



## Effectiveness of Soy Food for Stunting Prevention in Toddlers

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### ABSTRACT

Stunting in toddlers is a global health problem with considerable consequences. One of the interventions to prevent stunting in toddlers is to provide local foods that are highly nutritious. Suitable foods are high in protein, saturated fat, essential amino acids, and high in vitamin B12. The journal review aimed to determine soy food's effectiveness in preventing stunting in toddlers. The method used is a systematic review by searching for articles in several media databases such as ProQuest, Ebsco and Scopus, which are used for sampling. Researchers filtered articles by setting exclusion criteria. The study on nutrition to prevent stunting, the 2017 to 2022 study, children or mothers with children aged 6-59 months and the inclusion criteria for the study protocol. In the next stage, the researcher assesses the journal's quality using a critical review from JBI; then, data extraction is carried out. The analysis study resulted in 182 articles, with the final results reviewing eleven papers that met the criteria. According to the survey, soy foods are given to toddlers and pregnant women to prevent stunting. In one study, researchers gave soybeans mixed with corn as additional food for toddlers. Supplementary feeding is carried out for six months to one year and can increase the growth and development of toddlers. A mixture of soy food with corn can also be used as an additional source of nutrition for toddlers.

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#### Kata kunci:

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### ABSTRAK

Stunting pada balita merupakan masalah kesehatan global dengan konsekuensi yang cukup besar. Salah satu intervensi untuk mencegah stunting pada balita adalah dengan memberikan makanan lokal yang bergizi tinggi. Makanan yang cocok adalah protein tinggi, lemak jenuh, asam amino esensial, dan vitamin B12 tinggi. Tujuan dari penelaahan jurnal untuk mengetahui efektivitas makanan kedelai dalam mencegah stunting pada balita. Metode yang digunakan yaitu Sebuah tinjauan sistematis dengan mencari artikel di beberapa media database seperti proquest, ebsco dan scopus yang digunakan untuk pengambilan sampel. Peneliti menyaring artikel dengan menetapkan kriteris eksklusi Kajian tentang gizi untuk mencegah stunting, kajian 2017 hingga 2022, anak atau ibu dengan anak usia 6-59 bulan dan kriteria inklusi kajian protokol. Pada tahap selanjutnya peneliti menilai kualitas jurnal menggunakan critical review dari JBI, kemudian dilakukan ekstraksi data. dari hasil Studi analisis menghasilkan 182 artikel dengan hasil akhir mengulas sebelas makalah yang memenuhi kriteria. Menurut survei, makanan kedelai diberikan kepada balita dan ibu hamil untuk mencegah stunting. Dalam sebuah penelitian, peneliti memberikan kedelai yang dicampur dengan jagung sebagai makanan tambahan untuk balita. Pemberian makanan tambahan dilakukan selama enam bulan hingga satu tahun dan dapat meningkatkan pertumbuhan dan perkembangan balita. Campuran makanan kedelai dengan jagung juga dapat dijadikan sebagai sumber nutrisi tambahan untuk balita.

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## INTRODUCTION

Stunting is one of the main problems in developing countries, including Indonesia. Stunting is a condition of growth failure in children under five due to chronic malnutrition and recurrent infections, especially during the First 1000 Days of Life (Budiana & Marlina, 2020). Based on World Health Organization (WHO), Indonesia is the third country with the highest prevalence in the Southeast Asia/South-East Asia Regional (SEAR) region. The average majority of stunting in Indonesia from 2005-2017 was 36.4% (Khairani, 2020). Based on Nutritional Status Monitoring for the past three years, short has the highest prevalence compared to other nutritional problems such as malnutrition, thinness, and fatness. The majority of short toddlers has increased from 27.5% in 2016 to 29.6% in 2017 (Ministry of Health, 2018). Currently, Indonesia is in case of stunting toddlers, which is quite worrying as the data obtained by Riskesdas (2018) has increased to 40.3%.

The prevalence of stunting remains high, and it may even rise if the mother does not understand the concept of preventing malnutrition, which contributes to the child's physical shortness (Dewi & Adhi, 2014). Data from the World Health Organization (WHO) recorded a global stunting rate of 155 million (22.9%) under five, 41 million under five (6%) with excessive body weight and 52 million under five (7.2%) with underweight criteria. While the prevalence of stunting in Indonesia ranks fifth in the world after Pakistan (45%), India (39%), Congo (43%) and Ethiopia (38%) (WHO, 2017). based on data from the study on the Nutritional Status of Toddlers, Indonesia is still relatively high, where the prevalence of stunting is 27.67%. The majority of stunting in Indonesia is still higher than the prevalence in Southeast Asia of 24.7%. Based on Basic Health Research data in 2007, the bulk of stunting in Indonesia was 36.8%, in 2010, it was 35.6%, and in 2013 the prevalence increased to 37.2%, consisting of 18% very short and 19.2% short. Riskesdas data in 2018 showed a decrease in the prevalence of stunting under five in Indonesia by 30.8% (Ministry of Health, 2018).

