

How to Cite:

Akbar, I., & Huriyah, T. (2022). Community-based intervention for the prevention of stunting in children age 6-59 months: A systematic review. *International Journal of Health Sciences*, 6(S1), 6642-6652. <https://doi.org/10.53730/ijhs.v6nS1.6418>

Community-based intervention for the prevention of stunting in children age 6-59 months: A systematic review

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Abstract--Stunting is still a primary nutritional problem in many parts of the world. Globally, WHO (2021) has stated that 22% of children under five years are stunted, equalling an estimated 149.2 million children, most of whom are found in Asia and Africa. Many factors cause stunting, so the government needs a multisectoral approach to overcome this problem. In addition, because stunting is prevalent across vast areas, community-based interventions can save time and handling costs. This study was conducted with the aim of finding evidence of community-based interventions in the management of stunting in children aged 6-59 months. The study employed systematic review methods using the databases Pubmed, Ebsco, ProQuest, Emerald, Scopus and Google Scholar. 7 articles were identified from a total of 1191 articles through analysis using the PICO approach. The analysis showed that community-based interventions have taken place employing education, training, dietary supplements, and monitoring growth and development. The findings show evidence of interventions overcoming the problem of stunting in children aged 6-59 months.

Keywords---Community-based interventions, stunting prevention/countermeasures, children.

Introduction

Stunting is still a primary nutritional problem in many parts of the world (WHO, 2021). Stunting in children causes impaired growth and development and allows children to experience poor cognition and repeated spread of infection (Ponum et al., 2020). In the first 1000 days of life, a person's nutrition determines lifelong health, including physical development (Dattilo & Saavedra, 2020). This fact led to the inclusion of the elimination of dwarfism by 2030 in the *Sustainable Development Goals* (SDGs) (Ministry of Health, 2018).

Stunting is a condition where toddlers have a length or height that is low for their age (Ministry of Health, 2018). Vaivada et al. stated that stunting is a high-for-age z score (HAZ) of 2 below the median (Vaivada, T. et al., 2020), or a length or height that is more than minus two standard deviations from the median standard of child growth (Ministry of Health, 2018).

WHO (2021) has stated that, globally, 22% of children under five years are stunted, equaling an estimated 149.2 million children (see Figures 1 & 2). UNICEF, WHO and the World Bank (2021) have all stated that Africa and Asia have the highest numbers of malnourished children. In addition, Asia has the highest prevalence of stunting globally at 78.2 million cases, with 13.9 million of these cases being in Southeast Asia (see Figure 4).

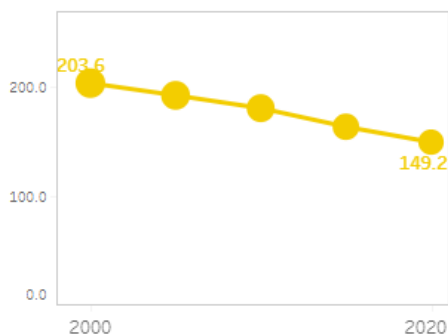


Figure 1: Stunting prevalence in children under five years (%)

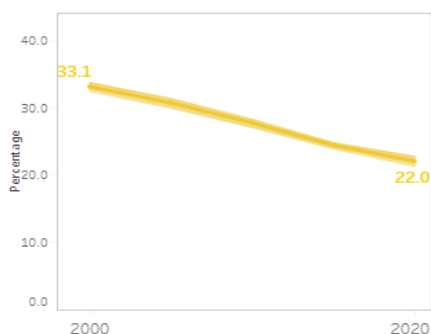


Figure 2: Stunting prevalence in children under 5 years (millions)

