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Meta Analysis
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An Analysis of the Quality of Life of Children Experiencing Stunting and Wasting Born to Adolescent Mothers in the Alak District

Yeri Delsia Nenogasu[1)], Estiyani Wulandari[2)], Gerda N. Buan[3)]

[1,2)] Study program of Midwifery, Citra Bangsa University, Indonesia
[3)] Penkase Health Center, Indonesia

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ABSTRACT

Background: Adolescent pregnancy remains a prevalent global issue with well-documented causes. However, it contributes significantly to nutritional challenges among young children, including stunting and wasting. This study aims to assess the impact of neonatal health, maternal caregiving practices, incidence of illness, disease prevention efforts, and nutritional intake on the quality of life of stunted and wasted children aged 37–60 months born to adolescent mothers.
Subjects and Method: This study is analytical correlational research using a cross-sectional approach. The study is conducted in Alak District (Consisting of Penkase, Alak, Naoini, and Manutapen Community Health Centers), Kupang City, from September to October 2024. The population in this study were mothers who had been pregnant and given birth when they were less than 20 years old. The sample comprises 50 mother-child pairs selected based on specified inclusion criteria. Data collection, including primary and secondary sources, was conducted from September to October 2024 following ethical approval. The study aims to analyze the effects of latent variables within a factor model related to the quality of life of children. These latent variables include the newborn's health history, maternal caregiving practices, illness occurrence, disease control efforts, nutritional intake, and the child's quality of life. Data was collected using a structured questionnaire and then analyzed with Partial Least Squares (PLS) using Smart PLS 3.0 software.
Results: The study findings reveal that newborn health, maternal caregiving practices, illness incidence, disease control efforts, and nutritional intake have both direct and indirect positive effects on children's quality of life. Significant direct positive relationships were observed between maternal caregiving practices and nutritional intake (T-statistic: 3.307), maternal caregiving practices and disease control efforts (T-statistic: 2.151), and disease control efforts and children's quality of life (T-statistic: 2.578).
Conclusion: Preventing adolescent pregnancy and childbirth is crucial, as it significantly impacts the long-term growth and development of children.

Keywords: adolescent pregnancy, stunting, wasting, quality of life.

Correspondence:
Yeri Delsia Nenogasu. Study program of Midwifery, Citra Bangsa University. Jl. Manafe, 17, Kayu putih District, Oebobo, Kupang City, East Nusa Tenggara. Email: yerinenogasu0801@gmail.com.

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BACKGROUND

Adolescent pregnancy remains a global concern with known contributing factors but persists in high numbers. Early pregnancy often leads to suboptimal growth during adolescence, which negatively impacts maternal nutritional status and subsequently impedes fetal development. This can result in outcomes such as low birth weight, shorter gestational age, or premature birth. Infants who experience inadequate growth due to insufficient nutritional intake are further at risk for compromised development in later stages of childhood (D. Nenogasu et al., 2020).

Nutritional issues constitute a global health challenge. In Indonesia, stunting and wasting among children under five remain significant concerns. According to the 2022 Indonesian Nutritional Status Survey, 21.6% of children under five experience stunting, and 7.7% experience wasting. In East Nusa Tenggara (NTT), the prevalence of stunting is 35.3%, while wasting is 10.7%. These figures position NTT as the province with the highest stunting rate in Indonesia and the sixth highest for wasting, following Maluku, West Papua, Central Sulawesi, Aceh, and North Maluku (Kemenkes, 2023).

Stunting is a form of growth faltering resulting from prolonged nutritional insufficiency, beginning during pregnancy and continuing through the first 24 months of life. The indicator used to identify stunting in children under five is the Height-for-Age (HAZ) index based on the WHO Child Growth Standards, with stunting defined as a HAZ z-score of < -2 standard deviations (SD). Wasting, another form of malnutrition, reflects a child's low weight relative to height, identified by a Weight-for-Height (WHZ) z-score of < -2 SD for wasting (Vaivada et al., 2020).

Malnutrition hinders children's growth and development. Stunting and wasting have detrimental impacts on a child's future development. These nutritional issues are interrelated and exacerbate one another. Children with untreated wasting are three times more likely to become stunted, while stunted children are 1.5 times more likely to experience wasting compared to well-nourished children (UNICEF, 2023). Stunting and wasting can lead to cognitive and motor development issues, affecting productivity in adulthood (Supriatin et al., 2020), which in turn hampers the economic growth of a country. Based on this context, the researcher is interested in analyzing the quality of life of children affected by stunting and wasting, particularly those born to adolescent mothers in Alak District, Kupang City, East Nusa Tenggara Province.

