

**THE INFLUENCE OF FEEDING PRACTICE ON THE RISK OF STUNTING IN TODDLER: A SCOPING REVIEW****Sholihah Gustavia Yolanda^{1*}, Ismarwati²**^{1,2} Fakultas Ilmu Kesehatan, Universitas 'Aisyiyah Yogyakarta, Yogyakarta, Indonesia* Correspondence Author: sholihah.gustaviayolanda@gmail.com**ARTICLE INFO****Article History:**

Received : May 1, 2024

Accepted : July 1, 2024

Published: July 11, 2024

DOI:[https://doi.org/10.26553/jikm.2024.15.2.149-](https://doi.org/10.26553/jikm.2024.15.2.149-166)[166](https://doi.org/10.26553/jikm.2024.15.2.149-166)**Available online at**<http://ejournal.fkm.unsri.ac.id/index.php/jikm>**ABSTRACT**

Child stunting is a serious case that is difficult to overcome because it is caused by poor food quality and the amount of food that does not meet the body's needs during the first two years of life. The purpose of this study is to review the influence of feeding practices and feeding methods on the risk of stunting in children under five. PRISMA-ScR reporting guidelines are used to identify key concepts and knowledge gaps. This scoping review used a five-step framework approach. The databases used were PubMed, Wiley Online Library, ScienceDirect, and EBSCO. Manual searches used the Research Rabbit search engine. Based on the search results of 979 articles, ten articles were found that matched the inclusion criteria. Out of the seven themes found, four were in line with WHO's complementary feeding indicators, namely Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD), Minimum Acceptable Diet (MAD), and Introduction of Solid, Semi-Solid or Soft Foods (ISSSF). While the other three themes are a time of first feeding, breastfeeding practices, and feeding methods. Overall, inadequate feeding practices result in child malnutrition, including stunting. Improper nutrition and care during the first 1000 days of birth is detrimental to a child's life, both in the short and long term as malnutrition that occurs at this early stage of life has serious and irreversible consequences. Large-scale studies are recommended to explore the role of IYCF in reducing stunting and qualitative studies to determine barriers and drivers to improve infant and young child feeding practices.

Keywords: complementary feeding, feeding practice, stunting

Introduction

Children between the ages of 0 and 5 years are more vulnerable to malnutrition.¹ About 45% of under-five deaths are caused by malnutrition (stunting, underweight and wasting). This occurs mainly in low- and middle-income countries.² Child stunting is a crucial problem that is difficult to solve because it is caused by many factors. Approximately a third of children under the age of 3 are stunted. This indicates chronic malnutrition in children.³ Moreover, children in the 12-23 month age group are entering a critical growth phase and growth failure is beginning to show. This can be caused by poor food quality and insufficient amount of food to meet the body's needs.¹

Based on the results of the 2021 Indonesia Nutrition Status Survey, it is known that the decline rate is 24.4%, but will decrease to 21.6% in 2022.^{4,5} Despite this 2.8% decrease, Indonesia still needs a lot of work to reach the 14% target by 2024. This can be started by providing nutrition in the first 1000 days of life.⁶ The first thousand days of life is the time between a woman's pregnancy and a two-year-old child. This period is unique and also known as a critical window of opportunity because it is the right time to build a foundation for optimal child health and development.³ Proper nutrition and care during the thousand days of life will affect a child's survival, both in the short term and in the long term considering that malnutrition that occurs at this early stage of life has serious and irreversible consequences.⁶

Adapting appropriate Infant and Young Child Feeding (IYCF) practices from the start will ensure optimal growth and development in children. However, many children are not fed the right way. Many children receive less than optimal complementary foods in terms of frequency of feeding and variety of foods for their age.⁷ Studies show the relationship between feeding practices, such as breastfeeding, minimum meal frequency, minimum dietary diversity, variety of foods, and complementary feeding are important interventions that can reduce acute malnutrition and stunting in children.⁸⁻¹⁰ However, other studies have found that feeding practices in terms of minimum acceptable diet, dietary diversity, and frequency are not associated with stunting.^{11,12}

The impact of stunting lasts a lifetime and can lead to disrupted brain development, lower IQ (Intelligence Quotient), a weak immune system, as well as a higher risk of disease later in life.³ Therefore, the aim of this study was to identify the effect of feeding practices and feeding methods on the risk of stunting in under-fives. Several researchers have examined and analyzed the application of feeding practices to stunting with quantitative and qualitative approaches. Thus, a review of previous research results is needed to see if there are gaps in the results of these studies. This review aims to identify and map the aspects that still have insufficient evidence or have not been studied previously in feeding practices on their association with stunting.

