

## The Impact of Multisector Intervention to Accelerate Derivation of Child Stunting: A Systematic Review

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**Abstract.** Stunting is considered a major concern for children worldwide in public health. Around 149 million children under the age of 5 were affected by stunting in 2018. This article aims to evaluate health and nutrition programs to identify context-specific intervention packages that may help prioritize the implementation of stunting programs. Methods: Using electronic databases, the literature published between 2009 and 2019 was systematically reviewed. It identified programs in which nutrition-specific and nutrition-sensitive interventions for children under five years of age were implemented. Results: 11 programs identified where nutrition-specific and sensitive approaches had been implemented, Nutrition education and counseling, growth monitoring and promotion, immunization, water, sanitation and hygiene, and social security networks were the most common interventions. Conclusions: Programs combining nutrition-specific and nutrition-sensitive interventions, especially those with solid access to health and safety net components, are most effective in reducing stunting.

**Keywords:** Stunting; Children; The stunting program; Nutrition; and Counseling.

### 1. Introduction

Stunting is considered a significant concern for children worldwide in public health [1]. Globally, in 2018, as many as 149 million, or one in three children aged 0-5 years, were affected by stunting. East and South Africa shared the highest stunting incidence of 33.6%, followed by 34.4% in South Asia and 33.1% in West and Central Africa [2].

Stunting of children (linear growth failure) is associated with multiple adverse effects on health and permanent harm. Stunting is related to low developmental achievement [3] and IQ development [4], [5]. It is also documented that stunted children are less likely to enter school [6]. Linear growth is the best overall measure of well-being for children and offers a reliable predictor of human development inequalities. Sadly, this is reflected in the millions of children worldwide who have stunted due to suboptimal health conditions and insufficient food and treatment; they fail to achieve their linear growth potential and experience significant permanent physical and cognitive harm accompanying stunted growth [7]. Higher morbidity and mortality, poor child growth and cognitive ability, risk of infection and non-communicable disease in adulthood, and diminished productivity and economic capacity are immediate and long-term implications of child stunting [8]. Therefore, improving obstetric risks is of significant concern [5].

Stunting is a form of growth failure due to the accumulation of insufficient nutrients that lasts for a long time from pregnancy to 24 months [9]. This situation is aggravated by the catch-up growth imbalance [4]. The height of age < -2 standard deviation of the reference population median is the marker used to define stunting based on the WHO child growth standard [10]. The period from 0 to 24 months is a period that determines the quality of life, so it is called the golden period. This time it is a vulnerable period because it will be lifelong and unable to reverse the effects caused to the baby now; therefore, adequate nutrition is needed [11]. In addressing the high prevalence of stunting in some of the world's poorest countries, the World Health Organization (WHO) has proposed a global target of reducing the incidence of stunting in children under five by 40% by 2025. Three African countries: Malawi, Niger, and Zambia, are projected to fall by only 0-2%, while in more than five countries, Afghanistan, Burkina Faso, Madagascar, Tanzania, and Yemen, the reduction is projected to be less than 20% or half of the proposed target [9].

Accelerating nutritional progress would involve an active, broad-based, nutrition-sensitive system that addresses critical underlying nutritional determinants and improves nutrition-specific

intervention coverage and effectiveness [12]. This article aims to evaluate health and nutrition programs to identify context-specific intervention packages that may help prioritize the implementation of stunting programs.



**Figure 1.** Nutrition-specific and nutrition-sensitive interventions program [12]

## 2. Research Method

**Study Selection** The systematic review uses a base from PubMed (<https://www.ncbi.nlm.nih.gov/PubMed>), Scinapse (<https://scinapse.io/search?query=stunting>), and Proquest <https://search.proquest.com/results>.

**Inclusion/Exclusion Criteria.** The search criteria in the database use the word "stunting," growth with restrictions on articles published during the last ten years (2009 to 2019), English language articles, open access (open access. The inclusion criteria were (1) full-text articles were selected. (2) Targeting studies of mother-children (under five years old) (3) RCT Study. Exclusion criteria were (1) Review/editorial, (2) Conference proceedings, (3) Systematic review/ literature review (4) Study Protocol and (5) Meta Analysis. **Data Extraction** The study selection process, following the PRISMA guidelines, is summarized in Figure 2.

