

Research

Assessing the multi-sectoral convergence of interventions impacting nutrition at the household level: Lessons from Sundarbans, West Bengal, India

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Background

Malnutrition is a multifaceted problem requiring interventions that address the multi-sectoral determinants contributing to it. As per National Family Health Survey - 5 (2019-21), with 33.8% stunted, 20.3% wasted, and 32.2% underweight children, West Bengal is one of the high burden states for childhood undernutrition in India.

Objectives

The objective of the study was to assess household-level access (i.e. the percentage of households availing select services) to various nutrition-specific and nutrition-sensitive interventions and understand the extent to which convergent action has taken place in the most hard-to-reach areas of the Sundarbans.

Methods

Cross-sectional survey following 30 x 30 cluster sampling; the sampling was done based on population proportion to size (PPS) methodology. A total of 912 households were recruited for a quantitative survey, and the data was collected through computer-assisted personal interview (CAPI) tools. Data was collected from October 15-25, 2021 from households having at least one child in the age group of 6 – 24 months.

Result

The study focused on 19 nutrition-specific and sensitive interventions. Household-level coverage of 13 of these interventions was 1.5%; coverage of the six others was 4.2%. The estimated coverage of all 19 interventions was found to be almost non-existent (0.2%).

Conclusion

The conspicuously low coverage of services at the household level is a clear indicator of poor convergence of government schemes and programs, reflecting, in turn, disjointed action on the part of the various departments of the government. The results suggest the need for reconsidering the household-level delivery of services as a wholesome package of interventions rather than seeing them as discrete departmental deliverables.

BACKGROUND

A multi-sectoral approach to improve nutrition was one of the central tenets of nutrition programming in the 1970s, though, it was considered too ambitious and overly depen-

dent on other sectors that were averse to coordinated action, at that time. However, in recent times, this approach received renewed importance in nutrition programming. This transition is taking place due to increased awareness of the critical role nutrition plays in child survival and its

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implication on the attainment of Sustainable Development Goals. The nutrition community now also increasingly recognizes the need to address nutrition problems directly (through nutrition-specific interventions primarily based in the health sector) and to tackle the determinants of nutrition through nutrition-sensitive interventions in other sectors (Levinson, Balarajan, and Marini, n.d.).

India has the highest burden of undernutrition in the world. It is home to roughly 30% of the world's stunted children and nearly 50% of all severely wasted children under the age of five. Undernutrition directly or indirectly contributes to an estimated 68% of all under-five deaths in India (Dandona et al. 2020). Acceleration of progress in nutrition will require effective, large-scale nutrition-sensitive programs that address key underlying determinants of nutrition and enhance the coverage and effectiveness of nutrition-specific interventions (Ruel and Alderman 2013). The convergence of sectoral programs is essential for achieving this goal. In India, these interventions are implemented through two government programs – Integrated Child Development Services (ICDS) and National Health Mission (NHM). Several other ministries also deliver nutrition-sensitive interventions. Although there continues a debate over the level of synergy that takes place when these programs are implemented together (Rajpal et al. 2020), the intention is that they should be implemented together. Launched in 2018, POSHAN Abhiyaan is the Government of India's flagship programme to improve nutritional outcomes for children, pregnant women and lactating mothers ("POSHAN Abhiyaan - Ministry of Women and Child Development, Government of India" n.d.). POSHAN Abhiyaan's approach is to anchor a multi-sectoral convergence to address nutritional issues through a framework of relevant interventions, indicators, and targets for programmes implemented by different departments. The goal of achieving multi-sectoral convergence is to ensure that interventions from different sectors converge on households in the first 1,000 days.

West Bengal had been identified as one of India's "high-burden states". The latest round of the National Family Health Survey -5 (2019-2021) reported that 33.8% of children less than 5 years are suffering from stunting; 20.3% of children are wasted, and 32.2% under 5 children are underweight. Surprisingly, both stunting and underweight prevalence have increased from NFHS - 4 (2015-2016) round marginally and wasting remained the same. The continuing trend of high levels of undernutrition is still a major problem in West Bengal. Within West Bengal, the Sundarban poses a unique public health challenge, owing to its geographical vulnerability. The Sundarban is a cluster of low-lying islands in the Bay of Bengal, famous for its unique mangrove forests. This region is ecologically fragile and climatically vulnerable owing to floods, cyclones, relative sea-level rise, and coastline erosion. Climate change leads to increased salinity, higher tidal surges, and permanent submergence of land mass.

This study was undertaken to assess the extent to which convergent action has taken place in the most hard-to-reach areas of the Sundarbans.

METHODS

We utilized Menon et al.'s definition of convergence (Menon et al. 2019). We recruited mothers of children 6-24 months of age so that all the relevant indicators could be assessed for the first 1,000 days – the period covering pregnancy and the first two years of the child's life.