Methods

Scoping review studies follow a systematic approach to map the evidence on a topic and identify key concepts, theories, sources and knowledge gaps.¹³ The PRISMA extension for Scoping Review (PRISMA-ScR) reporting guidelines were used to identify key concepts and knowledge gaps in the feeding practice literature base. This scoping review used a five-stage framework approach adopted by Arksey & O'Malley. The five stages consist of identifying the research question, identifying relevant articles, selecting studies, extracting data, and the final step is summarizing and reporting the data.¹⁴

This review used the Population, Exposure, and Outcome (PEO) framework to help identify the main concepts of the articles used as the focus of the review. The population is toddlers, the exposure used is feeding practices, and the resulting outcome is stunting. As for the literature search, four databases were used, namely PubMed, Wiley Online Library, Science Direct, and EBSCO. A manual search using the Research Rabbit search engine was also used. The keywords used in this literature review consisted of *“toddler OR under five* OR kid* OR child* OR infant AND feeding practice OR feeding* AND stunting OR stunted OR growth* OR nutritional status”*.

The inclusion criteria in this review were articles about feeding practices on stunting risk, international articles, original research articles, articles in English, and articles published between 2018-2022. From the search results of each database, 213 articles were obtained from PubMed, 302 from ScienceDirect, 259 from Wiley Online Library, and 67 from EBSCO. Meanwhile, 18 articles were found in Research Rabbit, so the total number of articles obtained was 694 articles. Furthermore, the articles were screened for duplication using Zotero and 79 duplicate articles were obtained, which were then deleted. The remaining 694 articles were filtered based on the suitability of the title, abstract, and type (original or non-original research). The remaining 46 articles were then subjected to full-text reading and entered into data charting for identification starting from the title, purpose, PEO (Population, Exposure, and Outcome) and research results. A total of 36 articles that did not fit the PEO scoping review framework were excluded, resulting in 10 articles that fit the inclusion criteria for review. The article screening process was made in the form of a PRISMA flowchart, which can be seen in Figure 1. Next, the articles were critically appraised using The Joanna Briggs Institute (JBI) tool.