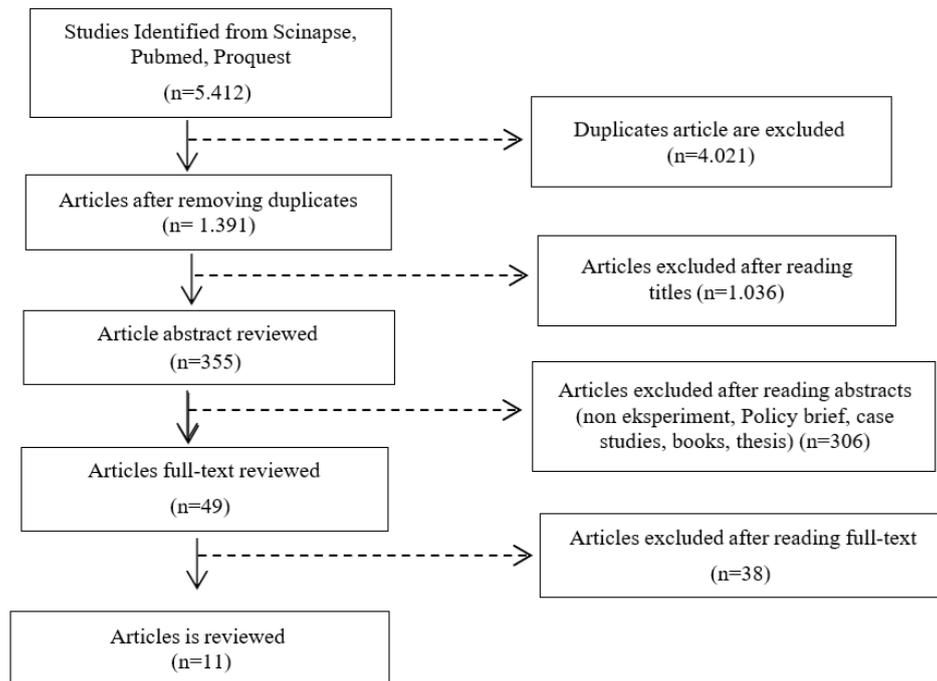


Figure 2 Flow diagram for the literature search.

Criteria Studies were included in the review if they (a) focused on children under five years, were written in English, and (b) focused on public health programs that implemented nutrition-specific and nutrition-sensitive interventions to reduce stunting.; (c) were published in a peer-reviewed journal (non-peer reviewed research, review, or commentaries were excluded); (d) Data Extraction All articles identified by the search were exported into a Mendeley Library, and duplicates were removed. The summary of the selected studies was recorded: author, year of publication, country of publication, study population, program name, program component, and outcome stunting reduction/effective program. (figure 2).

### 3. Result and Discussion

#### Result

A total of 5412 articles were retrieved from the three databases. After the removal of duplicates, four thousand twenty-one titles and abstracts were excluded as nonrelevant. The abstract of the resulting 355 papers full-text review to asses study eligibility. After the removal of 101 papers that were not eligible, 49 papers were included in the review (38 neglected articles). Lastly, 11 programs identified where specific approaches to nutrition were implemented, either alone or in combination with nutrition-sensitive intervention to reduce stunting.

| No | Country      | Author, year             | Study population         | Program name           | Program components  | Effectiveness program   |
|----|--------------|--------------------------|--------------------------|------------------------|---|---|
| 1. | Ethiopia[13] | Bridget Fennet al., 2012 | Children, 6-36 months    | Child Caring Practices | Health education, Nutrition education, WASH, Integrated comprising all intervention               | Only The WASH (water, sanitation, and hygiene) shows a significant increase in the mean.<br>Height for Age Z score            |
| 2. | Malawi[14]   | Alexander et al. 2009    | A, Children, 6-59 months | MICAH program          | Food fortification, dietary diversification, prevention treatment Malaria, building localcapacity | The MICAH was associated with a reduction in the prevalence ofstunting in phase 1 (1996-2000), but not in phase 2 (2000-2005) |

