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Tackling Toddler Malnutrition: Exploring Maternal Influences on Wasting

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ABSTRACT

Wasting is a state of malnutrition in toddlers, where Weight-for-Height is between -3 and less than -2 standard deviations for children aged 0-59 months. Wasting has been prioritized in the health development plan for RPJMN 2020-2024. The aim of this research is to identify maternal determinant factors causing wasting incidents. The research design is a case-control study. This research is a narrative literature review, A literature search was carried out, using PubMed and the Google database, to identify articles, published during a period of 12 years (2011-2023). The key-words used for searching these articles were wasting, malnutrition, and under 5 children.
The research has involved an assessment of 34 studies obtained from PubMed and Google's database regarding maternal factors causing occurrences of wasting in toddlers. Based on the conducted assessment, maternal factors causing wasting in toddlers include education, knowledge, occupation, parenting style, BMI, age, and birth spacing. The government needs to focus on enhancing nutritional knowledge among mothers of toddlers and implement programs aimed at improving parenting styles for these mothers.

Keywords: Wasting, Maternal Factors, Knowledge, Age, Parenting Style

INTRODUCTION

Wasting is a condition in toddlers characterized by Weight-for-Height (WHZ) or Weight-for-Length (WLZ) scores being between -3 and less than -2 standard deviations in children aged 0-59 months. Wasting is characterized by extreme weight loss, resulting in low weight for height (1). The global nutrition target until 2030 aims to reduce the prevalence of wasting and severe wasting to below 5% by 2025 and less than 3% by 2030 (2). Wasting is a priority in health development, aligned with the direction of the National Medium-Term Development Plan (RPJMN) 2020-2024, with a target of reducing wasting prevalence to 7% by 2024 (3).
Currently, an estimated 45.4 million (6.7%) children under 5 years old worldwide experience wasting, with 13.6 million (2%) experiencing severe wasting. In Asia, the number of wasting cases is 31.9 million, with 10.3 million classified as severe wasting. In 2020, more than 2/3 of all children under 5 experiencing wasting lived in Asia, and 3/4 of these children lived in developing countries (4). Wasting prevalence in Indonesia is 10.2%, with 3.5% categorized as severe wasting. This indicates that wasting in Indonesia, according to WHO criteria, is a significant public health problem (5). Risk factors for wasting come from maternal factors including education, knowledge, age, occupation, birth spacing, BMI, MUAC, and parenting style (4).
Wasting is a major health problem due to its association with morbidity and mortality risks, thus requiring attention (3). The

increased risk of mortality associated with wasting indicates the need for further assessment of its etiology and risk factors (6). Based on the description above, the author is interested in studying the maternal factors leading to wasting occurrences.

LITERATURE REVIEW

Wasting is Weight-for-Length/Height <-2 SD from the Weight-for-Height median based on WHO Child Growth Standards. Wasting results from acute malnutrition. It represents a significant public health issue due to its substantial impact on the future human resource capital quality. Growth disturbances experienced by children in early life, such as wasting, can lead to permanent damage (3).

Factors related to early-life nutrition begin with maternal factors such as height, BMI, number of pregnancies, obesity, inadequate nutritional intake, and unhealthy food and lifestyle habits. These factors impact the characteristics of the newborn. Poor maternal nutrition during pregnancy results in inadequate nutrient supply to the fetus. Babies are born with low birth weight or prematurely, hindering their growth and development. They grow up as undernourished individuals, at risk of obesity and hypertension, eventually becoming adults with chronic diseases, nutritional deficiencies, poor eating habits, and unhealthy lifestyles. These factors serve as potential bases for intergenerational effects (7,8).

The mother's education will influence child-rearing because higher education levels equip mothers to understand the importance of parental roles in child growth. Additionally, better education is associated with a higher likelihood of possessing good nutritional knowledge. Mothers with better education tend to more readily accept nutritional information and apply their knowledge in child-rearing practices and feeding practices (9).

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The factor of employment is more notably known to influence food provision, nutrient intake, and childcare. Mothers working outside the home often consider childcare but this isn't guaranteed. Meanwhile, mothers working at home don't have alternatives for childcare (11). The mother's age also influences wasting. Pregnant women at a young age can deplete their nutritional reserves because they are still needed for growth and development, thus increasing the likelihood of giving birth to low birth weight babies. These mothers are also at risk of not breastfeeding their babies due to insufficient breast milk supply, resulting in undernourished children (12). An optimal birth spacing is at least 2 years. This timeframe allows mothers to provide optimal care and nurturing for the child. The gap between children can influence the availability and variety of food, as well as time constraints in caring for the child (13).

