POLICY BRIEF 67

Intra-household double burden of malnutrition in India: Prevalence, Variations and Implications

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The coexistence of undernutrition, characterized by micronutrient deficiencies, stunting, wasting and underweight, and overnutrition in terms of overweight/obesity and non-communicable diseases, often referred to as the double burden of malnutrition (DBM), is increasingly becoming a significant public health concern in developing countries, including India.[1] The DBM can occur at the national, individual, population, and household levels. Most studies in the Indian context have focused on malnutrition at the population group and regional levels.[2] Only a few studies have been undertaken at the household level, and only in certain specific locations. The DBM at the household level, which is also the focus of this analysis, is defined by the coexistence of overnutrition in one member (e.g., mother) and undernutrition in another (e.g., child) residing together in a household. This phenomenon typically results from an unequal distribution of food and healthcare resources within households, rather than being solely attributable to poverty.

In India, while there has been modest progress in addressing undernutrition, there has also been a notable increase in the prevalence of overweight and obesity among adults, contributing to the growing DBM. This trend began nearly two decades ago and subsequently gained momentum.[3] Currently, India accounts for approximately 15% of the global obesity burden[4] and is projected to have the world's second-largest number of overweight or obese adults by 2050. Globalization of the agri-food industry and proliferation of fast-food establishments have resulted in significant changes in Indian diets in favour of processed and calorie-dense foods. This shift in dietary patterns, combined with increasingly sedentary lifestyles and a lack of nutritional awareness, has exacerbated the DBM.

This policy brief aims to better understand the issue of intra-household DBM among urban and rural households at both the national and sub-national levels. In another separate analysis, the key determining factors that explain this intra-household DBM are also being investigated. The diagnosis of the DBM at such a granular scale can assist policymakers in formulating and executing context-specific nutritional strategic action points and policy interventions.

Intra-household DBM and rural-urban variations

This analysis focuses on the intra-household DBM, which is defined as the simultaneous occurrence of undernutrition in at least one child under five years of age and overweight or obesity in that child's mother, who is aged between 15 and 49 years. Utilizing data from the National Family Health Surveys (NFHS), this study identifies such mother-child pairs. It excludes those women who were pregnant or had given birth in the preceding two months. A woman with a body mass index (BMI) of 25 kg/m² or higher is deemed as overweight or obese. Children are considered stunted, wasted, or underweight if their respective Z-scores for height-for-age (HAZ), weight-for-height (WHZ), and weight-for-age (WAZ) are below -2 standard deviations as prescribed by the World Health Organization (WHO).[5] For the purposes of this analysis, I do not consider

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1 Popkin, B. M., Corvalan, C., & Grummer-Strawn, L. M. (2020). Dynamics of the double burden of malnutrition and the changing nutrition reality. *The Lancet* 395(10217): 65-74.

2 Dwivedi, L. K., Puri, P., Pant, A., Chauhan, A., Scott, S., Singh, S.,....& Nguyen, P. H. (2023). Concurrent undernutrition and overnutrition within Indian families between 2006 and 2021. *Current Developments in Nutrition* 7(9): 101987.

3 Kumar, M., & Mohanty, P. (2022). Does maternal overnutrition carry child undernutrition in India? *PLoS ONE* 17(6): e0265788.

4 Ford, N. D., Patel, S. A., & Narayan, K. V. (2017). Obesity in low-and middle-income countries: burden, drivers, and emerging challenges. *Annual Review of Public Health* 38(1): 145-164.

5 The WHO's BMI classifications of overweight and obesity, intended for international use, were used in this analysis. However, as one would expect, the incidence of DBM is slightly higher with the use of BMI classification (i.e., a BMI of 23 kg/m² or higher is considered overweight or obese) as prescribed for the Asian population that considers the ethnic and region-specific effects of overweight or obesity. For instance, according to this classification, the incidence of intra-household DBM (OVOBM-S/W/UC) was 10.66% in 2015-16 and 13.09% in 2019-21.

micronutrient deficiencies and non-communicable diseases. To comprehensively evaluate the incidence of intra-household DBM, all the possible typologies of undernutrition among children and overnutrition among mothers have been considered. I considered three different categories of intra-household DBM: a mother who is overweight or obese with stunted children (OVOBM-SC), a mother who is overweight or obese with wasted children (OVOBM-WC), and a mother who is overweight or obese with underweight children (OVOBM-UC) residing in the same household. Furthermore, to assess any form of DBM, an overweight or obese mother is paired with at least one child suffering from some form (stunting or wasting or underweight) of undernutrition (OVOBM-S/W/UC).