SUBJECTS AND METHOD

1. Study Design

A cross-sectional study was conducted to examine the impact of the health of newborns, maternal parenting style, disease control efforts, incidence of illness, and nutritional intake that occurs and is carried out by adolescent mothers on the quality of life of children aged 37-60 months. The validity of the formulated theoretical concepts is tested using Structural Equation Modeling (SEM) with a Partial Least Square (PLS) approach, aided by the Smart PLS version 3.0 software.

2. Population and Sample

The study population includes mothers under the age of 20 during pregnancy. The sample comprises 50 mother-child pairs, with eligibility criteria including the mother's age being under 20 years at the time of pregnancy and childbirth, having a child with stunting or wasting aged 37-60 months, and residing in the same household

as the child. Mothers with a history of cardiovascular disorders before pregnancy, chronic diabetes, chronic hypertension, multiple pregnancies, or children with physical abnormalities are excluded.

3. Study Variables

The study aims to analyze the effects of latent variables within a factor model related to the quality of life of children. These latent variables include the newborn's health history, maternal parenting style, incidence of illness, disease control efforts, nutritional intake, and quality of life of children. Each latent construct has specific measures or indicators, as shown in Figure 1.

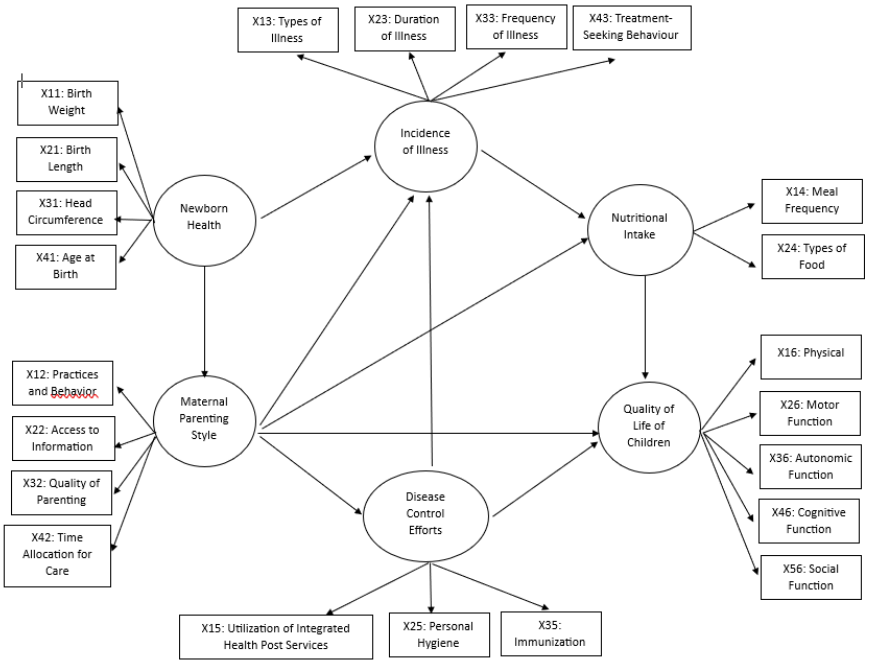

Figure 1. The factor model influencing children's quality of life

4. Operational Definition of Variables

Newborn Health was the general condition of the baby at birth as measured by birth attendants after birth includes birth weight, birth length, head circumference, and birth age.

Maternal parenting style was parenting style is the attitude and behavior of the mother or other caregiver regarding closeness to the child, feeding, caring for, maintaining cleanliness, giving affection, and so on. This phenomenon is reflected in health nutrition practices and behavior, time allocation for caring for children, quality of child care, and access to information.

Disease control efforts were various efforts made by mothers or families to maintain and care for the health of children under five, medically and non-medically, including posyandu services to monitor children's growth and development, personal hygiene behavior, and immunization for children under five.

Incidence of illness was an illness event is a disease or clinical symptoms of a particular disease that has been/is being suffered in the last 3 months.

Nutritional Intake was the type and frequency of food consumed by children every day are collected using the Food

Frequency Questionnaire (FFQ) method.

Quality of Life of Children was a child's quality of life is intended as a subjective perception of how the child (represented by his parents) feels about values related to his health status.