The nutritional status of the mother is related to the nutritional status of the child, which can be assessed by the mother's BMI and MUAC (14). Parenting style refers to household practices that ensure the availability of food, healthcare, and other resources for a child's survival, growth, and development. Childcare is closely related to household circumstances. A mother's knowledge of childcare and her access to it determine the care provided to the child. Toddlers who receive better quality childcare are more likely to have lower illness rates and relatively better nutritional statuses (15).

MATERIALS & METHODS

This research is a narrative literature review, A literature search was carried out, using Pub Med and the google data-base, to

identify articles, published during a period of 12 years (2011-2023). The key-words used for searching these articles were wasting, malnutrition, and under 5 children.

RESULT

The research has involved an assessment of 34 studies obtained from PubMed and Google's database regarding maternal factors causing occurrences of wasting in toddlers. The factors associated with wasting occurrences can be viewed in Table 1.

DISCUSSION

Based on the literature review, the factors that play a role in the occurrence of wasting are:

1. Maternal Education

Education enhances awareness of health issues, hygiene practices, and household income. Mothers with lower education tend to have less understanding of hygiene practices and health issues. According to Fonyuy and Joceline (2018), education levels affect knowledge of feeding practices, significantly impacting a child's nutritional status (30).

Maternal education influences child-rearing because higher education equips mothers to understand the pivotal role of parents in a child's growth. Moreover, with better education, it is presumed that there is a better understanding of nutrition. Educated mothers are more inclined to readily accept nutritional information and apply their knowledge in nurturing and feeding practices (31,9). Although this study didn't establish a direct link between maternal education and wasting incidents, mothers with lower education tend to have more wasting incidents in their children compared to those with higher education.

Murarkar's study (2020) on malnutrition prevalence and determinants in toddlers, where maternal education was not significantly associated with wasting incidents (p value = 0.358 OR = 0.68). The studies by Kim et al. (2019) and Akhade et al. (2019), where maternal education showed significant associations with wasting incidents. Yet, akin to this study, those studies also noted a higher proportion of wasted toddlers with mothers having lower education (25,32,22).

The researchers hypothesize that the lack of a clear connection between education and wasting incidents in toddlers could be due to education levels not always influencing knowledge. Respondents with higher education might not necessarily possess substantial nutritional knowledge or exhibit proper feeding behaviors towards toddlers. Despite having higher education, if the feeding practices towards toddlers are not conducive, it can affect the nutritional status of the child.

Table 1. The Maternal Factors Causing Occurrences of Wasting in Toddlers

Authors	Country	Sample Size	Wasting Prevalence	Factors founding significantly associated with prevalence rate
Khan, *et al*., 2019 (16)	Pakistan	3071	10,7%	Mother's employment status, mother's access to information, Mother's BMI,
Jeyakumar, *et al*., 2019 (17)	India	400	15,3%	Maternal Education
Afriyani *et al*., 2016 (18)	Indonesia	100	19%	Nutrtion intake based on Family income level, Nutritional intake based on food security
Idris, I., *et al*., 2020 (19)	Indonesia	90	17,15%	Knowledge, Parenting
Aguayo, *et al*., 2016 (20)	Bhutan	2028	-	Poor feeding practice, Prelacteal feeding
Gewa, C.A., et al., 2011 (21)	Kenya	3.793	8%	BMI, education level,
Akhade, et al., 2019 (22)	India	400	24,8%	Maternal education, maternal employment, maternal nutrition status
Khaing, H.T, *et al*, 2019 (23)	Myanmar	3727	6,8%	BMI
Meshram, I.I., *et al*, 2014 (24)	India	1915	20%	Literacy status of mother
Murarkar, S., *et al*, 2020 (25)	India	3671	17,1%	Ekslusif BF till 6 months of age
Ngoma, D.N., et al, 2019 (26)	Indonesia	62	17,7%	Parenting, income
Habyarimana, F., et al, 2016 (14)	Afrika Tengah	4.133	-	Birth order, BMI, incidence of anemia
Aheto, et al, 2015 (27)	Afrika	2083	8%	BMI
Gebremeskel, et al, 2022 (28)	Ethiopia	8919	10,1%	Education status
Nagahori, et al, 2015 (29)	Cameroon	100	6%	Mother age (low), low mother's education, mother with no family planning information

2. Maternal Knowledge

Maternal knowledge about nutrition is crucial for a child's health. Insufficient understanding of balanced dietary patterns and the types and quantities of nutrients needed by the body significantly affects a child's nutritional status, leading to malnutrition in children. Mothers with sound nutritional knowledge tend to have healthier children compared to those without adequate nutritional information (33). Mothers equipped with good nutritional knowledge are inclined to pay more attention to their toddler's nutritional needs, enabling optimal growth and development compared to those with lower nutritional awareness. Knowledge isn't solely determined by educational levels but also by access to information (11).

