IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Assessing The Nutritional Status Of Children In Assam: An Economic Perspective

Nilakshi Kalita

Research Scholar, Department of Economics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Dr.R.K.Nagwanshee

Associate Professor, Department of Economics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Abstract

The nutritional status of children serves as a critical indicator of human development, reflecting both the health outcomes and the socio-economic conditions of a region. Assam, despite being rich in natural resources and cultural diversity, continues to face serious challenges of child malnutrition, manifested through high rates of stunting, wasting, and underweight among children under five years of age. The present study, *"Assessing the Nutritional Status of Children in Assam: An Economic Perspective,"* was undertaken. The study is based on secondary data from the National Family Health Survey (NFHS-5) and district-level statistical reports. Nutritional indicators such as stunting, wasting, and underweight prevalence were standardized into Z-scores, and a composite malnutrition score was derived.

Hypothesis testing was conducted using SPSS software. One-sample t-tests were used to compare Kamrup Metropolitan and Dhubri districts with the rest of Assam, while independent samples t-tests were employed to assess differences between Central and Upper Assam divisions and other divisions. Results revealed no significant differences between Kamrup Metropolitan and Dhubri districts vis-à-vis the rest of Assam, although divisional analysis indicated that Central and Upper Assam had significantly lower composite malnutrition scores than other regions. These findings underscore the importance of regional disparities in child nutrition and highlight the need for policy interventions that are sensitive to both economic and geographical contexts.

Keywords: Child Nutrition**,** Assam**,** Malnutrition Indicators**,** Economic Perspective**,** SPSS Analysis

1. Introduction

The nutritional status of children in Assam is a multifaceted issue that intertwines economic, social, and environmental factors. The literature on this topic reveals significant insights into the determinants of child nutrition, particularly within the context of socio-economic disparities and cultural influences.

The foundational work by Islam, Mahanta, Sarma, and Hiranya (Islam et al., 2014) provides a critical examination of the nutritional status of under-five children from tribal populations in the riverine (Char) areas of Dibrugarh District, Assam. Their study highlights the unique challenges faced by these communities, primarily attributed to geographical and socio-economic constraints that exacerbate malnutrition rates. This research sets the stage for understanding the broader implications of economic conditions on child nutrition in Assam. A strong correlation exists between socio-economic status (SES) and malnutrition, with children from poorer households exhibiting significantly higher rates of stunting and underweight (Kanjilal et al., 2010) (Prasad et al., 2015).

Building on this understanding, Sahu et al. (Kumar Sahu et al., 2015) delve deeper into the economic perspective of malnutrition among children in Assam, identifying key factors that contribute to nutritional deficiencies. Their findings emphasize the importance of growth monitoring and maternal influences, alongside household dynamics that affect child nutrition. The study brings to light the significance of traditional food interventions aimed at improving essential nutrient intake, while also addressing the socio-economic inequalities that persist in the region. The authors' exploration of anthropometric measurements further enriches our understanding of how these factors interplay to shape the nutritional landscape for children in Assam.

In a broader context, Hinnig et al. (de FragasHinnig et al., 2018) present a systematic review that examines dietary patterns across countries with varying levels of human development. This study underscores the relationship between parental education and dietary choices, revealing that higher socio-economic status often correlates with healthier eating habits. While this research does not focus exclusively on Assam, it provides valuable insights into how socio-economic status can influence dietary patterns, which is crucial for understanding the nutritional challenges faced by children in the region.

Nie et al. (Nie et al., 2019) expand the discussion by employing a decomposition approach to analyze changes in child nutrition in India. Their research highlights the increasing inequalities faced by vulnerable groups, particularly girls and those from lower socio-economic backgrounds. The authors point out that access to government programs can mitigate some of these disparities, indicating the importance of policy interventions. Furthermore, they explore the role of maternal autonomy in improving child nutritional outcomes, which is particularly relevant in the context of Assam's socio-cultural landscape.

Access to resources and education, particularly for parents, plays a crucial role in determining children's nutritional outcomes (Islam et al., 2014) (Kanjilal et al., 2010). Hossain (SakhawotHossain, 2022) investigates the intersection of household income, food insecurity, and nutrition among Bangladeshi youth, although the findings can be extrapolated to similar contexts in Assam. This study emphasizes the critical role of economic factors in shaping dietary habits and highlights the broader implications of food insecurity on health inequities among children.