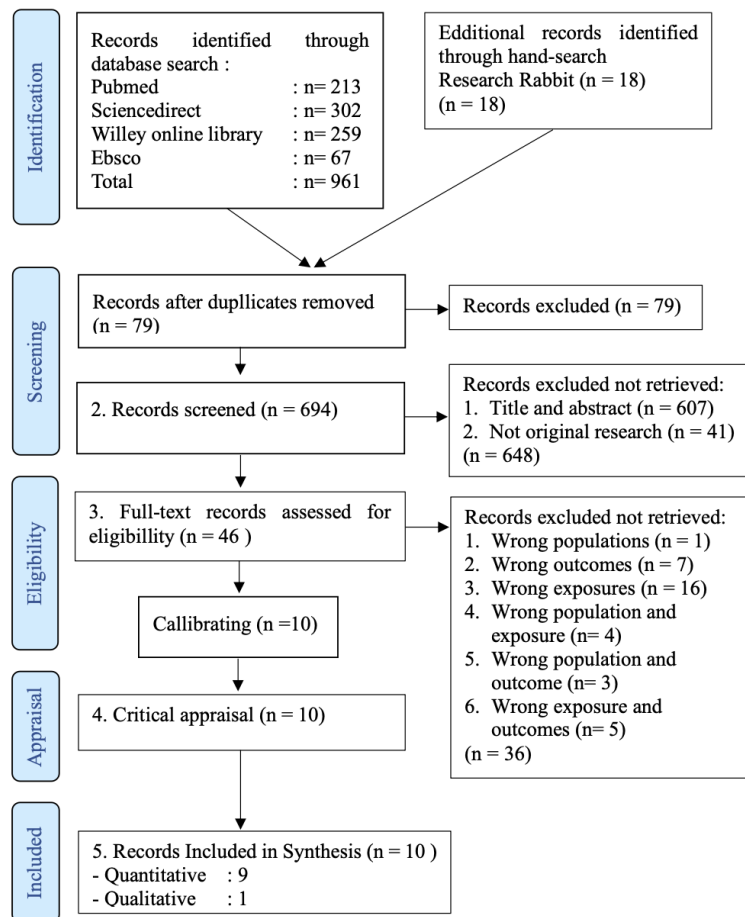


Figure 1. PRISMA-ScR Flow Chart

Results

Based on search results from four databases and one search engine using keywords through the PEO framework, only 10 articles were found that discussed feeding practices in relation to the risk of stunting in children and were considered to meet the inclusion criteria. The PRISMA results of this scoping review are presented in Table 1. Article and Participant Characteristics. Based on country characteristics, all articles were from developing countries in Asia and Africa. One study conducted research in seven East African countries [A9]. In Southeast Asia, studies came from Indonesia [A2, 10] and Myanmar [A6], South Asia studies came from India [A2], West Africa studies came from Burkina Faso [A8], and East Africa studies came from Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania and Uganda [A3, 5, 7, 9]. A diagram of the distribution of articles can be seen in Figure 2.

Table 1. Article and Participant Characteristics

No	Articles	Country	N	Participant (month)	Gender	Method/ Design	JBI Score
A1	Chakraborty et al. (2021) ¹⁵	India	390	< 24	not recorded	Quantitative, cross-sectional	A
A2	Hanindita et al. (2019) ¹⁶	Indonesia	30	9-15	M: 15 F: 15	Quantitative, cross-sectional	B
A3	Hiruy et al. (2021) ¹⁷	Ethiopia	5.638	6-23	not recorded	Quantitative, cross-sectional	A
A4	Satapathy et al. (2021) ¹⁸ 7/11/2024 11:27:00 AM	India	360	6-23	M: 189 F: 171	Quantitative, cross-sectional	B
A5	Masuke et al. (2021) ¹⁹	Tanzania	3.355	6-24	M: 1.922 F: 1.433	Quantitative, cohort retrospective	A
A6	Mya et al. (2019) ²⁰ 7/11/2024 11:27:00 AM	Myanmar	1.222	6-23	M: 658 F: 564	Quantitative, survey	A
A7	Walters et al. (2019) ²¹	Malawi	2.294	13-23	not recorded	Quantitative, survey	A
A8	Sarrassat et al. (2019) ²²	Burkina Faso	90	6-23	not recorded	Quantitative, cross-sectional	A
A9	Komakech et al. (2022) ²³	Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania and Uganda	7.772	6-23	not recorded	Quantitative, cross-sectional	A
A10	Soesanti et al. (2020) ²⁴	Indonesia	12	< 24	not recorded	Qualitative, not recorded	B

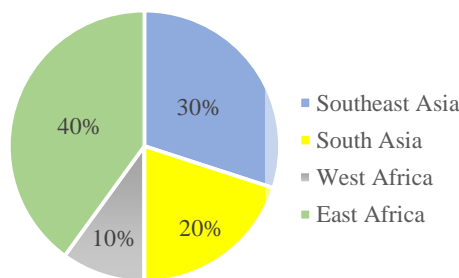


Figure 2. Distribution of Articles in Asian and African Countries

In terms of age characteristics, all participating children were aged 0-24 months. Two articles selected respondents who were less than 24 months old [A1,10]. Five studies used respondents aged 6-23 months [A3, 4, 6, 8, 9]. One study each used respondents aged 9-15 months [A2], 6-24 months [A5], and 13-23 months [A7]. While the number of samples has a range of 12 to 7,772 research samples [A2, 4, 5, 6]. The characteristics of the article when viewed in the table are more male than female, although the majority of studies do not include or are not specific in writing the proportion of numbers between male and female [A1, 3, 7, 8, 9, 10].

Based on the characteristics of the research method, 9 out of 10 studies used quantitative methods [A1, 2, 3, 4, 5, 6, 7, 8, 9] and one study used qualitative methods [A10]. Whereas in the

selection of study design, most studies used a cross-sectional design [A1, 2, 3, 4, 8, 9], two studies used a survey design [A6, 7], one study used a retrospective cohort design [A5] and one other study did not explain the type of qualitative study design used [A10]. Furthermore, based on the JBI score assessed based on the results of critical appraisal of each article, there were three articles that had grade B [A2,4,10] and seven articles with grade A [A1, 3, 5, 6, 7, 8, 9]. So overall, the articles reviewed have a good grade.

