



## Nutrition intervention to prevent stunting in children aged 6-59 months

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### ABSTRACT

Stunting prevention in the early years of life has become a worldwide concern in recent times. One of the preventions is to provide optimal interventions such as nutrition interventions. This study is aimed to discuss the nutritional intervention that can be given to prevent stunting. This review according to PRISMA guidelines. This study design was literature review conducted by searching database PubMed, Proquest, EBSCO and scopus from 2016-2021. The library search was developed using the PICO Logic Grid approach and the subject heading search using MeSH. The exclusion criteria in this review were study protocol or articles review. Eight articles were included in this review. The results show nutritional interventions that can be used for stunting prevention are complementary food in the form of supplements or foods containing micronutrients and macronutrients about 4 articles and the other 4 articles that discuss the provision of supplementary feeding assistance programs and nutrition education. the nutritional interventions for stunting prevention such as providing optimal complementary food, that contain micronutrient or macronutrient or both of them and providing nutrition program such as nutrition education or assistance in planting food.

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### Kata kunci:

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### ABSTRAK

Pencegahan stunting pada awal tahun kehidupan telah menjadi perhatian dunia belakangan ini. Salah satu cara pencegahannya adalah dengan memberikan intervensi yang optimal seperti intervensi gizi. Tujuan penelitian ini untuk membahas intervensi gizi yang dapat diberikan sebagai pencegahan stunting. Review ini sesuai dengan pedoman PRISMA. Desain penelitian ini adalah literature review yang dilakukan dengan mencari database PubMed, Proquest, EBSCO dan scopus dari tahun 2016-2021. Pencarian perpustakaan dikembangkan menggunakan pendekatan PICO Logic Grid dan pencarian judul subjek menggunakan MeSH. Kriteria eksklusi dalam review ini adalah artikel untuk studi protokol dan artikel review. Artikel yang direview berjumlah 8 artikel. Hasil menunjukkan intervensi gizi yang dapat digunakan untuk pencegahan stunting adalah makanan tambahan dalam bentuk supplement maupun makanan yang berisi micronutrient dan macronutrient sebanyak 4 artikel dan 4 artikel lainnya yang membahas tentang pemberian program pendampingan pemberian makanan tambahan dan edukasi gizi. Pemberian intervensi gizi untuk pencegahan stunting bisa berupa pemberian makanan tambahan maupun penggabungan antara program pendampingan pemberian makanan dan edukasi gizi.

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## INTRODUCTION

Stunting in children occurs as a result of malnutrition, recurrent infectious diseases and minimum psychosocial stimulation (WHO, 2017). The prevention of stunting in the early years of life has become a worldwide concern in recent times. The reason is that stunting affects a large number of children and its impact on children's growth and development is severe. Stunting in early life is associated with nutritional intake (WHO, UNICEF & Group, 2018). The peak incidence of stunting is during the first 24 months of life. Stunting is a multifactorial problem that suggests optimal nutrition in the first 2 years of life (Ara et al., 2019).

According to WHO in 2017, the incidence of stunting in the world has reached 150.8 million children or 22.2% of the total children under 5 years. From this number, Asia has around 83.6 million of them, and this figure is the number of children suffering from stunting with a presentation of more than half the number of stunting globally. Especially in Southeast Asia, the prevalence of stunting in children is 14.9% of the total world stunting (WHO, UNICEF & Group, 2018). In 2020 WHO reported a decline in the global stunting rate to 22% (WHO, 2021).

Based on the data above, it can be seen that the stunting problem is not only a national problem but also an international problem. Several countries have done many things in preventing stunting. Several countries have made efforts to prevent stunting. Peru, Vietnam, India and Bangladesh carried out campaigns in the mass media and public advocacy aimed at increasing public awareness to promote messages and behavior change to prevent stunting (TNP2K, 2018). Another thing that can be done is to improve the nutritional status of adolescent girls and improve the quality of care for pregnant and lactating women, as well as provide exclusive breastfeeding and adequate complementary foods (Saleh et al., 2021)

One way to prevent stunting is to provide optimal interventions such as nutritional interventions. An appropriate complementary food is one that can be given as a nutritional intervention. Complementary food is additional food needed in addition to breast milk, by children starting from around the age of 6 months to meet energy and nutritional needs. Due to the limited gastric capacity and higher nutritional requirements of the body, even children who are optimally breastfed are at risk of stunting if they do not receive sufficient quantity and quality of complementary foods after six months of age (Ara et al., 2019). The provision of complementary feeding must be in accordance with the needs based on its consistency, variety and frequency (Shaker-Berbari et al., 2021).