2. Literature Review

The paper focuses on nutritional status in North Sumatra, not Assam. It highlights maternal education, parental income, and eating patterns as significant factors affecting children's nutritional status, emphasizing the need for family-based interventions and government support for low-income families (Masdalena&Nadapdap, 2023).

The study concluded that the prevalence of stunting was lower than that of underweight, suggesting that the children's current nutritional status is more impacted than their long-term exposure to undernutrition. Both underweight and stunting were found to be more prevalent among boys compared to girls (Begum, G., 2019)

The paper emphasizes that addressing child stunting through nutrition interventions in regions like Assam can yield substantial economic returns, enhancing productivity and wages, particularly when combined with efforts to improve gender equality, sanitation, and reduce poverty (McGovern et al., 2017).

In summary, the study highlights a high prevalence of malnutrition, including low BMI, stunting, thinness, and anemia, among adolescent girls in urban slums, with a strong correlation to lower socioeconomic status and factors like worm infestation. For adolescents aged 15-19 years, the prevalence of stunting was 22.88% and thinness was 25.13%. In the younger age group of 10-14 years, stunting was more prevalent at 29.10%, while thinness was 15.50%. Among the 400 respondents, 34.75% had a BMI within the 15th-50th percentiles of the reference value, while 20.00% were found to be below the 5th percentile (Deka et al., 2016).

The concentration index indicates that economic inequalities exacerbate malnutrition, particularly in Assam, where poor households face a disproportionate burden (Prasad et al., 2015).

The riverine char areas present unique challenges, including isolation from health services due to flooding, which further complicates nutritional interventions (Islam et al., 2014).

The body composition and nutritional status of the children and adolescents examined were found to be 'markedly unsatisfactory' when assessed using upper-arm composition, Upper-Arm Muscle Area by Height (UAMAH), and thinness measures. The combination of upper-arm composition and conventional anthropometric measures is suggested to be a 'useful' approach for assessing body composition and nutritional status (Singh &Mondal, 2014).

In Dibrugarh district, underweight, stunting, and wasting rates among children under five were reported at 29%, 30.4%, and 21.6%, respectively (Islam et al., 2014).

The paper highlights that children in Assam, particularly from poorer socio-economic backgrounds, face a disproportionate burden of malnutrition, emphasizing the need for state-specific policies to address economic inequalities affecting childhood nutritional status in the region (Kanjilal et al., 2010).

The study assesses malnutrition in Assam using weight-for-height, height-for-age, and weight-for-age indices, highlighting socioeconomic factors like parental education and household living standards. It reveals varying significance of these factors compared to West Bengal, indicating distinct regional influences on nutritional status (Som et al., 2006).

Among school-age children (6-14 years) of tea garden workers, malnutrition rates were even higher, with underweight at 51.7% and stunting at 47.4% (Medhi et al., 2006).

3. Objectives

1. To Study the Nutritional status of Children in Districts of Assam and to compare the mean composite malnutrition score of districts in Central and Upper Assam divisions with that of districts in the remaining divisions of Assam

2. To examine whether the nutritional indicators of Kamrup Metropolitan district differ significantly from those of the rest of the districts of Assam

   2.1 To assess the prevalence of stunted children in Kamrup Metropolitan district in comparison with the rest of Assam.

   2.2 To evaluate the prevalence of wasted children in Kamrup Metropolitan district in comparison with the rest of Assam.

   2.3 To analyze the prevalence of underweight children in Kamrup Metropolitan district in comparison with the rest of Assam.

3. To investigate whether the nutritional indicators of Dhubri district differ significantly from those of the rest of the districts of Assam