Across the articles, the majority of studies used interviews and anthropometric measurements for data collection. In general, in both primary and secondary data collection, researchers assessed feeding and breastfeeding practices. Based on Table 2, about 90% of the articles used Infant and Young Child Feeding (IYCF) indicators according to WHO's complementary feeding indicators [A1, 3, 4, 5, 6, 7, 8, 9, 10]. Another article discusses feeding techniques or methods and their effect on stunting risk [A2]. There are nine indicators of IYCF according to WHO, but in the whole article only found five of the nine indicators used in the whole study.

Table 2. Data Collection and Results

No	Article	Data collection	Exposure	Results and Conclusions
A1	Chakraborty et al (2021)	Interview and anthropometric measurements	ISSSF, MDD, MMF, MAD	Early initiation of breastfeeding can influence the incidence of stunting. The introduction of food consistency, optimal food diversity, sufficient meal frequency, minimum diet accepted according to the child's age, and exposure to bottle-feeding do not affect the incidence of stunting.
A2	Hanindita et al (2019)	Interview, anthropometric measurements, Hb, Serum Transferrin, and Serum Ferritin	Feeding method	Babies who are still given complementary foods using the BLW (Baby Led Weaning) technique have a higher risk of experiencing iron deficiency, wasting and stunting than children who are given traditional spoon-feeding techniques.
A3	Hiruy et al (2021)	Ethiopia Demographic and Health Surveys, interviews, anthropometric measurements	ISSSF, MMF, MDD, MAD	Providing consistency of food according to age, consumption of iron-rich foods, minimum diversity diet, and minimum acceptable diet are significant predictors of stunting. In addition, breastfeeding and appropriate minimum feeding frequency have a lower chance of children with anemia.
A4	Satapathy et al (2021)	WHO Infant and Young Child Feeding (IYCF) questionnaire modified with 24-h dietary recall	MMF, MDD, MAD	Exclusive breastfeeding, minimum meal frequency, and minimum diet diversity are predicted as possible factors for stunting. Exclusive breastfeeding is the main factor in determining stunting and the next factor is followed by minimum feeding frequency. So the probability of stunting is highest in the non-exclusive breastfed and non-MMF group and the lowest in children who are exclusively breastfed and meet the minimum dietary diversity.
A5	Masuke et al (2021)	Mother-child cohort and WHO IYCF questionnaire	Time of first feeding, MDD, MMF	Early introduction of complementary foods at 0–1 month of age is significantly associated with the risk of wasting and underweight. Children with a low minimum meal frequency have a higher risk of stunting, wasting and underweight. Children with low minimum diversity diets are more likely to experience stunting compared to their peers who receive minimum diversity diets.
A6	Mya et al (2019)	Interview and anthropometric	MDD, MMF, MAD	A small number of children who meet the minimum acceptable diet, a variety of foods, and feeding with

No	Article	Data collection	Exposure	Results and Conclusions
		measurements		minimal frequency, breastfeeding and consumption of iron-rich foods may have an influence on stunting.
A7	Walters et al (2019)	The Malawi Demographic and Health Survey (2015-2016), interviews, WHO IYCF indicators	MDD, MMF, MAD	Compliance with minimum meal frequency and minimum acceptable diet is associated with underweight. Children whose mothers lived in urban areas were less likely to be breastfed within 1 hour of birth but more likely to meet minimum dietary diversity. There is no significant relationship between breastfeeding and the practice of providing complementary foods and stunting.
A8	Sarrassat et al (2019)	Interviews, WHO IYCF assessments use the 24 hour dietary recall method	Time of first feeding, MMF, MDD, MAD, MMFF	60% of children received minimum meal frequency, but only 18% and 13% benefited from minimum dietary diversity and minimum acceptable diet, respectively. Knowledge about the timely introduction of complementary foods and recommended feeding practices during illness remains low.
A9	Komakech et al (2022)	Demographic and Health Survey (DHS)	MDD	Women who have self-esteem (self-esteem) and health decision control is associated with better child growth and MDD in several EA countries.
A10	Soesanti et al (2020)	Interviews, observations and documentation	ISSSF	Abstinence from serving sea fish and only serving porridge or <i>lontong</i> to babies when providing complementary food (<i>Makanan Pendamping Air Susu Ibu</i> or MP-ASI) under two years old can result in protein deficiency and stunting. This culture was formed because of the belief that children's intestines are not strong enough to accept foods with a rough texture at the age of 8 or 9 months.

