

Decline of Child Stunting in India: State-Level Variations and Policy Implications from NFHS-6 (2023-24): An Ecological Analysis

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Abstract

Background: Child stunting, defined as height-for-age below -2 standard deviations from the WHO reference median, remains a major public health concern in India, and evaluating its trajectory alongside ongoing nutrition programmes is a policy priority. **Objective:** To analyse state-level trends in the prevalence of childhood stunting between NFHS-5 and NFHS-6, identify high-burden states where progress has stalled, and create evidence-based policy recommendations. **Material & Methods:** The NFHS-6 fact sheet data from all 27 states and 8 Union Territories (35 total), excluding Manipur was subjected to a ecological, descriptive, cross-sectional secondary analysis. State/UT-wise stunting prevalence from NFHS-5 (2019-21) and NFHS-6 (2023-24) was extracted and tabulated for comparisons. The absolute change in the prevalence of stunting was used to categorize states into four performance groups. **Result:** Over the course of almost four years, the national prevalence of stunting decreased by 6.2 percentage points (pp), from 35.5% (NFHS-5) to 29.3% (NFHS-6). Stunting varied from 16.6% (Puducherry) to 37.1% (Dadra & Nagar Haveli and Daman & Diu) in 35 states and UTs. In comparison to NFHS-5, two UTs (Andaman & Nicobar Islands and Lakshadweep) reported worsening of stunting. West Bengal (–11.4 pp), Tripura (–10.4 pp), and Himachal Pradesh (≥10.2 pp) were Tier I strong performers (reduction ≥ 10 pp). In almost every state and UT, there is still a significant stunting disparity between urban and rural areas. **Conclusion:** Although overall drop in stunting in India is positive, the persistence of high-burden regions necessitates targeted, area-specific programming.

Keywords: Child stunting, NFHS-6, State disparities, Undernutrition, Child health, POSHAN Abhiyaan

Introduction

Stunting, or chronic undernutrition that manifests as inadequate linear development, affects approximately 148 million children under five worldwide. A disproportionate amount of this burden comes from South Asia.^[1] Over 35 million children were predicted to be stunted in 2019 - 21, making India one of the largest absolute burdens worldwide, notwithstanding the country's consistent economic growth trajectory.^[2] During the critical 1,000 - day period between conception and a child's second birthday, stunting is a composite indicator of intergenerational poverty, inadequate prenatal and postnatal care, poor sanitation, limited dietary diversity, and suboptimal maternal nutrition.^[3,4]

The Government of India (GoI) has implemented important programmatic solutions through the Integrated Child Development Services (ICDS), the National Nutrition Mission (POSHAN Abhiyaan, started in 2018), the Pradhan Mantri Matru Vandana Yojana (PMMVY), and the Anganwadi service expansion under Saksham Anganwadi. Together, these initiatives aim to reduce stunting by two percentage points (pp)

every year.^[5,6] Although significant progress is being made, the rate is still sluggish to fulfil the World Health Assembly's objective of reducing child stunting by 40% by 2030, according to data from NFHS-5 (2019-21), which indicated a decline from 38.4% (NFHS-4, 2015-16) to 35.5%.^[7]

The most recent nationally representative statistics on stunting across all states and Union Territories (UTs), published in May 2026 as NFHS-6 (2023-24) fact sheets, enable a comprehensive temporal comparison.^[8] This analysis is timely: India's POSHAN 2.0 strategy,^[9] launched in 2021, consolidated multiple nutritional schemes and introduced a POSHAN Tracker digital monitoring system. Questions of immediate policy relevance include whether this consolidation has resulted in a quicker reduction in stunting and whether the benefits are dispersed fairly among states.

Previous research has shown that there is significant inter-state variation in the prevalence of stunting in India, which is caused by differences in female literacy, household food security, and health system capacity alongside the sanitation and care-related factors noted above.^[10-12]

While national-level stunting trends are well documented, no published analysis has yet mapped NFHS-6 (2023-24) state/UT level performance against a data-driven tier classification, or examined whether the POSHAN 2.0 implementation has translated into faster or more equitable subnational progress. Addressing this gap, the present analysis uses NFHS-6 data to examine state/UT-level stunting trajectories and classify subnational progress since NFHS-5.

Objective

This secondary analysis was performed with objective to compare state/UT-level stunting prevalence between NFHS-5 (2019-21) and NFHS-6 (2023-24) across all available states and UTs, classify states into performance tiers based on absolute pp change, and identify high-burden states/UTs and urban-rural disparities relevant to nutrition programme prioritization.