Source: WHO 2021

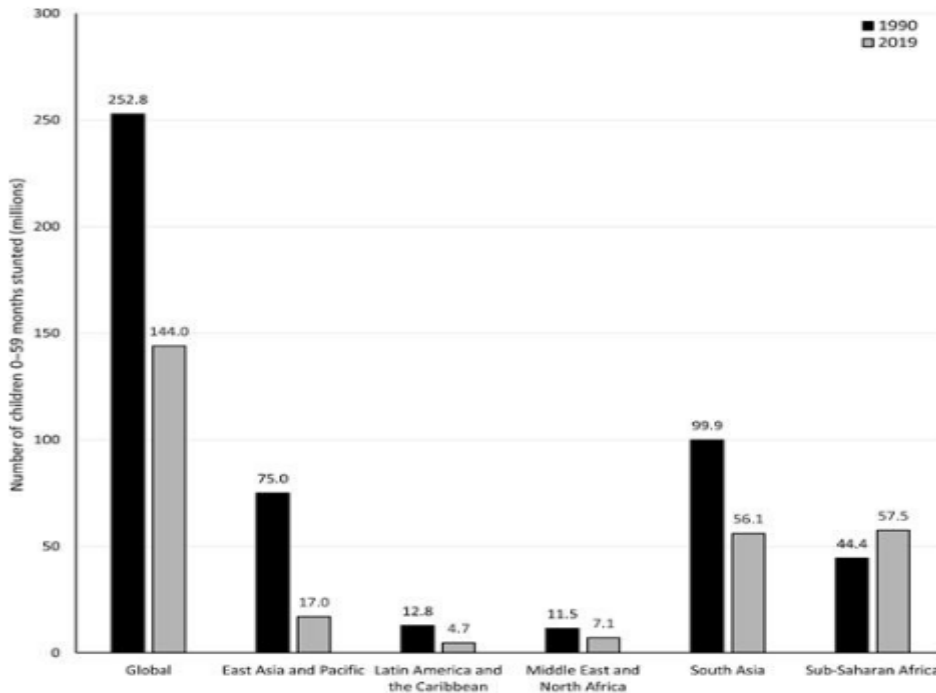


Figure 3. Global and regional stunting prevalence data (Vaidada, T. et al., 2020)

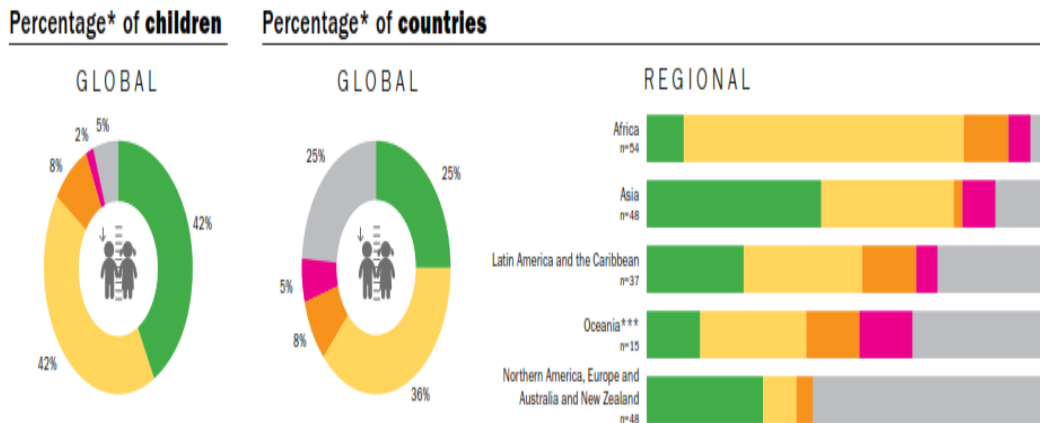


Figure 4. Percentage of stunted children globally and regionally (UNICEF, WHO & World Bank 2021)

Stakeholders need to take various steps and efforts to handle stunting, and these steps and actions cannot be carried out without the involvement of all parties (Ministry of Health 2020). The problem of stunting is not simple (WHO, 2021) and arises from many factors. As Vaivada, T. et al. (2020) have explained, there are two key factors and then determining factors. The key factors are the economy

(Ministry of Health, 2018; Vaivada, T. et al., 2020, WHO, 2021) and the education of the parent (Vaivada, T. et al., 2020; WHO, 2021). The determining factors include the fundamental determinant factor (economy and education of parents) as well as sanitation, access to clean water sources, bed nets (Vaivada, T. et al., 2020), antenatal care coverage, vaccination coverage, breastfeeding practices, complementary feeding practices and food security (Ministry of Health, 2018; Vaivada, T. et al., 2020, WHO, 2021).