Note: MMF: Minimum Meal Frequency, MDD: Minimum Dietary Diversity, MAD: Minimum Acceptable Diet, ISSSF: Introduction of Solid, Semi-Solid or Soft Foods, *lontong*: a food made from rice wrapped in banana leaves and cooked by steaming

Based on the results of this scoping review, seven main themes emerged related to infant and young child feeding practices. The seven themes are minimum meal frequency (MMF), minimum dietary diversity (MDD), minimum acceptable diet (MAD), introduction of solid, semi-solid or soft foods (ISSSF), time of first feeding, breastfeeding practices, and feeding methods. These themes are described in the Table 3 below.

Table 3. Thematic Analysis

Theme	Article number
1. Minimum Meal Frequency (MMF)	1, 3, 4, 5, 6, 7, 8
2. Minimum dietary diversity (MDD)	1, 3, 4, 5, 6, 7, 8, 9
3. Minimum acceptable diet (MAD)	1, 3, 6, 7, 8,
4. Introduction of solid, semi-solid or soft foods (ISSSF)	1, 3, 8, 10
5. Time of first feeding	5, 8
6. Breastfeeding practices	1, 4, 6, 7
7. Feeding methods	2

Discussion

Out of seven articles discussing meal frequency in relation to stunting [A1, 3, 4, 5, 6, 7, 8], three studies [A5, 6, 4] found that children with less than the minimum meal frequency have a higher risk of stunting.¹⁶⁻¹⁸ Minimum meal frequency is percentage of children aged 6-23 months who consumed a minimum amount or more of solid, semi-solid, or soft food (but also includes

milk feeding for non-breastfed children) on the previous day with 3 feedings for breastfed children aged 9-23 months; and 4 complementary feedings for non-breastfed children aged 6-23 months, where at least one of the four feedings must be solid, semi-solid or soft food.²³

While 60% of children received a MMF, only 18% and 13%, respectively, would benefit from MDD and MAD.²⁰ This suggests that fulfilling the minimum meal frequency does not necessarily fulfill the Minimum Dietary Diversity (MDD) and Minimum Acceptable Diet (MAD) aspects. MDD is the proportion of infants aged 6-23 months who received food from four or more food groups. While MAD is the proportion of children aged 6-23 months who had at least Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF) on the previous day.²⁴ WHO recommends a healthy child feeding frequency of at least 2-3 times a day for breastfed infants between 6-8 months of age, 3-4 times a day for breastfed children 9-23 months of age and 3-4 times a day for children 6-23 months of age with extra healthy snacks given 1-2 times a day.^{23,24}

In addition, children who do not fulfill the minimum frequency of feeding may also have an influence on wasting and underweight.¹⁷ Other studies suggest that lack of minimum feeding frequency is not associated with stunting, but is associated with wasting and underweight.^{13,19} Although meal frequency is not associated with stunting, appropriate minimum meal frequency has a lower likelihood of children with anemia.¹⁵

A qualitative study revealed that mothers give small meals 2-3 times per day to their stunted children. Some mothers stated that their children only eat half a spoonful of rice 3 times a day (half a baby plate or 4 to 5 baby spoons).⁸ Another qualitative study also revealed that children were only fed 2-3 times a day. Regarding the meal spacing of stunted toddlers, their meal times are not regulated by parents, but depend on the child's hunger. If the child does not ask for food, the parents will be silent.²⁶ A diet of less than 2 meals a day leads to a greater increase in the prevalence of stunting in toddlers. Low intake of energy, protein, and calcium is caused by the limited variety of foods and the number of meals that are only 2 times a day.²⁷ Naturally, the digestive organs in the body process food from the mouth to the small intestine. The digestive process in the stomach depends on the nature and type of food. If in general the stomach is empty between 3-4 hours, then this schedule also adjusts to the empty stomach.²⁶

In general, according to the Indonesian Ministry of Health, the feeding schedule for toddlers is three times a day (morning at 7, afternoon at 12, evening at 6) and two intermediate meals (between the two main meals). For dinner, a good time is not too close to bedtime. Because the body needs time to digest the food that enters the body. Normally a good time period for toddlers to eat dinner is around 5 pm to 7 pm. Nutritional status has to do with the frequency or schedule of children's meals. The better the frequency of meals that parents do for children, the more their

nutritional status will improve. Conversely, if the frequency of meals is not applied properly, the nutritional status of children will deteriorate.²