Material & Methods

Data Source

This is an ecological, descriptive secondary data analysis using publicly available state/UT-level aggregate estimates from NFHS-5 and NFHS-6. NFHS-6 (2023-24) information sheets were made available in May 2026 by the International Institute for Population Sciences (IIPS), Mumbai.^[8] The sixth iteration of India's premier population health survey, NFHS-6, was carried out in two stages: Phase I (May 2023-February 2024) and Phase II (February-December 2024) encompassed 679,238 households, 716,397 women aged 15 - 49, and 100,977 males aged 15 - 54 in all 28 states and 8 UTs (36 total), with the exception of Manipur, due to administrative reasons yielding data for 27 states and 8 UTs (35 units). The same published information sheet series is the source of comparative data from NFHS-5 (2019-21). Only aggregated state-level estimates that are already in the public domain were used in this research; no individual-level data were obtained, and secondary examination of publicly available aggregate information does not require ethical clearance. Where urban or rural disaggregated estimates were not available or not separately reported in the source fact sheet (e.g., Chandigarh, where the rural population is negligible and NFHS-6 does not report a separate rural stunting estimate), this is indicated as 'not applicable'.

Study Population and Variables

The unit of analysis was the state/UT ($n = 35$). The primary variable of interest was total stunting prevalence (%) by state/UT and survey round; urban and rural residence was treated as a disaggregating variable, and performance tier as a derived categorical variable.

Outcome Variable

The primary outcome is the prevalence of stunting among children under five years of age, defined as height-for-age

below-2 standard deviations from the WHO Child Growth Standards median (2006).^[13] For both NFHS-5 and NFHS-6, state-level total stunting estimates (urban + rural combined) were extracted. For every state, the absolute change in the prevalence of stunting (NFHS-6 minus NFHS-5) was computed.

State Classification

Based on the absolute change in the prevalence of stunting from NFHS-5 to NFHS-6, states were divided into four performance tiers:

1. Tier I (High Performers): reduction ≥ 10 percentage points (pp)
2. Tier II (Moderate Performers): reduction 6 – 9.9 pp
3. Tier III (Slow Performers): reduction 1 – 5.9 pp
4. Tier IV (Non-Performers or Deteriorators): change < 1 pp or increase.

States were classified into four performance tiers based on absolute change in stunting prevalence. Tiered classification of country/state nutrition progress has precedent in global monitoring frameworks;^[14] here, absolute percentage-point cut-offs (≥ 10 , 6-9.9, 1-5.9 pp) were defined a priori by the investigators to allow meaningful subnational comparison at the state/UT level.

Statistical Analysis

Descriptive statistics were computed for the prevalence of stunting in both survey rounds. The absolute change in prevalence (NFHS-6 minus NFHS-5) was calculated for each state/UT and used to assign performance tiers. Mean and standard deviation of stunting prevalence across all states/UTs were calculated. Urban-rural disparity was computed as (rural-urban) prevalence (in pp) for NFHS-6. Microsoft Excel (MS-Excel) was used for analysis. No inferential statistical testing was performed given the descriptive, ecological nature of the data; comparisons across states/UTs and tiers are therefore reported descriptively rather than as statistically significant differences.

Results

National-Level Trend

At the national level, the prevalence of stunting among children under five decreased by 6.2 pp over roughly four years, from 35.5% in NFHS-5 (2019-21) to 29.3% in NFHS-6 (2023-24). This results in an annualized drop of roughly 1.55 pp, which is below the target of 2 pp/annum (POSHAN Abhiyaan). With urban stunting at 23.9% and rural stunting at 30.9% in NFHS-6, there is still a countrywide disparity between the two.

Figure 1 compares the prevalence of child stunting (%) in 35 Indian states and UTs between NFHS-5 (2019-21, dark blue) and NFHS-6 (2023-24, teal), sorted in ascending order of NFHS-6 prevalence. With prevalence dropping from a national

average of 35.5% to 29.3% over roughly four years, the broadly consistent pattern - teal bars shorter than dark blue across almost all states - confirms a widespread national decline in stunting. With NFHS-6 prevalence well below 20%, states on the far left, like Puducherry, Chandigarh, and Goa, are the best performers. States on the far right, like Jharkhand, Bihar, Meghalaya, Dadra & Nagar Haveli, and Daman & Diu, are still above 35% (well above the red dashed 30% WHO high-burden threshold that divides the chart). The two UTs with orange bars (Andaman & Nicobar Islands and Lakshadweep) are the only ones where the NFHS-6 bar is higher than its NFHS-5 equivalent, indicating a decline rather than an improvement - a public health issue that needs careful examination. When considered collectively, it clearly shows that although India's overall trajectory is positive, the continuation of a high-burden cluster on the chart's right flank highlights significant inter-state inequality that cannot be resolved by aggregate national targets alone.