Nutrition education provided through nutrition classes and continued with home visits to increase the use of local food can be done as one of the ways to improve nutritional status (Effendy et al., 2020). Providing nutrition education to mothers of children under five can improve the nutritional status of their children (Jardi et al., 2021).

## METHOD

As an evidence-based for reporting this review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. Because all of the analyses for this study were based on already published literature, the authors did not require ethical clearance or patient consent.

## Data Sources and Search Strategy

The author collected data during November through the Ebsco, proquest, scopus and pubmed databases. The PICO Logic Grid technique was used to create the library search, and MeSH was used to develop the topic heading search.. The article search strategy used the Boolean operator's method with PICO approach : Stunting OR growth disorder OR Stunting disorder AND nutrition intervention OR nutrition education OR food intervention AND health education AND stunting prevention. The inclusion criteria used in data collection were studies related to the effectiveness of nutrition intervention for stunting prevention from 2016-2021. The language used is English. The exclusion criteria in the effectiveness of this review are the published articles that are study protocol and review. The journal of data collection results complied with the inclusion standards, and the analysis complied with the study goals.. The authors used Mendeley's bibliography software to help organize articles. This writing has also gone through a review process to determine the quality of the article using the critical appraisal tool from the Joanna Briggs Institute (JBI).

## Study Selection and Data Extraction

To identify search keywords based on preset inclusion criteria, the author creates a logic grid using the PICO approach in the first step of the search. The population in this literature search were mothers of children under five who received nutritional interventions. Data extraction was conducted independently by the author in Table 1. The extracted data were the characteristics of the study (first author, year of publication, study location, study design), participant characteristics (sample size, age), nutrition intervention, outcome.

## RESULTS AND DISCUSSION

The article selection process followed the PRISMA guidelines which can be seen in Figure 1. The article search found 396 journals from 4 database sources: ProQuest, PubMed, Ebsco and Scopus. From 396 journals obtained based on keywords, there are 11 articles that are the same and there are 377 that are not appropriate based on the title and abstract, and when analyzed in full text, there are 2 articles that are not appropriate, so that 8 articles are obtained that can provide an overview of nutritional interventions. for stunting prevention. Participants from the eight research journals in this review were mothers and children aged 6-59 months. Research from the articles obtained, was carried out in Asia, Africa and America, where research was conducted on nutritional interventions that can prevent stunting.

The main intervention that should be given to children six to fifty-nine months is to strengthen the provision of key nutrients such as increasing the intake of iron and folic acid. Sisay also said that promotion and counseling to family members regarding feeding in the first thousand years of life is very important (Eshete Tadesse et al., 2020).

According to (Roche et al., 2017) providing nutritional education regarding the intake of iron, zinc, vitamin A and protein can improve nutritional status and prevent stunting. Nutrition education was given for twelve days about giving a variety of foods. In line with this, (Zhang et al., 2016) stated

that the provision of additional dietary supplements containing protein, fat, carbohydrates, vitamins A, B1, B2, B12, D3, folic acid, iron, zinc and calcium and supplementary feeding counseling can improve the nutritional status of stunting infants.

The provision of food supplements containing macronutrients and micronutrients has been proven to prevent stunting, such as the research conducted by (J. Wang et al., 2017) with the results of giving Yingyangbao which is an additional food supplement containing soy beans followed by nutrition education can reduce the incidence of stunting, as well as Zaidi (Zaidi et al., 2020) stated that the provision of packaged food supplements containing a local

product called Wawamum which contained amino acids, vitamins and minerals as well as the provision of MNP, namely micronutrient powder given to children's food, could prevent children from stunting, and (Doocy et al., 2019), said that giving education about planting food ingredients so as to ensure cleanliness and giving a mixture of corn and soybeans and oil rich in vitamin A can prevent stunting.