The WHO recommendation on feeding breastfed and non-breastfed children is that the children aged 6-23 months are fed a diversity of foods that meet their nutritional needs. Food group diversity is associated with increased linear growth. Less varied diets can increase the risk of micronutrient deficiencies that can affect children's cognitive and physical development.²⁴ Studies have further shown that children with low MDD, which are less than four food groups of MDD are more likely to be stunted than their counterparts with sufficient MDD.¹⁵⁻¹⁸ These results are consistent with previous studies suggesting that dietary diversity is an important predictor.²⁵ A study revealed that children who have poor dietary diversity are more likely to be stunted.²⁶ Another similar study conducted in India confirmed that MDD has no association with stunting but is associated with the incidence of wasting.¹³ Based on these findings, it is found that not meeting this MDD can affect a child's nutritional status through both stunting and wasting.

In West Africa, only 7% of children met the MDD. This is a very small percentage. MDD is assessed by the proportion of children receiving food from 4 or more different food groups out of 7 according to WHO IYCF, which are (1) grains, roots, and tubers; (2) legumes and nuts; (3) dairy products (eg. milk, yoghurt, cheese); (4) flesh foods (e.g. meat, fish, poultry and liver/organ meats); (5) eggs; (6) vitamin A-rich fruits and vegetables; (7) other fruits and vegetables.^{20,27} In some East African countries, mothers who had self-esteem and health decision control were more likely to meet MDD and have children with better growth.²¹ In Malawi, children with mothers living in urban areas are more able to fulfill the MDD.¹⁹ It is possible that mothers who live in urban areas are easier to reach varied food sources. So in this case it is necessary to increase awareness for child feeding actors in meeting the MDD needs to prevent stunting.

In stunted toddlers, the diversity of food consumed is lower, which may be caused by poor parental knowledge and low family purchasing power in providing food for their toddlers. Toddlers are said to have less access to food if the quality and quantity of the menu composition each day is incomplete. In line with this food insecurity, the composition of menus that are not nutritious, not balanced and not varied both in quality and quantity can cause growth delays and malnutrition in toddlers.^{31,32}

In relation to parents' lack of knowledge, Soesanti et al. in their qualitative study revealed that before the age of 14 months, children in Pasongsongan Village were not given fish for fear of contracting worms based on myths developed in the community. After the age of 14 months, children are given fish but only a little, because they are still afraid that children will get worms if they are given a lot of fish. Food intake mostly contains carbohydrates. Mothers of stunted children argue that their children's intestines are not strong enough to digest food with a coarser texture such as eggs, fish, beef and chicken. Sea fish is given when the child can walk because there has long

been a belief that fish contains worms. The people of Pasongsongan Village consider food to be food that fills the stomach or gives a sense of pleasure and satisfaction after eating. The main dishes are usually corn rice, white rice, and *lontong*. The typical meal is rice with side dishes, while vegetables or broth as a complement.²²

In line with Priawantiputri & Aminah that children under five consume more food sources of carbohydrates and animal protein sources. Short toddlers are more due to micronutrient deficiencies where 65.8% of children do not consume fruits and vegetables.³³ Ruel et al. noted that food diversity is a challenge for people in developing countries. Dietary patterns in developing countries such as Indonesia rely on cereal staples with insufficient intake of animal protein, fruits and vegetables.³³ The Indonesian diet has shifted from consuming foods that are high in fiber to consuming foods that are high in fat and energy.³⁴ So in this case it is necessary to increase awareness for child feeding actors in meeting MDD needs to prevent stunting in children.

On the Minimum Acceptable Diet (MAD) aspect, it was found that only 6% of infants aged 6 to 11 months received the minimum diet, 17% in the 12 to 23 month group and 13% in the 6-23 month group.²⁰ These percentages are certainly still low. Studies conducted in Ethiopia and Myanmar identified the lack of a minimum acceptable diet as a significant predictor of stunting.^{15,18} Similar results were obtained from research conducted in Indonesia.²⁷ However, the results of studies in India and Malawi reported no effect between meeting the minimum acceptable diet according to the age of the child and stunting but was closely related to the incidence of wasting and underweight.^{13,19} The results of these studies show that there is an association between the fulfillment of the minimum diet received and poor nutritional status such as stunting, wasting, and underweight, which made the children become much more liable to disease and death.