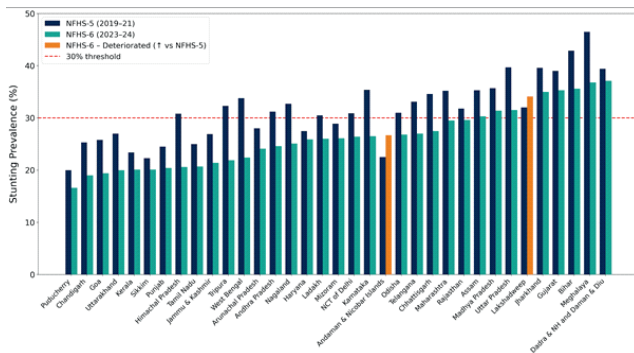


Figure 1: Clustered bar chart showing stunting prevalence (%) in NFHS-5 and NFHS-6

Source: NFHS-5 (2019-21) and NFHS-6 (2023-24) fact sheets, IIPS. Dark blue bars = NFHS-5 prevalence; teal bars = NFHS-6 prevalence; orange bars indicate states/UTs where NFHS-6 prevalence exceeded NFHS-5 (worsening); red dashed line = WHO 'very high' burden threshold (30%).

State-Level Classification

Stunting prevalence for 35 states and UTs is shown in Table 1 along with data from both survey rounds, urban/rural disaggregation, absolute change, and performance tier. Nine states/UTs are included in the high-burden cluster ($\geq 30\%$ overall stunting in NFHS-6): Dadra & Nagar Haveli and Daman & Diu (37.1%), Meghalaya (36.8%), Bihar (35.6%), Gujarat (35.3%), Jharkhand (35.0%), Lakshadweep (34.1%), Uttar Pradesh (31.5%), Madhya Pradesh (31.4%), and Assam (30.3%). West Bengal (-11.4 pp), Tripura (-10.4 pp), and Himachal Pradesh (-10.2 pp) were tier I strong performers (≥ 10 pp absolute fall). Tier II (6 - 9.9 pp decrease) was attained by eleven states and UTs. Lakshadweep (+ 2.1 pp) and the Andaman & Nicobar Islands (+ 4.2 pp) were Tier IV deteriorators. Puducherry had the lowest NFHS-6 prevalence (16.6%), compared to 20.0% for

NFHS-5. Gujarat's stunting prevalence (35.3%) remained above 35% despite having a higher per-capita income than Bihar or Jharkhand.¹⁵

Table 1: Stunting prevalence (%) among children under 5 years across Indian states in NFHS-5 (2019-21) and NFHS-6 (2023-24). Change = NFHS-6 minus NFHS-5. Tier I: ≥ 10 pp decline; Tier II: 6-9.9 pp; Tier III: 1-5.9 pp; Tier IV: < 1 pp or increase

