



Addressing Childhood Malnutrition in India: A Comprehensive Analysis in the Context of the Global Hunger Index.

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Abstract:

The Global Hunger Index (GHI) serves as a comprehensive measure of malnutrition, encompassing not only food scarcity but also the intricate issue of food security. The pervasive problem of hunger manifests in two distinct forms: food security and hidden hunger. In India, hidden hunger stands out as a notable factor contributing to malnutrition.

The primary objective of this paper is to underscore the significance of the GHI as a composite index for assessing malnutrition. It is important to note that the GHI is not skewed towards children alone, as they will eventually become adults. The question regarding the sample size for adult undernutrition is based on just 3000 data points, and the GHI is not significantly influenced by this indicator.

Critiques about the GHI's reliance on outdated data are worth acknowledging. However, when considering the most recent data from the Poshan Tracker, it appears that the GHI value has decreased. Yet, the malnutrition situation in India has not necessarily improved.

In conclusion, it can be asserted that the crux of the issue lies more in addressing malnutrition itself rather than critiquing the methodology of the GHI. Recognizing and addressing these criticisms is essential for refining and enriching our comprehension of hunger and malnutrition in India.

Keywords: Global Hunger Index, childhood malnutrition, India, policy initiatives, determinants, interventions, socio-economic factors, healthcare access, dietary factors, sanitation.

1. Introduction

The Global Hunger Index (GHI)¹ is an annual report that measures and tracks hunger and malnutrition at a global, regional, and national level. The report is a joint project of the International Food Policy Research Institute (IFPRI)², Concern Worldwide, and Welthungerhilfe. It provides valuable insights into the state of hunger and food insecurity around the world. The Global Hunger Index (GHI) has undergone a significant transformation, now encompassing four distinct indicators that offer a comprehensive insight into the state of hunger and malnutrition. These indicators, meticulously constructed, provide a more nuanced understanding of the issue: Proportion stunting of the child at age group (0-6), Proportion Wasting of the child age group (0-6), Proportion of Undernutrition in the community, Under five child mortality rates. The Global Hunger Index essentially serves as a comprehensive measure of the extent of malnutrition within populations, encompassing a spectrum of challenges. India's low Global Hunger Index (GHI) ranking, despite its strong economic and agricultural standing, has sparked concerns. GHI's indicators don't directly measure hunger, making it essential to create a country-specific, reliable hunger measurement to monitor progress in achieving Zero Hunger, a critical Sustainable Development Goal. Singh, P. (2023).

It reflects not only the unavailability of food but also the nuanced issue of food security. This pervasive problem of hunger takes two distinct forms:

A) Food Insecurity: This aspect of hunger arises when there is a lack of consistent and reliable access to an adequate quantity of nutritious food. It is the result of various factors, including limited food distribution systems and access barriers, ultimately leading to insufficient nutrition for communities. Food insecurity plagues developed countries due to inequality, with potential solutions beyond food banks, necessitating multi-sector collaboration and government leadership to address underlying social determinants. Pollard, C. M., & Booth, S. (2019).

B) Hidden Hunger: In contrast, hidden hunger is a subtler yet equally significant form of malnutrition. It occurs when individuals may have access to food, but that food lacks essential nutrients, vitamins, and minerals crucial for proper growth and development. Hidden hunger is often not immediately visible but can have severe long-term health consequences. While the study confirms the economic impact of micronutrient malnutrition,

¹ <https://www.globalhungerindex.org>

² <https://www.ifpri.org>

the estimates are lower than in previous studies, likely due to varying assumptions, data quality, and calculation precision. Future research should provide transparent calculation details for credibility. Stein, A. J., & Qaim, M. (2007).

Notably, in India, the second type of hunger, hidden hunger, is more prevalent than the first. This observation underscores the complexity of the issue, wherein food may be available, but its nutritional quality remains inadequate. Addressing hidden hunger becomes a crucial imperative in the fight against malnutrition, highlighting the need for not only food availability but also its nutritional adequacy to ensure the well-being and development of communities. Childhood malnutrition remains a critical challenge in India, as reflected by its ranking in the Global Hunger Index (GHI).

This research paper aims to provide an in-depth analysis of the factors contributing to child malnutrition in India, its implications, and potential solutions in the current context. Child malnutrition is a pressing concern in India, as evidenced by its Global Hunger Index (GHI) ranking. GHI essentially serves as a Malnutrition Index, emphasizing its severe impact on child survival. Nevertheless, it unmistakably serves as an indicator of malnutrition in the country. Addressing this complex issue requires multifaceted strategies, including targeted interventions and policies, to combat hunger and malnutrition effectively.

