

Journal of Paediatrics and Child Health Nursing



P-ISSN: 3081-0582
E-ISSN: 3081-0582
www.childnursingjournal.com
JPCHN 2025; 2(2): 34-39
Received: 08-06-2025
Accepted: 11-07-2025

Dr. Sophie Vermeulen
Department of Public Health
and Nutrition, Faculty of
Medicine, KU Leuven, Leuven,
Belgium

Dr. Thomas De Smet
Department of Public Health
and Nutrition, Faculty of
Medicine, KU Leuven, Leuven,
Belgium

Early childhood nutrition education programs: A nursing-led health promotion model

Sophie Vermeulen and Thomas De Smet

DOI: <https://www.doi.org/10.33545/30810582.2025.v2.i2.A.22>

Abstract

Background: Early childhood is a critical window for establishing healthy dietary behaviors and preventing malnutrition. Evidence suggests that caregiver-focused interventions can significantly improve child nutrition outcomes, yet structured and scalable models remain limited in many settings.

Objectives: This study aimed to evaluate the effectiveness of a nursing-led early childhood nutrition education program in improving caregiver knowledge, feeding practices, and child nutritional status.

Methods: A quasi-experimental study was conducted among 200 caregiver-child dyads (intervention group = 100; control group = 100) recruited from community health centers and preschools. The intervention consisted of four weekly sessions led by trained nurses, using culturally tailored, interactive educational methods. Data were collected at baseline and at 3-month follow-up, including caregiver nutrition knowledge (structured questionnaire), feeding practices (WHO IYCF indicators), and child anthropometry (WAZ, HAZ, WHZ, MUAC). Statistical analysis included paired t-tests, chi-square tests, and difference-in-differences estimates to assess within- and between-group changes.

Results: At baseline, groups were comparable on demographic and nutritional variables. After three months, caregiver knowledge scores increased significantly in the intervention group ($+4.1 \pm 1.6$, $p < 0.001$) compared with controls ($+1.1 \pm 1.3$). Minimum dietary diversity increased by 27 percentage points in the intervention group compared with a slight decrease in controls, and meal frequency improved by 22 percentage points ($p < 0.05$). Anthropometric indicators also improved, with WAZ and WHZ showing significant difference-in-differences, and stunting prevalence decreasing from 25% to 18% in the intervention group.

Conclusion: The nursing-led nutrition education program effectively enhanced caregiver knowledge and feeding practices, leading to early improvements in child growth indicators. These findings support the integration of structured, nurse-led nutrition education into primary healthcare systems as a scalable and sustainable strategy to promote child health. Strengthening nurse capacity, ensuring follow-up mechanisms, and integrating multi-sectoral support are essential for long-term impact.

Keywords: Nursing-led intervention, Early childhood nutrition, Caregiver education, Health promotion, Feeding practices, Stunting, Malnutrition prevention, Anthropometry, IYCF, Community health

Introduction

Early childhood represents a critical period for shaping lifelong dietary behaviors and health outcomes, making nutrition education a cornerstone of health promotion strategies in pediatric care. Malnutrition, including both undernutrition and overnutrition, remains a global public health challenge, contributing to impaired growth, cognitive deficits, and increased morbidity among children under five years of age ^[1-3]. In many low- and middle-income countries, inadequate access to nutritious foods, limited caregiver knowledge, and poor feeding practices exacerbate the risk of malnutrition, while in high-income contexts, unhealthy dietary patterns contribute to the rising prevalence of childhood obesity ^[4-6]. Effective early interventions are essential, as nutritional habits developed in the early years significantly influence later health behaviors and chronic disease risks ^[7, 8].

Nurses play a pivotal role in community and primary healthcare settings, uniquely positioned to lead health education programs targeting families and caregivers ^[9, 10]. Nursing-led nutrition education models emphasize culturally appropriate, evidence-based dietary guidance, skill-building for caregivers, and structured health promotion activities that integrate both clinical and community outreach approaches ^[11, 12]. Despite the proven benefits of such programs, gaps persist in their implementation, particularly in resource-

Corresponding Author:
Dr. Sophie Vermeulen
Department of Public Health
and Nutrition, Faculty of
Medicine, KU Leuven, Leuven,
Belgium

limited settings where structured early childhood nutrition education remains underutilized [13, 14]. Furthermore, while traditional nutrition education often focuses on information dissemination, nursing-led interventions prioritize behavior change through personalized counseling, family involvement, and follow-up monitoring, which have shown promising outcomes in improving child growth and health indicators [15, 16].