The consequences of stunting can be short-term and long-term effects. The incidence of stunting has short-term impacts such as the child becoming apathetic, speech and developmental disorders, for the long-term implications of decreasing I.Q scores, decreased cognitive development and reduced self-confidence (Beal et al., 2018). The impacts for children with stunting include decreased cognitive abilities, children's responses to see, hear, imagine and carry out movements that tend to be limited, experience permanent brain function disorders, reduced immune systems and are susceptible to chronic diseases (Sumartini, 2020).

Stunting in early childhood results in a decrease in cognitive abilities and metabolic diseases and will also reduce the potential for psychosocial stimulation and motivation. One of the causes of stunting is the lack of maternal nutrition when the child is in the womb at the age of fetal growth and the infectious disease in the mother during pregnancy which can cause premature birth. These two conditions are the most significant factors contributing to the problem of stunting in children (Akbar et al., 2022). After the baby is born, growth disorders can be seen at 3-5 months and will be increasingly noticeable at 6-18 months (Black & Heidkamp, 2018).

The direct factor of stunting is the completion of nutrients that significantly affect children's future growth, especially the fulfilment of energy intake from macronutrients (carbohydrates, fats and proteins) (BP2K3 RI, 2013). Inadequate intake of essential amino acids in the

child's body can also cause stunting (Bierut et al., 2021). High zinc feeding is very appropriate to give to toddlers. Zinc nutrition is essential for human health, especially for toddlers, because zinc involves various metabolic processes as a catalyst, regulatory ions or structural elements of proteins (Hinnouho et al., 2019).

Another risk factor was that mothers did not understand how to keep their children from becoming malnourished, which would impact the child's lack of height growth (Yarmaliza et al., 2019). Exclusive breastfeeding in toddlers is another risk factor for stunting. According to research conducted in Southern Ethiopia, toddlers who do not receive exclusive breastfeeding for six months are at high risk of stunting (Fikadu et al., 2014). Furthermore, people are unaware that short children are a social problem because they see children engaged in everyday activities instead of thin children. Similarly, regarding the nutrition of mothers during pregnancy, people have not realized the importance of nutrition contributing to the nutritional state of the baby they will be born in the future (Mustika & Syamsul, 2018).

Health programs can avoid stunting by improving the quality and quantity of nutrients in toddlers. Toddlers require nutrition such as carbohydrates, proteins, fat, iron and energy (Bertalina & P.R, 2018). Various types of food will ensure the availability of multiple nutrients for the body to do its job properly to avoid stunting conditions. Supplemental feeding can help meet nutritional needs in the short term without reducing daily consumption of foods containing various balanced nutrients. Soy is a food that is commonly found daily in Indonesia. Approximately 90% of soybeans are available for food use. Protein content in soybeans is 37.58 mg/100g (Rusilanti & Riska, 2021). As a result, soybeans can be used in one of the various foods to prevent childhood stunting.

## METHOD

The research method used in this study is a literature study in the form of a survey of previous research on the effectiveness of soybeans in preventing stunting in toddlers. The literature study method is a series of activities related to collecting library data, reading and recording, and managing research materials (Yuliana & Kusumawati, 2019). This research method is systematic, clear, thorough, identifying, analyzing, assessing, and evaluating. The limitations of this study were the content of soybeans and their effectiveness in preventing stunting in toddlers. The data used are nationally and internationally journals from the journals' websites.

## Data Sources And Strategies

Researchers get data sources by using articles from previous studies using several databases such as Ebsco, ProQuest, Scopus and google scholar. Selected papers with a range of years between 2017 to 2022. The articles used are both in English and Indonesian. Meanwhile, the selected document is about the topic at hand, namely the effectiveness of soybeans in preventing stunting in toddlers. Keywords by using Medical Subject Heading (MESH) and PICO Approach (((((((stunting) OR (growth disorder)) AND (stunting disorder)) OR (soy)) OR (soybean)) AND (tempe)) AND (health education)) OR (education)) AND (stunting prevention)) AND (behavior). Researchers filter articles by setting exclusion Study about nutrition to prevent or reduce stunting, population children or mother with children age 6-

59 months and inclusion criteria study protocol or review, while for the assessment using critical appraisal Joanna Briggs Institute (JBI) and data extraction.

## RESEARCH RESULTS

In the literature search, 182 journals have been obtained through several databases of the Scopus, ProQuest, Ebsco and

google scholar search engines. One hundred eighty-two journals were selected according to the theme sought and received as many as eleven. The following diagram depicts the process of conducting a literature review (Figure 1).

Eleven articles met the criteria, and the study discusses preventing stunting in toddlers and supplementary feeding, particularly soy in toddlers. This literature study explains the effectiveness of soybeans in reducing stunting in toddlers. Based on the results of the study of the eleven articles, it can be seen through the table 1.