5. Study Instruments

Data collection begins by compiling records of adolescent mothers who gave birth between 2019 and 2021, using a documentation method that reviews and records relevant information from reporting records. The required data includes the mother's age at childbirth. Primary data gathered from mothers include their weight and height at the time of the study; these figures are converted, and if a child falls into the stunting or wasting category, a further interview is conducted using prepared questions.

6. Research Ethics

Research ethical issues including informed consent, anonymity, and confidentiality, were addressed carefully during the study process. The study is conducted in Alak District (Consisting of Penkase, Alak, Naoini, and Manutapen Community Health Centers), Kupang City, from September to October 2024, after obtaining ethical approval from the health research ethics committee of Nusa Cendana University (No: 82/UN15.21/KEPK/2024).

RESULTS

Outer Model Evaluation

The measurement model using reflective indicators is evaluated by assessing convergent validity and discriminant validity based on the loading factor (>0.6). In this study, the loading factor threshold used is >0.7. Indicators should be eliminated if the loading factor value is <0.7. Next, the evaluation includes the Average Variance Extracted (AVE) (>0.5), cross loading (>0.7), and composite reliability (>0.7) (Henseler, 2018). The results of the PLS analysis are shown in Figure 2.

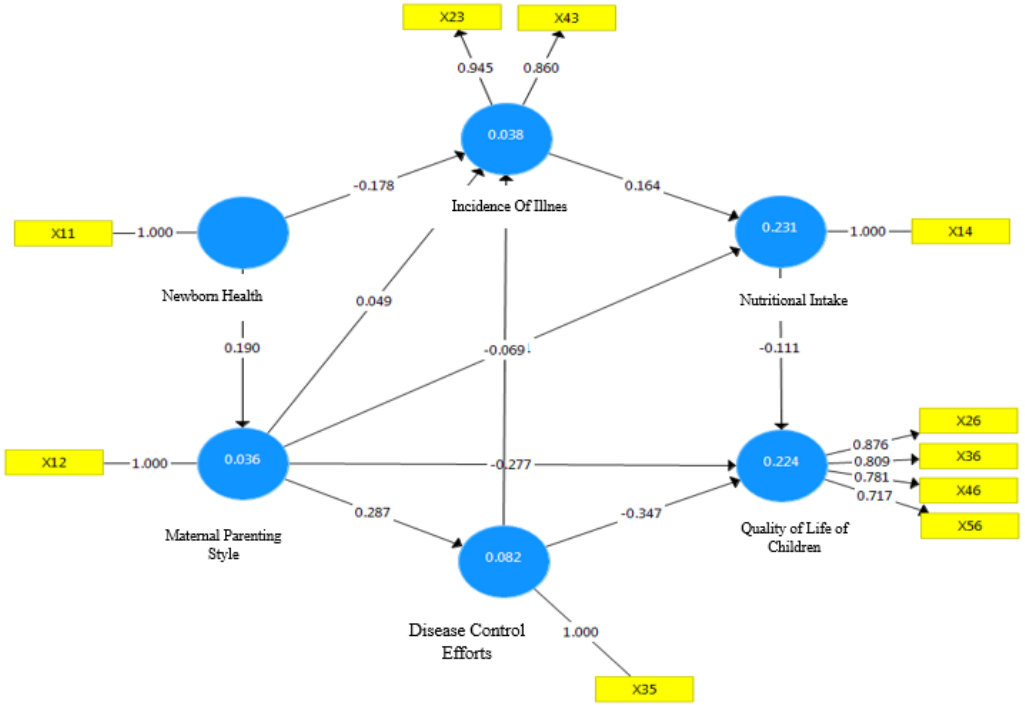

Figure 2. Path diagram final outer model

The figure above shows that there are loading factor values <0.7, necessitating several iterations of PLS calculations to produce loading factor, Average Variance Extracted, cross loading, and composite reliability that meet the standards. The final results of the external model evaluation are shown in Figure 3.

Based on the loading factors, Table 1 presents the AVE values and composite reliability. Furthermore, Table 2 presents the resulting cross-loading values .

Based on the loading factor values, AVE, composite reliability, and cross-loading, it can be concluded that both the convergent and discriminant validity assessed in the outer model are valid and reliable.

