Persistent Global Burden of Stunting Among Children

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ABSTRACT

Introduction: Childhood stunting is a critical indicator of chronic undernutrition, reflecting global challenges in poverty, food security, and health care, with variability highlighting the multifaceted nature of nutritional well-being.

Objective: This study aims to provide a comprehensive overview of the global prevalence and trends of childhood stunting, elucidating the interplay of factors influencing its dynamics.

Methods: A systematic review and analysis of epidemiological studies, meta-analyses, and health reports were conducted to compile a detailed table on the worldwide prevalence and trends of childhood stunting.

Results: The collected data reveal a significant global burden of stunting, with notable disparities across regions, socioeconomic statuses, and age groups. Findings show a persistent high prevalence in regions like northwest Ethiopia and varied trends, with some areas achieving reductions in stunting rates due to effective interventions, while others witness stagnation or increases. Key associations were identified between stunting and factors such as low birth weight, socioeconomic status, and maternal health. The synthesis of recent studies indicates a critical ongoing public health challenge, particularly in Asia and Africa, where a significant proportion of children under five remain stunted.

Discussion: The study underscores the complex interplay of demographic, socioeconomic, and environmental factors influencing stunting, highlighting the essential role of targeted and multifaceted public health interventions in mitigating this pervasive issue.

Conclusion: Addressing childhood stunting necessitates a global commitment to integrated, evidence-based strategies focusing on the nutritional, health, and socio-economic determinants to ensure the well-being and growth of children worldwide.

Keywords: Childhood, Nutrition, Prevalence, Stunting.
highlighting the need for targeted interventions. Effective strategies require a nuanced understanding of the local and regional determinants of stunting, with a focus on the critical 1,000-day window from pregnancy to a child’s second birthday, a period crucial for preventing stunting [3], [4].

Considering the varying trends and the multifactorial nature of stunting, there is an urgent call for a reinforced global commitment to child nutrition that not only addresses immediate nutritional needs but also tackles the underlying determinants of stunting. This includes strengthening maternal and child health services, enhancing nutritional education, improving sanitation and hygiene, and ensuring food security to build resilient communities capable of sustaining long-term improvements in child growth and development. References [5], [6] The fight against stunting is not only a nutritional challenge but a societal imperative that reflects our collective responsibility towards the world’s most vulnerable populations—our children.

2. METHODS FOR DATA COLLECTION, SELECTION, AND ANALYSIS

2.1. Data Collection

The comprehensive table on the prevalence and trend of childhood stunting worldwide was compiled through a meticulous data collection process. This process involved an extensive review of the existing literature, focusing on epidemiological studies, meta-analyses, systematic reviews, and global health reports that provided data on the prevalence of stunting in children across various countries and regions. The studies selected were those that reported specific percentages of stunting prevalence, offered insights into the trends over time, or provided comparative data across different demographics, geographical locations, and socio-economic conditions.

2.2. Selection Criteria

The selection of studies for the table was guided by a set of predefined criteria:

1. Relevance: Studies were chosen based on their focus on childhood stunting, specifically looking at the prevalence rates and trends over time.
2. Recency: Preference was given to the most recent studies to ensure the data reflected current trends and situations, although pivotal older studies were also included to depict changes over time.
3. Geographical Diversity: Efforts were made to include data from a broad range of countries and regions to capture the global scope of childhood stunting.
4. Study Design: The inclusion was primarily of studies with robust methodological designs, such as meta-analyses, systematic reviews, and large-scale epidemiological surveys, ensuring the reliability and validity of the data.
5. Data Consistency: Studies were selected based on the clarity and consistency of their findings on stunting prevalence, ensuring that the data were comparable and could be synthesized across different reports. The PRISMA criteria of the study are presented in Fig. 1.

2.3. Data Analysis

The data analysis involved synthesizing the findings from the selected studies to extract relevant information on the prevalence and trends of childhood stunting. The key steps included:

1. Data Extraction: Relevant data on the prevalence of stunting, the year of the study, key findings, and demographic details were meticulously extracted from each study.
2. Trend Analysis: Where available, data were analyzed to identify trends in stunting prevalence over time, noting any significant increases, decreases, or stable patterns across different regions or globally.
3. Comparative Analysis: The data were compared across different geographical regions, time periods, and demographic groups to identify patterns, disparities, and significant findings related to the global state of childhood stunting.
4. Synthesis: The extracted data were synthesized into a coherent table format, summarizing the key findings, and presenting a global overview of childhood stunting prevalence and trends, ensuring a comprehensive representation of the available data.