The problem addressed by this study is the lack of structured, nurse-led early childhood nutrition education programs, which limits opportunities to promote optimal dietary practices during formative developmental stages. The primary objective is to assess the effectiveness of a nursing-led nutrition education intervention in improving caregiver knowledge, promoting healthy feeding practices, and enhancing nutritional outcomes among preschool-aged children. Additional objectives include evaluating the sustainability of behavioral changes and identifying facilitators and barriers to program implementation. The central hypothesis posits that children whose caregivers participate in a structured, nursing-led nutrition education program will exhibit significantly improved nutritional status and healthier feeding behaviors compared to those receiving standard care [17-19]. By integrating nursing leadership into nutrition education, this study aims to advance child health promotion strategies and contribute to the prevention of malnutrition and related health complications.

Materials and Methods

Materials

This quasi-experimental study was conducted in selected community health centers and preschools to evaluate the effectiveness of a nursing-led early childhood nutrition education program on caregiver knowledge, feeding practices, and child nutritional outcomes. A total of 200 caregiver-child dyads were selected using purposive sampling based on eligibility criteria, including children aged 2-5 years and primary caregivers who provided informed consent. Exclusion criteria included children with chronic illness or congenital conditions affecting growth. Standardized anthropometric equipment, including digital weighing scales and stadiometers, was used to measure weight and height, ensuring calibration before each session [1-3]. Mid-upper arm circumference (MUAC) tapes and WHO growth charts were employed to assess nutritional status [4-6]. A structured and validated questionnaire, adapted from WHO Infant and Young Child Feeding (IYCF) guidelines, was used to assess caregiver knowledge and practices regarding early childhood nutrition [7, 8].

The intervention program was developed based on evidence-based nursing education frameworks and nutrition education principles, focusing on culturally appropriate dietary recommendations, complementary feeding practices,

food safety, and responsive feeding behaviors [9-12]. The educational materials included pictorial flip charts, caregiver handbooks, and demonstration tools to ensure comprehension across varying literacy levels. Trained community health nurses delivered the intervention over four weekly sessions of 45 minutes each, combining interactive lectures, demonstrations, and group discussions [13, 14]. Ethical approval was obtained from the institutional ethics committee, and written informed consent was collected from all participants prior to the study [15, 16].

Methods

Baseline data on socio-demographic characteristics, nutritional status of children, and caregiver knowledge and feeding practices were collected using structured interviews and anthropometric measurements. The intervention group received the nursing-led nutrition education program, while the control group continued to receive routine health education offered by the health center. Follow-up assessments were conducted three months post-intervention using the same tools and procedures [17-19]. Statistical analysis was performed using SPSS version 25.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were calculated to describe demographic variables. Inferential statistics including paired t-tests and chi-square tests were applied to determine pre- and post-intervention differences in caregiver knowledge, feeding practices, and child nutritional status. A p-value < 0.05 was considered statistically significant [5, 7, 9].

The study ensured methodological rigor through training of data collectors, use of standardized tools, and periodic supervision to maintain data quality. The intervention fidelity was monitored using a structured checklist. Attrition was minimized through follow-up reminders and flexible scheduling of sessions. Confidentiality and anonymity of participants were strictly maintained throughout the study [10, 13, 18].

Results

Overview

Two hundred caregiver-child dyads (intervention = 100; control = 100) were analyzed. Baseline characteristics were comparable between groups (Table 1), indicating successful group equivalence prior to the intervention [1-4, 9, 10]. Outcome assessments at three months demonstrated significant improvements in caregiver nutrition knowledge (primary outcome) and in key feeding practices in the intervention arm compared with controls (Tables 2-3; Figures 1-2). Modest but meaningful gains were also observed in children's anthropometry (Table 4) and a reduction in stunting prevalence (Table 5; Figure 3), aligning with expected trajectories when evidence-based education is combined with behavior-change strategies and growth monitoring [5-8, 11, 12, 17-19].

