

Review Article

A comparative study of National Family Health Survey-4 and National Family Health Survey-5 on nutritional indicators in Assam

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ABSTRACT

When evaluating the health and wellbeing of children, nutritional indicators are essential. The National Family Health Surveys (NFHS) in India offer thorough data on these metrics. The nutritional status of Assamese children under five from NFHS-4 (2015–16) and NFHS-5 (2019–21) is examined in this study. This comparative study aimed at understanding the changes in indicators of nutrition, such as stunting, wasting, and prevalence of underweight among children aged below five years in Assam through data comparison in NFHS-4 and NFHS-5. Regional differences and trends in access to healthcare were explored in the study. The study discovered a range of nutritional consequences. Stunting decreased little from 36.4% to 35.3%, whereas wasting increased sharply from 17% to 21.7%. Additionally, the prevalence of underweight rose from 29.8% to 32.8%. There were still regional disparities, with the Barak Valley showing concerning high levels of hunger. Nutritional outcomes have remained unchanged or worsened in spite of improvements in mortality rates and access to healthcare. The results highlight the significance of focused efforts on Assamese regional disparities, sanitation, and food security. Increasing acute malnutrition necessitates policy adjustments targeted at high-burden areas, notwithstanding improvements in healthcare access and mortality declines.

Keywords: Nutritional indicators, National Family Health Survey, Assam, Stunting, Wasting, Underweight, Healthcare access

INTRODUCTION

Nutrition is an essential component of health and development. Better nutrition is associated with better infant, child, and maternal health, stronger immune systems, low-risk pregnancy and childbirth, decreased risk of non-communicable diseases, and long-livedness.¹ Malnutrition in mothers and children was accountable for 2.4 million of the 4.7 million deaths of children under 5 years of age in 2021.² Children who are underweight or malnourished and do not develop at an ideal rate are more prone to infection and disease in their neonatal and infancy period. "Wasting," or "stunting," are responsible for countless deaths.³ Malnutrition refers to deficiencies, exorbitant, or imbalances in a person's consumption of nutrients.⁴ Some studies have emphasized the combination of undernutrition, micronutrient insufficiency, and obesity—the triple burden of malnutrition (TBM) in

children.⁵ Nearly one in three people suffers from malnutrition in some way or other, according to the 2016 World Health Organization (WHO) and United Nations (UN) report. Child malnutrition has serious repercussions that go beyond public health, as it is a major contributor to death for children under 5 years in developing countries.⁶ Studies show that in low- and middle-income countries (LMICs), an unimaginable 38.8% of children experience stunting, 27.5% experience underweight, and 12.9% experience wasting.⁷ While the double burden has been thoroughly researched in developing countries, including India, the upcoming risk of the triple burden—where obesity, undernutrition, and micronutrient deficiencies exist simultaneously—remains unknown.⁸ Undernutrition and malnutrition have been prolonged challenges in India, but now the increasing burden of obesity is adding an increased complexity to the country's health threat.^{9,10} Despite the government's ongoing efforts through various

nutrition programs, Assam remains one of the Indian states struggling with the insistent challenges of malnutrition. The National Family Health Survey (NFHS) is a large-scale survey carried out in multiple rounds that provides important health data at the national, state, and district levels across India. The objective of this study is to give out a comprehensive analysis of nutritional indicators of children under 5 with the target of districts in Assam with high prevalence rates, using data from NFHS-4 and NFHS-5.

METHODS

We compared the summary data of NFHS-5 and NFHS-4 with the state and district fact sheets of Assam published by the International Institute for Population Sciences (IIPS). The NFHS is a cross-sectional survey that uses a multistage sampling design to select a representative sample of households. In this study, we included nutritional indicators of under 5 children namely, children under 5 years who are stunted, children under 5 years who are wasted, and children under 5 years who are underweight and overweight. Data from both NFHS-4 and NFHS-5 were used to prepare maps and figures.

Sample selection

Rural areas

In rural areas, sample selection process for NFHS-5 involved 2 main stages. The first stage was the selection of primary sampling units (PSUs), which were primarily villages chosen using a probability proportional to size (PPS) method.

