POSHAN
Led by IFPRI
Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India
Policy Note
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Improving Nutrition in Bihar

Insights from Examining Trends in Outcomes, Determinants and Interventions between 2006 and 2016

INTRODUCTION

India has made considerable progress in child nutrition outcomes in the last decade. These rates of improvement, however, have been highly variable across the states, mostly due to variabilities in state-level changes in the determinants of nutrition and in the coverage of health and nutrition interventions. Although all the states operate under a similar national policy and programmatic environment, the variability in trends in nutritional outcomes points to state-specific factors. An understanding of such factors can facilitate both state-specific learning and cross-state learning, and help to identify strategies to help India accelerate progress in nutrition. In a series of *Policy Notes*, we examine state-specific trends in nutrition outcomes, determinants and the coverage of interventions, with the overall goal of supporting the state. This *Policy Note* focuses on Bihar.

Bihar is a landlocked state in northern India. It is split into 9 divisions and 38 districts. It is the nation's third most populated state, and is home to 103 million people (Bihar State Government 2017). With only 11.3 percent of its population living in cities, Bihar is one of India's least urbanized states. Fifty-eight percent of Bihar's population is below the age of 25, the highest proportion in the country. The state has a sex ratio of 916 females for 1000 males (Census of India 2011).

The purpose of this *Policy Note* is to examine the trends in undernutrition in Bihar and to document trends and geographic variability in the major determinants of nutrition and the coverage of key nutrition and health interventions. In doing this analysis, we aim to highlight the key areas of action to improve nutrition in Bihar.

METHODS

We used summary data from the recently released National Family Health Survey-4 (NFHS-4 2015–16) fact sheets (International Institute for Population Sciences 2017) and data from NFHS-3 from 2005–06 to compare trends in outcomes, determinants and interventions over a decade (International Institute for Population Sciences 2008). We also used information from fact sheets of the Rapid Survey on Children (RSoC 2013–14) (Ministry of Women and Child Development 2015) for indicators that are currently not available in NFHS-4 fact sheets. We used summary data reported in NFHS-4 district-level fact sheets to examine inter-district variability.

For outcome indicators, we examine progress on a set of global nutrition targets for maternal, infant and young child nutrition (World Health Organization 2014). These include stunting, wasting, low birth weight, exclusive breastfeeding, and anemia status among women of reproductive age.

We also examined levels and changes in several immediate, underlying and basic determinants (Black et al. 2013). For intervention coverage, we chose a set of nutrition-specific interventions across the lifecycle, including interventions affecting pregnant women, newborn babies, infants, and children.

FINDINGS

Trends in nutrition outcomes and variability in outcomes by district

Overall, there have been improvements in nutrition and health outcomes in Bihar between 2006 and 2016 (Figure 1). Stunting prevalence has declined from 55.6 percent to 48.3 percent. The prevalence of wasting declined from 27.1 percent to 20.8 percent and severe wasting declined from 8.3 percent to 7 percent during the same time period (IIPS 2008 and IIPS 2017). Bihar is one of the few states where wasting declined. The prevalence of low birth weight declined from 27.6 percent to 15 percent.

The state performed well on exclusive breastfeeding. The proportion of infants under six months who were exclusively breastfed increased considerably from 28 percent in 2006 to 53.5 percent in 2016. Although anemia prevalence among women of reproductive age declined slightly from 67.4 percent to 60.3 percent between 2006 and 2016, it still remains a significant public health challenge.

Stunting among children below five years varies among districts, ranging from 35.6 percent to 57.3 percent (Map 1). In 36 out of 38 districts of Bihar, more than 40 percent of children are stunted, which indicates a significant public health concern.

The prevalence of anemia among women of reproductive age is higher than 50% across Bihar and has low variability (Map 2). Buxar has the lowest anemia rate (51.3 percent) and Purnia has the highest (68.8 percent) in the state. In more than half of the districts of the state, 60 percent of women of reproductive age are anemic.

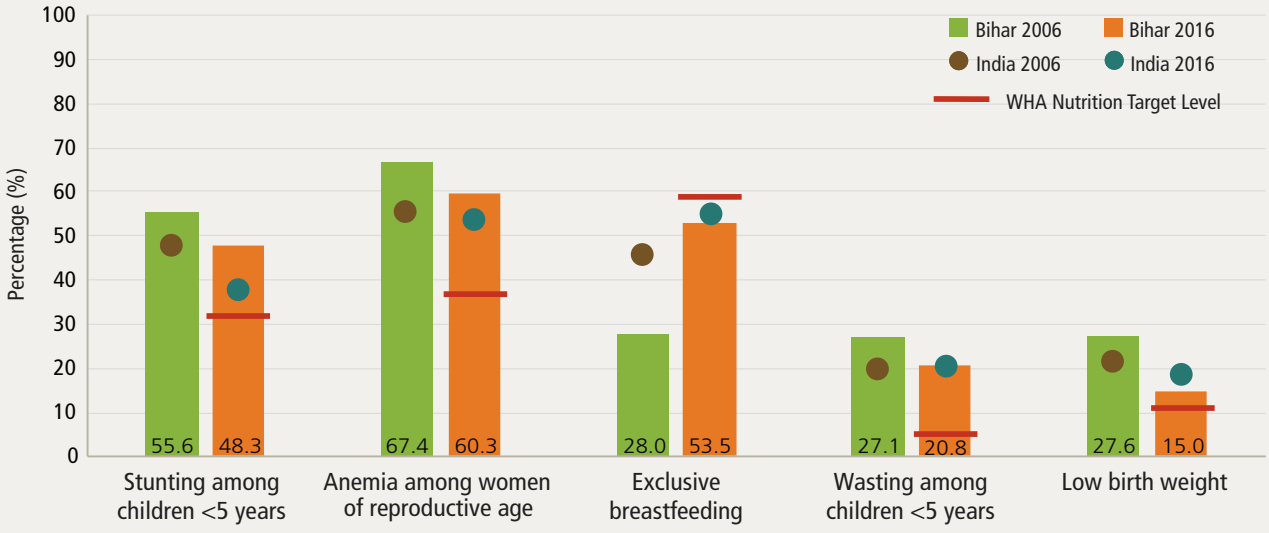
The prevalence of wasting ranged from 14.8 percent (Sheohar) to 30.7 percent (Arwal) (Map 3). Map 4 shows that the same districts had the lowest prevalence of severe wasting (4.3 percent in Sheohar), and the highest prevalence (16.4 percent in Arwal).