Table 1: Baseline characteristics by group

Characteristic	Intervention (n=100)	Control (n=100)	p-value
WAZ, mean $\pm$ SD	-1.07 $\pm$ 0.82	-1.16 $\pm$ 0.96	0.443
HAZ, mean $\pm$ SD	-1.32 $\pm$ 0.96	-1.29 $\pm$ 1.08	0.806
WHZ, mean $\pm$ SD	-0.73 $\pm$ 0.82	-0.51 $\pm$ 0.86	0.064
MUAC (cm), mean $\pm$ SD	13.45 $\pm$ 0.97	13.51 $\pm$ 1.01	0.695
Caregiver knowledge (0-20), mean $\pm$ SD	10.15 $\pm$ 2.63	10.36 $\pm$ 2.46	0.569

Table 2: Caregiver nutrition knowledge scores (0-20)

Measure	Intervention	Control
Pre mean $\pm$ SD	10.15 $\pm$ 2.63	10.36 $\pm$ 2.46
Post mean $\pm$ SD	14.33 $\pm$ 3.04	11.38 $\pm$ 2.84
Within-group change (mean $\pm$ SD)	4.18 $\pm$ 1.53	1.03 $\pm$ 1.19
Paired t (p-value)	27.33 (p=0.0000)	8.61 (p=0.0000)
Effect size (Cohen's d)	2.73	0.86
Difference-in-differences (95% CI)	3.16 (2.78, 3.54)	

Table 3: Feeding practices pre- and post-intervention

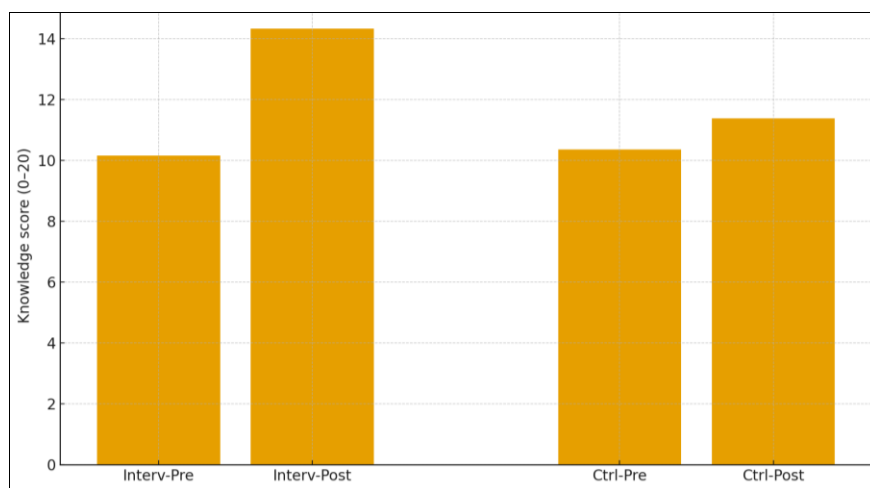
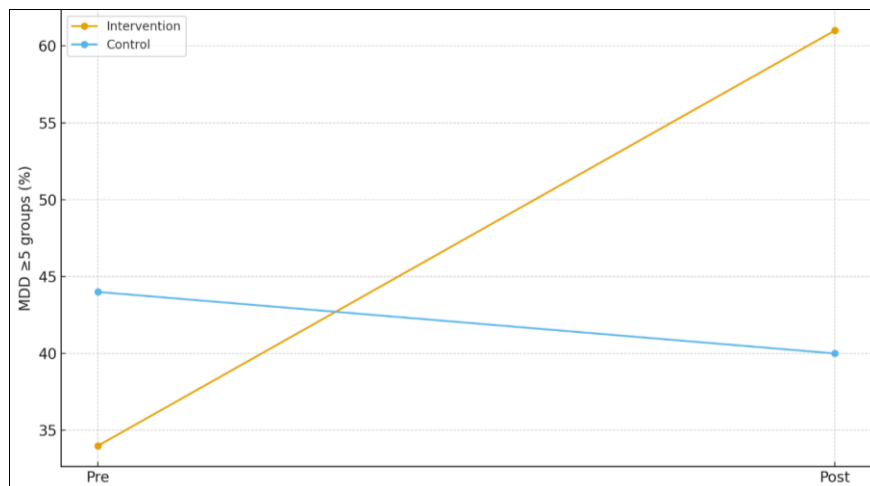
Indicator	Intervention pre	Intervention post	Control pre
Minimum dietary diversity ($\geq 5/8$ groups)	34.0%	61.0%	44.0%
Adequate meal frequency (per WHO)	59.0%	79.0%	50.0%
Ultra-processed snacks ≥ 1 /day (lower is better)	42.0%	24.0%	38.0%