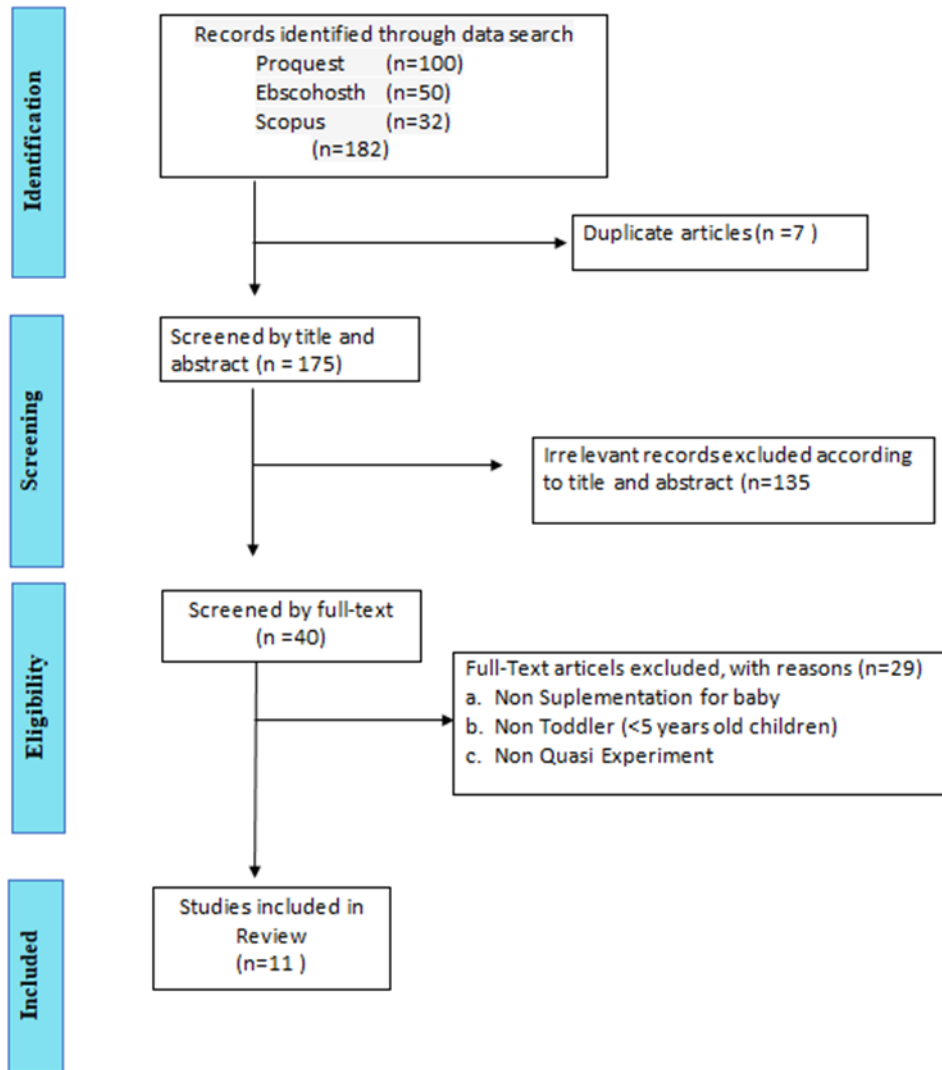


Figure 1. Prisma Flow Diagram

**Table 1. Characteristic of Article**

No	Author, Year	Title	Method	Setting	Characteristic	Result	Advantages	Limitation
1.	Sophia E Agapova, Kevin B Stephenson, Oscar Davila, Yankho Kamila, Kenneth M Maleta, Chrissie Thakwalakwa, M Isabel Ortiz, Indi Trehan, dan Mark J Manary (2018)	Common Peanut Supplements in Malawi children's diet do not affect linear growth but reduce intestinal permeability.	Double-blind clinical trials	Between July 2015 and December 2016, the study was carried out in the villages surrounding Limeira in the Machinga and Masenjere Districts of Nsjane District in southern Malawi.	Children aged 12-23	A total of 331 children completed clinical trials, and there was a change in growth measured by Z-score for 12 months. The measurements were carried out every three months after lactulose administration, and a growth change of 1.1 cm during the 12 months.	Researchers can get as much information as possible because there are no restrictions on taking subjects.	There are no subject limits that can result in inefficiencies in the timing of the study.
2.	Meghan Callaghan-Gillespie, Andrew A Schaffner, Patsy Garcia, Jocelyn Goreng, Rachel Eckert, Shirin Malek, Indi Trehan, Chrissie Thakwalakwa, Kenneth M Maleta, Mark J Manary, dan Peggy C Papathakis (2017)	Trial of ready-made supplementary food and corn-soy mixture in Malawian pregnant women with moderate malnutrition: a randomized controlled clinical trial	The method used is a single randomized controlled clinical trial.	A pregnant, 18-year-old woman who came to 15 antenatal clinics in southern Malawi with malnutrition is being recruited Between March 2014 and December 2015	performed in southern Malawi among 1828 pregnant women with moderate malnutrition, as the circumference of the upper arm (MUAC) \$20.6 and #23.0 cm. Women receive 1 of 3 regimens of dietary treatment that give 900 kcal/day and 33-36 g protein/day. The mother and baby's anthropometry is monitored until the child is three months old.	Additional mixed foods like corn-soybeans can increase growth and weight in pregnant women. The amount of food content given and the simple effect on linear growth in newborns suggests that stunting in utero is unlikely to be reduced by other food alone.	The information provided to pregnant women is complete and coherent.	The study was limited because there were no control groups.
3.	Christian Fabianse et al, 2017	Effectiveness of dietary supplements in improving fat-free tissue gain in	A randomized	Between September 9, 2013, and August 29, 2014. five	1609 children with criteria: a. they lived in the catchment area at the time	Lipid-based supplements (milk LNS) can increase height and weight gain by 0.083 kg/m2 compared to corn-soy mixtures (CSB). In contrast, soy isolates	The factorial design makes it possible to assess the influence of the main factors in	1. The effect of nutritional interventions depends on nutritional status, background and intake. 2. This lack of information