Exclusive breastfeeding is highly variable between the districts of Bihar (Map 5) with the lowest rates in Begusarai (27.3 percent) and highest rate in Muzaffarpur (78.9 percent). In nearly half of the 38 districts in Bihar, less than 50 percent of children below six months are exclusively breastfed.

Changes in the determinants of nutrition

Improving nutrition for women and children requires that investments be made in changing the

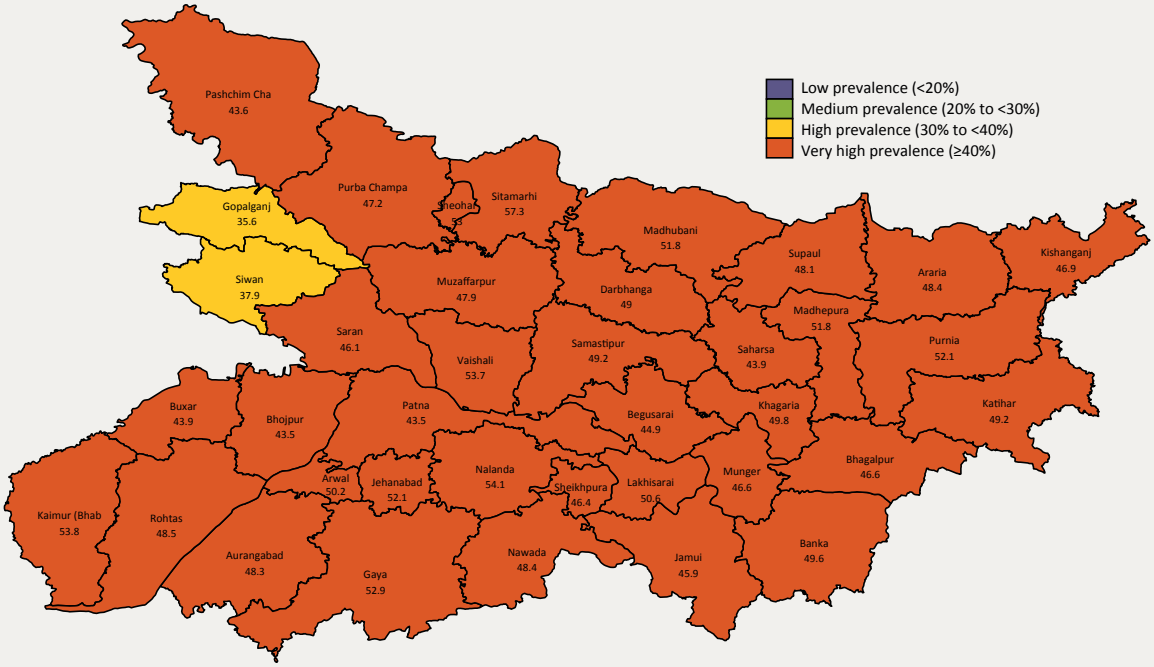
FIGURE 1 Trends in nutrition outcomes in Bihar, 2006 to 2016



Source: NFHS-3 and NFHS-4; RSoC data used for low birth weight.

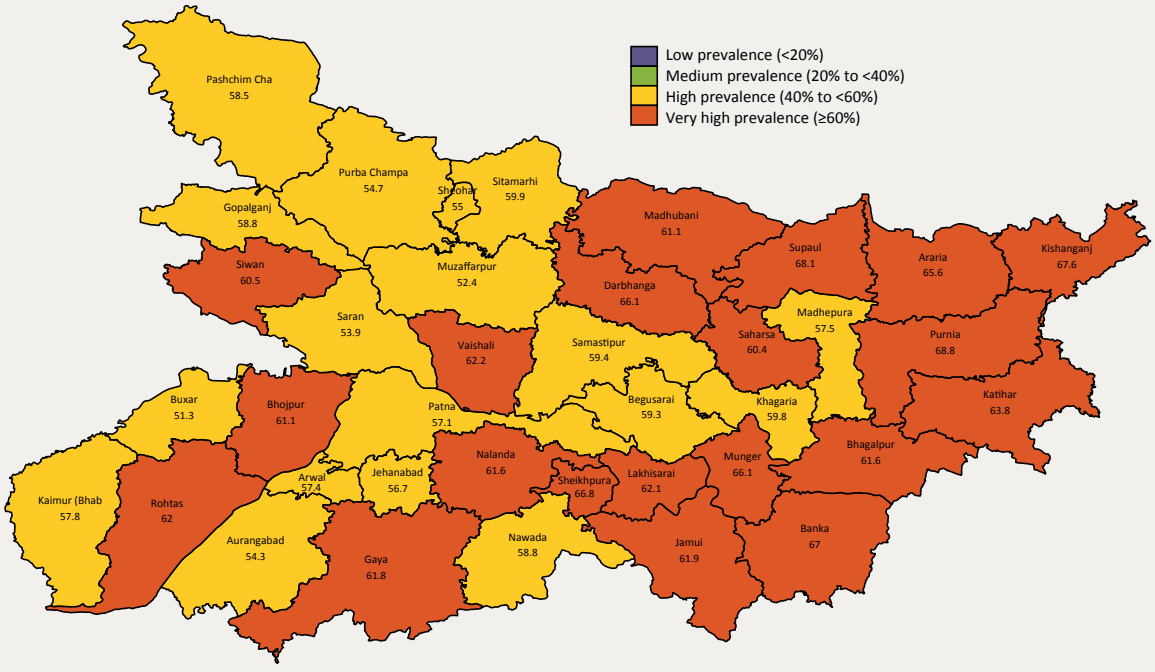
Note: A set of global nutrition targets for maternal, infant and young child nutrition were endorsed by the World Health Assembly (WHA) in 2012. The red lines represent the WHA targets to be achieved by the state, by 2025. The baseline reference year for these targets is 2012. The state baseline estimates are based on NFHS-4 (2016) as there is no survey data for 201; Child overweight data is not available; Refer to endnotes for indicator definitions.

