was conducted using the interactive model of Miles and Huberman, which involves three key stages:

Data Reduction

This stage involved selecting, simplifying, and focusing the data collected from interviews, observations, and documentation. Irrelevant information was discarded, and attention was directed toward data that demonstrated a clear connection between parental nutritional literacy and motor development in children.

Data Display

The reduced data were presented systematically in the form of descriptive narratives, matrices, and tables. These displays facilitated the identification of emerging patterns and relationships between variables, thereby supporting more rigorous analytical interpretation.

Conclusion Drawing and Verification

Conclusions were drawn through an iterative and reflective process, grounded in the data presented. To ensure the validity and reliability of the findings, data triangulation was applied, and initial conclusions were re-verified against the raw data. This stage emphasized consistency, credibility, and confirmability in the interpretation of the research results.

RESULTS AND DISCUSSION

This study investigates how parental nutrition literacy shapes children's physical motor development during early childhood. The findings, drawn from in-depth interviews with parents of children aged 4–6 years, are organized into thematic categories to illustrate the relationship between nutritional awareness and developmental outcomes.

Parental Knowledge and Understanding of Nutrition

The findings from this study reveal that most parents generally understood the importance of balanced nutrition for children's growth, particularly the intake of fruits, vegetables, and proteins. However, variations in their understanding of specific nutrients and their practical application were evident. Some parents expressed confusion regarding appropriate portion sizes and meal frequency for their children.

Sanlier et al., (2024) asserts that a high level of nutritional literacy enables parents to make informed decisions regarding their children's diets, directly impacting their growth and development. Supporting this notion, the findings in this study show that while parents demonstrated an awareness of healthy foods, their ability to implement this knowledge was inconsistent. Some parents admitted to struggling with determining appropriate portions or incorporating a variety of foods. One interviewee commented:

> *"I know my child needs healthy food, but I'm confused about how much and how often I should give it" (IT1, interview).*

This reflects a gap between nutritional awareness and the ability to apply this knowledge in practice. In a similar study, Cabezas & Nazar, (2023) found that despite recognizing the importance of nutrition, many parents faced challenges in translating knowledge into healthy feeding practices. Moreover, Jo et al., (2021) emphasized that parents' understanding of nutrition is often influenced by socio-economic factors, such as education and income, which may limit their capacity to make healthier choices. This variation in understanding aligns with the findings of this study, where socio-economic constraints played a role in parents' ability to provide consistent nutritional support.

Parental Feeding Practices at Home

Feeding practices varied widely among parents. Some consistently prepared nutrient-dense meals at home, while others relied on fast food due to time constraints or lack of cooking knowledge. Parents who were more nutritionally aware tended to prepare meals themselves, paying careful attention to the nutritional balance. However, convenience foods were often selected due to practical reasons, such as a lack of time.

Hashemzadeh et al., (2024) asserts that frequent consumption of outside food diminishes children's nutrient intake, primarily due to limited control over the nutritional content. The present study's findings echo this, with several respondents admitting to relying on fast food for their children due to convenience, despite knowing it was not the healthiest option. One parent remarked:

> *"I often buy fast food for my child because it's more convenient, even though I know it's not very healthy" (IT2, interview).*

The study by Bedoyan et al., (2021) found that while parents may acknowledge the importance of balanced nutrition, external factors such as work schedules, limited cooking skills, and access to affordable healthy food often influence their food choices. This study reinforces the finding that knowledge alone may not suffice without necessary support systems, as highlighted by Lai et al., (2021) who stressed that nutrition education should be accompanied by practical resources to help parents implement what they have learned.

Barriers to Nutritional Literacy Implementation

The implementation of nutritional literacy at home was hindered by several factors, including time limitations, financial constraints, access to healthy foods, and children's selective eating habits. A recurring issue noted by parents was the difficulty in persuading

children to eat vegetables or other healthy foods, as they often preferred specific items like fried chicken.

Stang & Story (2005) explain that modifying children's eating behavior is complicated by psychosocial factors, including children's food preferences and parental feeding practices. These findings align with the present study, where parents reported challenges in overcoming children's food selectivity. As one parent explained:

"My child only wants to eat fried chicken and refuses to eat vegetables" (IT3, interview).

This supports the work of Deitcher et al., (2021) who indicated that children's food preferences are influenced by both biological and environmental factors, often making it difficult for parents to introduce a variety of healthy foods. Furthermore, Deitcher et al., (2021) highlighted that children's food preferences can be shaped early in life by repeated exposure to certain foods. This suggests that changing eating behaviors requires not only knowledge but also repeated and strategic exposure to healthy foods, which can be facilitated by parents' persistence and appropriate guidance.

Impact of Parental Nutritional Literacy on Children's Physical Motor Development

Children whose parents demonstrated higher nutritional literacy were observed to have more optimal physical motor development. These children were more active, had ideal body weights, and displayed improved coordination and physical stamina compared to their peers who consumed less nutritious diets.

Fitria, (2024) emphasizes the critical role of adequate nutrition in supporting children's motor development, particularly in building muscle strength and coordination. This study's findings align with this view. Children of parents with higher nutritional literacy exhibited greater physical activity levels and better motor skills. One mother stated:

"Since I started paying more attention to my child's eating habits, she has become more active and rarely gets sick" (IT4, interview).

Supporting this observation, Artipah et al., (2024) found that nutritional intake plays a pivotal role in children's development of motor skills, particularly in activities requiring strength and coordination. Additionally, the research by Aditya et al., (2025) found that proper nutrition enhances children's physical stamina, enabling them to engage in prolonged physical activities such as play and exercise.

The Role of Support and Nutrition Education

The study also revealed that parents who received structured support, such as community-based nutrition education, were more likely to apply nutritional knowledge in their daily routines. Educational interventions, especially those delivered through community health posts (posyandu) or schools, significantly enhanced parents' confidence and ability to plan healthy meals for their children.

This finding is consistent with the Indonesian Ministry of Health's Allen et al., (2021) recommendations, which emphasize the importance of community-based nutrition education in improving parental skills. One parent shared:

> *"After attending the nutrition education session at the posyandu, I learned how to plan a balanced menu for my child" (IT5, interview).*

Similar findings were reported by Adriany, (2022), who noted that community-based nutrition education programs not only increase awareness but also provide parents with practical tools to manage their children's diets effectively. Moreover, the study by Finkelstein demonstrated that nutrition education programs positively influenced parents' attitudes and practices regarding children's dietary habits, underscoring the importance of continuous education in fostering lasting changes in food-related behaviors.

CONCLUSION

The findings of this study underscore the crucial role of parental nutritional literacy in promoting optimal physical motor development in children. While many parents possess an awareness of nutritional principles, the ability to implement this knowledge is influenced by various socio-economic and practical barriers. By addressing these challenges through targeted educational interventions and community-based support, parents can be better equipped to provide balanced nutrition that supports their children's growth and development. Further research is needed to explore the long-term effects of nutritional literacy on children's health and developmental trajectories.

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