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Original Article

Association between nurturing care practices and weight gain among acutely ill children aged 6–24 months: a cross-sectional study

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A B S T R A C T

Background: The period between 6 and 24 months represents a critical window for child growth, during which vulnerability to acute illness is high. Acute illness may disrupt normal growth trajectories; however, evidence on the role of nurturing care practices in supporting weight gain during illness remains limited.

Objective: This study aimed to examine the association between maternal nurturing care practices and weight gain among acutely ill children aged 6–24 months.

Method: A cross-sectional study was conducted at Banguntapan II Primary Health Center, Bantul District, Indonesia. A total of 58 mother–child dyads were recruited using consecutive sampling. Maternal nurturing care practices were assessed using a modified Knowledge, Attitude, and Practice questionnaire based on the World Health Organization nurturing care framework. Child weight gain was evaluated using World Health Organization growth standards. Associations were analyzed using chi-square tests and odds ratios with 95% confidence intervals.

Results: No statistically significant association was observed between nurturing care practices and weight gain (p = 0.069; OR = 0.371; 95% CI: 0.126–1.091). However, a higher proportion of children receiving good nurturing care achieved normal weight gain (70.0%) compared with those receiving poor care (46.4%), indicating a potential protective trend. Maternal education and family income were not significantly associated with nurturing care practices or child weight gain.

Conclusion: Although no statistically significant association was identified, nurturing care practices showed a potential protective trend in supporting weight gain during acute illness. These findings highlight the importance of integrating nurturing care into sick-child management and underscore the need for longitudinal studies to better understand growth recovery following illness episodes.

INTRODUCTION

The period between 6 and 24 months represents a critical developmental window characterized by rapid physical growth and heightened vulnerability to nutritional and health disturbances. During this phase, early growth patterns establish the foundation for long-term health outcomes.[1] Growth, commonly assessed by anthropometric indicators such as weight, length, and head circumference, is a fundamental marker of child health and survival.[2] Adequate weight gain reflects sufficient nutritional intake and physiological resilience, whereas growth faltering may indicate underlying nutritional, health, or caregiving inadequacies.[3]

In Indonesia, child growth disturbances remain a persistent public health concern. The 2022 Indonesian Nutritional Status Survey (SSGI) reported that 17.1% of children under 24 months had weight-for-age deficits, a slight increase from the previous year. These disturbances are strongly associated with inadequate dietary intake, recurrent infections, and suboptimal caregiving practices during early life.[4]

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Acute illness poses a substantial threat to optimal growth in children aged 6–24 months, whose immune systems are still developing.[5] National data indicate that diarrhea affects approximately 9.8% of Indonesian children, while acute respiratory infections account for an estimated 1.5–1.8 million pediatric cases annually.[6–8] Episodes of acute illness disrupt growth trajectories by reducing appetite, increasing metabolic demands, and impairing nutrient absorption, often resulting in weight loss or delayed recovery of growth.[9,10] Previous studies estimate that inadequate caregiving practices contribute to approximately 35% of child growth disturbances, and that children exposed to poor care are significantly more likely to experience growth faltering.[11–13]

To address the multifactorial determinants of early childhood development, the World Health Organization introduced the nurturing care framework, which encompasses five essential components: adequate nutrition, good health, responsive caregiving, safety and security, and opportunities for early learning.[14,15] This framework emphasizes integrating health, nutrition, and caregiving environments to support optimal child development. While evidence supports the effectiveness of nurturing care in promoting growth and developmental outcomes in healthy children, empirical research examining its relationship with growth outcomes among acutely ill children remains limited, particularly in low- and middle-income settings.

Most existing studies have focused on nurturing care practices in healthy or community-based populations, leaving a critical knowledge gap about how caregiving influences growth during acute illness. Acute illness represents a dynamic physiological condition in which metabolic stress may attenuate the immediate benefits of caregiving. However, nurturing care may still play an important role in supporting recovery and preventing further deterioration of growth.

This study addresses this gap by examining the association between maternal nurturing care practices and weight gain among acutely ill children aged 6–24 months. This study is among the first to focus on nurturing care within the context of acute illness episodes, a condition in which caregiving may function as a protective factor but remains understudied. Furthermore, to the best of our knowledge, no previous study has examined nurturing care practices in Bantul District, particularly at Banguntapan II Primary Health Center, which records a high volume of sick child visits requiring Integrated Management of Childhood Illness (IMCI) assessments. Therefore, this study aimed to examine the association between maternal nurturing care practices and weight gain among acutely ill children aged 6–24 months.

METHOD

Study Design

This study employed an analytic cross-sectional design to examine the association between maternal nurturing care practices and weight gain among acutely ill children aged 6–24 months.[16]

Setting and Participants

The study was conducted from October to November 2024 at Banguntapan II Primary Health Center, Bantul District, Yogyakarta, Indonesia. A total of 58 mother–child dyads were included. The sample size was calculated using the Lemeshow formula for cross-sectional studies.[17] Participants were recruited through consecutive sampling, whereby all eligible mother–child dyads attending the health center during the study period were enrolled sequentially until the required sample size was reached.