MAP 1 Stunting (among children <5 years) in Bihar in 2016, by district



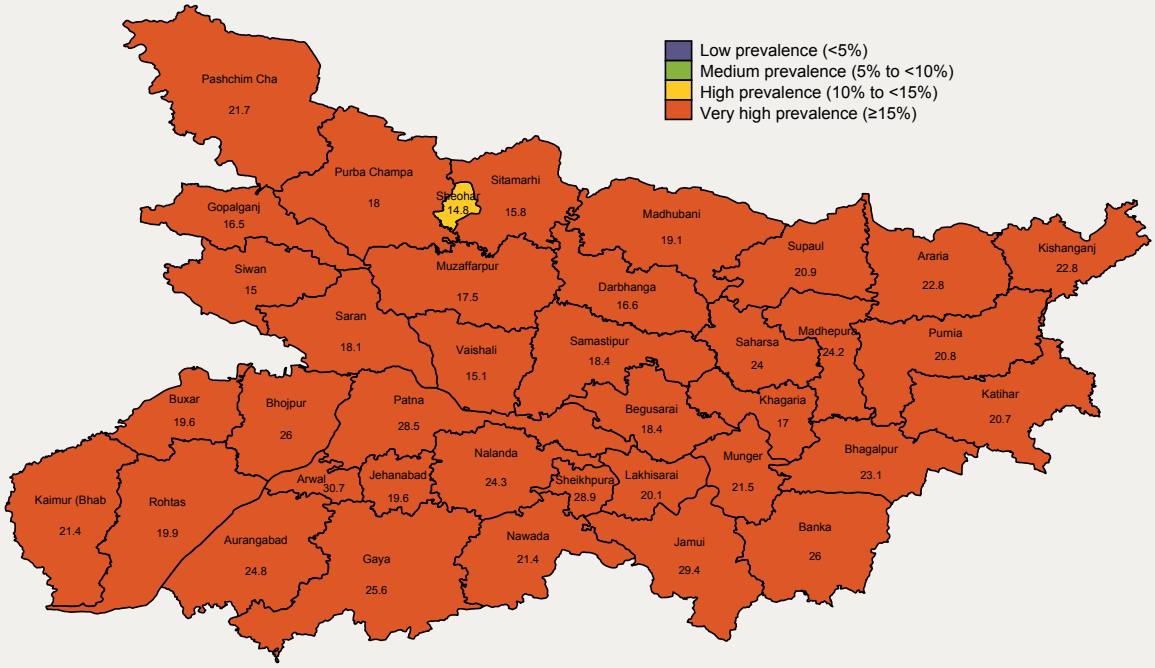
Source: NFHS-4.

MAP 2 Anemia (among women of reproductive age) in Bihar in 2016, by district



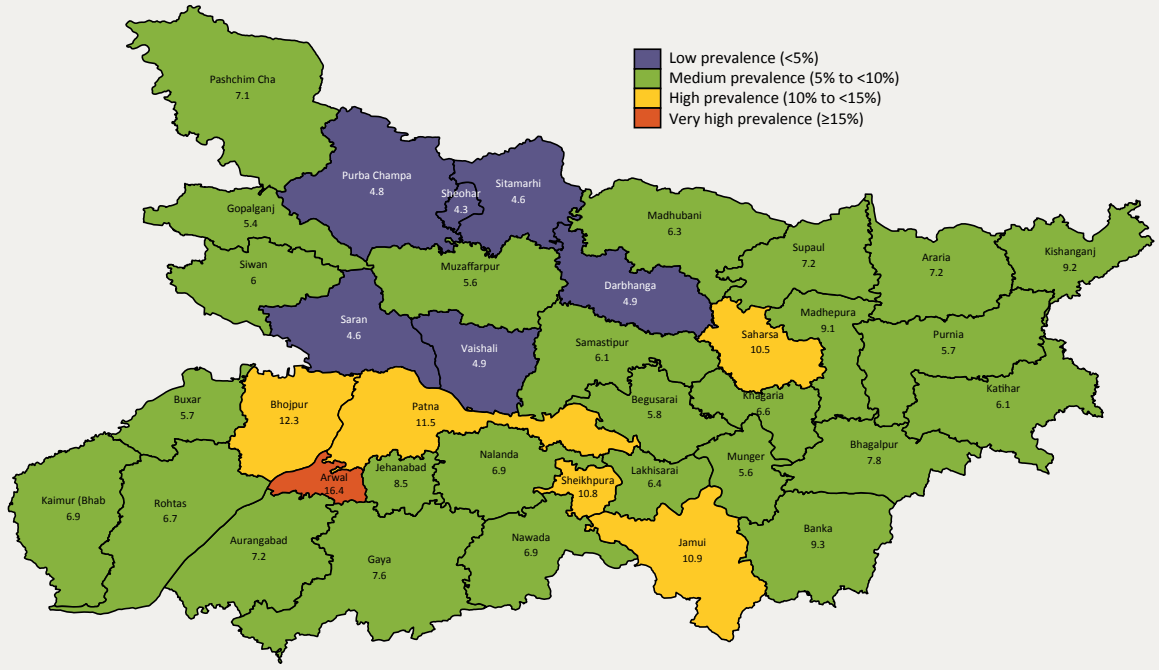
Source: NFHS-4.