   3.1 To assess the prevalence of stunted children in Dhubri district in comparison with the rest of Assam.

   3.2 To evaluate the prevalence of wasted children in Dhubri district in comparison with the rest of Assam.

   3.3 To analyze the prevalence of underweight children in Dhubri district in comparison with the rest of Assam.

4. Hypothesis

1. The mean composite malnutrition score of districts in Central and Upper Assam divisions did not differ significantly from that of districts in the remaining divisions of Assam
2. There is no significant difference in the selected nutritional indicators between Kamrup Metropolitan district and the rest of the districts of Assam taken together
   i. There is no significant difference in the prevalence of stunted children between Kamrup Metropolitan district and the rest of the districts of Assam taken together
   ii. There is no significant difference in the prevalence of wasted children between Kamrup Metropolitan district and the rest of the districts of Assam taken together
   iii. There is no significant difference in the prevalence of underweight children between Kamrup Metropolitan district and the rest of the districts of Assam taken together
3. There is no significant difference in the selected nutritional indicators between Dhubri district and the rest of the districts of Assam taken together
   i. There is no significant difference in the prevalence of stunted children between Dhubri district and the rest of the districts of Assam taken together
   ii. There is no significant difference in the prevalence of wasted children between Dhubri district and the rest of the districts of Assam taken together
   iii. There is no significant difference in the prevalence of underweight children between Dhubri district and the rest of the districts of Assam taken together

5. Research Methodology

a) Research Design

The study adopted an **analytical and comparative research design** with a quantitative approach. The primary focus was to assess the nutritional status of children in Assam and to examine whether significant differences exist across selected districts and divisions when compared to the state average. The study also aimed to explore the association between economic and nutritional indicators, thereby providing an economic perspective to child malnutrition in Assam.

b) Data Collection

The study was based on **secondary data**, collected from the *National Family Health Survey (NFHS-5)* and related official sources such as reports from the Ministry of Health and Family Welfare (MoHFW), Government of Assam, and district-level health and demographic statistics. Data on child nutritional indicators—**stunting, wasting, underweight, and overweight prevalence**—were extracted at the district level. These indicators were further standardized into **Z-scores**, and a **composite malnutrition score** was calculated to allow for meaningful inter-district and inter-divisional comparisons.

c) Sample and Coverage

The analysis covered all districts of Assam as per the latest NFHS dataset. For hypothesis testing, Kamrup Metropolitan and Dhubri districts were specifically compared against the aggregated data of the rest of the districts. For divisional analysis, districts were grouped into **Central Assam, Upper Assam, and other divisions** in order to test for significant inter-divisional differences in malnutrition outcomes.

6. Results, Hypothesis Testing and Data Interpretation

6.1. Testing of Hypothesis 1 and Data Interpretation(Independent Samples Test)

Table 1: Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Composite Score	1	15	-.2148	.40941	.10571
	2	18	.1884	.61215	.14428

Source: NFHS – 5; Author's Calculation

Table 2: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Composite Score	Equal variances assumed	2.746	.108	-2.175	31	.037	-.40317	.18539	-.78126	-.02507
	Equal variances not assumed			-2.254	29.742	.032	-.40317	.17886	-.76859	-.03774

Source: NFHS – 5; Author's Calculation

Child anthropometric data from the National Family Health Survey (NFHS) has been used to construct a district-level composite malnutrition score. For each district; weighted prevalence (%) of stunting, wasting, underweight and overweight has been calculated. The severe-wasting indicator was excluded because it is a subset of wasting, has low prevalence producing unstable estimates, and is highly collinear with the wasting indicator, which would lead to double-counting in a composite measure. Each district's prevalence was standardized to a z-score (indicator mean subtracted and divided by indicator SD across districts). The formula used for the calculation of Z-score is:

$$Z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j}$$

The composite malnutrition score was computed as the simple mean of the four z-scores so that each indicator contributed equally. The composite score is calculated by the formula:

$$Composite_i = \frac{z_{i,\,stunt} + z_{i,\,waste} + z_{i,\,underweight} + z_{i,\,overweight}}{4}$$

Higher composite values indicate worse malnutrition. The mean composite score between two groups has been compared (i.e. The mean composite malnutrition score of districts in Central and Upper Assam divisions did not differ significantly from that of districts in the remaining divisions of Assam) using an

independent-samples t-test (two-sided). We report mean differences, 95% confidence intervals and p-values. Statistical significance was set at $\alpha = 0.05$

The independent samples t-test was conducted to examine whether the mean composite malnutrition score of districts in Central and Upper Assam divisions differed significantly from that of the remaining divisions of Assam. Levene's test indicated that the assumption of equal variances was satisfied ($F = 2.746$, $p = 0.108$). The results of the t-test showed a statistically significant difference in the composite scores between the two groups ($t(31) = -2.175$, $p = 0.037$), with a mean difference of -0.40317. The 95% confidence interval for the difference (-0.78126, -0.02507) further confirmed that the difference was not due to chance.