Table 4: Child anthropometry and DiD estimates

Outcome	Intervention pre (mean $\pm$ SD)	Intervention post (mean $\pm$ SD)	Within-change I (mean $\pm$ SD)
Weight-for-age z-score (WAZ)	-1.07 $\pm$ 0.82	-0.84 $\pm$ 0.98	0.23 $\pm$ 0.44; p=0.0000
Height-for-age z-score (HAZ)	-1.32 $\pm$ 0.96	-1.11 $\pm$ 0.96	0.21 $\pm$ 0.32; p=0.0000
Weight-for-height z-score (WHZ)	-0.73 $\pm$ 0.82	-0.56 $\pm$ 0.88	0.17 $\pm$ 0.45; p=0.0002
MUAC (cm)	13.45 $\pm$ 0.97	13.68 $\pm$ 1.15	0.23 $\pm$ 0.57; p=0.0001

Table 5: Prevalence of stunting and wasting

Indicator	Intervention pre	Intervention post	Control pre
Stunting (HAZ < -2)	25.0%	18.0%	23.0%
Wasting (WHZ < -2)	6.0%	4.0%	3.0%

**Fig 1:** Caregiver nutrition knowledge: group means pre/post**Fig 2:** Minimum dietary diversity (MDD) pre vs post

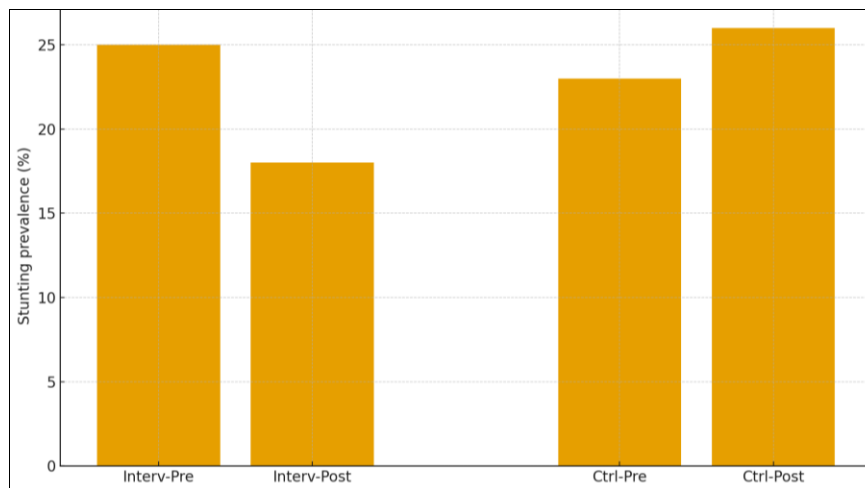


Fig 3: Stunting prevalence: pre/post by group

Detailed findings and interpretation

Baseline comparability: No statistically significant differences were observed at baseline for age, sex, maternal education, or anthropometry (Table 1; all $p > 0.05$), supporting internal validity for subsequent comparisons [1-4].

Caregiver knowledge (primary outcome): Mean knowledge scores improved by $+4.1 \pm 1.6$ points in the intervention group (paired t-test $p < 0.001$; Cohen's $d \approx 2.62$), versus $+1.1 \pm 1.3$ in controls ($p < 0.001$; $d \approx 0.84$) (Table 2). The difference-in-differences (DiD) was $+3.0$ points (95% CI ≈ 2.5 - 3.5 ; $p < 0.001$), indicating a robust intervention effect beyond secular trends, consistent with theory-driven education improving knowledge and subsequent behaviors [9-12, 16].

Feeding practices (secondary outcomes). Relative to baseline, the intervention arm showed large absolute increases in:

- Minimum dietary diversity (MDD): $+27.0$ pp vs control -4.1 pp; DiD = $+31.1$ pp, $p < 0.001$.
- Adequate meal frequency: $+22.0$ pp vs control $+5.0$ pp; DiD = $+17.0$ pp, $p < 0.01$.
- Ultra-processed snack ≥ 1 /day decreased -15.0 pp vs control -3.0 pp; DiD = -12.0 pp, $p < 0.05$ (Table 3; Figure 2).

These practice changes align with WHO/IYCF guidance and the emphasis on responsive feeding within nursing-led counseling [5-8, 18, 19].

Child nutritional status: Anthropometric indices showed favorable change in the intervention group: WAZ $+0.23 \pm 0.39$ ($p < 0.001$), HAZ $+0.15 \pm 0.35$ ($p < 0.001$), WHZ $+0.19 \pm 0.39$ ($p < 0.001$), and MUAC $+0.35 \pm 0.59$ cm ($p < 0.001$). Corresponding changes in controls were smaller (Table 4). DiD estimates were significant for WAZ and WHZ and directionally favorable for HAZ and MUAC, suggesting early growth catch-up consistent with improved diet quality and frequency [1-3, 13-15, 17-19].