MAP 3 Wasting (among children <5 years) in Bihar in 2016, by district



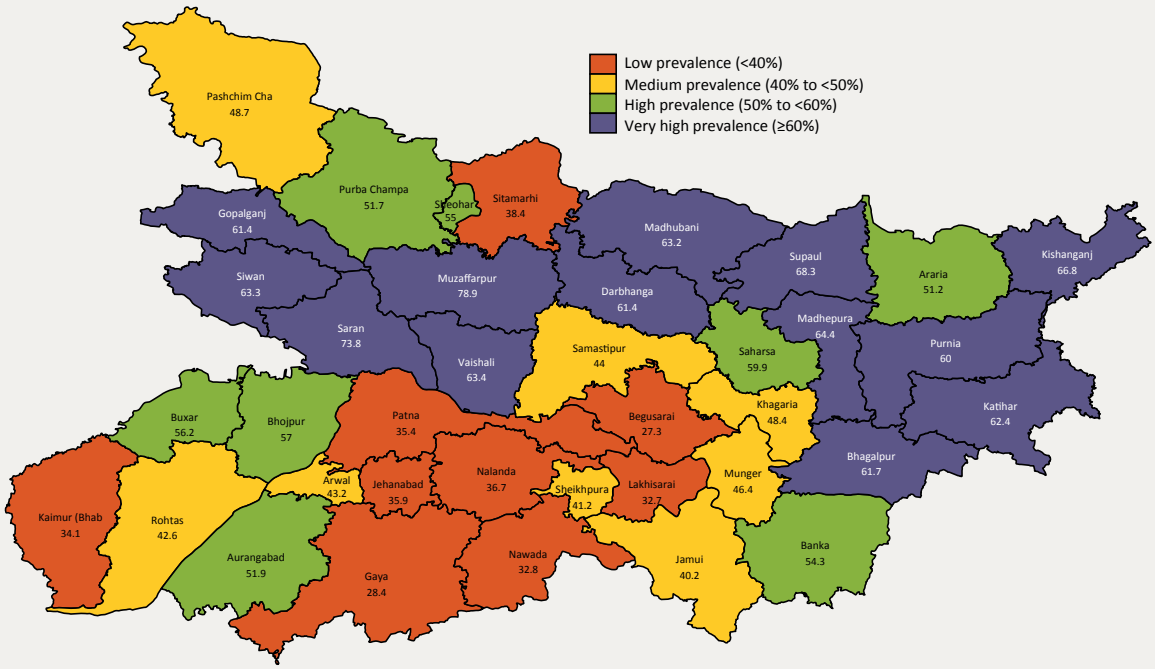
Source: NFHS-4.

MAP 4 Severe wasting (among children <5 years) in Bihar in 2016, by district



Source: NFHS-4.

MAP 5 Exclusive breastfeeding in Bihar in 2016, by district



Source: NFHS-4.

determinants of poor nutrition, using a variety of policy instruments and efforts. Here, we examine changes in the immediate determinants and nutrition-specific interventions to address these determinants. We also describe changes in the underlying determinants of nutrition. We do not examine coverage data on programs to improve the underlying determinants in this Note because data on those are not available at this time.

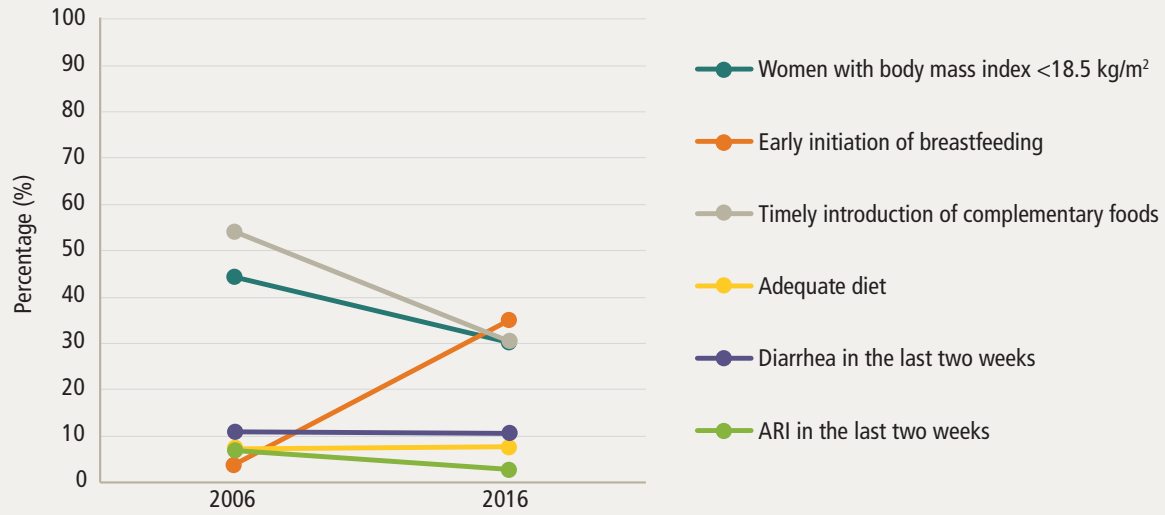
Changes in the ***immediate determinants*** of nutrition in Bihar have been mixed (Figure 2), particularly among infant and young child feeding (IYCF) practices and maternal health indicators. The prevalence of low body mass index (<18.5 kg/m^2) among women declined from 45 percent to 30.4 percent, and early initiation of breast-feeding improved considerably in the last decade from 4 percent in 2006 to 34.9 percent in 2016. However, timely introduction of complementary foods (between 6 to 8 months of age) declined substantially (from 54.5 percent to 30.7 percent). In 2016, only 7.5 percent of children between 6 and 23 months of age received an adequate diet.