Inner Model Evaluation

The inner model in PLS is assessed using R^2 values for dependent constructs and path coefficients or t-values for each path to determine the significance of relationships between constructs within the inner model. The resulting R^2 values are as follows:

1. Nutritional Intake (R^2: 0.231): This indicates that it is positively influenced by 23.1% due to the incidence of illness and maternal parenting style.
2. Incidence of Illness (R^2: 0.038): This indicates that 3.8% of it is positively affected by factors such as newborn health, maternal parenting style, and disease control efforts.
3. Disease Control Efforts (R^2: 0.082): This shows a positive influence of 8.2% from maternal parenting style.
4. Maternal Parenting Style (R^2: 0.036): This indicates a positive influence of 3.6% on newborn health.
5. Children's Quality of Life (R^2: 0.224): This reflects a positive influence of 22.4%, both directly and indirectly, from newborn health, maternal parenting style, incidence of illness, disease control efforts, and nutritional intake. Table 3 presents the path coefficients and T-statistic values for each path. Furthermore, Model Fit is presented in Table 4, which shows that the resulting model has a goodness of fit with the data of 66%.

Table 1. Values of (AVE) and composite reliability

Construct	AVE	Composite reliability	Description
Nutritional Intake	1.000	1.000	Fulfilled
Illness Occurrence	0.816	0.899	Fulfilled
Newborn Health	1.000	1.000	Fulfilled
Children's Quality of Life	0.636	0.874	Fulfilled
Maternal Parenting Style	1.000	1.000	Fulfilled
Disease Control Efforts	1.000	1.000	Fulfilled

Table 2. Cross loading values

Indicator	Newborn Health	Maternal Parenting Style	Incidence of Illness	Nutritional Intake	Disease Control Efforts	Children's Quality of Life
X11	1.000	0.190	-0.181	-0.143	0.190	-0.153
X12	0.190	1.000	-0.004	-0.451	0.287	-0.327
X23	-0.209	0.030	0.945	0.157	-0.071	0.271
X43	-0.097	-0.057	0.860	0.143	-0.095	0.296
X14	-0.143	-0.451	0.166	1.000	-0.175	0.075
X35	0.190	0.287	-0.088	-0.175	1.000	-0.408

Indicator	Newborn Health	Maternal Parenting Style	Incidence of Illness	Nutritional Intake	Disease Control Efforts	Children's Quality of Life
X26	-0.165	-0.098	0.378	-0.070	-0.352	0.876
X36	-0.099	-0.269	0.118	0.115	-0.440	0.809
X46	-0.116	-0.409	0.219	0.070	-0.240	0.781
X56	-0.116	-0.232	0.336	0.112	-0.232	0.717

Table 3: Path coefficients in the inner model testing

Construct	Original Sampel	Sampel Mean	Standard Deviation	T-statistic	Description
Nutritional Intake -> Children's Quality of Life	-0.111	-0.095	0.181	0.609	Not Significant
Incidence of Illness -> Nutritional Intake	0.164	0.162	0.153	1.071	Not Significant
Newborn Health -> Incidence of Illness	-0.178	-0.176	0.184	0.967	Not Significant
Newborn Health -> Maternal Parenting Style	0.190	0.177	0.146	1.304	Not Significant
Maternal Parenting Style -> Nutritional Intake	-0.451	-0.459	0.136	3.307	Significant
Maternal Parenting Style -> Incidence of Illness	0.049	0.027	0.173	0.284	Not Significant
Maternal Parenting Style -> Children's Quality of Life	-0.277	-0.267	0.204	1.360	Not Significant
Maternal Parenting Style -> Disease Control Efforts	0.287	0.289	0.133	2.151	Significant
Disease Control Efforts -> Incidence of Illness	-0.069	-0.068	0.178	0.385	Not Significant
Disease Control Efforts -> Children's Quality of Life	-0.347	-0.372	0.135	2.578	Significant

*Significance Level 5%

Table 4. Model fit presented in the following table

Fit Summary	Saturated Model	Estimated Model
SRMR	0.076	0.122
d-ULS	0.320	0.813
d-G	0.166	0.197
Chi-Square	46.451	53.725
NFI	0.710	0.664

DISCUSSION

The prevention and management of nutritional issues continue to be a government concern due to their significant impact on children's quality of life. Quality of life can be defined as an individual's perception of their position in life. In this study, based on the evaluation of loading factors, the assessment of children's quality of life is represented by motor function, cognitive ability, independence, and social skills.