In conclusion, while the Global Hunger Index serves as an important global benchmark, particularly in tracking malnutrition, its relevance in the context of India has been a matter of contention.

This paper is divided into several parts. Firstly, the introduction is discussed in section I. Secondly, section II describe the literature review. Then in section III illustrates the data description. Next, section IV covers the research methodology. Then, in section V, we present the empirical findings. Finally, we conclude the paper with the conclusion in section VI. We discuss each of these parts one by one.

Objective of the study

Concerns about GHI in India include an imbalance in child and adult indicators, data relevance, and variable weighting. Although GHI is a crucial global benchmark, its accuracy and applicability to India remain subjects of debate. The asymmetry in variable weightings, concerns about the relevance of the data, and the nuanced importance of child versus adult

malnutrition all contribute to the ongoing debate about the index accuracy and applicability to the Indian context. Our question is GHI is one of the malnutrition indicator or not? Then we want to examine GHI methods with real data the likely impact of these factors on this decision. Moreover, we want to examine whether these variables have significant impact on their decisions.

2. Literature Review:

Since its inception, the GHI has gone through several iterations and updates. Here are descriptions of some of the key Global Hunger Index reports:

Hunger index reports are directly or indirectly reveal the malnutrition:

Indeed, the series of Global Hunger Index reports from 2006 to 2021, directly or indirectly, emphasize the critical issue of malnutrition and its far-reaching consequences. These reports have been instrumental in providing a comprehensive and evolving perspective on the state of hunger and undernutrition globally. Here's how they have consistently emphasized the issue of malnutrition:

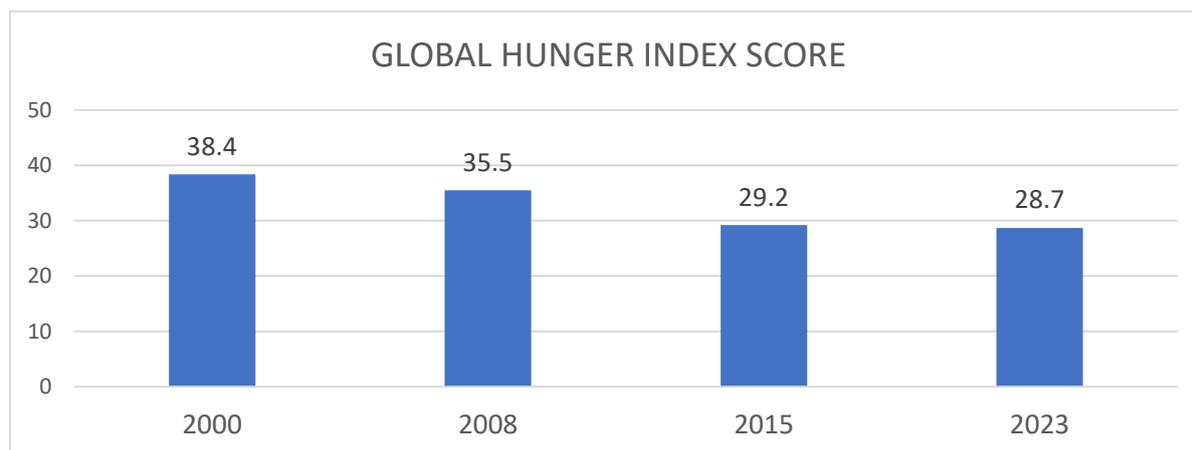
- I. **Global Hunger Index 2006:** This inaugural report assessed hunger and undernutrition in 118 developing countries. It considered three key indicators, one of which was "child underweight," highlighting the early emphasis on child malnutrition. Wiesmann, D. (2006).
- II. **Global Hunger Index 2007:** This report expanded to 122 countries and reinforced the link between hunger and child mortality. It also introduced the concept of "child wasting," underlining the significance of child undernutrition. Wiesmann, D., Sost, A. K., Schöninger, I., Dalzell, H., Kiess, L., Arnold, T., & Collins, S. (2007).
- III. **Global Hunger Index 2010:** This edition broadened its coverage to 129 countries and introduced a revised calculation method for the index. This method aimed to make comparisons across years more meaningful, further acknowledging the importance of child nutrition and health in addressing hunger. (Von Grebmer, K., et,all., 2010).
- IV. **Global Hunger Index 2014:** While covering 108 countries, this report delved into the relationship between conflict and hunger, demonstrating how conflicts and food insecurity are intimately interconnected, with malnutrition being a consequence. (Von Grebmer, K., 2014).