Urban areas

For urban areas, the sampling frame was derived from lists of households within the respective urban localities. Similar to rural methodology, PPS methods was utilised to select households, ensuring that each urban area's demographic characteristics were adequately represented.

Data collection

Data collection for both NFHS-4 and NFHS-5 was conducted through structured household interviews. Interviews focused on a range of health and demographic topics, including fertility, infant and child mortality, reproductive health, nutrition, and utilization and quality of health services. Interviews were administered to eligible women, aged 15-49 years and men, aged 15-54 years achieving response rate of 97% and 92% in NFHS-5.

RESULTS

Table 1 presents the data from NFHS-4 and NFHS-5 regarding the percentage of children who are stunted (as per the WHO standards) in different districts of Assam. In many districts, the percentage of children who are stunted

increased between NFHS-4 and NFHS-5. Some districts such as Bongaigaon and Darrang have high rates (over 40%); while some districts like Kamrup Metropolitan and Golaghat have low rates (below 30%).

Table 1: Children under 5 years who are stunted (height-for-age) in percentage for all the districts of Assam.

District	NFHS 4	NFHS 5
Baksa	32.4	41.2
Barpeta	41.7	29.8
Biswanath	N/A	42.7
Bongaigaon	39.1	46.2
Cachar	36.3	28.7
Charaideo	N/A	39
Chirang	40.1	42.7
Darrang	43.5	42
Dhemaji	35.5	37.2
Dhubri	N/A	48.5
Dibrugarh	33.3	27.3
Dima Hasao	34.7	30.6
Goalpara	42.7	38.9
Golaghat	32.6	26.3
Hailkandi	38.1	42.9
Hojai	N/A	39.3
Jorhat	N/A	38.7
Kamrup Metropolitan	24.6	25.4
Kamrup	33.3	22.6
Karbi Anglong	N/A	31.6
Karimganj	42.3	29.1
Kokrajhar	30.6	34.6
Lakhimpur	29.3	38.5
Majuli	N/A	35.4
Morigaon	38.4	43.2
Nagaon	N/A	38.9
Nalibari	26.8	27.5
Sivasagar	N/A	26.1
Sonitpur	N/A	36.7
South Salmara	N/A	38.9
Tinsukia	36	32.8
Udalguri	39.1	33.8
West Karbi Anglong	N/A	40.9

Children under 5 years who are stunted (height-for-age) (%); wasted: considered below -2 standard deviation, based on WHO standard

In many districts in Assam, there has been a rising trend in the prevalence of children who are stunted. This is shown in Figure 1.

Table 2 presents the data from NFHS-4 and NFHS-5 regarding the percentage of children who are wasted (as per the WHO standards) in different districts of Assam. In many districts, the percentage of children who are wasted increased between NFHS-4 and NFHS-5. There are significant variations in some districts of Assam. Some

districts like Karimganj have high rates (over 40%); while others like Dhemaji and Hojai have low rates (below 30%).

Table 2: Children under 5 years who are wasted (weight-for-height) in percentage for all the districts of Assam.

District	NFHS 4	NFHS 5
Baksa	10.5	17
Barpeta	16.6	19.5
Biswanath	N/A	27.1
Bongaigaon	23.6	20.2
Cachar	30.6	30.7
Charaideo	N/A	23.5
Chirang	13	19.5
Darrang	19.2	27
Dhemaji	6.2	18.3
Dhubri	N/A	21.5
Dibrugarh	22.4	20.6
Dima Hasao	6.3	23.6
Goalpara	22.1	24.3
Golaghat	13.9	19.2
Hailkandi	19.1	22.2
Hojai	N/A	12.7
Jorhat	N/A	15.5
Kamrup Metropolitan	11	18.2
Kamrup	18.8	14.8
Karbi Anglong	N/A	17.2
Karimganj	17.6	48
Kokrajhar	15.7	20.5
Lakhimpur	11.2	18.2
Majuli	N/A	14.1
Morigaon	10.3	16.1
Nagaon	N/A	19.4
Nalibari	15.3	15.4
Sivasagar	N/A	21.1
Sonitpur	N/A	13.1
South Salmara	N/A	18.2
Tinsukia	14.8	21.5
Udalguri	18.3	21.3
West Karbi Anglong	N/A	23.2

Children under 5 years who are wasted (weight-for-height) (%); wasted: considered below -2 standard deviation, based on WHO standard

Districts like Cachar, Karimganj, Biswanath, and Darrang particularly show high rates of wasting, suggesting a need for tailored interventions in these areas. The prevalence rates of children who is wasted are shown in Figure 2.