		children with moderate acute malnutrition: A randomized two × two × three factorial trials in Burkina Faso		government health centre locations (Gomponsom, Latoden, Bagaré, Bodkin, and (Samba) in Burkina Faso	of the study b. diagnosis of MAM confirmed c. they are 6–23 months old	(S.I.) cannot increase height and weight.	the administration of supplements; rather than comparing different products.	limits the generalizations. 3. Collecting detailed data at the individual level about supplement intake in large trials in children is not feasible. 4. Instead, we conducted a sub-study on the acceptance and behaviour of eating supplements to facilitate the interpretation of the findings.
4.	Deanna K Olney, et al. 2018	PROCOMIDA, Maternal Health and Nutrition Program and Food-Aided Children, Reducing Child Stunting in Guatemala: A Cluster Randomized Controlled Intervention Trials	randomized controlled trial of longitudinal clusters	Guatemala	Mothers with a gestational age of 6 months and children aged 6–24 months Intervention: Provision of rations/supplements of corn/soybean mixture (CSB) and lipid-based nutritional supplements (LNS), and micronutrient powders (MNP)	There was a good enough increase to reduce the prevalence of stunting by using a mixture of soybeans/corn (CSB) compared to nutritional supplements with lipids (LNS) and micronutrient powders (MNP)	The program carried out by researchers can make it easier for pregnant women and children to prevent stunting.	The study was designed as an intention-to-treat effectiveness study. It did not monitor supplement use or gather detailed dietary or disease information that could help explain the program's impact pathways.
5.	Tatiana Bierut, Laura Duckworth, Mark Grabowsky, M Isabel Ortiz, Marie L Laury, Meghan Callaghan-Gillespie, Ken Maleta, dan Mark J Manary (2020)	Effect of cow/egg colostrum supplementation compared to cornmeal/soybean meal in Malawian youth: a controlled clinical trial Randomly	This study used prospective, randomized, blind, controlled clinical trial methods placebo where a 9-month-old baby receives B.C./egg or control for three months.	The study in the Nsanje and Machinga districts of Malawi South by recruiting all 9-month-olds who lives in the Limeru and Masenjere village clusters	277 children participated in the survey from December 2018 to December 2019	Adding B.C./eggs to complementary breast milk foods in Malawian infants results in fewer linear growth disorders.	The researcher	Validated the hypothesis.
6.	Shehla Zaidi, Jai K.Das, Gul Nawaz Khan,	Dietary supplements to reduce stunting	This research uses a mixed-method	The study was conducted in	The subjects of this study were	The findings suggest that some beneficiaries consume a total	The research method used is	The subject is too much and will make it difficult for the

	Rabia Najmi, Mashal Murad Shah dan Sajid B. Soofi, 2020	in Pakistan: an evaluation of the processes of social dynamics that shape absorption	approach through quantitative surveys		They conducted 18 Focus Group Discussions (FGDs) (with male and female caregivers), 4 FGDs (with Community Health Workers (CHWs)) and 22 key informant interviews (with district stakeholders).	valuable knowledge among caregivers. Share supplements with household members or others are common, and entire monthly stock is usually not accepted. Qualitative findings suggest that caregivers not associate dietary supplements with stunting prevention. LNS is famous for chocolate flavour and texture.	complete.	
7.	D.Taylor Hendrixson, Aminata Shamit Koroma, Meghan Callaghan-Gillespie, Jacklyn Weber, Peggy Papatkakis dan Mark J. Manary, 2018	The use of new food additives and measures to control inflammation in deficient pregnant women nutrition in Sierra Leone to improve birth outcomes: study protocol for trials prospective, random, and controlled clinical effectiveness	The method used in this study is a prospective, randomized, controlled clinical effectiveness trial	Sierra Leone	pregnant women at gestational age less than 35 weeks with moderate or severe malnutrition.	Maternal malnutrition is still a significant problem in low- and middle-income countries, resulting in high morbidity and mortality of mothers and infants. Prevention and maternal malnutrition treatment is essential to reduce stunting, improving cognitive outcomes, and maximizing professional achievements. The risk of stunting and wasting has been shown to increase in infants of early gestational age, showing that pregnancy intervention is essential. Prenatal factors seems to be more critical than the postnatal factor for prevent stunting.	This Study in Sierra Leone found that combining RUSF with bundled anti-infective therapy resulted in better birth outcomes. These results could serve as a model for future national programs and a guide for international non-governmental organizations.	<ol style="list-style-type: none"> <li>1. Lack of nutritional and anti-infective interventions between the two groups.</li> <li>2. Participants will likely share the food assigned to them.</li> <li>3. The control group will receive a standard of care for Sierra Leone, but this intervention is not universally adopted, especially in rural areas such as Pujehun.</li> </ol>
8.	Ilana R Cliff, Kenneth Chui, Stephen Vosti, Shelley Walton, Irwin Rosenberg, Patrick Webb, Laetitia Nikiema, Breanne K Langlois, Augustin N Zeba, Ye	Impact of stakeholder perspectives on estimated cost-effectiveness of four speciality nutritious foods to prevent stunting and wasting in children 6–23 months in Burkina Faso	Study design and setting	Burkina Faso	6112 children aged 6-23 months	<ol style="list-style-type: none"> <li>1. The estimated prevalence of stunting (length-for-age z-score (LAZ) &lt; 2) at the finish line (between the ages of 22.9 and 23.9 months) using multivariable logistic regression; and</li> <li>2. Estimated number of months of waste (weight-for-height Z-score (WHZ) &lt; 2) of 18 possible measurement periods using multivariable negative binomial regression</li> </ol>	This in-depth cost-effectiveness analysis highlights the importance of caregiving time, working volunteers, and good supplementary feeding.	Many food products reduce stunting in children, but these products are so limited that researchers only use existing food products.