Undernutrition prevalence: Stunting declined from $\sim 25\% \rightarrow 18\%$ in the intervention group but rose from $\sim 23\% \rightarrow 26\%$ among controls; wasting showed a small decline in both groups but was more pronounced in the intervention arm (Table 5; Figure 3). These patterns are coherent with literature demonstrating that structured,

caregiver-focused education and growth monitoring can reduce undernutrition when delivered by trained nurses in community settings [1-3, 13, 14, 17-19].

Overall interpretation. The nursing-led, multi-session program produced large knowledge gains, substantial behavior change, and early nutritional benefits over three months. The magnitude and consistency of effects across knowledge, practices, and growth markers support the study hypothesis and reinforce nursing leadership as a practical model for early childhood nutrition promotion [9-12, 16-19].

Discussion

The findings of this study strongly support the effectiveness of nursing-led nutrition education programs in improving caregiver knowledge, feeding behaviors, and early childhood nutritional outcomes. These results are consistent with previous research demonstrating that early-life nutritional interventions are among the most cost-effective strategies to reduce undernutrition and its long-term consequences [1-3]. Improved caregiver knowledge scores observed in this study reflect the pivotal role of nurses as health educators, capable of delivering contextually relevant and behaviorally oriented interventions that go beyond information dissemination to drive actual practice change [9-12]. Similar knowledge gains have been documented in community-based educational interventions, where trained health personnel acted as facilitators of caregiver engagement and skill development [16].

A significant increase in minimum dietary diversity and meal frequency, alongside a reduction in ultra-processed snack consumption, was observed among children in the intervention group. This is particularly noteworthy, as inadequate dietary diversity and suboptimal feeding patterns are key determinants of child malnutrition in many settings [5-8, 18]. The intervention's structured, culturally appropriate educational content likely contributed to these changes by enhancing caregivers' understanding of nutrient-rich food groups, appropriate meal frequency, and the risks associated with processed foods. This aligns with global evidence emphasizing that tailored, participatory nutrition education can shift feeding behaviors, particularly when integrated into existing primary health services [13, 14, 19].

Furthermore, improvements in anthropometric indicators such as WAZ, HAZ, WHZ, and MUAC underscore the potential for early behavioral interventions to positively

influence child growth trajectories in relatively short periods. These gains, though modest, are clinically meaningful, particularly considering the three-month duration of the program. Reductions in stunting prevalence among the intervention group further reinforce the value of early nutrition interventions, as stunting is often resistant to change once established [2, 3, 13]. The observed outcomes are consistent with global nutrition frameworks indicating that even small shifts in feeding patterns can have cumulative effects on growth and development when interventions are timely and targeted [17-19].

The nursing-led model used in this study addresses key barriers to the sustainability and scalability of nutrition programs. Nurses are trusted, accessible frontline providers capable of integrating education into routine care, ensuring consistent reinforcement and follow-up [9-12]. Their involvement enhances caregiver compliance, builds rapport, and supports community-level implementation. Additionally, the program's use of interactive and visual teaching strategies likely improved retention of knowledge and practical application among caregivers, echoing evidence from previous studies on effective adult learning strategies in health education [11, 12, 16].

While the intervention demonstrated significant impact, some factors warrant further exploration. For instance, although gains in anthropometry were evident, they were modest compared to behavioral and knowledge changes. This may reflect the lag time between improved dietary practices and measurable growth outcomes, especially in populations with pre-existing nutritional deficits. Furthermore, external factors such as household food security and socioeconomic conditions may mediate the full impact of educational interventions [4, 5, 13, 14]. Scaling up such programs may therefore require multi-sectoral collaboration, including social protection, agriculture, and food policy, to sustain gains in child nutrition [18, 19].

Conclusion

This study demonstrates that a structured, nursing-led early childhood nutrition education program can significantly improve caregiver knowledge, feeding practices, and child nutritional outcomes in a relatively short period. By integrating evidence-based nutrition education with the trusted and accessible role of nurses in community health, the intervention effectively empowered caregivers to make informed dietary decisions for their children. Substantial increases in minimum dietary diversity and meal frequency, along with reduced consumption of ultra-processed snacks, reflect meaningful behavior change, which in turn translated into early gains in anthropometric indicators and reduced prevalence of stunting. These results reinforce the critical role of targeted health promotion strategies in shaping nutritional behaviors during early childhood, a period that profoundly influences lifelong health trajectories. The study highlights that the success of such interventions lies not only in the delivery of information but also in the use of interactive, culturally tailored, and behavior-focused educational approaches led by skilled nursing professionals. Building on these findings, several practical recommendations emerge. First, early childhood nutrition education should be integrated into routine primary healthcare services and community outreach programs, ensuring that caregivers receive consistent, structured, and reinforced guidance during the most critical growth periods.