State/UT	Urban NFHS-6 (%)	Rural NFHS-6 (%)	Total NFHS-6 (%)	Total NFHS-5 (%)	Change (pp)	Tier
India (National)	23.9	30.9	29.3	35.5	- 6.2	-
Tier I – High Performers (reduction ≥ 10 pp)						
Himachal Pradesh	16.4	20.9	20.6	30.8	- 10.2	Tier I
Tripura	18.5	22.4	21.9	32.3	- 10.4	Tier I
West Bengal	19.3	23.3	22.4	33.8	- 11.4	Tier I
Tier II – Moderate Performers (reduction 6 – 9.9 pp)						
Chandigarh	18.7	*	19.0	25.3	- 6.3	Tier II
Goa	18.8	20.0	19.4	25.8	- 6.4	Tier II
Uttarakhand	17.7	20.7	20.0	27.0	- 7.0	Tier II
Andhra Pradesh	21.7	25.8	24.6	31.2	- 6.6	Tier II
Nagaland	25.4	25.0	25.1	32.7	- 7.6	Tier II
Karnataka	19.0	32.0	26.5	35.4	- 8.9	Tier II
Telangana	22.3	28.6	27.0	33.1	- 6.1	Tier II
Chhattisgarh	21.7	28.5	27.5	34.6	- 7.1	Tier II
Uttar Pradesh	28.8	32.0	31.5	39.7	- 8.2	Tier II
Bihar	32.7	35.8	35.6	42.9	- 7.3	Tier II
Meghalaya	26.0	38.2	36.8	46.5	- 9.7	Tier II
Tier III – Slow Performers (reduction 1 – 5.9 pp)						
Puducherry	15.5	17.9	16.6	20.0	- 3.4	Tier III
Kerala	18.8	21.3	20.1	23.4	- 3.3	Tier III
Sikkim	28.2	17.8	20.1	22.3	- 2.2	Tier III
Punjab	23.0	18.9	20.4	24.5	- 4.1	Tier III
Tamil Nadu	20.2	21.0	20.7	25.0	- 4.3	Tier III
Jammu & Kashmir	19.3	21.9	21.4	26.9	- 5.5	Tier III
Arunachal Pradesh	23.5	24.4	24.1	28.0	- 3.9	Tier III
Haryana	23.8	26.9	25.9	27.5	- 1.6	Tier III
Ladakh	22.1	26.7	26.0	30.5	- 4.5	Tier III
Mizoram	18.3	32.6	26.1	28.9	- 2.8	Tier III
NCT of Delhi	26.4	28.5	26.4	30.9	- 4.5	Tier III
Tier IV – Deteriorators (increase ≥ 1 pp)						
Lakshadweep	34.1	36.2	35.1	33.0	+ 2.1	Tier IV
Andaman & Nicobar Islands	30.3	34.5	32.4	28.2	+ 4.2	Tier IV

"pp = percentage points."* Rural estimate not separately reported in the NFHS-6 fact sheet, as Chandigarh's rural population is minimal ($< 3\%$ as per Census 2011). Estimates are point prevalence values as reported in NFHS-5 and NFHS-6 fact sheets; confidence intervals were not available in the source documents and sampling variability, particularly for states/UTs with smaller populations (e.g., Lakshadweep, Andaman & Nicobar Islands), should be considered when interpreting small absolute changes

Urban-Rural Disaggregation

Using NFHS-6 (2023-24) data, Figure 2 shows the urban - rural disparity in stunting prevalence (rural minus urban, in pp) for 34 states/UTs (Chandigarh and Manipur not included), arranged from smallest to largest gap. Rural residence is a nearly

universal risk amplifier for child undernutrition throughout India, as evidenced by the fact that rural stunting exceeds urban stunting in 31 of 34 states/UTs (blue bars extending rightward). This disparity is most pronounced in Jharkhand (+17.1 pp), Dadra & Nagar Haveli and Daman & Diu (+16.3 pp), Mizoram (+14.3 pp), and Karnataka (+13.0 pp). The three red bars that extend to the left, Sikkim (-10.4 pp), Punjab (-4.1 pp), and Nagaland (-0.4 pp), show a reversal of the expected pattern, where urban stunting is equal to or greater than rural stunting. Tamil Nadu, Goa, Arunachal Pradesh, and NCT Delhi are among the states close to the zero line that show comparatively equal urban - rural stunting distributions.

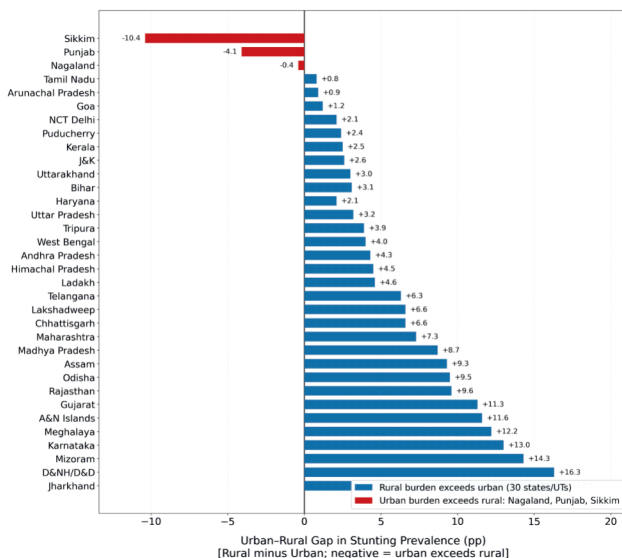


Figure 2 Horizontal diverging bar chart showing the urban-rural gap in stunting prevalence (percentage points; rural minus urban) for 34 states/UTs, NFHS-6 (2023-24), ordered by gap magnitude.