The incidence across all forms of DBM among the mother-child pairs is increasing, as is evident from Table 1. The most significant rise is observed in the prevalence of OVOBM-SC, which increased from 4.03% in 2015-16 to 5.18% in 2019-21. During the same period, the prevalence of OVOBM-UC increased from 3.24% to 3.97%. Similarly, the prevalence of OVOBM-WC increased from 2.12% to 2.48%. The OVOBM-S/W/UC, which includes either of the three forms of child undernutrition paired with an overweight or obese mother, shows a notable increase in prevalence from 5.96% in 2015-16 to 7.57% in 2019-21.

Furthermore, there are substantial urban-rural differences in the prevalence of all forms of intra-household DBM. For example, the prevalence of OVOBM-S/W/UC has been estimated to be higher in urban (11.1%) than in rural (6.27%) areas in 2019-21. However, the increase in the intra-household DBM is more pronounced in rural areas, indicating a shifting landscape of nutritional challenges. These observations contest the traditional belief that undernutrition is predominantly a rural issue associated with poverty, whereas obesity is associated with urban affluence.

Spatial differences in intra-household DBM

There are significant differences in the prevalence rates of the intra-household DBM across states. The spatial distribution of different forms of intra-household DBM among mother-child dyads is presented in Table 2. The southern and northern states generally have higher incidence rates across all forms of the intra-household DBM. In terms of the OVOBM-SC dyads, Delhi has the highest incidence rate, followed by Kerala and Tamil Nadu. Relative to the OVOBM-SC dyads, the OVOBM-WC pairs have lower incidence rates with the worst performers from the southern parts of the country. The spatial distribution of the broader measure of DBM (OVOBM-S/W/UC) further underscores these regional differences, with 15 states surpassing the national average incidence of 7.57%. Overall, the states of Jharkhand, Rajasthan, and Chhattisgarh consistently have the lowest incidence across the three DBM forms.

Further examination of the intra-household DBM in rural and urban areas at the sub-national level reveals its higher prevalence in urban areas than rural areas. For instance, the prevalence of OVOBM-SC is significantly higher in the urban areas of Karnataka, Jammu & Kashmir, and Delhi, while its prevalence in rural areas is higher in Kerala and Tamil Nadu. Likewise, the incidence of OVOBM-WC is significantly higher in urban areas of Jammu & Kashmir, Kerala, and Karnataka. However, rural areas of Goa, Jammu & Kashmir, and Kerala show a higher incidence of this DBM form (Table 2).

The comprehensive measure of the intra-household DBM (OVOBM-S/W/UC) has a higher concentration in both rural and urban areas in the southern and northern parts of the country (Figure 1). Urban areas of Jammu & Kashmir, Karnataka, and Goa, as well as rural areas in Kerala, Tamil Nadu, and Goa, exhibit its higher incidence rates. Notably, Karnataka has significant urban-rural

Table 1: Prevalence (%) of various forms of intra-household DBM at the national level

	2015-16 (NFHS-4)			2019-21 (NFHS-5)		
Type of intra-household DBM	**Urban**	**Rural**	**Overall**	**Urban**	**Rural**	**Overall**
Overweight/Obese Mother-Stunted Child (OVOBM-SC)	6.25 [2886]	3.14 [4474]	4.03 [7360]	7.35 [3491]	4.38 [5658]	5.18 [9151]
Overweight/Obese Mother-Wasted Child (OVOBM-WC)	3.73 [1585]	1.48 [1990]	2.12 [3575]	3.84 [1789]	1.98 [2515]	2.48 [4305]
Overweight/Obese Mother-Underweight Child (OVOBM-UC)	5.29 [2298]	2.43 [3201]	3.24 [5499]	5.55 [2690]	3.39 [4468]	3.97 [7159]
Overweight/Obese Mother-Undernourished (Stunted/Wasted/Underweight) Child (OVOBM-S/W/UC)	9.74 [4350]	4.46 [6284]	5.96 [10634]	11.1 [5107]	6.27 [7870]	7.57 [12978]