Based on (Leroy et al., 2018) together with his friends gave a nutrition program called Tubaramure where this program contains three components, namely food distribution, increasing health service visits and promoting the use of health services as well as programs to improve the practice of providing nutritious food to infants.

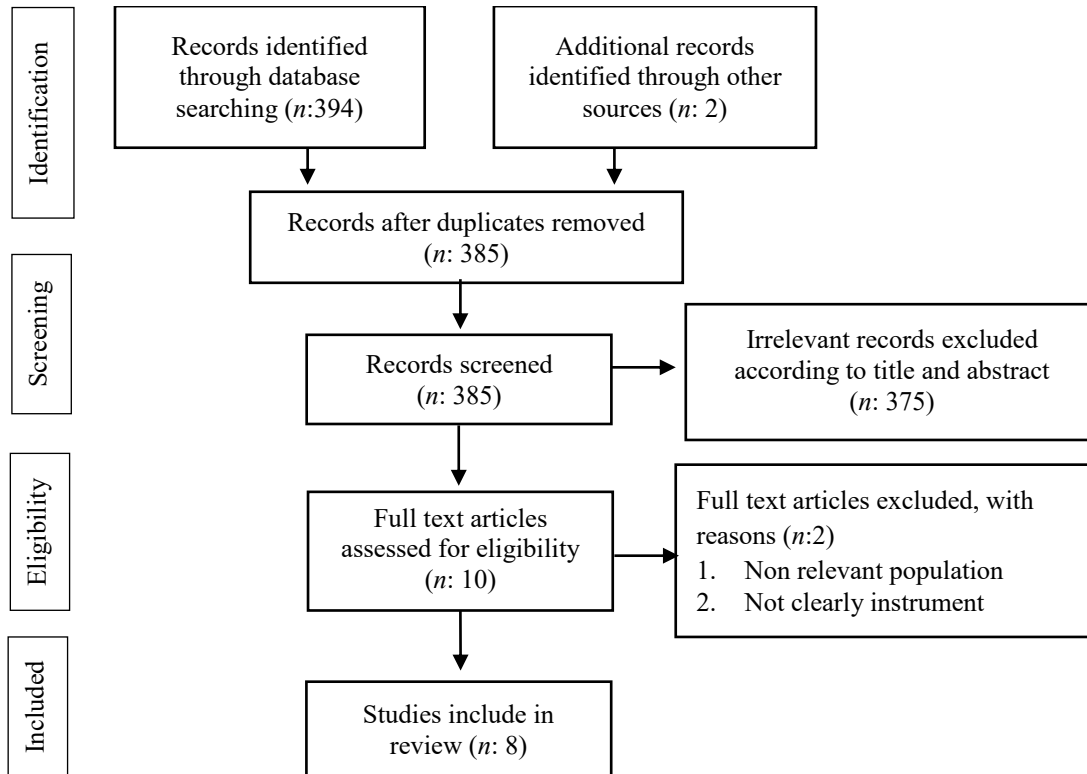


Figure 1. PRISMA flow diagram

Table 1  
 Summary of the included study

| No | Author & year                 | Title   | Research Design                           | Setting                                      | Respondent Characteristic   | Nutrition Intervention   | Outcome   |
|----|-------------------------------|---|---|--|---|--|---|
| 1. | (Eshete Tadesse et al., 2020) | Priorities for intervention of childhood stunting in Northeastern Ethiopia: A matched case-control study                                  | Case-control study                        | Ethiopia                                     | Children 6 – 59 months old  | Meat Consumption daily – Protein   | Children who did not receive meat every two weeks had nearly 2.4 times the likelihood of becoming stunted as those who did. |
| 2. | (Roche et al., 2017)          | A Community-Based Positive Deviance/Hearth Infant and Young Child Nutrition Intervention in Ecuador improved diet and reduced underweight | A quasi-experimental non-randomized study | Ecuadorian highlands provinces of Chimborazo | There are 6 intervention communities, 80 mother-child pairs and 184 mother-child pairs in 9 comparison communities. | Cooking training Program and Nutrition education<br>Macronutrient and Micronutrient (iron, zinc, vitamin A, protein, and energy) | Had improved After intakes for iron, zinc, vitamin A, protein, and energy (P < .05) at follow-up                            |