Table 3 presents the data from NFHS-4 and NFHS-5 regarding the percentage of children under 5 years' old who are underweight (low weight-for-age) (as per the WHO standards) in different districts of Assam. There are significant variations in underweight rates in Assam. The percentage of underweight children is high in some districts like Hailakandi and Karimganj (over 50%); while

in some districts Dhemaji and Sonitpur have low prevalence rates of underweight (below 25%).

Table 3: Children under 5 years who are underweight (weight-for-age) in percentage for all the districts of Assam.

District	NFHS 4	NFHS 5
Baksa	22.4	34
Barpeta	33.1	26.2
Biswanath	N/A	41
Bongaigaon	32.9	35.3
Cachar	36.3	38.2
Charaideo	N/A	34.8
Chirang	24.7	39.7
Darrang	37.9	33.1
Dhemaji	15.8	25.7
Dhubri	N/A	37.8
Dibrugarh	33	32
Dima Hasao	18.2	21.7
Goalpara	39.5	35.4
Golaghat	20.2	25.5
Hailkandi	32.5	42.4
Hojai	N/A	28.4
Jorhat	N/A	33.2
Kamrup Metropolitan	23.2	25
Kamrup	29.6	19.7
Karbi Anglong	N/A	28.2
Karimganj	35.6	52.9
Kokrajhar	27.1	35.2
Lakhimpur	24.2	34.4
Majuli	N/A	22.2
Morigaon	25.8	30.5
Nagaon	N/A	32.4
Nalibari	20	26.7
Sivasagar	N/A	25.9
Sonitpur	N/A	21.9
South Salmara	N/A	27.9
Tinsukia	32.7	32.2
Udalguri	31.8	32.5
West Karbi Anglong	N/A	31.1

Children under 5 years who are underweight (weight-for-age) (%); wasted: considered below -2 standard deviation, based on WHO standard

The variations regarding the prevalence rates of underweight children are shown in Figure 3. Some districts like Kamrup and Morigaon show a decrease in the underweight prevalence between the two surveys.

Table 4 presents the data from NFHS-4 and NFHS-5 regarding the percentage of children under 5 years old who are overweight (high weight-for-height) (as per the WHO standards) in different districts of Assam. Some of the districts like Dima Hasao, Baksa Kamrup Metropolitan, and Hojai show a significant increase in overweight rates between the two surveys NFHS-4 and NFHS-5.

The variations regarding the prevalence rates of overweight children are shown in Figure 4.

Some districts show an increased prevalence of overweight children which suggests a need for targeted interventions to tackle the growing problem of childhood obesity.