|     |                |                             |                       |                                  |   |   |
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| 3.  | Bangladesh[15] |                             | Mother-children dyads | EHC program                      | Nutrition counseling, improved feeding practices  | The risk of stunting was 25% lower in the intervention areas compared to the comparison areas.  |
| 4.  | Mexico[16]     | Ivonne et al., 2012         | Children 0-59 months  | Oportunidades program            | Conditional cash transfer, nutrition education, health service, fortified food supplement   | The oportunitades program had a positive impact on the diet of children. The program's effects on dietary intake resulted from the food supplement and not from improvements in the home diet.  |
| 5.  | Cambodia[17]   | Lylia, et al. 2017          | Children 0-59 months  | CEN program                      | Nutrition Education and counseling, micronutrients based on local food  | There is no significant impact on the provision of local foods combined with the CEN program  |
| 6.  | African[18]    | Roseline Remans et al. 2011 | Children 0-24 months  | Multisector intervention         | Food security, diet diversity, coverage of child healthcare, disease control, nutrition education and counseling, immunization, vit A, malaria prevention treatment | The prevalence of stunting in children 2 and 3 years of age was 43% lower than at baseline.   |
| 7.  | African[19]    | Paul M, et al. 2012         | Children 0-24 months  | Millenium Village                | Food security, diet diversity, coverage of child healthcare, disease control, nutrition education and counseling, immunization, vit A, malaria prevention treatment | After three years, poverty reduction, food insecurity, stunting, and malaria parasitemia were observed across nine Millennium Village sites. Access to improved water and sanitation and coverage for many maternal-child health interventions increased. Mortality in children younger than five years decreased by 22% in Millennium Village sites relative to baseline (absolute decrease of 25 deaths per 1000 live births, p=0.015) and 32% relative to matched comparison sites (30 deaths per 1000 live births, p=0.033). The average annual rate of reduction in mortality in children younger than five years of age was three times faster in Millennium Village sites than the most recent 10-year national rural trends (7.8% vs 2.6%). |
| 8.  | Haiti[20]      | Shannon, et al. 2010        | Children 0-59 months  | MCHN program                     | Food assistance, education, nutrition, immunization,  | The MCHN program led to higher mean HAZ scores and lower prev of stunting among children living in communities exposed to the program   |
| 9.  | Peru[21]       | Aaron et al., 2009          | Children 0-36 months  | The Good Star in Life Program    | Nutrition education and counseling, immunization, micronutrient powder intervention, Vit A, WASH, early stimulation of the child                                    | The rate of stunting decreased from 54.1% to 36.9%, the rate of iron-deficiency anemia decreased from 76.0% to 52.3%, and the rate of vitamin A deficiency decreased from 30.4% to 5.3%   |
| 10. | Nepal[22]      | Oleg Bilukha, et al. 2011   | Children 6-59 months  | Micronutrient Home Fortification | Nutrition education and counseling, immunization, micronutrient powder intervention, deworming, vit A   | The prev. of stunting decreased significantly from 39.2% at baseline to 23.4% at the end line.  |

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| 11. | Brazil[23] | Cesa G, et al.2011 | Children 0-59 months | Nutrition Program | Parental education, WASH, Imunisation, social safety, growth monitoring, and promotion | The prevalence of stunting among children <5 years of age decreased from 37% (1974) to 7% (2006). |
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## Discussion

Seven successful programs have been established in Asia, Bangladesh, and Vietnam. Brazil has succeeded in reducing the prevalence of stunting in Latin America. The Millennium Villages Program has successfully combined specific and sensitive nutritional interventions in nine sub-Saharan countries. These were found in three out of seven programs involving nutrition education and counseling, immunization, growth monitoring and promotion (GMP), water, sanitation and hygiene (WASH), and network interventions for social security. Malaria prevention and treatment programs were implemented only in African countries (Malawi and sub-Saharan Africa) with a high malaria prevalence. Most Social Security Net initiatives are introduced in Latin America and target disadvantaged beneficiaries. The progress plan in these countries was due to complementary intervention, even when the individual components for the intervention seemed identical (nutrition education and therapy, vitamin A supplementation, immunization, WASH, food security, and Social Security). Programs that recruited younger children from poor rural households (0-36 months) and were implemented in areas without other health programs (Bangladesh, Peru, and sub-Saharan Africa) reduced stunting more effectively than others (Ethiopia, Haiti, Malawi, and Mexico). A systematic review recognizes that a combination of variables and components is required to achieve success with interventions designed to reduce stunting. The most commonly used elements in the treatment packages were health education and therapy, GMP, immunization, WASH, and social security services. This review has shown that the best effect requires a combination of nutrition-specific and nutrition-sensitive approaches in most settings.

## 4. Conclusions

Programs combining specific and sensitive nutritional interventions, particularly those emphasizing health components and safety nets, have proven effective in reducing stunting. Success has been observed in seven programs across Asia, Bangladesh, and Vietnam, as well as in Brazil for Latin America. The Millennium Villages Program in nine sub-Saharan countries has also demonstrated success by integrating nutritional education, therapy, growth monitoring and promotion (GMP), immunization, water, sanitation, hygiene (WASH), and social safety nets. A review of these programs underscores that the key to success lies in the combination of variables such as nutritional education, GMP, immunization, WASH, and social safety nets. Recruiting children from poor rural households and implementing programs in areas without other health initiatives has proven more effective. In conclusion, an approach that integrates specific and sensitive nutritional interventions, with a focus on health components and safety nets, yields positive outcomes in the global effort to reduce stunting.

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