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Effect of Supplementary Feeding on Stunting Toddler Weight : A Literature Review

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ABSTRACT

Stunting is still a significant nutritional problem worldwide. To address this problem, various efforts have been made, including investment in child nutrition as a strategy to achieve the SDGs by 2030. One of the efforts made by the government is to provide additional food to stunting children, who are then monitored intensively to monitor weight and height development. The purpose of this literature review was to determine the effect of supplementary feeding on the body weight of stunted toddlers,i either through the provision of additional protein or diet. The method used is a literature review with Dimension Ai. A total of 4,939 articles were obtained with keywords related to the effect of supplementary feeding on stunted toddlers ibody weight such as protein needs, stunting, and its effects. Systematic reviews relevant to research questions were collected using Mendeley version 1.19.8. A total of 9 articles qualified for analysis. The results showed that supplementary feeding by providing adequate nutrition to stunted toddlers can reduce stunting. Nutritional adequacy can be achieved with the addition of sufficient protein and a good diet. However, the results of previous studies have shown that the interventions provided can have an increased impact on body weight, but some have no impact at all. Therefore, it is necessary to monitor the growth and development of stunted toddlers and external factors so that the weight of stunted toddlers does not change after the intervention. Strict supervision related to the growth and development of toddlers can ensure the effectiveness of feeding health workers in steps to solve stunting problems.

Keywords: *Stunting, Weight, Diet, Protein*

1. INTRODUCTION

Development Goals (SDGs), especially in developing countries (IFPRI, 2015; Sibiri et al., 2022). Although the prevalence of stunting among children under the age of five has decreased from 33.1% in 2000 to 22.0% in 2020, there are still nearly 150 million children under the age of 5 in the world who experience stunting (Samosir et al., 2023). Despite progress in recent years, the rate of child malnutrition in Indonesia is one of the highest in the world. 1 in 10 children under five are wasted (thin) and 3 in 10 children are stunted (short stature) (UNICEF Indonesia, 2022). Nutrition must be seen as a strategic investment to achieve SDGs by 2030. Investing in child nutrition is essential for the development of human resources. Nutrition is the cornerstone of a child's growth and development,

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cognitive development, successful academic performance, and future productivity (Keeley et al., 2019; Sibiri et al., 2022).

Improvement of nutritional status in stunted children is possible. This is achieved through several factors including maternal factors through the mother's education and height level, economic, socio-cultural status, nutritional supplementation, and community-based interventions (Utami et al., 2021; Endrinikapoulos et al., 2023). In Tanzania, the average amount of food consumed by the mentally ill is low. The results of the study concluded that low meal frequency, insufficient nutrient intake, small portion sizes, and limited food variety make children unable to meet their daily nutritional needs. In addition, most mothers in this study rarely gave their children vegetables and vegetable proteins, such as legumes (Beal T et al., 2018; Samosir et al., 2023). Insufficient amounts of food, such as beans, meat, sardines, and vegetables, can inhibit children under five from meeting their nutritional needs (Santika O et al., 2016; Samosir et al., 2023).

The government's efforts in addressing malnutrition and chronic I malnutrition include 3 policies: 1) the program Indonesia sehat bersama keluarga approach (PIS-PK) by coming directly to families suffering from severe and chronic malnutrition with the aim of monitoring their health, the most important of which is the monitoring of their nutritional needs. carried out by health center staff, 2) Additional I feeding (PMT) is given to toddlers with macro and micro nutrients aimed at increasing nutritional needs I with instructions for feeding, and the first 1000 days of life (PHK) (Alita, 2013; (Endrinikapoulos et al ., 2023).

2. METHODS

The purpose of this review was to better understand the effect of supplementary feeding in stunted toddlers on body weight. The inclusion criteria included stunted toddlers who were given supplementary food. We conducted literature research using Dimension AI. A total of 4,939 I articles were obtained with keywords related to the effect of supplementary feeding on stunting toddler weight such as protein needs, diet, and so on. Systematic reviews I relevant to the research question were collected using Mendeley version 1.19.8.

3. RESULTS

We found a total of 4,939 papers. From 4.939 filtered using Mendeley with the results of 500 articles. Then filtered back by title and abstract to produce 13 articles. Of the 13 articles identified to determine the feasibility of the analysis, there are 10 articles. Articles that meet the eligibility for analysis due to inclusion in the inclusion criteria. The two articles that were not selected met the requirements expected by the authors.