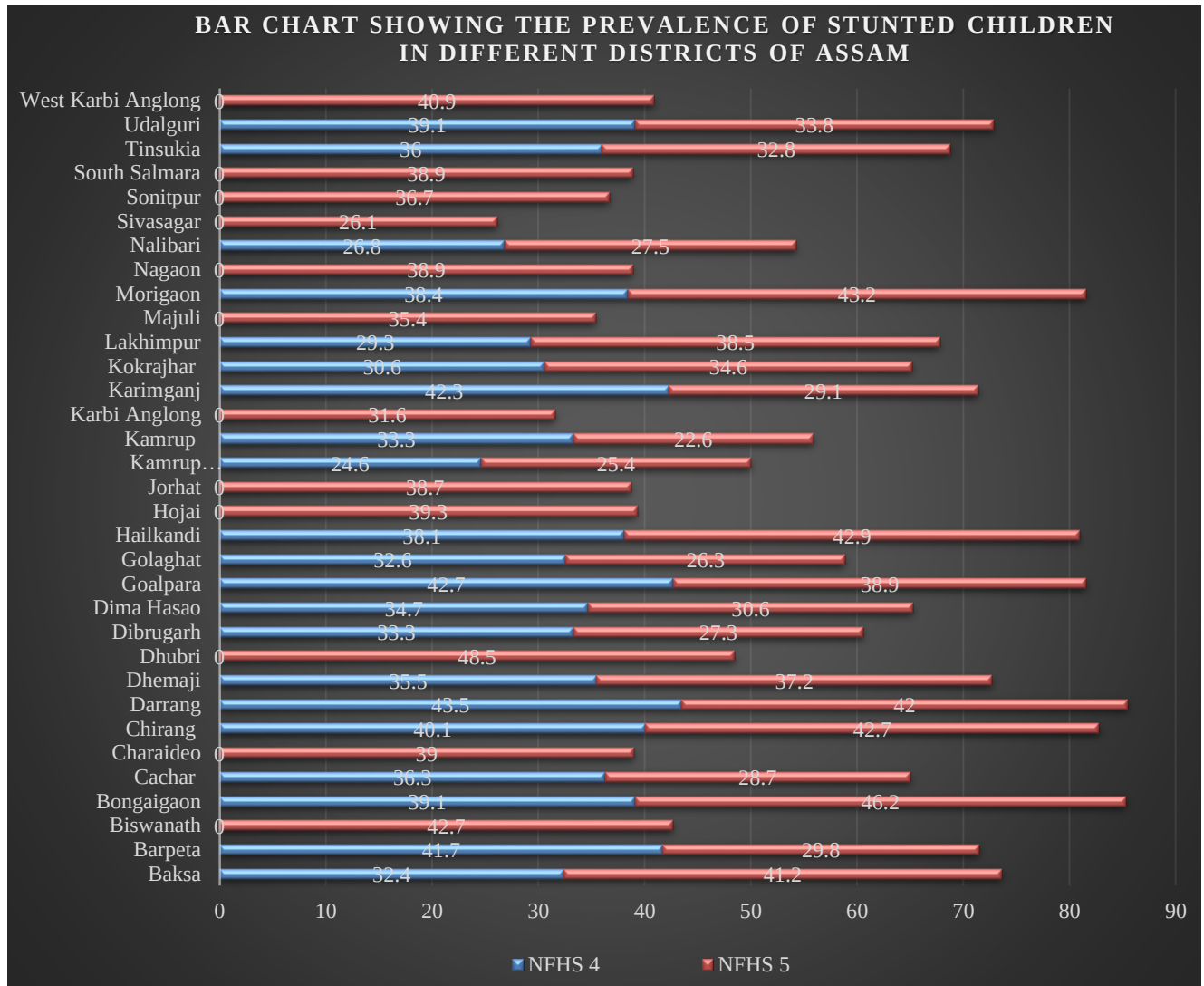


Figure 1: Percentage of children under 5 years who are stunted in all the districts of Assam.