Source: NFHS-6 (2023-24) fact sheet, IIPS. Bars show rural-minus-urban stunting prevalence (percentage points); blue bars = higher rural stunting (expected direction); red bars = higher or equal urban stunting (reversed direction)

As NFHS-6 fact sheets report point estimates only, confidence intervals (CIs) were not available for inclusion; findings should be interpreted with this in mind, particularly for states/UTs with smaller sample sizes.

Discussion

India's national stunting prevalence has dropped to 29.3% from 35.5% in NFHS-5, an absolute decrease of 6.2 pp over about four years. This results in an annualized drop of about 1.55 pp annually, which is significant in absolute terms but falls short of the POSHAN Abhiyaan objective of 2 pp annually.^[5] Although the general trajectory is in line with the programmatic investments made under POSHAN 2.0, the Saksham Anganwadi expansion, and the PMMVY, state-level data show that significant and enduring subnational heterogeneity is

concealed by overall national growth.^[9,10] The variation, from 16.6% in Puducherry to 37.1% in Dadra & Nagar Haveli and Daman & Diu, highlights that India faces a heterogeneous set of subnational nutrition challenges rather than a single nutrition problem. As this is an ecological analysis of state-level aggregate data, associations observed here should not be interpreted at the individual or household level (ecological fallacy); findings are intended to inform subnational prioritization rather than individual-level causal inference.

The prevalence of stunting is still at or above the WHO's "very high" level of 30% in nine states/UTs: Dadra & Nagar Haveli and Daman & Diu (37.1%), Meghalaya (36.8%), Bihar (35.6%), Gujarat (35.3%), Jharkhand (35.0%), Lakshadweep (34.1%), Uttar Pradesh (UP) (31.5%), Madhya Pradesh (MP) (31.4%), and Assam (30.3%).^[7,8] Even within the high-load cluster, five of these nine states - Bihar, UP, MP, Jharkhand, and Assam - have a disproportionately high absolute burden of stunted children because these are among India's most populated states. Despite being one of India's more economically developed states, Gujarat has a unique epidemiological paradox: its stunting prevalence of 35.3% is higher than that of Assam and Madhya Pradesh and comparable to that of Bihar. This dissociation between economic growth and nutritional outcomes has been shown in the Indian context and is in line with the larger body of research demonstrating that, in the absence of fair service delivery and dietary diversification, increases in per capita income do not always result in decrease in child undernutrition.^[16-18] Gujarat's continued presence in the high-burden cluster over subsequent NFHS rounds is a notable finding that calls for district and tribal-community level research. This persistence despite relatively higher per-capita income may point to intra-state inequality rather than aggregate resource shortage as a driver of Gujarat's burden.

The performance of Tier I states, West Bengal (-11.4 pp), Tripura (-10.4 pp), and Himachal Pradesh (-10.2 pp), should be thoroughly examined since they show that stunting may be reduced quickly and significantly within the framework of the Indian health system.^[8] During the four-year inter-survey period, all three states saw declines of more than 10 pp, which is significantly higher than the national average reduction of 6.2 pp. West Bengal's decline of 11.4 pp, the largest in the country, is especially noteworthy. These Tier I states' convergence towards sub-25% prevalence, which is linked to moderate rather than high public health relevance, provides evidence that the nutritional transition can be completed quickly when favourable circumstances are met.^[19] Future primary research should prioritize systematic documentation of the particular programmatic, governance, and community aspects driving these gains. This would equip laggard states with actionable learning.

The only two UTs where the nutritional condition of children under five was noticeably poorer in 2023-2024 than in 2019-2021 are Andaman & Nicobar Islands (+ 4.2 pp) and Lakshadweep (+ 2.1 pp), indicating a fundamentally distinct concern from slow improvement.^[7] A plausible, though unverified, explanation is the reliance of these island UTs on inter-island supply routes for food and medical supplies, alongside small, geographically scattered populations and limited healthcare infrastructure - factors that warrant direct investigation rather than assumption.^[7] However, the consistent directional finding of increasing stunting in both UTs calls for a focused programmatic review that includes an evaluation of supply chain interruptions, ICDS service delivery, and institutional delivery rates in the post-COVID era.