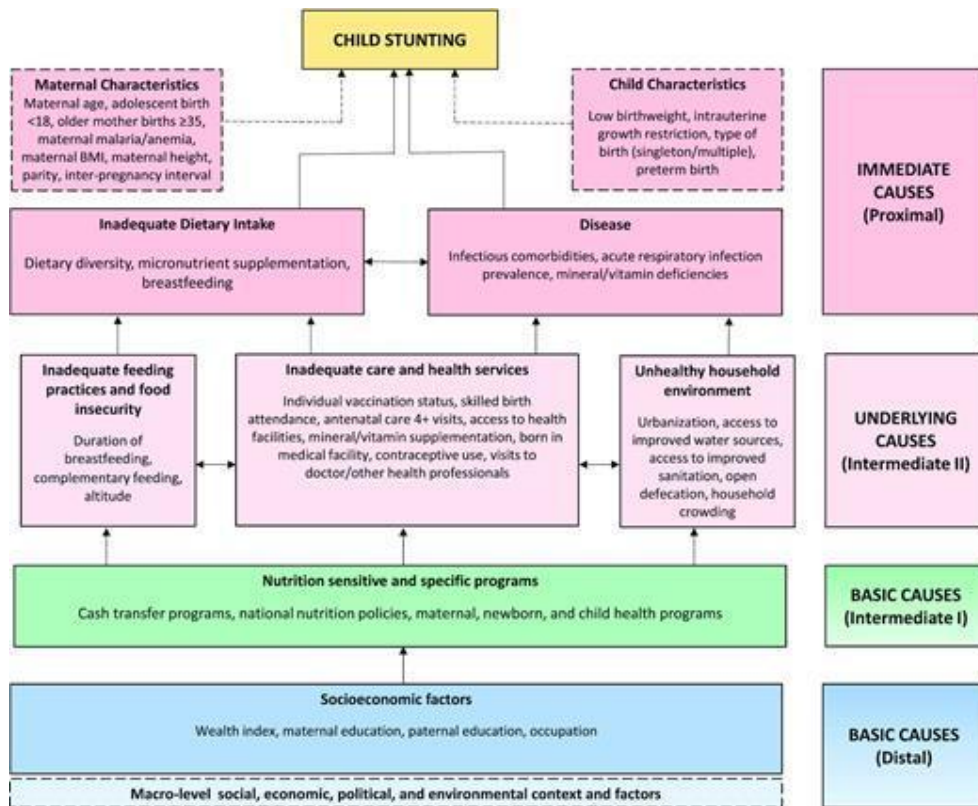


Figure 5. Causes and mechanisms of stunting (Vaivada, T. et al. (2020)

Rahayu et al. (2018) mentioned many methods for the prevention and handling of stunting at the individual, group, and community levels. However, the method selected should consider the conditions in the region (Wang, J. et al. 1, 2017).

Based on review of existing literature, different programs or approaches have been used to reduce stunting rates and accelerate the achievement of more optimal health development targets. One such approach is community/community-based intervention. Society is one of the critical elements in stunting prevention. Understanding cadres and communities in stunting prevention can increase the success of stunting prevention programs (Candarmaweni and Rahayu, 2020). Forms of community differentiation programs include providing information and education related to stunting, providing additional food (PTM) for pregnant women and toddlers in villages using village funds, and providing skills for making organic food products (Haryani, Astuti, Sari, 2021). This article will outline

community-based stunting prevention/management interventions that have been carried out for children aged 6-59 months.

Method

The method used in this study is a systematic review. The systematic review focused on the implementation of community-based interventions and countermeasures in stunting prevention and used several databases, including ProQuest, Ebsco, PubMed, Emerald, Scopus, and Google Scholar, with search time ranges of 2011 to 2021. The selected articles used English, a type of quantitative research analyzed using the PICO approach. The keywords used in the article search were *community-based intervention*, *stunting* and *children aged 6-59 months*.