1.1. Diet

A combination of several approaches to good dietary practices gives better results (Sibiri et al., 2022). Nutritional disorders in children can be prevented by increasing food

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diversity, frequency of eating, protein consumption, use of iron & folic acid (IFA), and food fortifcation (Khaliq et al., 2023). That affect the implementation of the program, three variables have not run optimally, thus inhibiting the implementation of the program. These three things are preparation, among others, the absence of dietary studies and calculation of children's daily needs, the absence of Target groups of mothers and toddlers, and the lack of socialization/counseling (MARYAM, 2022).

1.2. Protein Requirement

Adequate protein needs are closely related to growth and development, so that foods containing high levels of nutrients can make it easier for stunted children to catch up (Endrinikapoulos et al., 2023). One of the main findings was that giving children foods that were animal-sourced and rich in vitamin A was associated with lower levels of malnutrition (Petrikova, 2021). The main food sources with varying macronutrient priorities are organs, bivalves, crustaceans, fresh fish, mutton, canned fish with bones, and eggs, closely followed by beef, lamb/mutton, dark green leafy vegetables, cow's milk, yogurt, and cheese, and to a lesser extent, canned fish without bones bone (Ortenzi & Beal, 2021). The adequacy of nutrients studied is macronutrients (energy, protein) and micronutrients (vitamin C). There is a relationship between the completeness of nutritional status with the incidence of stunting in children aged 1-2 years in the working area of Puskesmas I Kembaran (Nanda & Supriyadi, 2020). Overall, 4% of children were malnourished, 8% were underweight, 15% were stunted, 18% were at risk of being overweight, and 7% of children were malnourished (Cheikh Ismail et al., 2022). Compared to dietary guidelines, the lowest dietary adherence was found in vegetables (17.8,8–20.7%) and fruits (14.4-34.3%). Protein supplements are recommended for most children. Although total fat intake in toddlers and preschoolers was lower than in infants, more than 40% of toddlers and preschoolers exceeded the AMDR for fat and 87.3,3% of preschoolers exceeded the AMDR upper limit for saturated fat. Only 3.6% of toddlers and 11.5% of preschoolers exceeded the AI level for dietary fiber (Samosir et al., 2023).

1.3. Impact

Among those at risk of being overweight, overweight and obese, 20% experienced stunting compared to 13% of those experiencing stunting among children with normal BMI status (data not shown) (Cheikh Ismail et al., 2022). The likelihood of being overweight/obese is higher in children who adhere to MMF. However, a study conducted in Thailand showed no association of MMF with overweight/obesity, and a low probability of overweight/obesity among children with MDD (Benedict L et al, 2021; Khaliq et al., 2023).

In the study presented in the Journal children aged 6 - 15 months received an average daily ration of 71 g of the corn-soy mixture (CSB) or 43 g of Lipid-based nutritional supplement (LNS), giving respectively 1188 kJ and 920 kJ for 12 weeks or without supplementation according to research [72]. This intervention increased mean weight gain by more than 90 g ($p = 0.185$) in children who received LNS and a weight-to-length (WLZ)

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z score of more than 0.22 (p = 0.049) compared to children who did not receive (Sibiri et al., 2022).