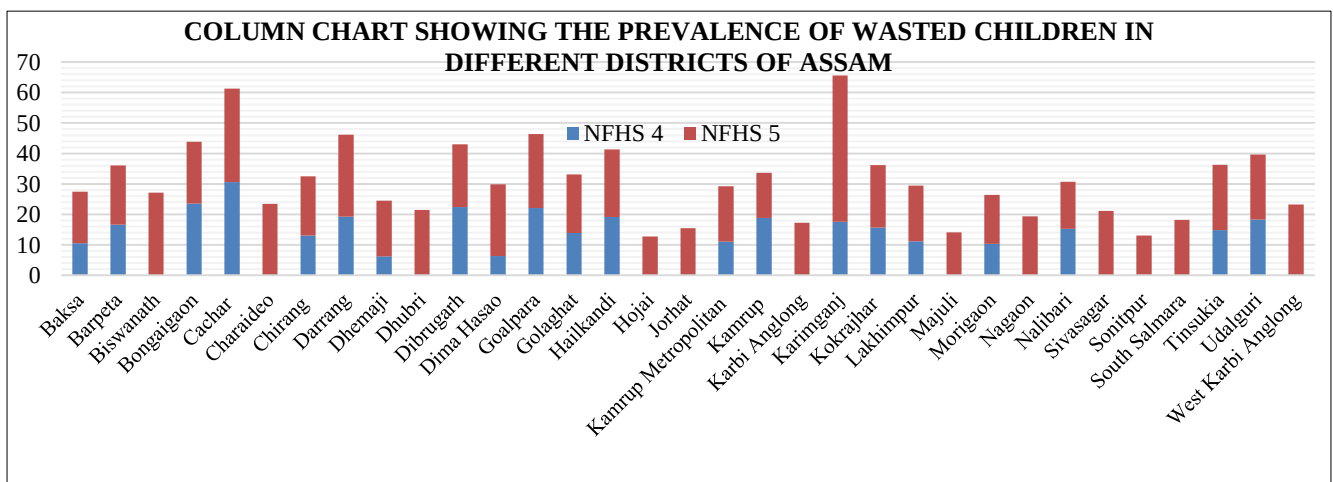


Figure 2: Percentage of children under 5 years who are wasted in all the districts of Assam.