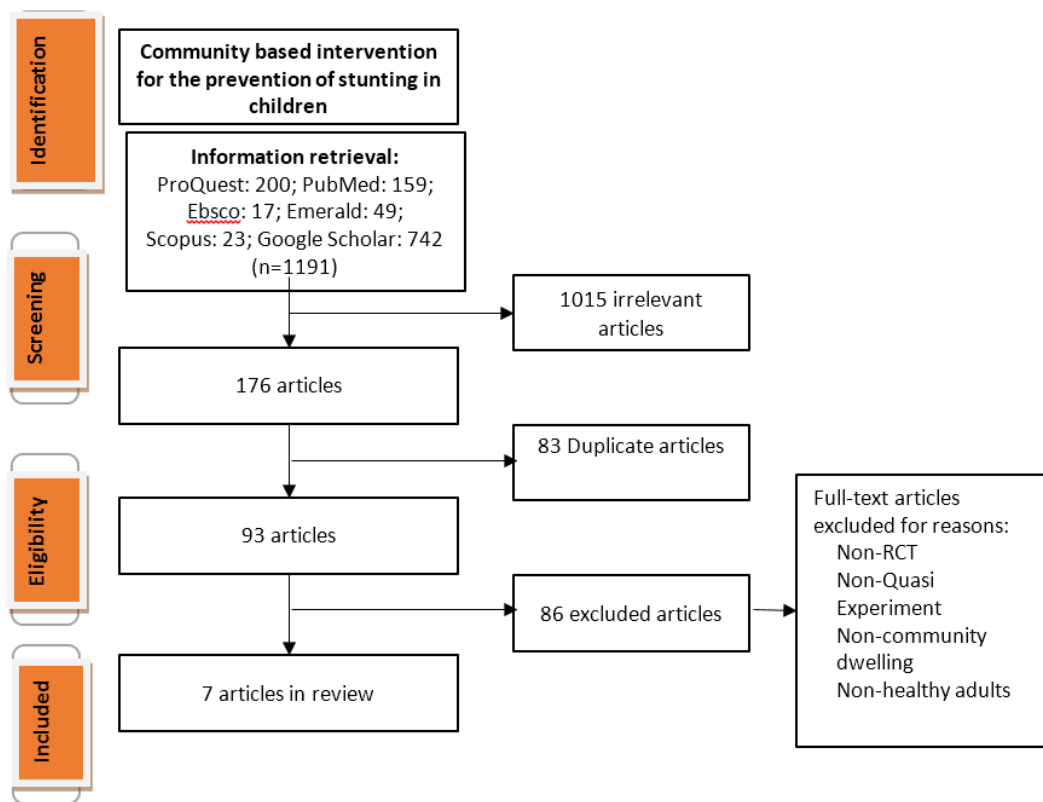


Figure 6. Database Search Diagram

Table 1
Overview of Literature Community-based Intervention for the Prevention of Stunting in Children

No	Author/ Year	Title	Design	Setting	Sample	Community-based intervention	Finding/ Result
1	Kang, Y., et al., 2017	Effectiveness of a community-based nutrition programme to improve child growth in rural Ethiopia: a cluster-randomized trial	Cluster randomized trial with follow-up for 12 months consisting of five meetings	Hasbro and Melka Bello Districts, Eastern Ethiopia	1790 children aged 6-12 months (876 interventions and 914 controls)	Education: Promotion of Community-Based Participatory Nutrition	Scores of frequency of feeding, composite feeding and combined feeding (frequency and food diversity) in children were higher in the intervention area than in the control. However, there were no differences in breastfeeding scores, food diversity and handwashing in the intervention and control groups.
2	Wang J 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	Three poor districts based on MDGs-China data	A total of 693 toddlers aged 6-23 months in 41 villages	Provision of soy-based breast milk as companion dietary supplements (Yingyangbao) & nutrition education	Significant improvement in the quality and nutritional status of children aged 6-23 months with the intervention of Yingyangbao and nutrition education.
3	Gelli A et al. 2018	Using a Community-Based Early Childhood Development Center as a Platform to Promote Production and Consumption	Longitudinal cluster-randomized controlled trial	60 community-based childcare centres in Malawi	1,248 pre-school children aged 36–72 months and 304 younger siblings with an age range of 6–24 months	Education: Promotion of Diversity of Food Production and Consumption	Preschoolers in the intervention group experienced greater nutritional intake and food diversity than the control group. However, the increased scores against stunting prevalence were more significant in the younger siblings of the intervention group.