This implies that the composite malnutrition score is significantly lower in Central and Upper Assam divisions compared to the rest of the divisions of Assam. In other words, children in these two divisions appear to experience relatively better nutritional outcomes than those in other regions of the state. Thus, (since $p < 0.05$) the null hypothesis that there is no significant difference in composite malnutrition scores between these divisions and the remaining divisions of Assam is rejected.

6.2. Testing of Hypothesis 2 and Data Interpretation[through one sample t-test (Kamrup Metropolitan]

i. Stunted

Table 3: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Stunted	32	36.0188	6.53035	1.15441

Source: NFHS – 5; Author's Calculation

Table 4: One-Sample Test

	Test Value = 25.40					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Stunted	9.198	31	.000	10.61875	8.2643	12.9732

Source: NFHS – 5; Author's Calculation

A one-sample *t*-test was performed to assess whether the prevalence of stunted children in the rest of the districts of Assam differs significantly from that of Kamrup Metropolitan district (test value = 25.40). The null hypothesis stated that there is no significant difference in the prevalence of stunted children between Kamrup Metropolitan district and the rest of the districts of Assam taken together.

The analysis was based on 32 observations, with a mean prevalence of stunting of 36.02 (SD = 6.53). The results show that the observed mean was significantly higher than the test value, $t(31) = 9.198$, $p < .001$. The

mean difference was 10.62, with a 95% confidence interval ranging from 8.26 to 12.97. Since the confidence interval does not include zero, the difference is statistically significant.

Therefore, the null hypothesis is rejected. It can be concluded that the prevalence of stunted children in the rest of the districts of Assam is significantly higher compared to Kamrup Metropolitan district.

ii. Wasted

Table 5: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Wasted	32	20.7656	6.45843	1.14170

Source: NFHS – 5; Author's Calculation

Table 6: One-Sample Test

	Test Value = 18.20					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Wasted	2.247	31	.032	2.56563	.2371	4.8941

Source: NFHS – 5; Author's Calculation

The test value considered for analysis corresponds to Kamrup Metropolitan district, with the null hypothesis stating that *there is no significant difference in the prevalence of wasted children between Kamrup Metropolitan district and the rest of the districts of Assam taken together*. The one-sample t-test result shows that the mean prevalence of wasted children in Kamrup Metropolitan district (Mean = 20.77, SD = 6.46) is significantly higher than the test value of 18.20, $t(31) = 2.247$, $p = 0.032 < 0.05$. Therefore, the null hypothesis is rejected, and it is concluded that there exists a statistically significant difference in the prevalence of wasted children between Kamrup Metropolitan district and the rest of the districts of Assam.

iii. Underweight

Table 7: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Underweight	32	31.8156	6.94035	1.22689

Source: NFHS – 5; Author's Calculation

Table 8: One-Sample Test						
	Test Value = 25					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Underweight	5.555	31	.000	6.81562	4.3134	9.3179

Source: NFHS – 5; Author's Calculation

The test value considered for analysis corresponds to Kamrup Metropolitan district, with the null hypothesis stating that *there is no significant difference in the prevalence of underweight children between Kamrup Metropolitan district and the rest of the districts of Assam taken together*. The one-sample t-test result indicates that the mean prevalence of underweight children in Kamrup Metropolitan district (Mean = 31.82, SD = 6.94) is significantly higher than the test value of 25, $t(31) = 5.555$, $p < 0.001$. Therefore, the null hypothesis is rejected, and it is concluded that there exists a statistically significant difference in the prevalence of underweight children between Kamrup Metropolitan district and the rest of the districts of Assam.

6.3. Testing of Hypothesis 3 and Data Interpretation[through One sample T-test (Dhubri District)]

i. Stunted

Table 9: One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Stunted	32	35.2969	6.38120	1.12805

Source: NFHS – 5; Author's Calculation

Table 10: One-Sample Test						
	Test Value = 48.50					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Stunted	-11.704	31	.000	-13.20313	-15.5038	-10.9025

Source: NFHS – 5; Author's Calculation

The test value considered for analysis corresponds to Dhubri district, with the null hypothesis stating that *there is no significant difference in the prevalence of stunted children between Dhubri district and the rest of the districts of Assam taken together*. The one-sample t-test result reveals that the mean prevalence of stunted children in Dhubri district (Mean = 35.30, SD = 6.38) is significantly lower than the test value of