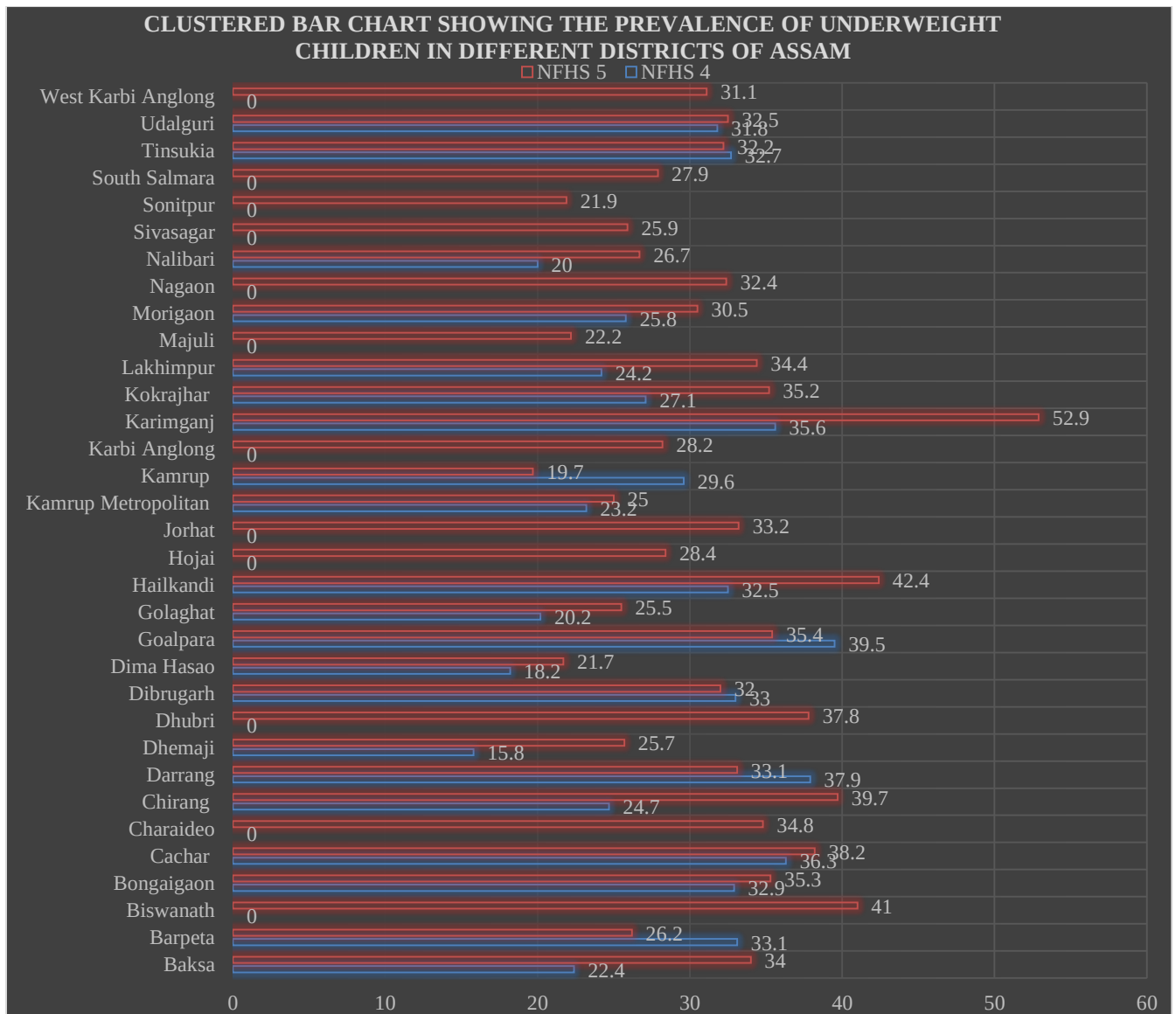


Figure 3: Percentage of children under 5 years who are underweight in all the districts of Assam.

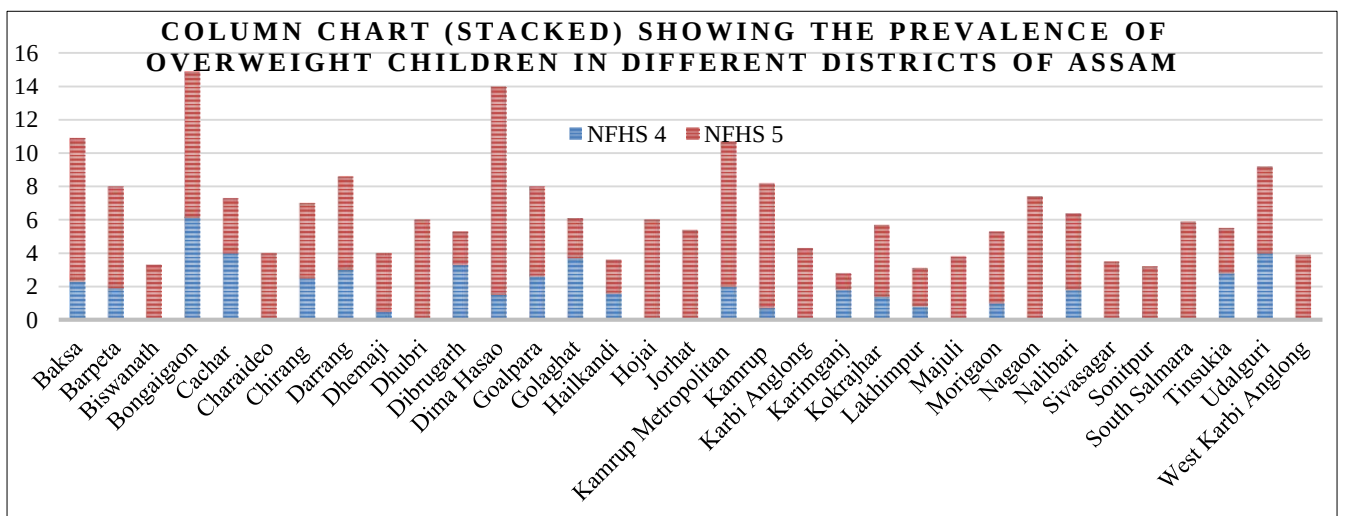


Figure 4: Percentage of children under 5 years who are overweight in all the districts of Assam.

Table 4: Children under 5 years who are overweight (weight-for-height) in percentage for all the districts of Assam.