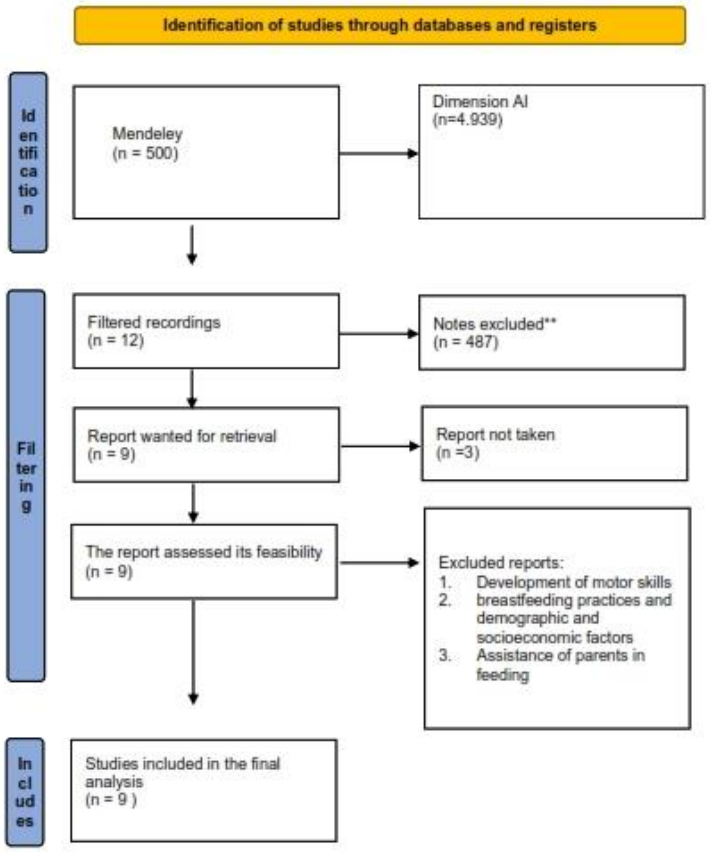

Figure 1. Prism Flow Chart

4. DISCUSSION

Supplementary feeding is one solution to reduce toddlers' edits. When supplementary feeding is not observed, it can cause impaired child growth (Damanik, N.S.M., 2023). Stunting reduction steps can be started with a good diet. A good diet will give good results as in research that the combination of several approaches to good dietary practices gives better results (Sibiri et al., 2022). Research conducted by Petrikova (2021) showed that feeding toddlers in India with a diverse minimum diet was associated with a lower prevalence of stunting and underweight in all wealth quintiles except the middle quintile, with the strongest relationship not only in the two poorest quintiles but also in the richest quintile. Factors that may favor eating habits were identified as associated with better child nutrition outcomes—namely, timely weaning, minimal dietary diversity, and consumption of fruits and vegetables rich in vitamin A and ASF. As for the research conducted by Khaliq et al. (2023) nutritional disorders in children can be prevented by increasing food diversity, meal frequency, protein consumption, use of iron & and folic acid (IFA), and food fortifies. In addition, a diet that is not recorded or implemented is still not good and can hinder the process of reducing stunting in Maryam's research (2022) 3 things hinder the implementation of the program, one of i which is the study of diet and calculation of daily needs.

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The average nutritional intake of stunted children which includes energy, protein, calcium, and phosphorus is below the recommended daily nutritional adequacy rate. The low value occurs due to a lack of nutritional intake, especially total energy, which is directly related to the child's physical growth (Endrinikapoulos et al., 2023). Inadequate nutrition will at risk of stunting and impact growth and development as well. In the overall study, 4% of children are malnourished, 8% are underweight, 15% are stunted, 18% are at risk of being overweight, and 7% of children are malnourished (Cheikh Ismail et al., 2022). Nutritional adequacy that needs to be considered in stunting toddlers is the adequacy of protein intake as in Petrikova's research (2021) that giving children foods that are sourced from animals and rich in vitamin A is associated with lower levels of malnutrition. As well as in the research of Nanda & Supriyadi (2020) and, the adequacy of macronutrients (energy, protein) and micronutrients (vit C) it was found that the relationship between the completeness of nutritional status with the incidence of stunting in children aged 1-2 years and protein intake became a recommendation for most children. In reducing stunting, protein becomes one of the macronutrients that plays an important role in the growth and development of children. In addition, by adding high-protein foods at least increases biomarkers of linear growth in children. (Endrinikapoulos et al., 2023). Foods that are rich in protein are mentioned in a study by Ortenzi & Beal (2021), including fresh fish, goats, fish with bones, eggs, and so on.

The fulfillment of nutrition for stunting children is still in the process of reducing stunting rates. Adequate good nutrition will result in a normal body weight (Putri et al, 2023). Stunting toddler weight in previous studies is the average obesity. In some studies children affected by stunting with intervention given there are experiencing development there is also no development either an increase or decrease in body weight. In the study of Cheikh Ismail et al (2022) that di among those at risk of being overweight, overweight, and obese, 20% were stunted compared to 13% of stunted children with a BMI normal status (data not shown). In addition, a child aged 6 - 15 months received an average daily ration of 71 g of a corn-soy mixture (CSB) or 43 g of a Lipid-based nutritional supplement (LNS), delivering 1188 kJ and 920 kJ for 12 weeks or no supplementation respectively according to for a study [72]. This intervention increased mean weight gain by more than 90 g ($p = 0.185$) in children who received LNS and a weight-to-length (WLZ) z score of more than 0.22 ($p = 0.049$) compared to children who did not receive (Sibiri et al., 2022). In contrast, a study conducted in Thailand showed no association of MMF with overweight/obesity, and a low probability of overweight/obesity among MDD children (Benedict L et al, 2021; Khaliq et al., 2023).

5. CONCLUSION

Supplementary feeding by providing adequate nutrition to stunted toddlers is a step in reducing stunting. Nutritional adequacy can be with the addition of sufficient protein and a good diet. In previous studies, the intervention provided an increased impact on body weight and there was no impact at all. That way, there is no significant effect on stunting toddler weight. However, there is still a need for supervision related to the growth and development of stunted toddlers and external factors so that the weight of stunted toddlers

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does not change after being given intervention and there is a need for routine evaluation and recording and discipline by health workers. In addition, strict supervision related to toddler growth and development can make it easier for health workers to solve stunting problems.

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