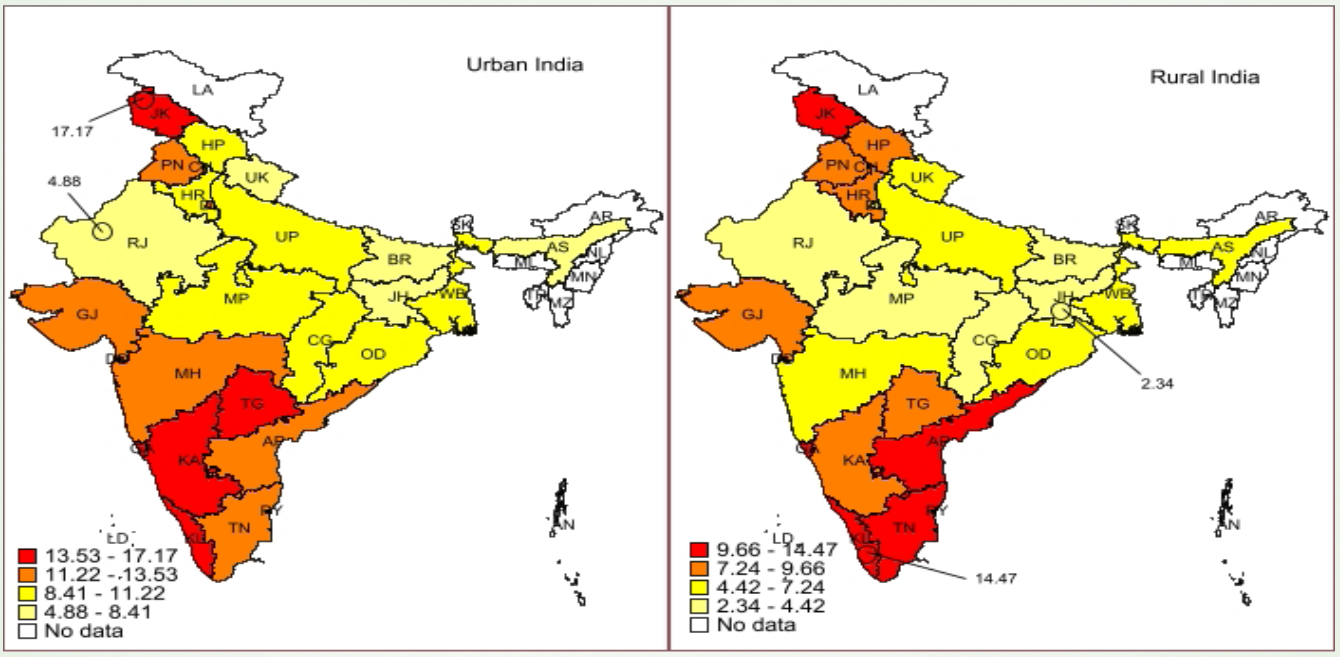
Note: The figures in square brackets denote the frequency for mother-child pairs in each category of intra-household DBM.
Source: Author's estimation using unit-level data from the NFHS-4 (2015-16) and NFHS-5 (2019-21).

Table 2: Prevalence (%) of different forms of intra-household DBM across states, 2019-21

	Overweight/Obese Mother-Stunted Child			Overweight/Obese Mother-Wasted Child			Overweight/Obese Mother-Underweight Child		
States	**Urban**	**Rural**	**Overall**	**Urban**	**Rural**	**Overall**	**Urban**	**Rural**	**Overall**
Andhra Pradesh (AP)	7.63	7.36	7.43	5.36	2.49	3.29	8.37	5.82	6.53
Assam (AS)	4.05	2.82	2.95	1.64	1.36	1.39	3.15	2.13	2.24
Bihar (BR)	4.66	3.13	3.34	2.49	2.21	1.38	3.85	2.47	2.65
Chhattisgarh (CG)	6.07	2.08	2.91	3.06	0.90	1.35	2.87	1.42	1.72
Delhi (DL)	9.93	5.94	9.79	2.74	0.83	2.67	5.40	2.21	5.28
Goa (GA)	9.57	6.29	8.35	5.15	5.98	5.45	9.23	4.02	7.33
Gujarat (GJ)	7.98	5.23	6.28	5.30	2.33	3.47	8.08	4.23	5.71
Haryana (HR)	6.73	5.52	5.87	2.55	1.91	2.10	5.17	3.76	4.17
Himachal Pradesh (HP)	8.35	6.85	7.04	2.65	3.25	3.18	8.21	5.31	5.67
Jammu & Kashmir (JK)	11.02	6.92	7.89	6.85	5.80	6.05	7.96	6.01	6.48
Jharkhand (JH)	4.17	1.58	2.06	2.96	0.84	1.23	3.77	1.55	1.96
Karnataka (KA)	11.05	6.33	8.03	5.63	3.37	4.18	9.17	5.47	6.80
Kerala (KL)	8.24	9.15	8.72	6.69	5.05	5.83	6.77	6.43	6.59
Madhya Pradesh (MP)	5.98	2.38	3.21	2.15	1.17	1.40	4.30	1.69	2.03
Maharashtra (MH)	7.69	3.82	5.43	4.93	2.73	3.65	6.58	3.84	4.97
Odisha (OD)	6.16	3.00	3.45	3.22	2.01	2.18	3.90	2.62	2.80
Punjab (PN)	8.51	6.56	7.24	3.37	2.50	2.81	4.45	4.66	4.59
Rajasthan (RJ)	3.25	1.81	2.10	1.62	0.96	1.09	2.59	1.51	1.73
Tamil Nadu (TN)	8.65	8.47	8.55	4.31	4.76	4.56	6.14	6.88	6.55
Telangana (TG)	7.81	4.96	5.99	5.01	2.82	3.61	5.28	4.41	4.73
Uttar Pradesh (UP)	7.89	5.41	5.93	3.52	1.95	2.28	5.02	3.79	4.05
Uttarakhand (UK)	4.55	4.69	4.65	2.12	2.23	2.19	3.28	3.26	3.27
West Bengal (WB)	6.21	4.85	5.21	2.88	1.77	2.06	4.23	3.61	3.77