WHO recommends that children aged 6-23 months should be fed with appropriate variety and frequency to ensure their energy and nutrient needs are fulfilled.²⁴ Previous studies have found that fulfillment of the minimum acceptable diet indicator is lower when compared to the MDD and MMF indicators. This is because the fulfillment of the minimum acceptable diet is a combination of two indicators, namely MDD and MMF.²⁷ So that to fulfill the minimum acceptable diet, children must fulfill both indicators.

Based on a study in Burkina Faso, the mean and median age reported for ISSSF was around 9 months.²⁰ Besides that, a qualitative study conducted in Indonesia discussed the consistency of food given to children in communities that prohibit serving sea fish and only serve porridge or *lontong* for infants in providing complementary foods under two years old. This custom is due to the cultural assumption that a child's gut is not strong enough to accept coarse-textured food at 8 or 9 months of age. This can lead to protein deficiency and stunting in children.^{15,22} However, a quantitative study states that the introduction of age-appropriate feeding does not affect the incidence of stunting.¹³

Food consistency should progress gradually from soft to semi-solid to solid or from smooth, soft then rough texture as they age in accordance with the needs and capabilities of the child. Young children transition from eating pureed foods to smaller meals to family meals during the first year of life. Children may consume only small amounts, so improper consistency can affect nutrient absorption. At the same time, watering down complementary foods to reduce their consistency can also reduce their energy density.^{23,28} A study revealed that the quality of feeding practices was worst in children over 12 months of age, with only 6% meeting age-appropriate feeding criteria at the last visit. Researchers found a relationship between child length and weight.²⁹ In Cambodia's Ratanakiri Province, age-appropriate child feeding was the second largest determinant of slow child growth.²⁹

At the age of six months, babies are allowed to be given food other than breast milk. This transitional period is often referred to as complementary feeding. According to WHO and UNICEF, around the age of 6 months, the baby's energy and nutrient demands start to outpace the quantities produced by breastmilk, so additional food is needed to meet these needs. Babies of this age are ready to accept other foods as well. At about 6 months of age, babies can suffer from growth retardation if complementary foods are not given or given incorrectly.^{23,30}

In this review, two articles were found that discussed the timing of complementary feeding introduction [A5,8]. A study found that mothers' knowledge on the timely introduction of complementary foods was low. In this study, mothers reported the need to introduce solids from 6 months of age, but noted that the median age of first solid introduction in this study was 9 months.²⁰ Meanwhile, a study revealed that early introduction of complementary foods between 0 to 1 month of age was not related with stunting but had a significant effect on wasting and underweight.¹⁷ This is contrast to a previous study by Paramashanti et al., which stated that the right timing of complementary feeding can be a protective factor against stunting.²⁶

Moderate evidence from the results of a systematic literature review study shows that the introduction of complementary foods and drinks is not related with body circumference, body composition, weight or height when compared in infants aged 4-5 months with 6 months. Limited evidence recommends that introduction of complementary foods before the age of 4 months can be related with a higher likelihood of obesity or overweight. At ≥ 7 months of age, there was insufficient evidence on the effect of food and drink introduction.³¹

Children who are initiated within the first hour of birth have a low risk of stunting and wasting.¹³ To meet the nutritional needs of infants, exclusive breastfeeding is required until the child is six months old. Exclusive breastfeeding is the main factor to determine stunting.¹⁶ Another study mentioned that exclusively breastfed children were 25% less likely to experience stunting than non-exclusively breastfed children, although the correlation was not statistically significant.³² Therefore, exclusive breastfeeding can protect low-income children from growth retardation.