		Diversity Increases Children's Dietary Intake and Reduces Stunting in Malawi: A Cluster-Randomized Trial					
4	Marion R et al. 1, 2016	A Community-Based Positive Deviance/Hearth Infant and Young Child Nutrition Intervention in Ecuador improved diet and reduced underweight	Quasi-experimental nonrandomized study	Chim-borazo and Tungurahua Ecuador	80 mother-child pairs in 6 intervention communities and 184 mother-child pairs in 9 control communities	Cooking training and Nutrition education for 12 days	Nutrition education and cooking exercises proved 1.3-5.7 times more likely to provide children with the right foods to support stunting prevention. Children of the intervention also had higher recommended food intake than non-intervention children.
5	Juarez, M., et al. 2021	Community-Based Interventions to Reduce Child Stunting in Rural Guatemala: A Quality Improvement Model	Quality Improvement Model	Rural Guatemala	125 Households	Growth and administration of micronutrient supplements	During the two-year improvement period, there was a noticeable improvement in the delivery of program components, such as growth monitoring services and micronutrient supplements. The prevalence of child stunting dropped from 42.4 to 30.6%, meeting the criteria for a specific variation of causes. The average length/height by age Z-score rose from -1.77 to -1.47, meeting the requirements for a particular interpretation of causes.

6	White, S. et al., 2016	Can gossip change nutrition behaviour? Results of a mass media and community-based intervention trial in East Java, Indonesia	Quasi-experiment Behaviour centred design (BCD), 3 stages for three months	24 Villages in Sidoardjo Regency of East Java (intervention) and 10 Villages in Kudus Regency of Central Java (Control)	414 interventions (243 in intervention 1 and 171 in intervention 2) and 150 controls	Education: The healthy gossip movement	The food diversity score increased by 0.8 points in the arms exposed only to TV ads (95% CI: 0.4–1.2) and 0.2 points in the arms that received both intervention components (95% CI: 0.6–1.4). There was an increase in vegetable and fruit intake frequency in both intervention groups. Inconsistent evidence was found of the effects of unhealthy snacking.
7	Liang, W., et al. 1. 2018	Community health education improves child health care in Rural Western China	Quasi-experiment design with cross-sectional survey	34 districts: nine intervention districts and 25 control districts	2673 children in an intervention group and 9031 children in a control group	Education by including the government	After a four-year study, parents in the intervention group showed significantly better infant and child feeding practices and childcare behaviors than their control group counterparts. In addition, all three anthropometric indicators in 2005 in the intervention group were better than controls, with stunting 4.9% lower (p <0.001), underweight 2.2% lower (p <0.001), and wasting 1.0% lower (p <0.05).).

Discussion

Analysis of the seven articles outlined in Table 2 has indicated that 4 (four) community-based interventions have been carried out in a number of countries to address the issue of stunting in children aged 6-59 months. These efforts include education programs (White, S. et al., 2016; Marion R et al., 2016; Wang, Y. et al., 2017; Kang, Y et al., 2017; Liang, W. et al., 2018; Gelli A et al., 2018); cooking training (Marion R, et. al, 2016); use of supplementation (Wang, Y. et. al, 2017; Juarez, M. et al. 2021) and growth and development monitoring (Juarez, M. et al. 2021).

Most studies provided educational interventions. Researchers of these studies carried out several methods of education, including education involving the government (Liang, W. et al., 2018); a *healthy gossip movement* (White, S. et al., 2016); promotion of diversity in food production and consumption (Gelli A et al., 2018); promotion of community-based participatory nutrition (Kang, Y et al., 2017), and nutrition education (Marion R et al. , 2016; Wang, Y. et al. , 2017).

Education

The education provided by White S. et al. (2016) took the form of a healthy gossip movement with a behaviour-centred design (BCD) approach. This gossip movement was a means of intervention directed at mothers who have children using two approaches, namely the use of television and community activation. This research found that mass media can have a measurable effect on nutrition-related behaviour, and these effects are likely to be enhanced by complementary community activation. In Ecuador, Marion R et al. (2016) found that nutrition education and cooking exercises were 1.3-5.7 times more likely to result in mothers giving their children the proper support for stunting prevention than non-interventional mothers.

The nutrition education conducted by Wang J et al. (2017) managed to reduce the prevalence of stunting and decrease underweight ($P < 0.05$). In addition, the prevalence of anaemia decreased from 28.0% to 19.9% ($P < 0.01$), and the prevalence of vitamin B12 deficiency decreased from 26.8% to 15.4% ($P < 0.01$). In this study, nutrition education was combined with the provision of Yingyangbao (YYB, soy-based supplements). Children aged 12-23 months who liked YYB and consumed six sachets or more of YYB each week had a lower risk of anaemia (OR = 0.34, 95% CI 0.13-0.90, $P < 0.05$). Furthermore, the risk of stunting was found to be lower compared to non-diverse diets (OR = 1.48, 95% CI 1.06-2.07, $P < 0.05$).