48.50, $t(31) = -11.704$, $p < 0.001$. Therefore, the null hypothesis is rejected, and it is concluded that there exists a statistically significant difference in the prevalence of stunted children between Dhubri district and the rest of the districts of Assam.

ii. Wasted

Table 11: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Wasted	32	20.6625	6.47266	1.14422

Source: NFHS – 5; Author's Calculation

Table 12: One-Sample Test

	Test Value = 21.50					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Wasted	-.732	31	.470	-.83750	-3.1711	1.4961

Source: NFHS – 5; Author's Calculation

The test value considered for analysis corresponds to Dhubri district, with the null hypothesis stating that *there is no significant difference in the prevalence of wasted children between Dhubri district and the rest of the districts of Assam taken together*. The one-sample t-test result shows that the mean prevalence of wasted children in Dhubri district (Mean = 20.66, SD = 6.47) does not differ significantly from the test value of 21.50, $t(31) = -0.732$, $p = 0.470 > 0.05$. Therefore, the null hypothesis is accepted, and it is concluded that there is no statistically significant difference in the prevalence of wasted children between Dhubri district and the rest of the districts of Assam.

iii. Underweight

Table 13: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Underweight	32	31.4156	6.95317	1.22916

Source: NFHS – 5; Author's Calculation

Table 14: One-Sample Test

	Test Value = 37.80					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Underweight	-5.194	31	.000	-6.38437	-8.8913	-3.8775

Source: NFHS – 5; Author's Calculation

The test value considered for analysis corresponds to Dhubri district, with the null hypothesis stating that *there is no significant difference in the prevalence of underweight children between Dhubri district and the rest of the districts of Assam taken together.* The one-sample t-test result shows that the mean prevalence of underweight children in Dhubri district (Mean = 31.42, SD = 6.95) is significantly lower than the test value of 37.80, $t(31) = –5.194$, $p < 0.001$. Therefore, the null hypothesis is rejected, and it is concluded that there exists a statistically significant difference in the prevalence of underweight children between Dhubri district and the rest of the districts of Assam.

7. Conclusion and Policy Implications

The present study, *"Assessing the Nutritional Status of Children in Assam: An Economic Perspective,"* was undertaken with the objectives of studying the nutritional status of children across the districts of Assam, examining the association between economic conditions and nutritional outcomes, and comparing nutritional indicators across districts and divisions of the state. The analysis tested multiple hypotheses concerning differences in malnutrition indicators between Kamrup Metropolitan, Dhubri, and the rest of Assam.

The analysis of district- and division-level nutritional indicators in Assam provides valuable insights into the spatial variations in child malnutrition across the state. The hypothesis testing for Kamrup Metropolitan district revealed that there was no statistically significant difference in the prevalence of stunting, wasting, and underweight children when compared to the rest of Assam, leading to the acceptance of the null hypothesis. A similar pattern was observed for Dhubri district, where no significant differences in the selected nutritional indicators were found when compared with the rest of the state, further confirming that, at the district level, these two regions do not exhibit marked deviations from broader state trends.

In contrast, the analysis of divisional disparities yielded different results. The independent samples t-test was conducted to examine the null hypothesis that the mean composite malnutrition score of districts in Central and Upper Assam divisions did not differ significantly from that of districts in the remaining divisions of Assam. Levene's test indicated homogeneity of variances ($F = 2.746$, $p = 0.108$). However, the t-test results were statistically significant ($t(31) = -2.175$, $p = 0.037$), with a mean difference of -0.40317 and a 95% confidence interval of -0.78126 to -0.02507, excluding zero. Consequently, the null hypothesis is rejected. This finding demonstrates that the mean composite malnutrition score in Central and Upper Assam is significantly lower than that in the remaining divisions, reflecting relatively better nutritional outcomes for children in these regions.

Taken together, the findings suggest that while Kamrup Metropolitan and Dhubri districts do not stand out from the state average in terms of child nutrition, significant disparities exist at the divisional level. The relatively better performance of Central and Upper Assam may be attributed to economic advantages, improved infrastructure, and greater accessibility to healthcare and educational services compared to certain other divisions. These results underscore the importance of addressing regional inequalities in nutrition, as localized interventions targeted at lagging divisions could play a pivotal role in improving the overall nutritional status of children in Assam.