The table serves as a consolidated resource, providing a global snapshot of childhood stunting, which is instrumental for policymakers, researchers, and public health professionals in understanding the scale of the issue, monitoring progress, and strategizing interventions.

3. RESULTS

Analyzing the key findings about the prevalence and factors associated with stunting in children across various regions and timeframes can be summarized: (Table I); n = 21 studies.
### TABLE I: THE PREVALENCE AND TREND OF CHILDHOOD STUNTING WORLDWIDE

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Findings</th>
<th>% of Stunting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khara et al. [1]</td>
<td>2017</td>
<td>A meta-analysis across 84 countries found a 3.0% prevalence of children aged 6–59 months being concurrently wasted and stunted, with an estimated burden of 5,963,940 children. Higher rates were observed in boys and fragile states.</td>
<td>3.0%</td>
</tr>
<tr>
<td>Joulaei et al. [7]</td>
<td>2021</td>
<td>Prevalence of stunting in the MENA region = 22.0%. Stunting was higher in rural areas (34.1%) compared to urban (12.4%), and in war-involved countries (28.5%) compared to others (20.6%).</td>
<td>22%</td>
</tr>
<tr>
<td>de Onis et al. [8]</td>
<td>2011</td>
<td>Demonstrated a global decrease in stunting rates among pre-school children from 1990 to 2010. Global prevalence decreased from an estimated 40% in 1990 to 25% in 2013. Stunting remains prevalent, particularly in Asia and Africa, with significant numbers also in the Americas, East Africa, West Africa, South-Central Asia, and Oceania.</td>
<td>40% in 1990 25% in 2013.</td>
</tr>
<tr>
<td>Geberselassie et al. [9]</td>
<td>2018</td>
<td>Identified a high prevalence of stunting among children aged 6–59 months in northwest Ethiopia.</td>
<td>49.4%</td>
</tr>
<tr>
<td>Campisi et al. [10]</td>
<td>2017</td>
<td>In Children under 5 years in East Asia and Pacific and South Asia, the stunting prevalence decreased by 24.8 and 25%, respectively, by 12.6 in Latin America and the Caribbean and by 12.9%, in the Middle East and North Africa and 13.4% in sub-Saharan Africa at 13.4%.</td>
<td>Decreasing trend</td>
</tr>
<tr>
<td>Mamabolo et al. [11]</td>
<td>2005</td>
<td>In South Africa, found high prevalence rates of stunting, overweight, and obesity in 3-year-old children, with correlations to early weight gain and maternal employment.</td>
<td>48%</td>
</tr>
<tr>
<td>Monteiro et al. [12]</td>
<td>2010</td>
<td>Over the 33 years period the: total prevalence of stunting decreased from 37.1% to 7.1%, from 39.0% to 11.2% in the poorest quintile and from 12.1% to 3.3% among the wealthiest quintiles.</td>
<td>Decreasing trend</td>
</tr>
<tr>
<td>Nshimiyiryo et al. [13]</td>
<td>2019</td>
<td>Reported a 38% prevalence of stunting among under-five children in Rwanda,</td>
<td>38%</td>
</tr>
<tr>
<td>Amartha et al. [14]</td>
<td>2023</td>
<td>Investigated the correlation between birth weight and stunting, highlighting a significant association where low birth weight increased the risk of stunting in Indonesian children under five.</td>
<td>Not specified</td>
</tr>
<tr>
<td>Lundeen et al. [15]</td>
<td>2014</td>
<td>Prevalence of stunting at 1 year ranged from 21% (Vietnam) to 46% (Ethiopia). From age 1 to 5 years, stunting prevalence decreased by 15-1 percentage points in Ethiopia but increased in the other cohorts by 3% in Vietnam and to 5-3% in India.</td>