The results of the path coefficient test show that nutritional intake has a positive but non-significant impact on children's quality of life, with a T-statistic value below the rule of thumb threshold (<1.96), specifically 0.609. Nutritional intake quality and quantity are identified as contributors to stunting (Welis et al., 2022). This study demonstrates that maternal parenting is a significant factor affecting nutritional intake, with a T-statistic exceeding the rule of thumb threshold (<1.96), specifically 3.307. Additionally, the incidence of illness has a positive but non-significant effect on nutritional intake, with a T-statistic below the threshold (<1.96), specifically 1.071. The analysis further reveals that disease incidence is positively influenced by efforts at disease control. Supporting research indicates that recurring illness reduces appetite and increases nutrient loss (McGee, 2004). This is corroborated by other studies showing that parenting practices influence dietary quality, such as providing nutritious meals and establishing eating rules (Chen et al., 2021). Furthermore, research on disease control efforts, such as immunization, shows a positive impact on reducing illness incidence (Talbird et al., 2022).

Nutritional intake plays a vital role in children's growth, development, and daily activities, such as playing outdoors. Adequate nutrition can meet all necessary requirements, leading to an active child (Puji Afiatna and Mulyasari, 2022). Other research shows that nutrition significantly impacts children's motor development. Malnutrition can lead to irreversible developmental issues that cannot be corrected later in life. Specifically, insufficient protein intake is associated with structural and functional brain pathology, which subsequently affects child development (Hardiansyah and Supariasa, 2016; Afiatna and Mulyasari, 2022). Additional studies emphasize that stunting is a chronic nutritional issue resulting from prolonged poor nutritional intake. During the first year of life, nutrient needs are exceptionally high to support rapid growth and development. Furthermore, stunted children tend to exhibit physical weaknesses, including muscle weakness, poor coordination, and delayed fine and gross motor development, making it difficult for them to walk, jump, or run (Pranoto et al., 2024).

The first two years of life are a critical period for brain development. During this time, inadequate nutrition can lead to the shortening of apical dendrites in the brain, resulting in diminished brain function and impaired cognitive abilities (Khasanah et al., 2024). Furthermore, if issues arise during this period, there is a reduction in the total number of brain cells, and myelination is disrupted, failing to progress adequately in subsequent growth stages (Putri, Lely and Evayanti, 2021). Other studies emphasize that growth impairments in early childhood can reduce cognitive and motor functions, as well as negatively impact emotional and behavioral development (Komainand Mardela, 2018).

A child's social-emotional development is one of the essential developmental milestones they must reach. Factors influencing a child's social-emotional growth are primarily derived from the family environment, which serves as the first setting where

a child learns. Through the family's social environment, children receive initial caregiving quality before learning to engage with the broader natural environment (Sari et al., 2019). Research by Primagita demonstrates that children with nutritional issues, such as stunting, tend to have lower emotional well-being compared to other children (Hendrawati et al., 2023). This study indicates that maternal parenting practices have a positive but not significant impact on children's quality of life (T-statistic below the rule of thumb <1.96, specifically 1.360). Parenting can be especially challenging for adolescent mothers, as they are still in a developmental stage themselves and must complete their own developmental tasks while fulfilling a parental role. Adjusting to parenthood is closely linked to the mother's preparation and understanding of child care behaviors. Other research shows that adolescent mothers whose expectations for their children do not align with reality are more likely to use harsh discipline and exhibit rejection, potentially leading to neglect in areas such as physical care, emotional support, supervision, medical needs, and education all foundational developmental needs for children. Such neglect can have detrimental effects on a child (Kristanti et al., 2018). Additional studies support that pregnancy and childbirth among adolescents can induce stress, which negatively affects parenting quality and, consequently, the well-being of the child or offspring (Kumar and Huang, 2021).

Independence is the effort to separate oneself from parents with the intention of self-discovery through the process of identity formation, which involves the development of individuality. In early childhood, independence is characterized by the child's ability to make choices, exhibit creativity, take initiative, regulate behavior, demonstrate responsibility, practice self-control, make decisions autonomously, and solve problems without external influence (Sari and Rasyidah, 2020). Parents play a crucial role in fostering independence in their children. Other research underscores that parenting styles significantly influence children's character development, including the cultivation of independence (Puspa et al., 2019).

The analysis revealed that the health of newborns, incidence of illness, maternal caregiving practices, disease control efforts, and nutritional intake along with the indicators for each variable positively influence the quality of life of children aged 37 to 60 months born to adolescent mothers, both directly and indirectly.

AUTHOR CONTRIBUTION

Yeri D. Nenogasu and Estiyani Wulandari compiled and designed this research, prepared research administration, collected research data, processed data, and analyzed data as well as reviewed research documents and articles. Gerda N. Buan collected and processed research data.

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CONFLICT OF INTEREST

There was no conflict of interest.

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