There have been minor improvements in disease burden among children in Bihar. The proportion of children with diarrhea decline slightly from 10.7 percent in 2006 to 10.4 percent in 2016. The proportion of children with acute respiratory infection (ARI) declined from 6.8 to 2.5 percent during the same time period.

Changes in the coverage of ***nutrition-specific interventions*** in Bihar are presented in Figure 3. There has been improvement in coverage of nearly all interventions during the last decade. Nutrition-specific interventions related to child birth saw substantial improvements in the state. Institutional deliveries increased from 19.9 percent in 2006 to 63.8 percent in 2016, and health professional-assisted births increased from 29.3 percent to 70 percent over the decade. There has been a nearly 55 percentage point increase in births registered (from 5.8 percent in 2006 to 60.7 percent in 2016).

Interventions related to care during pregnancy had limited progress between 2006 and 2016. The proportion of women who received antenatal care (ANC) in their first trimester of pregnancy improved

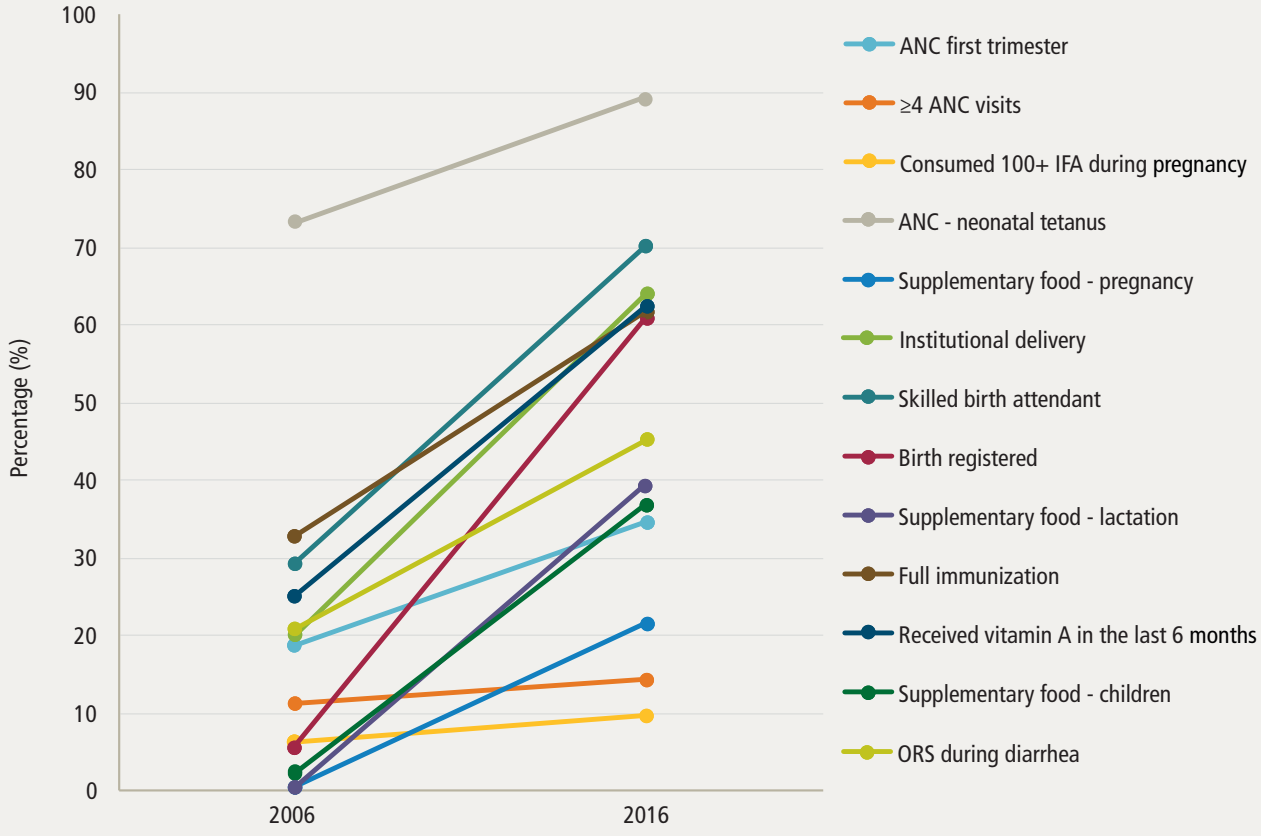
FIGURE 2 Changes in immediate determinants of nutrition in Bihar, 2006 to 2016



Source: NFHS-3 and NFHS-4.

Note: ARI= Acute respiratory infection; Refer to endnotes for indicator definitions.