|    |                         |  |                                     |                                      |   |   |  |
|----|-------------------------|--|-------------------------------------|--------------------------------------|---|---|--|
| 3. | (Leroy et al., 2018)    | Tubaramure, a Food-Assisted Integrated Health and Nutrition Program, Reduces Child Stunting in Burundi: A Cluster-Randomized Controlled Intervention Trial   | Cluster-randomized controlled study | Middle East and North Africa region. | 6–23 months children in five countries in the Middle East and North Africa region | Nutrition Program (Tubaramure) corn-soy blend and micronutrient-fortified vegetable oil. 3 component of the program (the distribution of food rations, improvements in the provision of health services and promotion of the use of these services, and a behavior change communication (BCC) strategy) | There is a significant decrease in stunting rates in the group with children under 24 months   |
| 4. | (Zhang et al., 2016)    | Effectiveness of complementary food supplements and dietary counselling on anaemia and stunting in children aged 6–23 months in poor areas of Qinghai Province, China: a controlled interventional study | A controlled intervention study     | China                                | Caregivers and their children aged 6–23 months.                                   | Complementary food supplements Yingyangbao - containing protein, fat, carbohydrate, vitamin A, B1, B2, B12, D3, folic acid, iron, zinc and calcium  | The provision of additional food supplements containing protein, fat, carbohydrates, vitamins A, B1, B2, B12, D3, folic acid, iron, zinc and calcium and counseling on the provision of additional food can improve the nutritional status of stunted infants. |
| 5. | (Jie Wang et al., 2017) | Effectiveness of community-based complementary food supplement (Yingyangbao) distribution in children aged 6–23 months in poor areas in China  | Cross-sectional surveys             | China                                | Children aged 6–23 months and 24 – 59 months.                                     | Complementary food supplements Yingyangbao – from soybeans containing protein, fat, carbohydrate, vitamin A, B1, B2, B12, D3, folic acid, iron, zinc and calcium Nutrition Education  | Micronutrient supplements (Yingyangbao) significantly enhance food quality and lower the prevalence of stunting, underweight, anemia, vitamin A deficiency, and vitamin B12 deficiency in children when combined with nutrition education.                     |
| 6. | (Doocy et al., 2019)    | Evaluating interventions to improve child nutrition in Eastern Democratic Republic of Congo  | quasi-experimental design           | Eastern Democratic Republic of Congo | 1312 children from 1113 households. children 6–23 months of age                   | Jenga Jamaa II programme  | Providing education about planting food ingredients thus ensuring cleanliness and providing a mixture of corn and soybeans as well as oils rich in vitamin A can prevent stunting. as much as 4%   |
| 7. | (Zaidi et al., 2020)    | Food supplements to reduce stunting in Pakistan: a process evaluation of community dynamics shaping uptake   | Mixed Method                        | Pakistan                             | children 6–23 months of age   | Lipid-based Nutrient Supplement (LNS) and micronutrient powder (MNP) One sachet a day   | Provision of packaged food supplements containing a local product called Wawamum which contains amino acids, vitamins and minerals as well as the provision of MNP, namely micronutrient   |

|    |              |   |                  |          |               |   |  |
|----|--------------|---|------------------|----------|---------------|---|--|
| 8. | (Baye, 2019) | Prioritizing the scale-up of evidence-based nutrition and health interventions to accelerate stunting reduction in Ethiopia | Quasi Experiment | Ethiopia | < 5 years old | Appropriate complementary feeding and zinc supplement | powder given to children's food can prevent children from stunting<br>90% of stunting case number reduce from<br>Appropriate complementary feeding and zinc supplement |
|----|--------------|---|------------------|----------|---------------|---|--|

### Complementary Food

After six months of life, breast milk is no longer sufficient for nutrition and the introduction of complementary foods should be initiated. Nutrition determines the length, weight and head circumference of the baby. Nutrients are basically divided into two classifications, macronutrients and micronutrients. Macronutrients are the main components of the human body's energy source consisting of carbohydrates, proteins and fats. Meanwhile, micronutrients are dietary components that do not contribute significantly to caloric intake, but are important for health and vital functions, even in small amounts, including vitamins and minerals (Savarino et al., 2021).