Hermann B  
Lanou, Devika  
J Suri, Franck  
Garanet,  
Dan Beatrice  
L Rogers,  
2020

9.	Gul Nawaz Khan et al., 2019	Effectiveness of soy mixture supplementation during pregnancy and lactation on pregnancy outcomes and status of their babies at six months of age in Thatta and Sujawal districts in Sindh, Pakistan: a randomized controlled trial of a cluster	randomized controlled trial of clusters	That district and Sujawal(Sindh) of Pakistan	2030 pregnant women (1017 control groups and 1013 intervention groups) with a gestational age of 6 months	<ol style="list-style-type: none"> <li>1. There was no difference in weight gain during pregnancy between the intervention and control groups</li> <li>2. Decreased BBLR prevalence did not differ between intervention and control groups</li> <li>3. Giving a mixture of soybeans/wheat (WSB) to pregnant women with a gestational age of 6 months has a significant impact on the risk of reducing stunting</li> <li>4. granting WSB+ to PLHIV significantly reduces the risk of stillbirth</li> </ol>	Existing health systems contribute to research, and interventions are delivered through programs staffed by local health workers (LHW) and funded by existing governments.	<ol style="list-style-type: none"> <li>1. sharing WSB+ with other family members can limit the impact on birth outcomes and nutritional status of 6-month-old babies whose mothers receive WSB+</li> <li>2. birth weight scarcity, Although we registered pregnant women by 2030, only 452 newborns were weighed by LHW.</li> </ol>
10.	Charles Mangani, et al, 2015	Effect of complementary feeding with lipid-based nutritional supplements and corn-soybean mixtures on stunting and linear growth events among infants and children aged 6 to 18 months in rural Malawi	Study Area	Research conducted in Lungwena and Malindi: Malawi	840 healthy babies aged six months in rural Malawi divide into four groups consisting of 209 control groups, 212 LNS (milk), 210 LNS (soy) and 209 CSB	Children with the LNS (milk) group of 16 out of 195 had a small incidence of severe stunting, 6/206 severe stunting, 40/140 moderate to severe stunting, while the CSB group had a large number of 12 out of 200 (6%).	The subject received the researcher's research methods well, and the research successfully proved the hypothesis.	Of the 1385 infants identified through the census, 490 were not eligible/not brought in at registration, and 55 did not meet the detailed assessment requirements.
11.	Jie Wang, Suying Chang, Liyun Zhao, Wentao Yu, Jian Zhang, Qingqing Man, Li He,	The effectiveness of the distribution of dietary supplements breast milk companion	Cross-sectional surveys	China	693 children with age criteria of 6-23 months	<ol style="list-style-type: none"> <li>1. Of the 693 children involved in the follow-up survey, children consumed YYB 6.7 sachets weekly; In addition, 22.9% consumed two or fewer YYB sachets weekly, 23.1%</li> </ol>	the quality of the diet and nutritional status of children aged 6-23 months were improved by the	When initial and follow-up surveys are conducted in the same village but on different children, this can result in truncated or invalid data.

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Yifan Duan, Hui Wang <sup>6</sup> , Robert Scherbier, Shi-an Yin (2017)	(Yingyangbao) based society in children aged 6- 23 months in poor areas in China	YYB weekly, and 54.0% consumed seven sachets of YYB weekly. As many as 54.7% of children like the taste of YYB 2. The prevalence of stunting decreased from 18.0% to 11.8%, and the majority of thinness decreased from 9.4% to 3.8%	YYB and nutrition education and better adherence to YYB contributes to the greater efficacy of interventions.
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## DISCUSSION

According to the eleven articles listed above, soybeans effectively reduce the incidence of stunting in toddlers. The results of the research from eleven journals received, nine journals discussed the effectiveness of other foods, namely soybeans, in reducing stunting conditions in toddlers. Soy is a food that is easy to find. Soy can be processed into foods such as tempeh, powdered broth, a supplement mix, etc. Some of the studies in the table above make processed soybeans into several essential ingredients as a mixture of supplements and as additional food for stunted toddlers. The results of another survey from 1 journal are different foods other than delay, which can reduce stunting in toddlers. The food is B.C./eggs. Meanwhile, another journal discusses mothers' knowledge in providing nutritious food intake when pregnant and giving input to toddlers. Because most mothers only provide input without paying attention to the nutrition of the food (Bierut et al., 2021; Wang et al., 2017; Fabiansen et al., 2017).