- V. **Global Hunger Index 2017:** This edition refined the methodology and introduced a more detailed analysis of various forms of malnutrition, including stunting, wasting, and underweight. It incorporated data on child stunting and child wasting for the first time, directly addressing these malnutrition indicators. (Von Grebmer, K., et.all., 2017).
- VI. **Global Hunger Index 2019:** This report focused on the challenges of achieving the Sustainable Development Goal of Zero Hunger by 2030. It analyzed the role of inequalities and climate change in perpetuating hunger and malnutrition, underscoring the pervasive nature of the malnutrition problem. (Von Grebmer, K., et.all., 2019).
- VII. **Global Hunger Index 2021:** The most recent available report as of your knowledge cutoff date continued to assess and analyze the state of hunger, particularly in the context of the COVID-19 pandemic and its impact on global food security. The COVID-19 pandemic had a significant impact on food security and indirectly exacerbated malnutrition concerns. (Von Grebmer, K., et.all., 2021).

Throughout the years, these reports have evolved to consider a broader range of malnutrition indicators and the complex factors contributing to malnutrition, reflecting the multidimensional nature of the problem. They have consistently highlighted the need to address malnutrition comprehensively to combat hunger and improve global well-being. So, the hunger index is the degree of malnutrition.

3. Data Interpretation:

The Global Hunger Index (GHI) is a tool designed to comprehensively measure and track hunger and undernutrition at the global, regional, and national levels. It is published annually and is a collaboration between Concern Worldwide and Welthungerhilfe, with data collected from various sources, including the United Nations.



Source: <https://www.globalhungerindex.org>

It's important for organizations like Concern Worldwide and Welthungerhilfe, which publish the GHI, to provide detailed information about their data sources and collection methods. So, we consider the proportion of GHI rank in India with the proportion of undernourished population (%) in this table.

The GHI ranks countries on a scale from 0 to 100, with lower scores indicating lower levels of hunger and higher scores indicating higher levels of hunger. The index takes into account four key indicators are Undernourishment, Child Stunting, Child Wasting, Child Mortality.

Table-1(Rank and position of India in GHI)

GHI rank in India	Position of India out of 100 countries	GHI severity scale	Proportion of undernourished population(%)	GHI score in India
96 of 119 (2006)	80.67	Alarming	21	25.7
94 of 118 (2007)	79.66	Alarming	20	25.3
66 of 88 (2008)	75.00	Alarming	20	23.7
65 of 84 (2009)	77.38	Alarming	21	23.9
67 of 84 (2010)	79.76	Alarming	22	24.1
65 of 79 (2012)	82.28	Alarming	19	22.9
63 of 78 (2013)	80.77	Alarming	17.5	21.3
55 of 76 (2014)	72.37	Serious	17	17.8
80 of 104 (2015)	76.92	Serious	15.2	29
97 of 118 (2016)	82.20	Serious	15.2	28.5
100 of 119 (2017)	84.03	Serious	14.6	31.4
103 of 119 (2018)	86.55	Serious	12.3	30.3
102 of 117 (2019)	87.18	Serious	14.8	30.3
94 of 107 (2020)	87.85	Serious	14	27.2
101 of 116 (2021)	87.07	Serious	14	27.5
107 of 121 (2022)	88.43	Serious	16.3	29.1
111 of 125 (2023)	88.80	Serious	16.6	28.7

Source: Global Hunger Index (Year 2011 is not available as per GHI calculation)

The table presented above indicates that the issue of malnutrition in India has persisted since at least 2006. In that year, India's position in the global rankings stood at 81 out of 100, signifying that this is a long-standing concern rather than a recent problem.

What's particularly interesting is the inverse relationship between the Global Hunger Index (GHI) score and the proportion of undernourished population. Despite the GHI score being a low 30.3 in India when the proportion of undernourished individuals was at its highest (12.3% in 2018), and conversely, the GHI score being lower at 24.1 when the undernutrition rate was relatively higher (22% in 2010). This suggests that the GHI may not be strongly influenced by the undernourished population alone.

Furthermore, a closer look at the data reveals a gradual decline in India's position concerning other countries. The relative standing of India in the global context has been steadily decreasing over the years. This is a matter of significant concern, as it indicates that India's efforts in addressing hunger and malnutrition may not have kept pace with the progress made by other nations.