SAMPLING AND SAMPLE SIZE

To establish a representative sample of households, 30 clusters – in this case, villages - were randomly selected from four gram-panchayats (clusters of rural villages) in the Sandeshkhali block of the Sundarbans, the block being the smallest unit for which population data is available in India. Since a sample size of 900 was needed, a total of 912 households were interviewed from December 10-19, 2019 across four gram-panchayats, using 30X30 cluster sampling.

Using a map, each cluster was divided into four quadrants. In each quadrant, one of five starting points was chosen at random. At each starting point, a water bottle was spun to determine the direction of the households for selection. Once the direction was determined, the number of households from the starting point to the end of the quadrant in the direction of the bottle was estimated, and a house was selected at random as the starting household. Following the direction of the bottle spin from this first household, the subsequent eligible households were interviewed. This process was repeated in each of the four quadrants of the cluster. Within each eligible household, only one eligible child was selected to be the focus of the survey. For households having more than one child in the targeted age group, the youngest child was selected. In the case of twins, the index child was selected randomly. The age of the children was verified by health records whenever possible and, when unknown, was estimated using life event calendars and re-call of the mother.

OUTCOME VARIABLES

The outcome variables were benefits obtained from relevant interventions, divided into nutrition-specific and nutrition-sensitive benefits.

The nutrition-specific variables were:

1. Receipt of deworming medication in the last six months
2. Receipt of Vitamin A supplementation in the last six months
3. Receipt of iron/folic acid (IFA) supplementation in the last 6 months
4. Household receipt of a take-home ration (THR)
5. Child weighed in last month
6. Receipt of THR by mother during lactation
7. A health worker visit within 2 days of giving birth
8. Janani Suraksha Yojana (JSY) payment received (cash incentive for institutional delivery)
9. Institutional delivery
10. Receipt of THR by mother during pregnancy

11. Receipt of IFA by mother during pregnancy
12. Four or more antenatal check-ups during pregnancy
13. Mother and Child Protection Card (An individual card for accessing and monitoring essential health and nutrition services for mothers and children).

The nutrition-sensitive variables were:

14. Household membership in a self-help group
15. Awareness of Swachh Bharat Abhiyan
16. An improved source of drinking water available to the household
17. An improved toilet
18. Household having a Mahatma Gandhi National Rural Employment Guarantee Scheme Job Card (which provides at least 100 days of guaranteed wage employment in a financial year to every rural household whose adult members volunteer to do unskilled manual work)
19. Household having a ration card

STATISTICAL ANALYSIS

The survey tool for data collection was developed in digital form, both in English and Bengali and was pre-tested. After field-testing the tools, the surveyors were oriented on the tools and methodology. Household survey data was collected on the Kobo collect application using handheld devices (Android-based tablets). The data from each of the devices were collated and then exported to Stata Version 14.2 for cleaning and analysis.

RESULTS

912 children between 6 - 24 months were sampled. The median age was 14 months with an interquartile range of 9 months; 41% were aged 6 to 12 months, 33% were 13-18 months, and 26%, 19 to 24 months.

The monthly average income of the sampled households was INR 4225 (~ 63 USD). More than half (55%) of the families were nuclear, 34% were joint families, and 11% were living in extended joint families.

In terms of location, 36% were from Bermajur-1, 23% were from Bermajur-2, 22% were from Sandeshkhali and 19% were from Khulna.

Household-level coverage of all 13 nutrition-specific interventions was only 1.5%. Coverage of all 6 nutrition-sensitive interventions was 4.2%. The estimated coverage of all 19 interventions was almost non-existent (0.2%). For detailed estimates, refer to [Table 1](#).

A Fisher's exact test of independence was conducted between the two primary categorical factors: access to all six nutrition-sensitive interventions and access to all 13 nutrition-specific interventions. The association was statistically significant, $\chi^2(1) = 46.1, p < .005$. This suggests that nutrition-sensitive interventions not only address the underlying determinants of undernutrition but also may help improve access to nutrition-specific services in the sampled households.

DISCUSSION

Nutrition-sensitive programmes address critical underlying determinants of undernutrition—such as poverty, inadequate food availability, and inadequate education. These interventions are also expected to improve the effectiveness of nutrition-specific interventions although evidence of these effects continues to be inadequate (Ruel and Alderman 2013). Examining the coverage of these nutrition-sensitive interventions, the present study found that 64% of the sampled households have improved toilet facilities, and almost all (99%) families used drinking water from an improved source (hand pump). However, only 36.2% of the mothers were aware of the benefits of the Nirmal Bangla scheme (State specific adaptation of Swachh Bharat Abhiyan—which is a scheme launched by the Government of India in 2014 for achieving universal sanitation coverage). Almost all households (99%) had a ration card, while 59% had a family member possessing an MNREGA job card. While half of the mothers were aware of the benefits of being a member of a self-help group, only 18.4% of the mothers were members.