Macronutrients are nutritional components needed by the body that can prevent stunting. There are 4 studies that provide complementary foods in the form of supplements containing macronutrients (Doocy et al., 2019; Roche et al., 2017; J. Wang et al., 2017; Zhang et al., 2016). Prevention of stunting is not only given by providing one type of nutritional component, but can be combined as in the study (Doocy et al., 2019; Roche et al., 2017; Zhang et al., 2016) given Zinc, Iron, Vitamins A, B, B12 and D3 combined with protein, carbohydrates and fat.

Toddlers' energy requirements are met in order to promote physical and psychomotor development, increase physical activity, and provide appropriate nutrition for daily demands, specifically for the maintenance and improvement of children's health. Proteins have a role in the growth, maintenance, repair, and replacement of damaged tissue as well as the creation of new tissue. Children who don't consume enough protein despite getting enough calories will have trouble growing their bodies. (Wulandary & Sudiarti, 2021). Fat is a macronutrient with higher calories. Fat intake is important in the first two years of life to support brain growth and development. In early childhood, the quality of fat consumption is more important than the amount. Monounsaturated fatty acids (MUFA) are the highest quality fats (Savarino et al., 2021).

Minerals and vitamins are crucial for growth in the early years of life. Micronutrients like calcium, phosphorus, and vitamin D are crucial for the development of bones. Red blood cell production and the development of new tissues both heavily rely on iron. Zinc is a crucial element for the development and control of the immune system (Savarino et al., 2021). According to research conducted, the intake of vitamin A, iron, protein, fat and carbohydrates have an effect on the incidence of stunting. Children who lack vitamin A intake have 1,582 times the risk of stunting than children whose vitamin A intake is sufficient. Children who are deficient in iron intake have 1,784 times the risk of stunting

than children who have adequate iron intake (Wulandary & Sudiarti, 2021). Research conducted in Ethiopia, children under five are given meat consumption every day to meet their protein needs, and it has been proven to be effective preventing stunting is 2.4 times better than toddlers who are given meat consumption once a week (Eshete Tadesse et al., 2020).

### Nutrition Education Program

According to (Goudet et al., 2019) providing nutrition education is one of the stunting prevention measures. The provision of nutrition programs can be in the form of direct feeding, giving vitamin A, or in the form of nutrition education (Bahjuri, 2020). Nutrition education that can be done is in the form of nutrition classes or home visits (Effendy et al., 2020). The article search found there were 4 articles that stated about stunting prevention through nutrition programs. Some of the nutrition programs provided are in the form of nutritional counseling, some in the form of nutrition education, as well as assistance in planting food ingredients to ensure food hygiene and direct assistance in providing food to children (Doocy et al., 2019; Eshete Tadesse et al., 2020; Leroy et al., 2018; Roche et al., 2017; J. Wang et al., 2017; Zhang et al., 2016).

Nutrition education can also be provided in the form of workshops and direct feeding practices, accompanied by nutritional counseling in the hope of increasing stunting prevention behavior in mothers of children under five (Jardí et al., 2021). Nutrition education is proven to be able to reduce the incidence of stunting by teaching additional food preparation techniques and education about stunting itself by providing knowledge about stunting (Teshome et al., 2020). Providing complementary feeding either through education on how to give food and supplements, or both, as well as providing micronutrient supplements which are various measures of stunting prevention (Goudet et al., 2019)

### CONCLUSIONS AND SUGGESTIONS

This review identifies the nutritional interventions for stunting prevention such as providing optimal complementary food, that contain micronutrient or macronutrient or both of them and providing nutrition program such as nutrition education or assistance in planting food until giving food and nutrition program from pre-marital until pregnancy phase.

## Ethical Considerations

There is no ethical clearance because all analyses of this study were based on previously published literature.

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## Conflict of Interest Statement

This review has no conflicts of interest

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