These observations underscore the complexity of the malnutrition issue in India and the need for a more comprehensive assessment of the factors that contribute to the GHI. It suggests that addressing malnutrition in India requires a multi-faceted approach that goes beyond just reducing the proportion of undernourished individuals, encompassing factors like food security, healthcare, and socio-economic development to make a more substantial impact on the GHI and improve India's global standing in this regard.

This index is a composite index not depends upon any single variable. So it above table shows when proportion of undernutrition increases shows the value of hunger decreases. That means value of other three variables decrease. The Global Hunger Index (GHI) report is not the sole source underscoring India's concerning nutrition status. Over time, the State of Food Security and Nutrition in the World (SOFI) reports have consistently pointed to the nation's nutritional challenges. In the most recent SOFI-2023 report³, a striking revelation is made, stating that a staggering 74.1% of the Indian population cannot access or afford a nutritionally adequate and healthy diet.

4. Methodology:-

³ <https://www.fao.org/3/cc3017en/cc3017en.pdf>

The calculation methodology for the Global Hunger Index (GHI) underwent a significant transformation in 2016. The GHI used to be computed as a simple average of three components:

1. The proportion of the population that is undernourished (PUN).
2. The prevalence of underweight children under five years of age (CUW).
3. The proportion of children who die before reaching the age of five (CM).

Under the previous method, each of these components contributed equally to the GHI score, with a higher score indicating greater hunger and poorer performance.

However, the revised methodology, implemented from 2016 onwards, assigns different weights to these components and standardizes them. The new formula is as follows:

$$\text{GHI} = 1/3 * [\text{Standardized PUN}] + 1/6 * [\text{Standardized CWA}] + 1/6 * [\text{Standardized CST}] + 1/3 * [\text{Standardized CM}]$$

Here's how the components are adjusted under the new methodology:

- PUN is standardized by multiplying it by (100/80).
- CWA (prevalence of wasting in children under five) is standardized by multiplying it by (100/30).
- CST (prevalence of stunting in children under five years old) is standardized by multiplying it by (100/70).
- CM (proportion of children dying before the age of five) is standardized by multiplying it by (100/35).

All three index components are calculated in percentages, and after standardization, they are combined using principal component analysis. This approach assumes that each component should not be equally weighted, leading to a more nuanced assessment. A higher GHI score still indicates higher levels of hunger, with a score of 100 signifying poor performance and 0 representing the best performance in combating hunger.

$$\text{GHI} = 1/3 * [\text{Standardized PUN}] + 1/6 * [\text{Standardized CWA}] + 1/6 * [\text{Standardized CST}] + 1/3 * [\text{Standardized CM}]$$

In the above formula PUN means the adult undernutrition (AU). Where CWA and CST are the child malnutrition(CU). And third one CM means the child mortality is not an indicator of child but it reflect health and socioeconomic Indicator (HIS) of a society. Then we get

$$\text{GHI} = 1/3 * [\text{Standardized AU}] + 1/6 * [\text{Standardized CU}] + 1/6 * [\text{Standardized CU}] + 1/3 * [\text{Standardized HIS}]$$

$$\text{Or, GHI} = 1/3 * [\text{Standardized AU}] + 1/3 * [\text{Standardized CU}] + 1/3 * [\text{Standardized HIS}]$$

Above formula of GHI shows that formula is equally adjointed child related variable, adult related variables and as well as the socio-economic variables.

5. Empirical Findings:

Many of our researcher argument that the wasting rate in India is high. Using above methodology and putting the value of the Poshon tracker value. Which is shown in below table.

Table-2 (Calculation of GHI using methodology)

India(GHI)	Under five mortality rate	Wasting	Stunting	% of under nutrition	PUN	CWA	CST	CM	GHI Value
Using NFHS-5 data	3.10	18.70	35.50	16.60	20.75	62.33	50.71	8.86	28.71
Using Poshan Tracker	3.10	6.00	39.00	16.60	20.75	20.00	55.71	8.86	22.49

Source: <https://www.globalhungerindex.org/ranking.html> and <https://www.poshantracker.in/statistics>

This study scrutinizes the reduction in wasting percentages among children under the age of five by comparing data from two comprehensive sources: the National Family Health Survey-5 (NFHS-5)⁴ and the Poshan Tracker⁵. Wasting rates, a critical measure of child malnutrition, exhibit a notable decline in the transition from NFHS-5 to Poshan Tracker data. However,