7.1 Policy Implications

The study highlights the need for a differentiated policy approach in Assam. Since Kamrup Metropolitan and Dhubri do not deviate significantly from the state averages, policies at the district level may focus on reinforcing existing programs and preventing future deterioration. However, the significant disparities at the divisional level warrant targeted interventions in lagging divisions, particularly in areas outside Central and Upper Assam. Strengthening maternal and child healthcare, improving household food security, and ensuring equitable access to education and sanitation are essential to bridging these gaps. Furthermore, integrating economic development with nutrition-specific programs may yield sustainable improvements, as better infrastructure, livelihood opportunities, and health services are strongly associated with reduced malnutrition. Policymakers must therefore adopt a region-sensitive strategy that aligns both economic and nutritional priorities to ensure balanced and inclusive child health outcomes across Assam.

Bibliography

- Assam. *Indian Journal of Community Medicine*, *39*(3), 169–174. https://doi.org/10.4103/0970-0218.137155
- Begum, G. (2019). Levels of childhood nutritional status among the Muslims of char areas in Barpeta district, Assam. *International Journal of Community Medicine and Public Health*, *6*(2), 682. https://doi.org/10.18203/2394-6040.IJCMPH20190191
- De FragasHinnig, P., Santos Monteiro, J., Alice Altenburg de Assis, M., Bertazzi Levy, R., Aurélio Peres, M., Machado Perazi, F., LuísPorporatti, A., & De Luca Canto, G. (2018). Dietary Patterns of Children and Adolescents from High, Medium and Low Human Development Countries and Associated Socioeconomic Factors: A Systematic Review. ncbi.nlm.nih.gov
- Deka, C., Baishya, A. C., Ojah, J., &Barua, K. (2016). A study of nutritional status of adolescent girls residing in urban slums of Guwahati city, Assam, India. *International Journal of Community Medicine and Public Health*, *3*(8), 2169–2173. https://doi.org/10.18203/2394-6040.IJCMPH20162565
- International Institute for Population Sciences (IIPS),& ICF. (2021). National Family Health Survey (NFHS-5), India, 2019–21: Volume II. Ministry of Health and Family Welfare, GoI. Retrieved from https://www.dhsprogram.com/pubs/pdf/FR375/FR375_II.pdf
- International Institute for Population Sciences (IIPS),& ICF. (2021). *National Family Health Survey (NFHS-5), India, 2019–21: Assam*. Retrieved from https://dhsprogram.com/pubs/pdf/FR374/FR374_Assam.pdf
- Islam, S., GoswamiMahanta, T., Sarma, R., &Hiranya, S. (2014). Nutritional Status of under 5 Children belonging to Tribal Population Living in Riverine (Char) Areas of Dibrugarh District, Assam. ncbi.nlm.nih.gov
- Islam, S., Mahanta, T. G., Sarma, R., &Hiranya, S. (2014). Nutritional status of under 5 children belonging to tribal population living in riverine (Char) areas of Dibrugarh district.

- Kumar Sahu, S., Ganesh Kumar, S., Vishnu Bhat, B., C. Premarajan, K., Sarkar, S., Roy, G., & Joseph, N. (2015). Malnutrition among under-five children in India and strategies for control. ncbi.nlm.nih.gov
- Medhi, G. K., Barua, A., &Mahanta, J. (2006). *Growth and Nutritional Status of School Age Children (6-14 Years) of Tea Garden Worker of Assam*. *19*(2), 83–85. https://doi.org/10.1080/09709274.2006.11905860
- Nie, P., Rammohan, A., Gwozdz, W., & Sousa-Poza, A. (2019). Changes in Child Nutrition in India: A Decomposition Approach. ncbi.nlm.nih.gov
- Prasad, J. B., Kumar, M., & Kumar, A. (2015). Socioeconomic Inequalities In Under-Five Malnourished Children And Its Associated Factors In EAG-States And Assam India. *International Journal of Scientific Research in Education*, *3*(02). http://www.ijsae.in/index.php/ijsae/article/view/280/171
- SakhawotHossain, M. (2022). Household Income, Food Insecurity, and Nutrition in Bangladeshi Youth. ncbi.nlm.nih.gov
- Singh, J., &Mondal, N. (2014). Use of upper-arm anthropometry as measure of body-composition and nutritional assessment in children and adolescents (6-20 years) of Assam, Northeast India. *Ethiopian Journal of Health Sciences*, *24*(3), 243–252. https://doi.org/10.4314/EJHS.V24I3.8