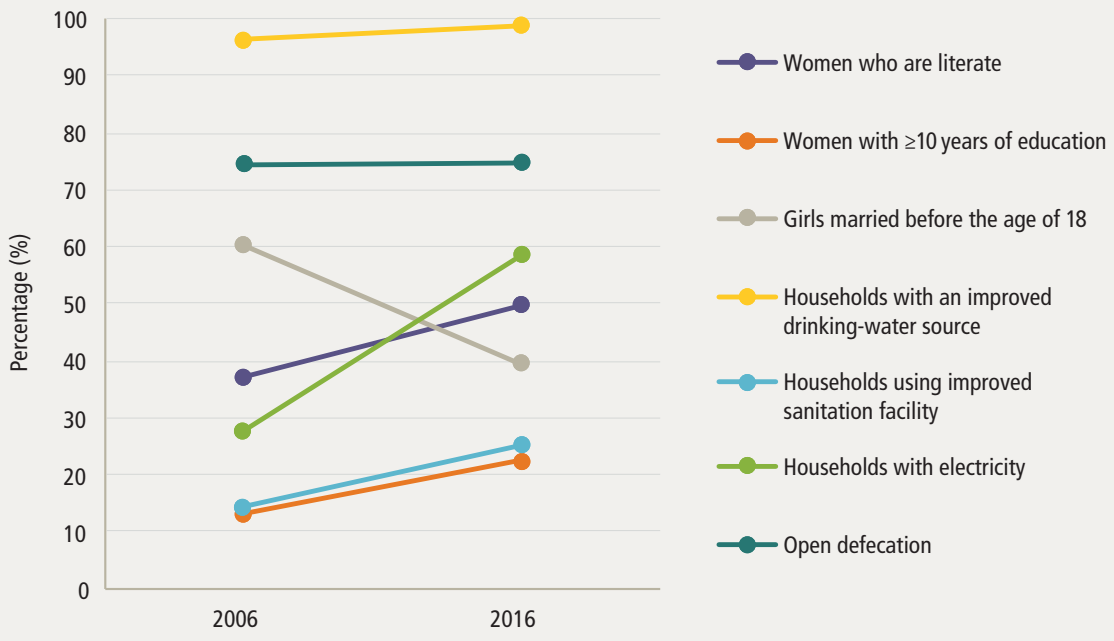
FIGURE 3 Changes in coverage of nutrition-specific interventions along the continuum of care in Bihar, 2006 to 2016



Source: NFHS-3 and NFHS-4; RSoC data used for food supplementation.

Note: ANC= Antenatal care; IFA= Iron and folic acid; ORS= Oral rehydration salts; Refer to endnotes for indicator definitions.

FIGURE 4 Changes in underlying determinants of nutrition in Bihar, 2006 to 2016



Source: NFHS-3 and NFHS-4; RSoC data used for open defecation.

Note: Refer to endnotes for indicator definitions.

moderately (from 18.7 percent to 34.6 percent). The proportion of women who had 4 or more ANC visits during pregnancy remained low although it slightly increased from 11.2 percent to 14.4 percent. The proportion of women who consumed 100+ iron and folic acid (IFA) tablets during pregnancy is also very low (6.3 percent in 2006 and 9.7 percent in 2016).

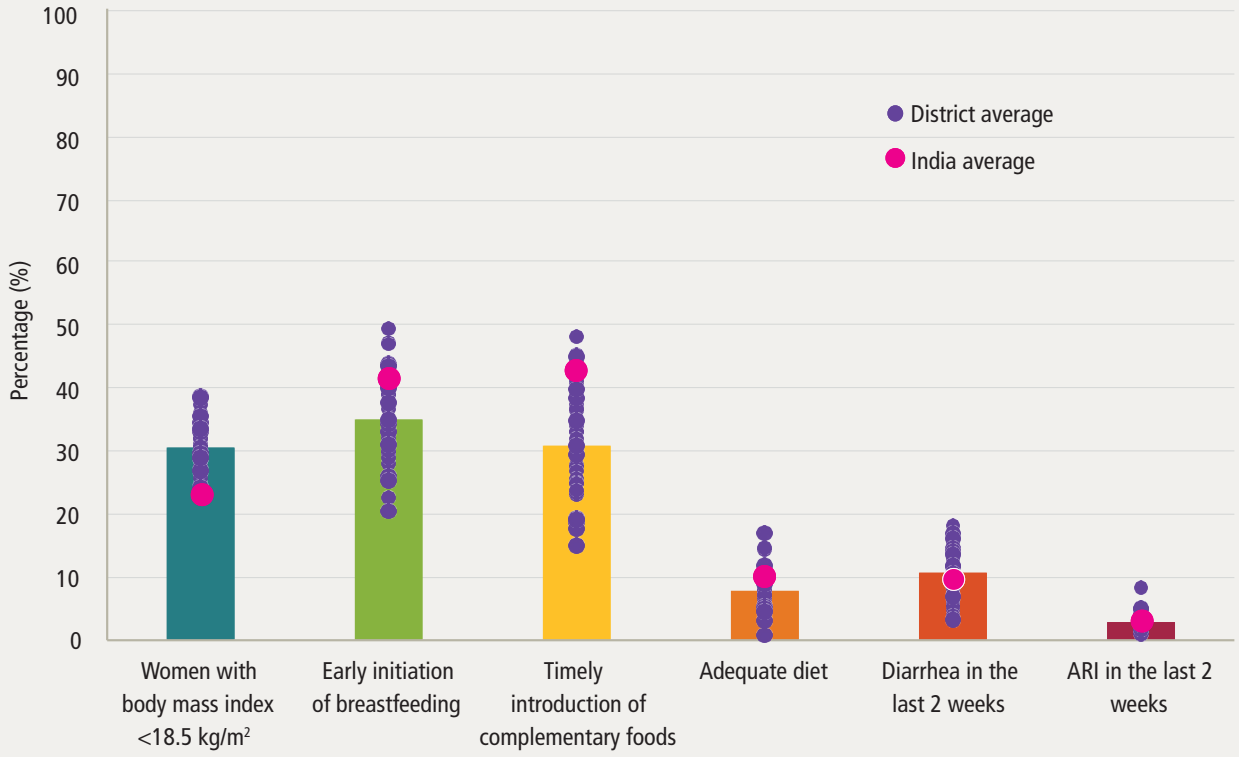
Full immunization increased from 32.8 percent to 61.7 percent, vitamin A supplementation increased from 25.1 percent to 62.3 percent, and oral rehydration salt (ORS) treatment during diarrhea increased from 20.9 percent to 45.2 percent.