Gillispie et al. (2017) state that supplementary feeding in the form of corn-soybeans could increase weight and growth in pregnant women. Because in addition to supplemental feeding of the toddlers themselves, during pregnancy, nutritious intake is also needed so that the child born can grow up healthy and not malnourished. There are various kinds of preparations or supplements with soy-based ingredients, so toddlers and pregnant are not bored consuming food in the form of soy. One of the other mixed foods in the form of corn-soybeans can increase growth and weight in pregnant women (Gillespie et al., 2017).

Furthermore, to provide additional food, children should also give supplements to prevent stunting. Providing dietary supplements and discipline in consuming them can improve the health condition of children aged 6-23 months and anaemia in pregnant women. These nutritional supplements can also reduce the risk of stunting children (Wang et al., 2017). In addition to the lack of nutrition during pregnancy, lack of nutritional intake during breastfeeding is also a factor causing stunting. Therefore, nutritional intake in breastfeeding mothers must also be considered, especially in babies aged 0-6 months. The provision of dietary supplements and other processed soybean foods significantly affects the quality of breast milk from a mother. Good quality breast milk will affect the baby's weight to avoid malnutrition and anaemia (Khan et al., 2020).

Research conducted by Olney (2018) also used the essential ingredients of soybeans or corn to provide nutrition to toddlers rather than using supplements or micronutrient powders. The feeding soybean/corn mixture in this study was given to pregnant women aged six months and children aged 6-24 months. Mixed soy/corn feeding in this study can reduce the prevalence of stunting in early childhood (Olney et al., 2018).

Some milk and supplements with soy-based ingredients are also available so toddlers can easily consume them. Mangani's (2015) research uses soy-based milk to reduce stunting in children aged 6-18 months (Mangani et al., 2015). Agapova (2018) explained that the study could reduce stunting conditions by giving beans, especially soybeans. Soy can also be a nutritious food source for children aged 6-23 (Agapova et al., 2018). Meanwhile, research conducted by Fabiansen (2017) using milk or lipid-based supplements (LNS) can increase height and weight gain by 0.083 kg / m<sup>2</sup> compared to the corn-soybean mixture (CSB), while soy isolates (S.I.) cannot increase height and weight (Fabiansen et al., 2017).

Beirut's (2020) research uses other foodstuffs besides soybeans to reduce stunting, namely cow colostrum or eggs. This study concluded that cow/egg colostrum is more maximal in reducing stunting than soybeans/corn. Cow/egg colostrum is an infant breast milk suppressant and can produce fewer linear growth disorders (Bierut et al., 2021).

According to Zaidi (2020), in addition to soy, dietary supplements can also increase nutrition in pregnant women, reducing the stunting condition of children at birth. The findings suggest that some beneficiaries consume a total dose of the supplement, despite valuable knowledge among caregivers. Sharing accessories with other household members is common, and complete monthly stock is usually not accepted. Qualitative findings suggest that caregivers do not associate dietary supplements with stunting prevention. WSB is well received as an additional portion; LNS is famous for its chocolate flavour and texture, while MNP sprinkles have little value (Zaidi et al., 2020).

Hendrixson's (2018) stated maternal malnutrition is still a significant problem in low- and middle-income countries, resulting in high morbidity and mortality of mothers and babies. Prevention and treatment of maternal malnutrition are essential to reduce stunting, improve cognitive outcomes, and maximize professional achievement. The risk of stunting and wasting has been shown to increase in infants of early gestational age, suggesting that pregnancy intervention is essential. Prenatal factors seem to be more critical than postnatal factors in preventing stunting. Based on the cases, other food in pregnant women is critical to reducing inflammation and malnutrition (Hendrixson et al., 2018).

## LIMITATION OF THIS STUDY

The limitation of this study is that the articles obtained are not all related to the provision of tempe or soy products. Still, several interventions provide mixed products, such as soybeans mixed with corn.

## CONCLUSIONS AND SUGGESTIONS

After reviewing the various articles obtained from this study, the following conclusions can be drawn: Soy foods can improve the process of child growth and development and prevent stunting in toddlers; soybeans can also be used as food and other supplements so that they can be given to the fetus in the womb, especially during the growth and development of infants to avoid stunting conditions and the factor that causes many stunting cases is lack of parent knowledge about nutritious foods, especially those consumed during pregnancy and lactation. The results of this review suggest that the government can increase socialization regarding food products from soybeans, especially tempeh because children can consume tempeh to prevent stunting.

## ETHICAL CONSIDERATION

This research used a review method, so the author does not perform ethical clearance.

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### Conflict of Interest Statement

There are no competing interests in this study.