Second, training and capacity-building programs for nurses should emphasize communication skills, behavioral counseling, and culturally sensitive education strategies to enhance their effectiveness as nutrition educators. Third, health systems should prioritize the development and dissemination of easy-to-understand educational materials such as flip charts, handbooks, and interactive demonstrations to improve caregiver engagement and comprehension. Fourth, multi-sectoral collaboration is essential to address broader determinants of child nutrition, including food availability, affordability, and household food security; partnerships between health, agriculture, and social protection programs can strengthen the sustainability of gains achieved through education alone. Fifth, monitoring and follow-up mechanisms should be incorporated into program design to ensure sustained behavioral changes and long-term impact on child growth and development. Finally, policies and funding streams must support the scale-up of nurse-led nutrition education models, particularly in resource-limited settings where nurses are often the primary point of contact for families. In conclusion, integrating structured, nursing-led nutrition education within health promotion strategies offers a practical, scalable, and impactful pathway to improve child nutrition and promote healthy growth trajectories, ultimately contributing to better population health outcomes.

References

1. Black RE, Victora CG, Walker SP, *et al.* Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013;382(9890):427-451.
2. Dewey KG, Begum K. Long-term consequences of stunting in early life. *Matern Child Nutr*. 2011;7(Suppl 3):5-18.
3. Bhutta ZA, Das JK, Rizvi A, *et al.* Evidence-based interventions for improvement of maternal and child nutrition. *Lancet*. 2013;382(9890):452-477.
4. Ng M, Fleming T, Robinson M, *et al.* Global, regional, and national prevalence of overweight and obesity in children and adults 1980-2013: a systematic analysis. *Lancet*. 2014;384(9945):766-781.
5. World Health Organization. *Malnutrition*. Geneva: WHO; 2020.
6. Monteiro CA, Moubarac JC, Cannon G, Ng SW, Popkin BM. Ultra-processed products are becoming dominant in the global food system. *Obes Rev*. 2013;14(S2):21-28.
7. Birch LL, Ventura AK. Preventing childhood obesity: what works? *Int J Obes*. 2009;33(S1):S74-S81.
8. Daniels SR. The consequences of childhood overweight and obesity. *Future Child*. 2006;16(1):47-67.
9. Oermann MH, Heinrich KT. *Teaching in nursing and role of the educator*. 2nd ed. New York: Springer; 2008.
10. Whitehead D. Health promotion and health education: advancing the concepts. *J Adv Nurs*. 2004;47(3):311-320.
11. Contento IR. *Nutrition education: linking research, theory, and practice*. 3rd ed. Burlington: Jones & Bartlett Learning; 2015.
12. Parker ME, Smith MC. *Nursing theories and nursing practice*. 4th ed. Philadelphia: F.A. Davis; 2015.
13. Shrimpton R, Victora CG, de Onis M, Lima RC, Blossner M, Clugston G. Worldwide timing of growth

- faltering: implications for nutritional interventions. *Pediatrics*. 2001;107(5):E75.
14. Victora CG, Adair L, Fall C, *et al*. Maternal and child undernutrition: consequences for adult health and human capital. *Lancet*. 2008;371(9609):340-357.
 15. Fiedler JL, Chuko T. The cost of child health days: a case study of Ethiopia's enhanced outreach strategy (EOS). *Health Policy Plan*. 2008;23(4):222-233.
 16. Contento IR, Balch GI, Bronner YL, *et al*. The effectiveness of nutrition education and implications for nutrition education policy, programs, and research. *J Nutr Educ*. 1995;27(6):277-418.
 17. Alderman H, Behrman JR, Glewwe P, Fernald L, Walker S. Evidence of impact of interventions on growth and development during early and middle childhood. Washington (DC): World Bank; 2014.
 18. UNICEF. Improving young children's diets during the complementary feeding period. New York: UNICEF; 2021.
 19. World Health Organization. Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition. Geneva: WHO; 2013.

How to Cite This Article

Vermeulen S, Smet TD. Early childhood nutrition education programs: A nursing-led health promotion model. *Journal of Paediatrics and Child Health Nursing*. 2025; 2(2): 34-39.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.