Overall, the coverage of food supplementation is low in Bihar among all the beneficiaries. Between 2006 and 2016, the coverage of food supplements improved for pregnant women (from 0.6 percent to 21.7 percent) and for children below three years (from 2.3 percent to 36.6 percent). The coverage of food supplements for lactating mothers during the first 6 months after delivery increased (from 0.6 percent in 2006 to 39.3 percent in 2016). Low coverage of food supplements is expected as the Supplementary Nutrition Program (SNP) is not implemented at scale in Bihar.

In the last decade, Bihar experienced improvements in all ***underlying determinants*** of nutrition (Figure 4). There was a remarkable decline in the proportion of girls getting married before 18 years (from 60.3 percent in 2006 to 39.1 percent in 2016). Similarly, there has been an increase in literacy among women (from 37 percent in 2006 to 49.6 percent in 2016) and among women with 10 or more years of education (from 13.2 percent in 2006 to 22.8 percent in 2016).

There have been infrastructure improvements in the state such as household access to improved drinking water (from 96.1 percent to 98.2 percent) between 2006 and 2016. The proportion of households in Bihar with access to electricity doubled from 27.7 percent in 2006 to 58.6 percent in 2016. Although levels are still too low, there was a rise in the proportion of households using improved sanitation (from 14.6 percent to 25.2 percent) in the last decade. The proportion of households practicing open defecation increased marginally from 74.6 percent in 2006 to 74.8 percent in 2016.

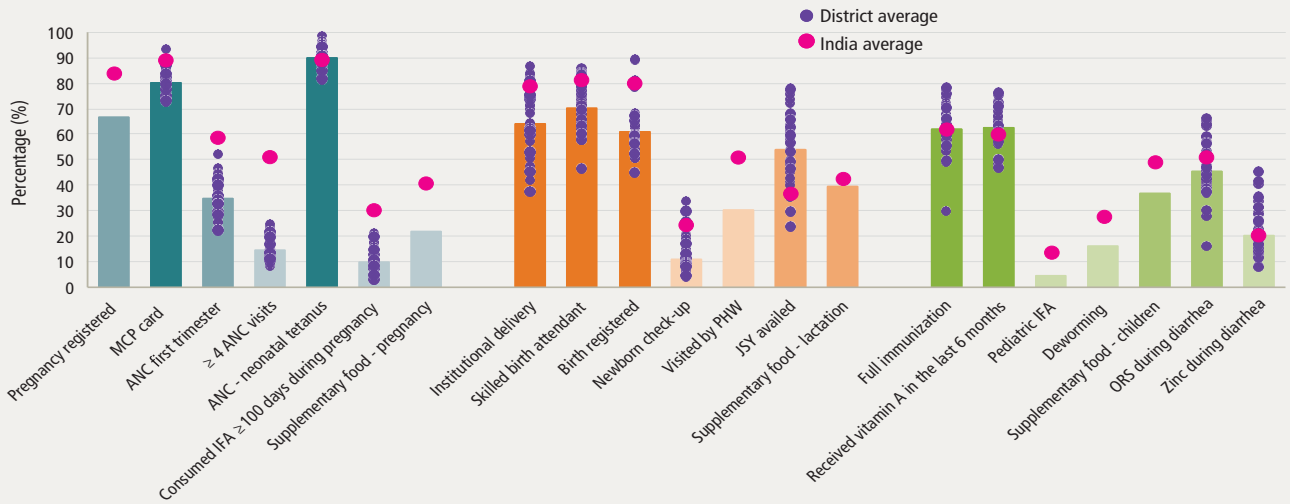
FIGURE 5 Inter-district variability in immediate determinants in Bihar, in 2016



Source: NFHS-4.

Note: ARI= Acute respiratory infection; Refer to endnotes for indicator definitions.

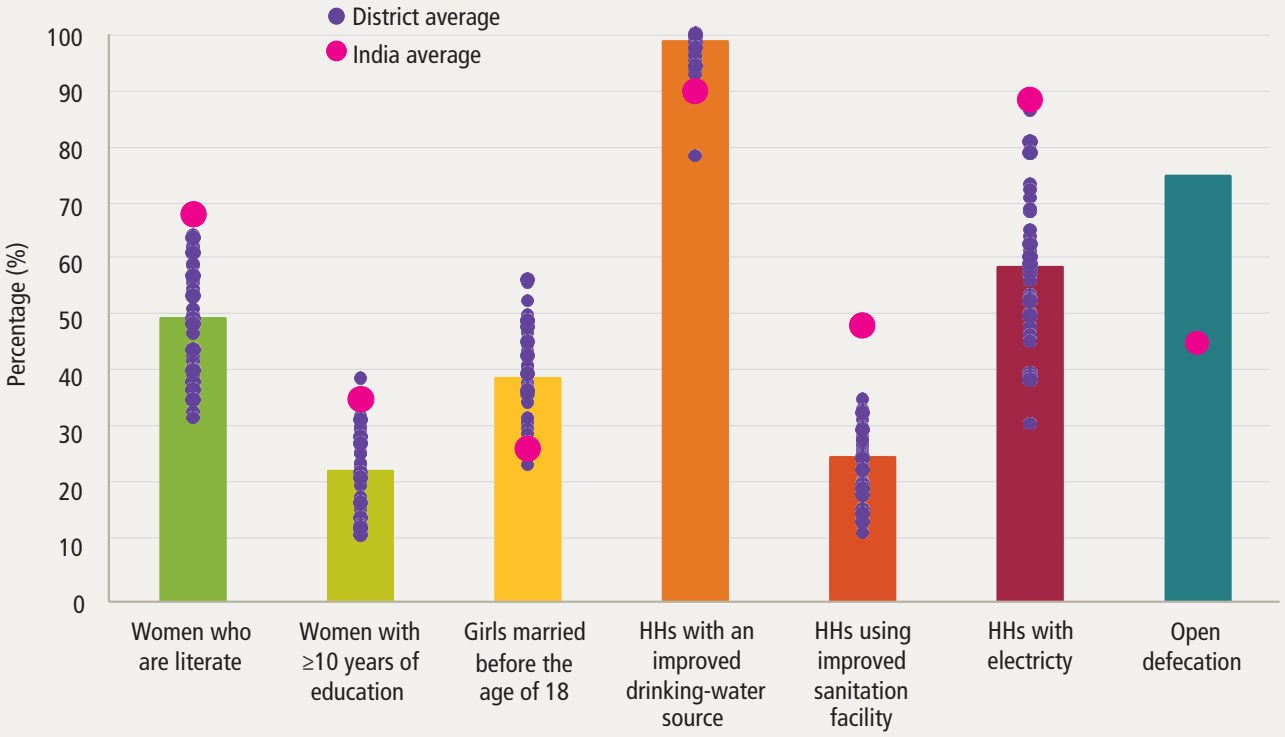
FIGURE 6 Inter-district variability in coverage of selected interventions in Bihar, in 2016