Study Marniati et al.'s research (2020) on the relationship between knowledge, income, and social culture with child nutrition status, which found that knowledge significantly relates to child nutrition status (p value = 0.000) (34). Habyarimana et al.'s study (2016) on determinants of malnutrition in toddlers, where knowledge showed a significant association with wasting incidents (p value = 0.007 OR = 5.71) (14). Ngoma's study (2019) on factors influencing malnutrition in toddlers, which concluded that knowledge had no association with wasting incidents (p value = 0.103) (26).

An educational programs on nutrition id needed in communities aiming to impart knowledge and foster healthy attitudes and behaviors regarding balanced nutrition.

3. Maternal Age

A woman's age during pregnancy ideally shouldn't be too young or too old. Being under 20 years old or over 35 years old carries a high birthing risk. A woman's readiness for pregnancy should encompass physical, emotional, psychological, social, and economic aspects. Pregnancy between the ages of 20-35 is considered a safe period due to reproductive and mental maturity for pregnancy and childbirth (12).

Pravana et al.'s study (2018), which found a significant relationship between maternal age at birth and wasting incidents (p value = 0.005, OR = 2.16) (35). Murarkar's study (2020) on the prevalence and determinants of malnutrition in toddlers, where maternal age did not relate to wasting incidents (p value = 0.138, OR = 1.83), (25) and Habyarimana et al.'s study (2016) on determinants of malnutrition in toddlers, which found no association between maternal age at birth and wasting incidents (p value = 0.0663, OR = 2.4) (14). However, similar to this study, those studies also found a higher incidence of wasting in mothers with risky ages, i.e., under 20 years old and over 35 years old.

Pregnancy at a young age is associated with premature births because the blood supply to the uterus hasn't fully developed, resulting in inadequate nutrition flow to the fetus. During adolescence, a time of growth, there's a competition for nutrients between the fetus and the mother's metabolism, causing fetal malnutrition and hindering fetal growth and development, leading to low birth weight. Similarly, pregnancies at an older age involve reproductive organs that are less prepared to handle the reproductive burden, affecting fetal growth and development and posing a risk of complications. These factors contribute to the risk of wasting in toddlers. The research found that pregnant mothers at higher risk were often over 35 years old. Hence, promoting awareness about the risks of high-risk pregnancies and the ideal age for pregnancy and childbirth is crucial.

4. Maternal Occupation

Maternal employment status is associated with a child's nutritional status. Working mothers often lack sufficient time to provide adequate care to their children. Rashad and Sharaf (2018) stated that although working mothers contribute to household income, there's a positive relationship between employment and malnutrition in toddlers (36).

Khan's study (2019) on determinants of stunting, underweight, and wasting, which found no association between occupation and wasting incidents (p value = 0.81) (16). Akhade et al.'s study (2019) on malnutrition in toddlers, which found a significant relationship between occupation and wasting incidents (22). Nevertheless, both studies concluded that working mothers are at risk of having a child with wasting compared to non-working mothers.

Occupation is a crucial factor in determining the quality and quantity of food, as it's linked to income. With increased income, improvements in health and family-related nutritional status issues are expected. However, children aged 0-5 are still highly dependent on their mothers for aspects such as feeding, care, and nurturing. Good nutrition isn't only about the quantity of food but also its quality and diversity. Therefore, a working mother must prioritize child-rearing. Since most mothers in this study didn't work, it can be concluded that they had sufficient time for child care and nurturing. The lack of relationship between occupation and wasting incidents might be due to other factors like knowledge, household income, and childcare practices. Hence, there's a need for health promotion regarding the importance of proper feeding practices and childcare for children.

5. Birth Spacing

Optimal birth spacing is at least 2 years, providing mothers with an opportunity for optimal childcare and nurturing. Birth spacing also impacts the availability and variety of food and the limited time in caring for children (13).

Khaing et al.'s study (2019) on the risk factors and variations in malnutrition in toddlers, where the eldest child and children born with a spacing > 2 years have a lower chance of experiencing wasting (23). Pravana et al.'s study (2018) on acute malnutrition in toddlers, where birth spacing was significantly associated with wasting incidents (p value = 0.001 OR 4.17) (35).

Very close birth spacing affects childcare practices. Parents tend to be suboptimal in child rearing, and it also affects the family's economic condition. Based on the research, most mothers have spaced pregnancies with a minimum interval of 2 years. However, it's essential to ensure that mothers receive health promotion regarding Family Planning (FP) and have easy access to FP programs.