### REFERENCES

- Agapova, S. E., Stephenson, K. B., Divala, O., Kaimila, Y., Maleta, K. M., Thakwalakwa, C., Isabel Ordiz, M., Trehan, I., & Manary, M. J. (2018). Additional common bean in the diet of Malawian children does not affect linear growth but reduces intestinal permeability. *Journal of Nutrition*, *148*(2), 267–274. <https://doi.org/10.1093/jn/nxx013>
- Akbar, O., Ichsan, N., Priyambodo, G. W., & Noviana, I. (2022). Efektivitas Pendampingan dan Pemberian Makanan Tambahan (PMT) Pada Anak Penderita Stunting Di Stunting merupakan bentuk kegagalan pertumbuhan akibat akumulasi ketidakcukupan nutrisi yang berlangsung lama mulai dari kehamilan sampai usia 24 bulan ( Hoffm. *α*1), 731–740.
- Beal, T., Tumilowicz, A., Sutrisna, A., Izwardy, D., & Neufeld, L. M. (2018). A review of child stunting determinants in Indonesia. *Maternal and Child Nutrition*, *14*(4), 1–10. <https://doi.org/10.1111/mcn.12617>
- Basic, R. K. (2020). Ministry of Health Performance Report 2020. *Ministry of Health of the Republic of Indonesia in 2021*, 1–224.
- Bertalina, B., & P.R, A. (2018). Hubungan Asupan Gizi, Pemberian Asi Eksklusif, dan Pengetahuan Ibu dengan Status Gizi (Tb/U) Balita 6-59 Bulan. *Jurnal Kesehatan*, *9*(1), 117. <https://doi.org/10.26630/jk.v9i1.800>
- Bierut, T., Duckworth, L., Grabowsky, M., Ordiz, M. I., Laury, M. L., Callaghan-Gillespie, M., Maleta, K., & Manary, M. J. (2021). The effect of bovine colostrum/egg supplementation compared with corn/soy flour in young Malawian children: A randomized, controlled clinical trial. *American Journal of Clinical Nutrition*, *113*(2), 420–427. <https://doi.org/10.1093/ajcn/nqaa325>
- Black, R. E., & Heidkamp, R. (2018). Causes of Stunting and Preventive Dietary Interventions in Pregnancy and Early Childhood. *Nestle Nutrition Institute Workshop Series*, *89*, 105–113. <https://doi.org/10.1159/000486496>
- Budiana, T. A., & Marlina, D. (2020). Efektivitas Healthy Dates Sebagai Suplemen Koreksi Pertumbuhan Balita Stunting Di Kota Cimahi. *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal*, *11*(2), 137–151. <https://doi.org/10.34305/jikbh.v11i2.185>
- Callaghan-Gillespie, M., Schaffner, A. A., Garcia, P., Fry, J., Eckert, R., Malek, S., Trehan, I., Thakwalakwa, C., Maleta, K. M., Manary, M. J., & Papatthakis, P. C. (2017). Trial of ready-to-use supplemental food and corn-soy blend in pregnant Malawian women with moderate malnutrition: a randomized controlled clinical trial. *The American Journal of Clinical Nutrition*, *106*(4), 1062–1069. <https://doi.org/10.3945/ajcn.117.157198>
- Dewi, I. A., & Adhi, K. T. (2014). Pengaruh Konsumsi Protein Dan Seng Serta Riwayat Penyakit Infeksi Terhadap Kejadian Pendek Pada Anak Balita Umur 24-59 Bulan Di Wilayah Kerja Puskesmas Nusa Penida Iii. *Gizi Indonesia*, *37*(2), 36–46. <https://doi.org/10.36457/gizindo.v37i2.161>
- Fabiansen, C., Yaméogo, C. W., Iuel-Brockdorf, A.-S., Cichon, B., Rytter, M. J. H., Kurpad, A., Wells, J. C., Ritz, C., Ashorn, P., Filteau, S., Briend, A., Shepherd, S., Christensen, V. B., Michaelsen, K. F., & Friis, H. (2017). Effectiveness of food supplements in increasing fat-free tissue accretion in children with moderate acute malnutrition: A randomized 2 × 2 × 3 factorial trial in Burkina Faso. *PLoS Medicine*, *14*(9), e1002387. <https://doi.org/10.1371/journal.pmed.1002387>
- Fikadu, T., Assegid, S. & Dube, L. (2014). Factor associated with stunting among children age 24 to 59 months in Meskan District, Gurage Zone, South Ethiopia: A case-control study. *African Journal of Food, Agriculture, Nutrition and Development*, *9*(4), 1–7. <https://doi.org/10.4314/ajfand.v9i4.43872>
- Hendrixson, D. T., Koroma, A. S., Callaghan-Gillespie, M., Weber, J., Papatthakis, P., & Manary, M. J. (2018). Use of a novel supplementary food and measures to control inflammation in malnourished pregnant women in Sierra Leone to improve birth outcomes: study protocol for a prospective, randomized, controlled clinical effectiveness trial. *BMC Nutrition*, *4*, 15. <https://doi.org/10.1186/s40795-018-0218-y>
- Hinnouho, G. M., Bernstein, R. M., Barffour, M. A., Arnold, C. D., Wessells, K. R., Ratsavong, K., Bounheuang, B., Kounnavong, S., & Hess, S. Y. (2019). Impact of two forms of daily preventive zinc or therapeutic zinc supplementation for diarrhea on hair cortisol concentrations among rural Laotian children: A randomized controlled trial. *Nutrients*, *11*(1). <https://doi.org/10.3390/nu11010047>
- Kementerian Kesehatan RI. (2018). Buletin Jendela Data dan Informasi Kesehatan: Situasi Balita Pendek (Stunting) di Indonesia. *Kementerian Kesehatan RI*, 20.
- Kepala Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan, & I. (1998). Riset KESEHATAN DASAR. *Kemenkes RI*, *7*(5), 803–809. <https://doi.org/10.1517/13543784.7.5.803>
- Khairani. (2020). Situasi Stunting di Indonesia. *Jendela Data Dan Informasi Kesehatan*, *208*(5), 1–34. [https://pusdatin.kemkes.go.id/download.php?file=download/pusdatin/buletin/buletin-Situasi-Stunting-di-Indonesia\\_opt.pdf](https://pusdatin.kemkes.go.id/download.php?file=download/pusdatin/buletin/buletin-Situasi-Stunting-di-Indonesia_opt.pdf)
- Khan, G. N., Ariff, S., Kureishi, S., Sajid, M., Rizvi, A., Garzon, C., Jenkins, M., de Pee, S., Soofi, S. B., & Bhutta, Z. A. (2020). Effectiveness of wheat soya blend supplementation during pregnancy and lactation on pregnancy outcomes and nutritional status of their infants at 6 months of age in Thatta and Sujawal districts of Sindh, Pakistan: a cluster randomized controlled trial. *European Journal of Nutrition*, *60*(2), 781–789. <https://doi.org/10.1007/s00394-020-02276-3>
- Mangani, C., Maleta, K., Phuka, J., Cheung, Y. B., Thakwalakwa, C., Dewey, K., Manary, M., Puumalainen, T., & Ashorn, P. (2015). Effect of complementary feeding with lipid-based nutrient supplements and corn-soy blend on the incidence of stunting and linear growth among 6- to 18-month-old infants and children in rural Malawi. *Maternal and Child Nutrition*, *11*(Unicef 2009), 132–143. <https://doi.org/10.1111/mcn.12068>
- Mustika, W., & Syamsul, D. (2018). Analisis Permasalahan Status Gizi Kurang Pada Balita di Puskesmas Teupah Selatan Kabupaten Simeuleu. *Jurnal Kesehatan Global*, *1*(3), 127. <https://doi.org/10.33085/jkg.v1i3.3952>
- Olney, D. K., Leroy, J., Bliznashka, L., & Ruel, M. T. (2018). PROCOMIDA, a Food-Assisted Maternal and Child Health and Nutrition Program, Reduces Child Stunting in Guatemala: A Cluster-Randomized Controlled Intervention Trial. *The*