Children were eligible if they were aged 6–24 months, experiencing acute illness (fever, cough, rhinorrhea, and/or diarrhea), and undergoing Integrated Management of Childhood Illness (IMCI) assessment. Mothers were included if they were the primary caregivers and provided written informed consent. Exclusion criteria included a history of low birth weight (<2,500 g), referral to secondary health facilities, incomplete weight records, and severe maternal depression indicated by a Beck Depression Inventory-II score ≥29, due to its potential influence on caregiving behaviors.

Variable, Instrument and Measurement

The independent variable was maternal nurturing care practices, while the dependent variable was child weight gain. Maternal education and family income were included as potential confounding variables based on previous literature and data availability.

Nurturing care practices were assessed using a modified Knowledge, Attitude, and Practice (KAP) questionnaire originally developed for healthy children. The instrument was adapted to reflect caregiving during acute illness and to encompass the five domains of the World Health Organization's nurturing care framework: adequate nutrition, good health, responsive caregiving, safety and security, and early learning.[18] Content adaptation ensured contextual relevance. Validity testing among 30 mothers demonstrated that 21 of 28 items were valid ($r = 0.267–0.621$; critical r value = 0.258), with good internal consistency (Cronbach's alpha = 0.828).[19] Total scores were dichotomized at the median, with scores ≥ median classified as "good" nurturing care practices and scores < median as "poor" practices.

Child weight gain was assessed using World Health Organization growth standards. Current body weight was measured using a calibrated digital scale (SECA 354) with 10 g precision. Previous weight data, recorded two months prior, were obtained from the child's Maternal and Child Health (KIA) book.

Weight increment was calculated as the difference between current and previous measurements and analyzed using WHO Anthro software version 3.2.2.[20] Weight gain was categorized as normal (≥3rd percentile) or inadequate (<3rd percentile) based on age- and sex-specific WHO standards. Maternal education was categorized as basic (≤9 years), secondary (12 years), or higher (>12 years). Family income was dichotomized based on the 2024 Bantul District minimum wage (IDR 2,216,463).

Data Analysis

Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize participant characteristics and study variables. Associations between nurturing care practices and weight gain, as well as relationships with potential confounding variables, were analyzed using chi-square tests. Odds ratios with 95% confidence intervals were calculated. Due to the limited sample size, multivariable analysis was not performed. Statistical significance was set at $p < 0.05$.

Ethical Consideration

Ethical approval was obtained from the Medical and Health Research Ethics Committee, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada (approval number KE/FK/1416/EC; September 12, 2024).

RESULTS

Participants Characteristics

A total of 58 mother–child dyads were included in the analysis. Most mothers were aged 20–35 years (81.0%), had completed secondary education (50.0%), and were not formally employed (72.4%). The majority of households (63.8%) reported family income at or above the regional minimum wage. Child sex distribution was balanced, with 48.3% males and 51.7% females. The acute illness presentation was dominated by fever-related symptoms (82.8%), occurring alone or in combination with other symptoms. Respiratory symptoms were reported in 24.1% of children, while diarrhea was less common (8.6%). Detailed characteristics are presented in Table 1.

Distribution of Nurturing Care Practices and Child Weight Gain

Among participating mothers, 51.7% (n = 30) demonstrated good nurturing care practices, while 48.3% (n = 28) demonstrated poor practices. Regarding growth outcomes, 58.6% (n = 34) of children exhibited normal weight gain, whereas 41.4% (n = 24) experienced inadequate weight gain. These distributions are summarized in Table 2.

Association Between Nurturing Care Practices and Child Weight Gain

The association between nurturing care practices and child weight gain is presented in Table 3. Chi-square analysis showed no statistically significant association ($p = 0.069$). However, a higher proportion of children receiving good nurturing care achieved normal weight gain (70.0%) compared with those receiving poor care (46.4%). Children exposed to good nurturing care had lower odds of inadequate weight gain (OR = 0.371; 95% CI: 0.126–1.091).

Table 1. Sociodemographic Characteristics of Mother–Child Dyads

Characteristic	n (%)
Child sex	
Male	28 (48.3%)
Female	30 (51.7%)
Maternal age (years)	
< 20	1 (1.7%)
20–35	47 (81.0%)
> 35	10 (17.2%)
Maternal education	
Basic	11 (19.0%)
Secondary	29 (50.0%)
Higher	18 (31.0%)
Employment status	
Working	16 (27.6%)
Non	42 (72.4%)
Family income	
< IDR 2,216,463	21 (36.2%)
≥ IDR 2,216,463	37 (63.8%)

Table 2. Distribution of Acute Illness Types, Nurturing Care Practices, and Weight Gain Status

Variable	Result
Acute illness type*	
Fever-related symptoms	48 (82.8%)
Respiratory symptoms only	14 (24.1%)
Diarrhea-related	5 (8.6%)
Other	1 (1.7%)
Nurturing care practices	
Good	30 (51.7%)
Poor	28 (48.3%)
Weight gain status	
Normal	34 (58.6%)
Inadequate	24 (41.4%)

*Categories not mutually exclusive.