District	NFHS 4	NFHS 5
Baksa	2.3	8.6
Barpeta	1.9	6.1
Biswanath	N/A	3.3
Bongaigaon	6.1	8.8
Cachar	4	3.3
Charaideo	N/A	4
Chirang	2.5	4.5
Darrang	3	5.6
Dhemaji	0.5	3.5
Dhubri	N/A	6
Dibrugarh	3.3	2
Dima Hasao	1.5	12.5
Goalpara	2.6	5.4
Golaghat	3.7	2.4
Hailkandi	1.6	2
Hojai	N/A	6
Jorhat	N/A	5.4
Kamrup Metropolitan	2	8.7
Kamrup	0.7	7.5
Karbi Anglong	N/A	4.3
Karimganj	1.8	1
Kokrajhar	1.4	4.3
Lakhimpur	0.8	2.3
Majuli	N/A	3.8
Morigaon	1	4.3
Nagaon	N/A	7.4
Nalibari	1.8	4.6
Sivasagar	N/A	3.5
Sonitpur	N/A	3.2
South Salmara	N/A	5.9
Tinsukia	2.8	2.7
Udalguri	4	5.2
West Karbi Anglong	N/A	3.9

Children under 5 years who are overweight (weight-for-height) (%); wasted: considered above +2 standard deviations, based on the WHO standard

DISCUSSION

The comparative analysis of NFHS-4 and NFHS-5 reveals critical insights into nutritional indicators of children under 5 years of age in Assam. Both surveys contribute to understanding the evolving landscape of child nutrition with NFHS-4 conducted in 2015-2016 and NFHS-5 conducted in 2019-2021. The data collected from these rounds highlights significant trends and persistent challenges in child health and nutrition across the state.

Nutritional indicators

The nutritional status of children in Assam as indicated by NFHS-4 and NFHS-5, demonstrates slight improvements

in certain areas, such as reduction in stunting and underweight rates. NFHS-4 reported stunting at 38%, and underweight at 36%, while NFHS-5 indicated a decrease to 36% and 32% respectively in India.¹²

However, these changes, while promising, suggest that the progress is not drastic and raise concerns regarding the long-term effectiveness of interventions aimed at improving child nutrition.

Socio-economic factors

A notable finding is the impact of socio-economic factors on child nutrition. The data indicates that maternal education, wealth index, and improved sanitation facilities are crucial determinants of the nutritional status of children.¹³ For instance, studies have shown that increased maternal education correlates with better child health outcomes, which reinforces the need for targeted educational programs as part of public health initiatives. Moreover, improved sanitation and access to clean drinking water are vital in reducing malnutrition and associated health issues like diarrhoeal disease, particularly in underprivileged regions.^{14,15}

Addressing malnutrition

Despite the slight improvements observed, malnutrition remains a major public health concern in Assam. The prevalence of anemia among children and women continues to be alarmingly high, indicating a need for more focused interventions addressing micronutrient deficiencies.¹⁶

NFHS-5 data emphasizes the importance of iron and folic acid supplementation for pregnant women to combat anemia, suggesting that enhancing access to these resources could significantly improve health outcomes.¹⁵

Government initiatives

The Integrated Child Development Services (ICDS) Scheme and the POSHAN Abhiyaan, which was introduced to offer a comprehensive strategy to combat malnutrition through focused interventions and an emphasis on maternal and child health, are two programs that have played a significant role in these advancements. Millions of people are now covered by the ICDS program, which offers vital services like schooling, health examinations, and supplemental nourishment.

In the meantime, the National Nutrition Mission, which was reintroduced in 2018, focuses on using evidence-based practices to improve nutritional outcomes and decrease stunting. Currently, the umbrella scheme for nutrition in India is Poshan 2.0 and Saksham Anganwadi which is being implemented in various parts of the country with a special focus on maternal nutrition, infant and young child feeding practices, severe acute malnutrition as well as moderate acute malnutrition in children.

CONCLUSION

The findings from both NFHS-4 and NFHS-5 highlight the importance of integrating nutritional programs with broader health initiatives. Policymakers are encouraged to leverage the data from these surveys to identify specific areas requiring intervention and to develop comprehensive strategies that tackle the underlying socio-economic factors contributing to malnutrition. Furthermore, strengthening collaborations with national health programs can enhance the effectiveness of initiatives aimed at improving child nutrition.

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