Continued breastfeeding until two years of age is also associated with stunting.¹⁸ However, another finding reported that breastfeeding had no correlation with stunting. The researchers also revealed that children whose mothers are located in urban areas are less often breastfed in the first hour after birth.¹⁹ The absence of an association between breastfeeding and the incidence of stunting can occur in children who are not breastfed because the mother still meets the child's nutritional needs starting from the minimum food diversity and minimum meal frequency. So that the minimum diet received by children is still fulfilled according to their age and needs. But keep in mind, breast milk contains antibodies that act as a defense system for the digestive wall against infection. It has been proven that infants who are exclusively breastfed have higher antibody levels than those who receive formula milk. Therefore, the body's resistance to pathogenic bacterial infections in breastfed infants is greater than that of formula-fed infants.⁴¹

In recent years, there has been a lot of talk among parents about Baby-Led Weaning (BLW) methods of feeding their children. BLW was first introduced in the UK by Gill Rapley & Tracey Murkett in 2010 who wrote a book entitled *Baby-Led Weaning: The essential to Introducing Solid Food and Helping Your Baby to Grow Up a Happy and Confident Eater*. BLW feeding is served at the same time as family meals. Food is given in hand-held pieces that they can pick up and learn to put in their own food, rather than puree. Infants are given control over what and how much they eat.¹⁴ The BLW feeding method has the same name as finger food.³⁴ It is the opposite of traditional spoon-feeding where the mother's control is superior to child control. In the traditional spoon-feeding method, the mother gradually introduces a variety of flavors and textures that increase as the child grows, until solid foods are introduced.⁴³ Therefore, the child has no choice but to adhere to the diet prescribed by the mother.

BLW offers an alternative for those who are actively looking for something different or a choice of options for those whose babies refuse to eat porridge or be fed. There are many parents who still find it difficult to find a process regarding what to eat and when to give in the BLW method.³⁴ However, observational studies reveal that infants who are still being fed complementary foods using the BLW technique have a higher risk of iron deficiency, wasting and stunting than children with traditional spoon-feeding.¹⁴

A systematic review study reported that currently, there is not enough evidence to make conclusions about the BLW method on energy adequacy and dietary intake because of the limited quality of evidence. This is concerning as several previous studies have shown that mothers who use BLW methods expect their babies to consume more breastmilk and less solid food when compared to mothers who use traditional methods. This has resulted in poor child nutrition as early as 6 months of age.³⁵

When referring to the recommendations according to WHO²³, the BLW method is not in accordance with the recommendations for complementary feeding, which requires a gradual

introduction of food texture and consistency. Starting from the texture of smooth, soft, then rough and consistency from liquid, semi-solid, to solid.²³ However, in BLW, children are immediately introduced to finger food, so the BLW method is considered less suitable for the age and development of infant feeding skills.¹⁴

In general, the studies found an effect of feeding on children's nutritional status. Differences in study results may be due to the use of design, sample size, and data collection methods using interview guidelines or questionnaires based on indicators of IYCF practices with 24-h of dietary recall according to WHO, which are considered to under-represent daily IYCF habits. Limitations in this scoping review, namely the population is not representative considering that the population in this review is toddlers (under five years of age), while the articles found as a whole only find the 0-24 month age group because there are still limited studies in the international scope that discuss feeding practices in toddlers and their influence on the risk of stunting.

Conclusion

Out of ten studies that addressed Infant and Young Child Feeding (IYCF) practices, the time of first feeding indicator revealed no association with stunting. However, other indicators that can influence the occurrence of stunting are lack of Minimum Dietary Diversity (MDD), consistency in giving food that is not according to age, not meeting the Minimum Meal Frequency (MMF), not doing Early Initiation of Breastfeeding (EIBF) and exclusive breast milk, and continued breastfeeding until two years old were associated with stunting. However, only one study found that continuing breastfeeding until two years of age and BLW feeding methods can cause stunting. So this related evidence is also still relatively low because it comes from study results in category B.

Large-scale studies are recommended to explore the role of IYCF in reducing stunting and qualitative studies to determine barriers and drivers to improve infant and young child feeding practices. Especially in the aspect of MDD because all studies still use 7 indicators of feeding groups. So, an updated study is needed on the MDD aspect by applying 8 indicators from the WHO IYCF published in 2021. In addition, there is still a need for research related to breastfeeding practices, especially in the aspect of continued breastfeeding 12-23 months and feeding methods, because the evidence related to this is still low.

Acknowledgement

This research work was supported by the Midwifery Masters study program at Universitas 'Aisyiyah Yogyakarta. In addition, the authors would like to thank Mrs. Ismarwati, who has guided the preparation of this scoping review.

Funding

This study was funded by the author without any sponsors. The funding sponsors had no role in the design of the study, data collection, analysis, writing the manuscript and decision to publish the results.

Conflict of Interest

There is no conflict of interest for the authors in this research.

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