Table 3. Association between Nurturing Care Practices and Weight Gain Status

Nurturing care practices	Inadequate n (%)	Normal n (%)	*p-value*	OR (95% CI)
Good (n = 30)	9 (30.0%)	21 (70.0%)	0.069[a]	0.371 (0.126–1.091)
Poor (n = 28)	15 (53.6%)	13 (46.4%)		

[a] Chi-square test; OR = odds ratio; CI = confidence interval.

DISCUSSION

This study found no statistically significant association between maternal nurturing care practices and weight gain among acutely ill children aged 6–24 months. Nevertheless, children exposed to good nurturing care demonstrated a higher proportion of normal weight gain compared to those receiving poor care, indicating a potential protective trend that did not reach statistical significance. Socioeconomic variables, including maternal education and family income, were also not significantly associated with nurturing care practices or child growth outcomes.

The absence of a measurable association during acute illness may be explained by the dominant physiological responses triggered by infection. Acute illness induces metabolic reprioritization toward immune defense and tissue repair, characterized by increased basal metabolic rate, inflammatory-mediated gastrointestinal dysfunction, and reduced appetite. These processes collectively create a transient catabolic state that suppresses growth, regardless of caregiving quality. Even optimal nurturing practices may be insufficient to counteract this metabolic stress during the acute phase, although they likely support more rapid recovery once illness resolves.[21]

In contrast, the effects of nurturing care are inherently cumulative and manifest over extended periods. Longitudinal studies have shown that caregiving quality predicts changes in child growth indicators only after months or years of consistent exposure.[22] The cross-sectional design of this study captured children during an acute physiological stress period, potentially preceding the timeframe in which nurturing care benefits translate into observable growth recovery. This temporal mismatch may partly explain the null statistical findings.

The nearly equal distribution of good and poor nurturing care practices observed in this study contrasts with reports from healthy child populations, where good practices are typically more prevalent.[23] Caring for acutely ill children imposes additional demands on caregivers, including managing altered child behavior, medication administration, frequent health facility visits, and feeding difficulties due to illness-related anorexia.[13] These concurrent stressors may temporarily compromise caregiving quality, even among otherwise capable caregivers, highlighting acute illness as a vulnerability period for both children and caregiving systems.

The lack of association between socioeconomic factors and child growth aligns with evidence suggesting that socioeconomic status influences child outcomes indirectly through proximal caregiving behaviors rather than through direct pathways.[24] Families with limited economic resources may compensate through extended family support and culturally embedded caregiving practices. Previous studies indicate that maternal responsiveness, emotional availability, and psychological well-being mediate the relationship between socioeconomic conditions and child growth, reinforcing the notion that caregiving quality may transcend economic boundaries when adequate knowledge and support are present.[25]

The proportion of children experiencing inadequate weight gain in this study is consistent with findings from other studies of acutely ill pediatric populations.[26] Growth outcomes during illness are influenced by a complex interaction of disease severity, baseline nutritional status, inflammatory burden, and cumulative illness exposure.[27] While single episodes of acute illness may be compensated by children with adequate nutritional reserves, repeated or prolonged infections without sufficient recovery can progressively impair growth trajectories.[28]

Evidence examining comprehensive nurturing care in acutely ill populations remains scarce. Most existing research focuses on healthy children or isolates specific caregiving behaviors such as feeding or healthcare utilization. Studies that have assessed caregiving during illness have similarly reported null associations, attributing findings to the multifactorial nature of growth regulation.[29] In contrast, structured nurturing care interventions that provide systematic caregiver training, supervision, and continued support have demonstrated significant improvements in child growth outcomes.[30,31] These programs likely sustain caregiving quality throughout illness and recovery by buffering parental stress and promoting illness-adapted caregiving strategies—elements that are typically absent in routine, unstructured caregiving contexts.[32]

This study contributes to the limited body of evidence on nurturing care among acutely ill children, a population frequently underrepresented in child development research. Strengths include the use of standardized World Health Organization growth references, validated measurement instruments, and data collection in a high-volume Integrated Management of Childhood Illness setting, enhancing clinical relevance. However, several limitations should be considered. The single-site design restricts generalizability, and the two-month interval used to assess weight change may not fully capture longer-term growth recovery following illness. Additionally, the cross-sectional design precludes causal inference and limits assessment of cumulative caregiving effects over time.

CONCLUSIONS AND RECOMMENDATION

This study found no statistically significant association between maternal nurturing care practices and weight gain among acutely ill children aged 6–24 months. However, children receiving good nurturing care showed a more favorable weight gain pattern, indicating a potential protective trend amid the physiological stress of acute illness. These findings underscore the importance of integrating nurturing care into sick-child services to support feeding and growth monitoring during recovery. Future longitudinal studies are needed to clarify delayed growth effects and inform the incorporation of nurturing care principles into national IMCI guidelines.

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