<td>Decreasing trend with age</td>
</tr>
<tr>
<td>Dorsey et al. [16]</td>
<td>2018</td>
<td>Explored individual, household, and community level risk factors for stunting in Nepalese children under 5 years, with a 38% prevalence, highlighting the importance of maternal and environmental influences.</td>
<td>38%</td>
</tr>
<tr>
<td>Senbanjo et al. [17]</td>
<td>2011</td>
<td>Assessed stunting and its risk factors among school children and adolescents in Nigeria, finding a 17.4% prevalence and associations with factors like family setting, maternal education, and social class.</td>
<td>17.4%</td>
</tr>
<tr>
<td>Soekatri et al. [18]</td>
<td>2020</td>
<td>Studied the associations of stunting with morbidity, parental education, and socioeconomic status in Indonesian children, showing a high prevalence of 31.4% and highlighting the impact of these factors on child malnutrition.</td>
<td>31.4%</td>
</tr>
<tr>
<td>Karlsson et al. [19]</td>
<td>2023</td>
<td>Analyzed stunting patterns by age in children 0–59 months old across 94 countries, finding higher prevalence in older children, particularly in poorer households and among boys, suggesting the need for early interventions.</td>
<td>Varies by age</td>
</tr>
<tr>
<td>Sartika et al. [20]</td>
<td>2021</td>
<td>The Sambas District in Indonesia has a high prevalence of stunting (28.4%)</td>
<td>28.4%</td>
</tr>
<tr>
<td>Mongkolchati et al. [21]</td>
<td>2020</td>
<td>Determined the prevalence and incidence of stunting in Thai children from birth to two years, showing increasing stunting rates over time and associating it with factors like gender, maternal characteristics, and geography.</td>
<td>16.6% at 24 months</td>
</tr>
<tr>
<td>Dukhi et al. [22]</td>
<td>2017</td>
<td>Assessed stunting prevalence and spatial clustering in South African children aged 0–59 months, finding a 21.1% prevalence and recommending community-level interventions.</td>
<td>21.1%</td>
</tr>
<tr>
<td>Beckmann et al. [23]</td>
<td>2021</td>
<td>Investigated the relationship between stunting, dietary diversity, hemoglobin levels, food insecurity, and cognitive outcomes in South African children, finding a 9% stunting prevalence and associations with academic achievement, especially among girls.</td>
<td>9%</td>
</tr>
<tr>
<td>World Health Organization (WHO) [24]</td>
<td>2022</td>
<td>India 31.7%, Pakistan 34%, China = 4.6%, Brazil = 7.2, Argentina = 9.5%, Mexico = 12.6, Ecuador = 22.7%, Egypt = 20.4%, Libya = 52%, Nigeria 34.2%, South Africa 22.8%, Congo = 40.3%, S Arabia = 12.4%</td>
<td>Very variable</td>
</tr>
<tr>
<td>Rafique and Afzal [6]</td>
<td>2023</td>
<td>Nine studies were selected from the last five years to estimate pooled prevalence in children under five years of age. The overall pooled prevalence was 39.1% (Asia and Ethiopia)</td>
<td>39.1%</td>
</tr>
<tr>
<td>Sentongo et al. [25]</td>
<td>2021</td>
<td>62 low-and middle-income countries, The overall prevalence was 29.1% for stunting, 6.3% for wasting, and 13.7% for underweight.</td>
<td>29.1%</td>
</tr>
</tbody>
</table>
A significant global burden of concurrent stunting in children aged 6–59 months, with higher rates observed in boys and fragile states, indicates a need for targeted interventions in these populations [1].