The nutritional status of women at the time of conception and during pregnancy has significant effects on both foetal growth and development and on the mother's health. Our study found that more than 90% of all mothers had received four or more antenatal checkups, 180 IFA tablets (99%) and take-home rations (94%) during their last pregnancy. Almost all mothers sampled (98%) had immunization cards. Although there was a high rate of institutional delivery (92%) and health worker visits within 2 days of delivery, less than half (46%) of the mothers received JSY (cash incentive for institutional delivery) funds after delivery.

Deficiencies of essential vitamins and minerals which adversely affect child survival and development are widespread in the coverage area. Deficiencies of Vitamin A and Zinc, negatively affect child health and survival, and deficiencies of iodine and iron contribute to children not reaching their developmental potential. While the provision of maternal and child health services immediately after facility deliveries is satisfactory, the provision of supplies to newborns and young children declines with the passage of time. For example, although 65% received Vitamin A supplementation, only 12% received deworming tablets (Albendazole), and only 27% received iron and folic acid supplementation.

The success of the Government's flagship programs, like the POSHAN Abhiyan, will lie in the ability of convergent processes to trigger actions within and across sectors. These actions will lead to the synergistic and effective delivery of core interventions to all households during the first 1,000 days.

While we document high coverage for some nutrition interventions, we found low availability of the combination of recommended packages of nutrition-sensitive and specific interventions at the household level, a poor reflection of convergence among relevant government departments. These findings are consistent with an earlier study of tribal

Table 1. Coverage of nutrition interventions

	95.0% Confidence Interval		
	Estimate (%)	Lower	Upper
Ration card	99.3	98.6	99.8
Job card	59.0	55.7	62.2
Improved toilet	63.5	60.3	66.6
Improved source of drinking water	98.7	97.7	99.3
Awareness of Swachh Bharat Abhiyaan (Mission Nirmal Bangla)	36.2	33.1	39.4
SHG membership	18.4	17.9	18.9
MCP Card available	98.4	97.3	99.1
> = 4 ANC	90.6	88.5	92.4
IFA received during pregnancy	98.8	97.9	99.4
THR received during pregnancy	94.2	92.5	95.6
Institutional delivery	91.6	89.6	93.3
JSY received	46.3	43.0	49.6
Health worker visited within 2 days of delivery	74.0	69.0	79.0
Mother received THR during lactation	94.5	92.8	95.9
Children weighed in last month	96.1	94.6	97.2
Child received THR	97.6	96.4	98.5
Child received IFA last month	26.9	24.0	29.9
Vit-A in the last six month	78.6	78.1	79.1
Deworming in the last six months	17.5	17.0	18.0
All 6 nutrition-sensitive services	4.2	3.0	5.7
Any 6 nutrition-sensitive services	100.0	99.6	100.0
All 13 nutrition-specific services	1.5	0.8	2.6
Any 13 nutrition-specific services	100.0	99.6	100.0
All 19 services	0.2	0.0	0.8
Any 19 services	100.0	99.6	100.0

areas in 5 Indian states indicating that the combined reach of nutrition-specific and nutrition-sensitive interventions at households in the first 1,000 days is poor (Menon et al. 2019).

India is currently scaling up its nutrition movement by adopting a strategy of cross-sectoral convergence. Although the overarching intent of convergence is clear, the operational guidance does not clarify how stakeholders could ensure that multiple programmes reach the same beneficiary in a given timeframe.

The Government of India's Operational guideline for the Convergent Action Plan (CAP) seeks to clarify the process of multi-sectoral engagement. The CAP framework has identified the activities and indicators based on the existing services that contribute to improved nutrition. The CAP requires program managers to set targets for the key indicators, identify bottlenecks, plan activities, and define monitoring mechanisms across the key thematic areas. However, studies have found no clear operational guidelines for village-level convergence. According to the NITI Aayog

monitoring report (NITI Aayog 2020), Poshan Abhiyaan improved nutritional outcomes for children, pregnant women, and lactating mothers. However, its coverage remains low in most states. This study emphasizes the need for expanding coverage and improving the quality of essential nutrition interventions.

An adjustment in governmental and sectoral perceptions of household-level service delivery is needed – seeing them as an integrated and potentially synergistic convergence package rather than discrete departmental deliverables.

LIMITATIONS OF THE STUDY

This cross-sectional study does not focus on the historical trends of household-level access to multi-sectoral convergent interventions for improving nutritional outcomes. Moreover, it focuses on a select number of nutrition-sensitive and nutrition-specific interventions rather than the exhaustive list of all possible interventions.

AUTHOR CONTRIBUTIONS

All authors confirmed they have contributed to the intellectual content of this paper and have met the following three requirements: (a) significant contributions to the conception and design, acquisition of data, or analysis and interpretation of data; (b) drafting or revising the article for intellectual content; and (c) final approval of the published article.

CONFLICT OF INTEREST

The authors declared there is no conflict of interest. The study was supported by Save the Children, India.

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