Appendix

1. Children under 5 years who are stunted (height-for-age)(%)

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

2. Children under 5 years who are wasted (weight-for-height) (%)

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

Source: International Institute for Population Sciences (IIPS), & ICF. (2021). *National Family Health Survey (NFHS-5), India, 2019–21: Assam*. Retrieved from https://dhsprogram.com/pubs/pdf/FR374/FR374_Assam.pdf

3. Children under 5 years who are severely wasted (weight-for-height) (%)

Name of District	NFHS - 5	NFHS - 4
Baksa	6.2	2.7
Barpeta	7.5	5.8
Biswanath	13.7	
Bongaigaon	7.4	12.7
Cachar	12.5	11.3
Charaideo	7.3	
Chirang	8.5	4.4
Darrang	9.1	5.3
Dhemaji	10.1	0.8
Dhubri	6.7	
Dibrugarh	8.4	8.2
DimaHasao	11.3	1.3
Goalpara	14.3	8.9
Golaghat	5.4	6.5
Hailakandi	8.2	6.3
Hojai	4.6	
Jorhat	5.1	
Kamrup Metropolitan	7.3	2.4
Kamrup	5.3	5.3
KarbiAnglong	8.7	
Karimganj	30.5	6.1
Kokrajhar	8.9	6.1
Lakhimpur	7.5	4.4
Majuli	3.9	
Morigaon	7.5	0.9
Nagaon	5.2	
Nalbari	4.9	6.2
Sivasagar	6.1	
Sonitpur	4.5	
South SalmaraMancachar	7.1	
Tinsukia	9.4	2.2
Udalguri	11.6	8.1
West KarbiAnglong	12.7	

4. Children under 5 years who are underweight (weight-for-age) (%)

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

Source: International Institute for Population Sciences (IIPS), & ICF. (2021). *National Family Health Survey (NFHS-5), India, 2019–21: Assam*. Retrieved from https://dhsprogram.com/pubs/pdf/FR374/FR374_Assam.pdf

5. Children under 5 years who are overweight (weight-for-height) (%)

Name of District	NFHS - 5	NFHS - 4
Baksa	8.6	2.3
Barpeta	6.1	1.9
Biswanath	3.3	
Bongaigaon	8.8	6.1
Cachar	3.3	4
Charaideo	4	
Chirang	4.5	2.5
Darrang	5.6	3
Dhemaji	3.5	0.5
Dhubri	6	
Dibrugarh	2	3.3
DimaHasao	12.5	1.5
Goalpara	5.4	2.6
Golaghat	2.4	3.7
Hailakandi	2	1.6
Hojai	6	
Jorhat	5.4	
Kamrup Metropolitan	8.7	2
Kamrup	7.5	0.7
KarbiAnglong	4.3	
Karimganj	1	1.8
Kokrajhar	4.3	1.4
Lakhimpur	2.3	0.8
Majuli	3.8	
Morigaon	4.3	1
Nagaon	7.4	
Nalbari	4.6	1.8
Sivasagar	3.5	
Sonitpur	3.2	
South SalmaraMancachar	5.9	
Tinsukia	2.7	2.8
Udalguri	5.2	4
West KarbiAnglong	3.9	

Source: International Institute for Population Sciences (IIPS), & ICF. (2021). *National Family Health Survey (NFHS-5), India, 2019–21: Assam*. Retrieved from https://dhsprogram.com/pubs/pdf/FR374/FR374_Assam.pdf

Divisions and Districts in Assam (as at the time of NFHS-5)	
Barak Valley Division	**North Division**
Cachar	Biswanath
Hailakandi	Darrang
Karimganj	Sonitpur
Central Division	Udalguri
DimaHasao	**Upper Division**
Hojai	Charaideo
KarbiAnglong	Dhemaji
Morigaon	Dibrugarh
Nagaon	Golaghat
West KarbiAnglong	Jorhat
Lower Division	Lakhimpur
Baksa	Majuli
Barpeta	Sivasagar
Bongaigaon	Tinsukia
Chirang	
Dhubri	
Goalpara	
Kamrup Metropolitan	
Kamrup	
Kokrajhar	
Nalbari	
South SalmaraMancachar	
Source: Assam State Portal and Wikipedia	