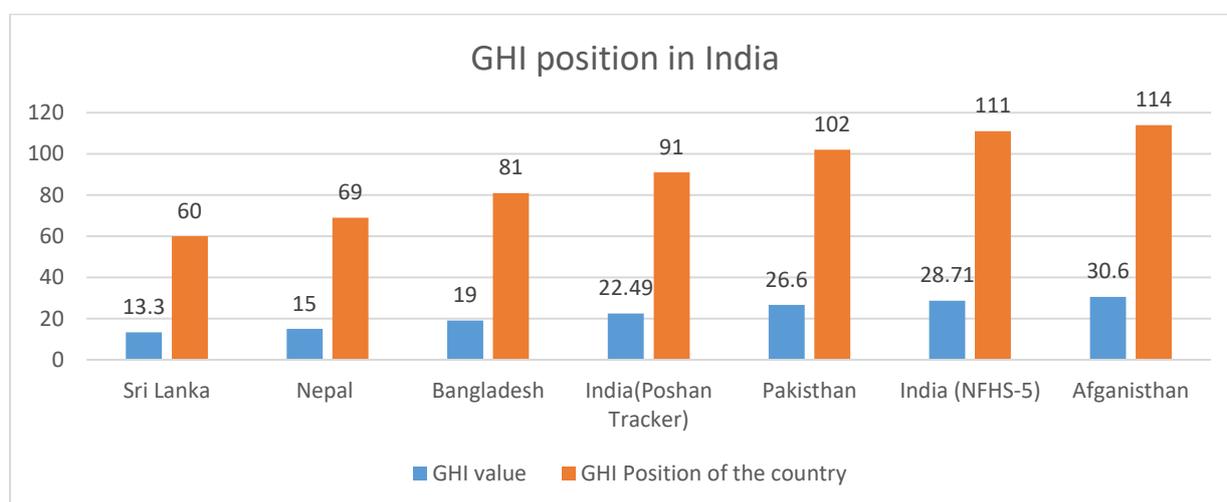
⁴ <https://main.mohfw.gov.in/sites/default/files/NFHS-5>

⁵ <https://www.poshantracker.in>

what is particularly intriguing is the fact that while wasting rates have decreased significantly, the GHI value of India has reduced by only 21.66%. This suggests that the GHI does not solely depend on the wasting rate.

India, post-independence in 1947, faced hunger challenges, with leaders emphasizing agriculture's importance. Despite becoming self-sufficient in food production and exports, 14% remain undernourished. India must transition from food to nutritional security through research and policy to eliminate hunger. Pampori, Z. A. (2021).

Food security, a fundamental human right, remains a global concern due to hunger and malnutrition driven by poverty and unemployment. India ranks 107 out of 121 countries in the Global Hunger Index 2022, despite the National Food Security Act 2013. Strengthening the public distribution system is crucial for addressing this challenge. Ramani, B. M. (2023).



Source: <https://www.globalhungerindex.org/ranking.html>

Many researchers argue that the Global Hunger Index (GHI) fails to fully consider the most up-to-date wasting rates in India. However, the latest data show a slight improvement in India's position on the hunger index. According to the National Family Health Survey (NFHS) data, India performs better than only its neighboring country, Afghanistan. Yet, when we examine data from the Poshon Tracker, which encompasses wasting and stunting indicators, India surpasses only Pakistan and Afghanistan. This indicates that India still faces significant challenges in addressing malnutrition. Importantly, India lags behind countries like Sri Lanka, Bangladesh, and Nepal, underscoring the persistent issue of malnutrition in the nation.

6. Conclusion

The Global Hunger Index has been a valuable tool for raising awareness about the critical issue of hunger and malnutrition worldwide. However, in the context of India, criticisms have been raised regarding its methodology, data quality, and the weighting of variables. It is essential to consider these concerns seriously, especially when crafting policies and strategies to combat malnutrition in the country.

While GHI has its limitations, it remains an important benchmark for assessing hunger and malnutrition, drawing attention to areas that need improvement. The paper proposes enhancing the Global Hunger Index by incorporating indicators directly related to hunger, such as dietary intake and food access behaviors, through computer-based statistical techniques like simulation to provide a more accurate assessment of hunger. Nigam, A. K. (2019).

Initiatives like the Poshan Tracker are steps in the right direction, ensuring that more recent and accurate data is used in the evaluation of hunger in India. Ultimately, the GHI should be viewed as a valuable tool but should be complemented by other indicators and research to provide a comprehensive understanding of the complex issue of hunger and malnutrition in India.

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