One almost universal aspect of India's nutritional landscape is the disparity in stunting prevalence between urban and rural areas. In 31 of the 34 states and UTs for which disaggregated data were available, rural stunting was higher than urban stunting. According to NFHS-6, rural stunting was 30.9% while urban stunting was 23.9%, a difference of 7.0 pp.^[8] At the state level, this disparity reached 17.1 pp in Jharkhand, 16.3 pp in Dadra & Nagar Haveli and Daman & Diu, and 14.3 pp in Mizoram, most probably indicating a significant rural disadvantage in terms of access to sanitary facilities, safe drinking water, dietary diversity, and prenatal care.^[10] The opposite tendency was seen in three states: Sikkim, Punjab, and Nagaland, where urban stunting either matched or surpassed rural stunting. A possible explanation for this reversal is the nutritional vulnerability of migrant labour and peri-urban populations in these states, a pattern increasingly documented in South Asian contexts.^[20-22] There is a strong argument that state-level average targets systematically obscure the depth of rural deprivation and should be replaced by district- or block-level benchmarks because the magnitude of within-state urban-rural disparity in several states surpasses the overall stunting burden of the best-performing states nationally.

Three policy imperatives are indicated by these findings taken together. First, ring-fenced resource allocation, varying monitoring intensity, and tailored intervention packages for the nine high-burden states/UTs must replace national aggregate targets in India's nutrition governance architecture with clearly subnational accountability frameworks.^[14] Second, state-level stunting averages conceal significant within-state geographic disparities, and the persistence of a rural disadvantage across most states/UTs necessitates the monitoring of rural nutrition programs as a separate strategic priority rather than relying on uniform state-wide interventions. This includes investments in last-mile service delivery via Anganwadi workers and Accredited Social Health Activists (ASHAs), enhanced rural supply chains for fortified foods, and expedited progress on

rural sanitation and water access through the Jal Jeevan Mission and Swachh Bharat Mission. Third, in order to prevent additional decline in the next survey cycle, an immediate programmatic review is required due to the Tier IV degradation in island UTs. India's SDG 2.2 commitment calls for halving the prevalence of stunting in children under five by 2030; at the current annualized rate of 1.55 pp per year, this target is only achievable nationally if the high-burden cluster accelerates significantly and the declining UTs are put back on a positive trajectory.

Limitations

This study has several limitations. First, multivariable adjustment for variables such as household wealth, maternal education, and dietary diversity was not possible, as the analysis relied on publicly available state-level aggregate estimates rather than individual-level microdata. Second, state-level estimates - particularly for smaller states/UTs such as Lakshadweep and Andaman & Nicobar Islands - are subject to sampling variability that was not quantifiable from the published fact sheets, and small absolute changes in these units should be interpreted cautiously. Third, although NFHS anthropometric measurement follows standardized protocols, non-differential measurement error cannot be entirely excluded. Fourth, the cross-sectional, ecological design precludes causal inference; observed associations between state characteristics and stunting trends are correlational only. Fifth, findings at the state/UT level cannot be assumed to apply to individuals or households within those states (ecological fallacy). Despite these limitations, the use of a nationally representative survey with consistent methodology across rounds provides a robust basis for monitoring India's stunting trajectory.

Conclusion

This analysis of NFHS-5 to NFHS-6 trajectories confirms that India's national progress against child stunting masks substantial and uneven subnational performance. A persistent cluster of high-burden states/UTs, together with a small but concerning group of states/UTs moving in the wrong direction, indicates that uniform national targets are insufficient to address the country's actual nutritional landscape. On the other end, the consistent urban-rural gap observed across most states/UTs reinforces that state-level averages alone are inadequate from programme planning. These findings suggest a need for differentiated, geographically tailored programme planning - potentially including strengthened maternal education, IFA supplementation, and prenatal care delivery - though this descriptive analysis cannot establish which specific interventions drove Tier I states' progress; targeted implementation research is needed to confirm actionable levers. Translating this state-level evidence into equity-

focused action will require explicit integration into existing platforms - ring-fenced resource allocation within POSHAN 2.0, subnational monitoring through the POSHAN Tracker, and targeted ASHA/Anganwadi-led delivery in high-burden and rural areas - rather than continued reliance on uniform national targets.

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