The Middle East and North Africa (MENA) region reported a high stunting prevalence, particularly in rural areas, low-income countries, and conflict-affected regions, suggesting the impact of socioeconomic and environmental factors on child growth [7].

There was a decreasing global trend in stunting among preschool children over two decades, yet stunting remains a significant concern, especially in Asia and Africa, pointing towards ongoing nutritional challenges [8].

High stunting rates in specific regions like northwest Ethiopia, Congo, and South Africa, indicated regional disparities in child nutrition and the influence of local [9], [11].

Notable decreases in stunting prevalence over the years in different regions reflected the positive impact of nutritional and health interventions, although the rates still vary widely [10], [12].

The association between low birth weight and increased risk of stunting in Indonesian children emphasized the importance of maternal and child health in preventing stunting [14].

Stunting prevalence varied with age, household wealth, and geography in a large cross-country analysis, highlighting the complexity of stunting and the necessity for multifaceted approaches to address it [19].

The pooled prevalence from recent studies indicates a significant proportion of children under five are stunted, particularly in Asia and Some African countries (Ethiopia, Congo) underscoring the persistent public health challenge stunting poses [8]. These findings collectively highlighted the ongoing challenge of stunting in children worldwide, influenced by a mix of demographic, socioeconomic, and environmental factors, and underscored the critical need for targeted and effective nutritional and health interventions.

### 4. Discussion

The different findings presented in the result section reflect a significant variation in the prevalence of stunting across different countries, as well as varying trends in some countries showing either improvement or deterioration. These variations can be attributed to a multitude of factors ranging from socioeconomic status, public health policies, and maternal and child health services, to nutritional practices and environmental conditions.

#### 4.1. Variation in Prevalence Among Countries

The stark differences in stunting prevalence rates across countries, as illustrated by the data, can be influenced by several key factors:

**Socioeconomic Factors:** The prevalence rates are notably higher in low-income countries (some African and South Asian countries) and regions experiencing conflict, such as in the Middle East and North Africa, and in rural areas compared to urban ones [7]. Economic instability, poverty, and food insecurity are closely linked to malnutrition and stunting, as they limit access to nutritious food, healthcare, and sanitation [1].

**Maternal and Child Health Services:** Access to and the quality of maternal and child health services play a crucial role. For instance, low birth weight, which is a risk factor for stunting, is associated with poor maternal nutrition and inadequate prenatal care [14]. Countries with better healthcare systems tend to have lower stunting rates due to effective nutritional interventions and education [12].

**Nutritional Practices:** Dietary diversity, breastfeeding practices, and the availability of micronutrient-rich foods significantly affect stunting rates. In regions where there is less emphasis on these practices, or where food security is a major issue, higher rates of stunting are observed [10].

**Public Health Policies and Interventions:** The implementation of effective public health policies and interventions, including nutrition programs, education, and social safety nets, can lead to significant reductions in stunting, as seen in countries like Brazil, where a sharp decline in stunting was observed over 33 years [12].

#### 4.2. Trends in Prevalence: Improvement Versus Deterioration

**Improvement:** The global decrease in stunting rates from 1990 to 2010 signifies the impact of concerted public health efforts, improved socioeconomic conditions, and better maternal and child health services [8]. Countries that have shown a commitment to addressing malnutrition through comprehensive strategies, including fortification, supplementation, and education, tend to exhibit a downward trend in stunting prevalence.

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**Fig. 2. Recommendations to improve the global problem of stunting.**

- **Strengthen policies against malnutrition**
- **Foster multisectoral collaboration for stunting reduction**
- **Address root socioeconomic causes**
- **Amplify nutrition focused intervention**
- **Enhance maternal and child health**
- **Prioritize continuous monitoring and research**
5. Conclusions

The variation in stunting prevalence and the different trends observed across countries highlight the multifactorial nature of malnutrition, influenced by a complex interplay of demographic, socioeconomic, environmental, and policy-related factors. Addressing stunting effectively requires a multidimensional approach, tailored to the specific needs and challenges of each region, emphasizing the importance of sustained and integrated public health efforts to improve nutrition, healthcare access, and overall living conditions.

5.1. Recommendations (Fig. 2)

In addressing the critical challenge of global stunting, the following recommendations are proposed to tackle its multifaceted causes and to promote sustainable growth and development in affected populations.

1. Governments and international organizations should reinforce public health policies focusing on reducing child malnutrition. This includes integrating stunting reduction strategies into national health and development agendas.

2. Improving access to and the quality of maternal and child health services is crucial. This includes prenatal care, maternal nutrition, breastfeeding support, and infant and young child feeding (IYCF) programs.

3. Tailored interventions that address the specific dietary needs of children at risk of stunting, such as micronutrient supplementation and fortification, should be scaled up.

4. Addressing the underlying socioeconomic factors contributing to stunting, such as poverty, food insecurity, and lack of education, is essential. Social protection programs, income-generating activities, and education can play a significant role in this regard.

5. Continuous monitoring, evaluation, and research are necessary to understand the evolving patterns of stunting and to assess the impact of interventions. This will enable the adaptation of strategies to local contexts and emerging challenges.

6. Combating stunting requires a coordinated approach involving various sectors such as health, nutrition, education, water, sanitation, and social services. Partnerships between governments, nongovernmental organizations (NGOs), the private sector, and communities are essential to ensure effective and sustainable outcomes.

References