6. Maternal Body Mass Index (BMI)

Maternal malnutrition directly affects the health and development of both the mother and the child. It's crucial to ensure that women maintain good nutritional status as it directly impacts the health of developing children. Research on twins in the UK reported that BMI is influenced by genes, with only 25% of variations attributed to environmental factors (37).

Victoria's study (2015), stating that there's no association between maternal BMI and wasting incidents. Mothers with a BMI < 18.5 have a 2.4 times greater risk of their toddlers experiencing wasting (38), and Kim et al.'s research (2019) on variables associated with child anthropometry states that mothers with a BMI < 18.5 kg/m2 have a 2.22 times higher risk of their toddlers experiencing wasting (32).

Akhade et al.'s study (2019) on malnutrition in toddlers, where the mother's nutritional status significantly relates to wasting incidents in toddlers (22). Underweight during pregnancy poses a very high risk of premature delivery and also influences the volume and composition of breast milk, including the concentration of several micronutrients, which depend on the mother's status and intake.

Low maternal Body Mass Index (BMI) is associated with intrauterine growth restriction. Improving maternal nutrition from the preconception period is essential to prevent wasting in the first 6 months. This begins with educating and enhancing mothers' knowledge about feeding practices and preventing low birth weight. Interventions should be focused on vulnerable groups, particularly mothers with poor nutritional status, to end child malnutrition by 2030 in line with sustainable development goals.

7. **Maternal Mid Upper Arm Circumference (MUAC)**

MUAC is an indicator used to assess nutritional status by measuring the upper arm circumference. It's utilized as a proxy indicator for chronic energy deficiency (KEK) among pregnant women in Indonesia due to the lack of pre-pregnancy weight data for most pregnant women. KEK refers to a chronic state of maternal undernutrition leading to health issues for the mother. Health issues during pregnancy will impact the fetus (38).

Zaif (2017) regarding the relationship between maternal nutritional status during pregnancy and toddler growth, which found no association between maternal MUAC and wasting incidents (p value = 0.869) (40). Linda's study (2014), stating a significant relationship between maternal MUAC during pregnancy and nutritional status (41). Despite MUAC not being directly related to wasting incidents, mothers with Low MUAC for Age are more at risk of having a child experience wasting compared to mothers with a normal MUAC during pregnancy. These disparities could be attributed to various factors such as age, energy intake, education level, and income.

Pregnant women with poor nutrition require adequate nutrition in terms of quantity, quality, and diet composition, along with access to health education about nutrition. Malnutrition during pregnancy can affect brain weight, parts of the brain, and the number of brain cells, resulting in below-average IQ after birth. Due to maternal malnutrition, blood volume decreases, placental size decreases, and nutrient transfer through the placenta reduces, affecting the fetus. Consequently, malnourished pregnant women tend to give birth to premature or low birth weight babies who are at high risk of experiencing wasting. Therefore, preconception screening for prospective couples and proper pregnancy planning are essential to identify and intervene in nutritional status issues at an early stage.

8. **Parenting Style**

Household-level caregiving practices involve providing children with food and health care from available sources for their survival, growth, and development. The appropriateness of child-rearing practices is crucial in ensuring the nutritional well-being of toddlers. Toddlers who receive better quality caregiving are more likely to have lower illness rates and relatively better nutritional statuses. This underscores the importance of caregiving in a toddler's nutritional status and overall health (12).

Idris's research (2020) on factors related to malnutrition incidents in toddlers, stating that parenting styles significantly relate to wasting incidents (p value = 0.000) (30). Ni'mah's study (2015) on

the relationship between education level, knowledge, parenting styles, wasting, and stunting in toddlers, where parenting styles were found not to be associated with wasting incidents (p value: 0.719) (42).

Suboptimal complementary feeding clearly determines growth delays. Improving feeding practices and energy density, ensuring adequate diets including sufficient micronutrients and animal-based food consumption are crucial. Research results indicate that most respondents face challenges in feeding toddlers, failing to provide protein-rich foods, and lacking knowledge about feeding regulations for toddlers. Therefore, enhancing knowledge about infant and toddler feeding, managed by health centers through integrated health posts, is necessary.

CONCLUSION

Maternal factors contributing to wasting in toddlers include age, education, knowledge, parenting style, BMI, birth spacing, and income. Preventive efforts are needed to avoid wasting in toddlers, such as providing education on nutrition to mothers of toddlers, practicing proper feeding techniques, nurturing child care practices, and promoting healthy pregnancy planning.

Declaration by Authors

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