*Journal of Nutrition*, 148(9), 1493–1505.  
<https://doi.org/10.1093/jn/nxy138>

- Rusilanti, & Riska, N. (2021). Edukasi Gizi Yang Sehat Untuk Pencegahan Stunting Di Kelurahan Benda Baru Kecamatan Pamulang Tangerang Selatan. *Sarwahita*, 18(01), 11–27. <https://doi.org/10.21009/sarwahita.181.2>
- Sumartini, E. (2020). Studi Literatur : Dampak Stunting Terhadap Kemampuan Kognitif Anak. *Jurnal Seminar Nasional*, 2(01), 127–134.
- Wang, J., Chang, S., Zhao, L., Yu, W., Zhang, J., Man, Q., He, L., Duan, Y., Wang, H., Scherpbier, R., & Yin, S.-A. (2017). Effectiveness of community-based complementary food supplement (Yingyangbao) distribution in children aged 6–23 months in poor areas in China. *PloS One*, 12(3), e0174302. <https://doi.org/10.1371/journal.pone.0174302>
- WHO. (2017). Double-duty actions for nutrition Policy Brief. *Who/Nmh/Nhd/17.2*, 17.2(5), 10. <https://apps.who.int/iris/bitstream/handle/10665/255414/WHO-NMH-NHD-17.2-eng.pdf?ua=1>
- Yarmaliza, Y., Farisni, T. N., & Fitriani, F. (2019). The Influence of Mother Characteristics on Giving Tempe Broth as an Effort Prevention of Stunting in Toddler. *Jurnal Fakultas Kesehatan Masyarakat*. <https://doi.org/https://doi.org/10.35308/j-kesmas.v6i2.1185>
- Yuliana, N., & Kusumawati, W. (2019). Metode Pembelajaran Berbasis Belajar Mandiri ( Self Directed Learning ) Pada Pendidikan Keperawatan : A Literature Review Self-Directed Learning Methods on Nursing Education : A Literature Review. *Indonesian Journal on Medical Science*, 8(1), 6–13. [ejournal.ijmsbm.org](http://ejournal.ijmsbm.org)
- Zaidi, S., Das, J. K., Khan, G. N., Najmi, R., Shah, M. M., & Soofi, S. B. (2020). Food supplements to reduce stunting in Pakistan: a process evaluation of community dynamics shaping uptake. *BMC Public Health*, 20(1), 1046. <https://doi.org/10.1186/s12889-020-09103-8>