The nutrition education conducted by Kang Y et al. (2017) in Ethiopia found that scores of frequency of feeding, composite feeding, and combined feeding (frequency of feeding and food diversity) in children were higher in intervention areas than in control areas. However, there were no differences observed in breastfeeding scores, food diversity, and handwashing between the intervention and control areas.

Gelia et al. (2018) also conducted education-based intervention in Malawi. These researchers found that preschoolers in the intervention group experienced greater increases in nutritional intake and food diversity than the control group did. Nonetheless, increased scores against stunting prevalence were more significant in the younger siblings of the intervention group than in the intervention group itself. There was no significant impact on preschoolers' anthropometry, but again, younger siblings had a more substantial increase in high-for-age z scores than children in the control group and a more significant decrease in stunting prevalence.

Liang W (2018), who conducted research in rural Western China, found that the intervention group showed significantly better infant and child feeding practices and childcare behaviour than the control group did. In addition, the anthropometric indicators of the intervention group were better than the controls, with stunting 4.9% lower ($p < 0.001$).

Meanwhile Juarez, M. et al. 2021 in Guatemala explained that during the two-year improvement period of their study, there was a noticeable improvement in the delivery of program components, such as growth monitoring services and micronutrient supplements. The prevalence of child stunting dropped from 42.4 to 30.6%, meeting the criteria for a specific variation of causes. The average length/height by age Z-score rose from -1.77 to -1.47, also meeting the requirements for a particular interpretation of causes. This study came to the conclusion that structured performance visualizations and audit and feedback components of existing community-based nutrition programs significantly improve child health indicators through increased loyalty to existing evidence-based nutrition packages.

All the studies outlined above that used educational interventions were successful in the prevention and handling of stunting in children. It must be noted though that Wang J's research combined education and Yinyangbao provision; thus, it cannot provide a measurable influence of education on stunting as the two approaches were directly integrated.

Training

For the studies that conducted intervention using training, cooking demos were only conducted by Marion R et al. , (2016). This cooking training was found to reduce the risk of stunting. Mothers who were part of the intervention group were 1.3-5.7 times more likely to give healthy food, as promoted in the training program, to their children resulting in a Z-restriction score, especially for weight. No significant change was observed with height. The improvements encouraged influenced the increases in Z score in diet and diversity of the food consumed by the child. This intervention was carried out for six months.

Supplementation

The provision of soy-based breast milk dietary supplements (Yingyangbao) was shown to reduce the prevalence of stunting ($P < 0.05$), the prevalence of anaemia from 28.0% to 19.9% ($P < 0.01$), and the prevalence of vitamin B12 deficiency from 26.8% to 15.4% ($P < 0.01$). Children aged 12-23 months who liked YYB and consumed six sachets or more of YYB each week had a lower risk of anaemia (OR = 0.34. 95% CI 0.13-0.90, $P < 0.05$). Furthermore, the risk of stunting was found to be lower compared to non-diverse diets (OR = 1.48.95% CI 1.06-2.07, $P < 0.05$) (Wang, Y. et al. , 2017). Wang Y. et al., 2017 also revealed that age could affect intake and appetite for YYB and a more significant proportion was consumed in children of 12-23 months than those of 6-11 months.

Juarez, M. et al. (2021) showed that provision of micronutrient supplements leads to a decrease in the proportion of stunting and changes in Z scores. The most striking observation of this study was the change in Z Score from -1.77 to -1.47 with ($P < 0.05$). Juarez et al. noted that it is essential to evaluate the implementation of supplement provision to the community so that the program can continue to run following predetermined targets.

Growth monitoring

According to Juarez M et al. (2021), growth monitoring by combining micronutrients reduces stunting. Monitoring, according to Jaurez et. al., is critical in every stunting prevention intervention in children, and they emphasize how research can avoid biases from their respective interventions. If the intervention or research has used standard mechanisms to support the science, then the desired results will be obtained, but it is still essential to evaluate the enumerators of each research.

Conclusion

Community-based interventions using educational methods, micronutrient training, and monitoring have been proven to prevent and overcome stunting in children aged 6-59 months in several countries, both in highland and rural areas.

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