Source: Author's estimation using unit-level data from the NFHS-5 (2019-21).

Figure 1: Prevalence (%) of intra-household DBM (OVOBM-S/W/UC) in different states, 2019-21



Source: Author's estimation using unit-level data from the NFHS-5 2019-21.

differences in prevalence for this particular DBM form, while Rajasthan, Jharkhand, and Bihar consistently perform better in both rural and urban areas.

Both underdeveloped and developed regions are affected by the dual burden of malnutrition. Factors such as limited access to nutritious food, inadequate

healthcare and poor sanitation facilities may all contribute to this concern in underdeveloped regions. In contrast, in developed regions, rising obesity rates are the main driver of increasing DBM incidence. Sedentary lifestyles and an excessive consumption of calorie-dense and ultra-processed foods are the primary causes of overnutrition. This emphasizes the necessity for region-specific strategies tailored to address various distinct factors that contribute to malnutrition.

Policy implications

Malnutrition is not merely a health issue; it is also a significant barrier to human capital development and economic growth, which ultimately results in reduced productivity and innovation. Furthermore, rising healthcare costs associated with malnutrition-related illnesses put a strain on public resources, diverting funds away from other areas of development. As a result, addressing malnutrition is a strategic investment in a country's future economic success.

The rising incidence of intra-household DBM in India calls for a strategic policy shift in the nutrition sector, moving beyond isolated interventions that target either child undernutrition or maternal obesity. A comprehensive household-centric approach is essential to effectively address the complex nutritional imbalances existing within households. There is a need for concurrent and integrated nutrition strategic policy actions such as:

- ***Multi-dimensional policy approach:*** Tackling the intra-household DBM necessitates a comprehensive and long-term multi-component policy strategy that simultaneously addresses all underlying social, behavioural and institutional factors that affect both maternal and child nutrition.
- ***Improving women's health before childbirth:*** Investment in maternal health is an important aspect in addressing the DBM. Policies must prioritize both maternal and child health, focusing on improving women's nutritional status prior to childbirth, delaying early pregnancy, and promoting informed dietary and caregiving choices.
- ***Tackling household-level inequities:*** Within households, disparities in the allocation of food and healthcare practices often result in the simultaneous presence of undernutrition in children and overnutrition in their mothers. To address this issue, it is essential to increase awareness about balanced diets, the importance of breastfeeding and complementary feeding, physical activity, and promotion of healthy food environments.
- ***Moving beyond calories:*** Nutritional programs should progress beyond merely ensuring caloric sufficiency and towards encompassing the provision of high-quality diets. This approach is essential for providing both mothers and their children with nutrient-rich and diverse foods, which are crucial for their health and well-being.
- ***Encouraging nutri-sensitive agri-food systems:*** Agri-food system environments should foster diversity in food production and address the challenges of inadequate access to and affordability of healthy and nutritious foods. It is essential to promote healthy food choices while discouraging the production, consumption, and marketing of ultra-processed food. Additionally, food labelling with comprehensive nutritional information can assist consumers in making informed decisions.
- ***Balanced and context-specific nutrition education:*** It is essential to implement universal yet customized nutrition awareness campaigns and counselling sessions that address child undernutrition while also preventing maternal overnutrition. A life-cycle approach should be adopted to effectively manage malnutrition.
- ***Strengthening frontline service delivery systems and promoting hygiene:*** Enhancing the capabilities of frontline service providers, such as Anganwadi workers and primary healthcare staff, to identify and support households experiencing the DBM can be beneficial. Incorporating water, sanitation, and hygiene practices into nutrition programs can effectively address infection-related undernutrition in children and promote healthier routines for mothers to deal with overweight and obesity.

This study particularly focused on the prevalence of intra-household DBM among mother-child pairs. However, the strategies proposed above can also be adapted and applied to other population segments, considering their specific nutritional needs and socio-economic contexts.

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