Source: NFHS-4; RSoC data was used for indicators on pregnancy registration, food supplementation during pregnancy, lactation, and for children, visits by a health worker, pediatric IFA and deworming.

Note: As RSoC data is not representative at the district-level, district variability is unavailable for these indicators; ANC= Antenatal care; IFA= Iron and folic acid; JSY= Janani Suraksha Yojana; ORS= Oral rehydration salts; MCP= Mother and child protection; PHW= Primary health worker; Refer to endnotes for indicator definitions.

FIGURE 7 Inter-district variability in underlying determinants in Bihar, in 2016



Source: NFHS-4; RSoC data is used for indicator for open defecation.

Note: HH= Household; Refer to endnotes for indicator definitions.

Inter-district variability in coverage of selected interventions in Bihar in 2016

The 38 districts of Bihar are subject to a range of agro-ecological and economic conditions. As seen in Figures 5-7, among these districts, there is a high degree of inter-district variability for some key determinants (that is, early initiation of breastfeeding, timely introduction of complementary foods, institutional delivery, women availing of the *Janani Suraksha Yojana*, full immunization, children with diarrhea treated with ORS). In contrast, there is little to no inter-district variability for some other determinants, either because coverage is very high (for example, household access to improved drinking water, neonatal tetanus during ANC visit, MCP card coverage) or challenges are uniform across all districts (for example, adequate diet among children 6–23 months).

LOOKING FORWARD: IMPLICATIONS & RECOMMENDATIONS

Bihar contributes tremendously to India's overall burden of malnutrition, and in an era of India's commitment to global nutrition targets, it is urgent that Bihar set its own nutrition targets and accelerate actions necessary to improve all forms of malnutrition. There are major challenges in several nutrition outcomes, particularly anemia among women of reproductive age and stunting among children under five years of age. Although anemia among women has declined in the last decade, it is still above 50 percent across Bihar and above 60 percent in half of districts. This calls for a multipronged strategy to address the issue, including IFA supplementation before and during pregnancy, improvement of hygiene and reducing infectious diseases, and addressing other social and economic factors.

To achieve progress in child nutrition, special attention is required to strengthen actions to support

adequate infant and young child feeding practices, including exclusive breastfeeding and complementary feeding practices in Bihar. Continuing to emphasize the positive progress on immunization and vitamin A supplementation is key to further increase and sustain coverage. In Bihar, there is also an urgent need to review and strengthen the supplementary nutrition program to ensure coverage and quality across multiple beneficiary groups. On underlying determinants, it is imperative that investments be sustained to improve women's education and reduce early marriage, while also addressing the major challenge of poor sanitation across the state.

Bihar also needs to actively consider the challenge of non-communicable diseases (NCDs) as it looks forward to an overall nutrition strategy for the state. As Figure 8 below shows, the challenge is emerging, with 1 in 10 men and women in Bihar now overweight or obese. The challenge of high blood pressure is still slightly below the Indian average, but high blood sugar levels among both women and men in Bihar are nearly on par with the Indian average.

In closing, it is imperative for Bihar to develop a state-wide nutrition strategy to simultaneously address undernutrition and these emerging NCDs related to nutrition. This is particularly important because the double burden of undernutrition and NCDs in a poor and a highly populated state like Bihar, can have dire consequences for the state's progress.

NOTE

1. Indicator definitions, in alphabetical order:

Access to electricity: Percentage of households with electricity.

Adequate diet: Percentage of children 6–23 months old who received 4 or more food groups and a minimum meal frequency.

ANC (4 or more visits): Percentage of mothers receiving at least 4 ANCs for the last birth in the last 5 years.

ANC (first trimester): Percentage of mothers who received ANC during the first trimester of pregnancy for the last birth in the last 5 years.

ANC-neonatal tetanus injections: Percentage of mothers who were protected against neonatal tetanus for the last birth in the last 5 years.

Anemia among women of reproductive age: Percentage of women 15–49 years old who are anemic (<12.0 g/dl for non-pregnant women and <11.0 g/dl for pregnant women).

Birth registered: Percentage of children under age 5 years whose birth was registered.

FIGURE 8 Levels of non-communicable diseases in Bihar and India, in 2016

Source: NFHS-4.

Note: Refer to endnotes for indicator definitions.

Consumption of IFA supplements: Percentage of mothers who took IFA supplements for at least 100 days for the last birth in the last 5 years.

Deworming: Percentage of children 6–59 months old who were given deworming medication in the last 6 months.

Early initiation of breastfeeding: Percentage of children who were breastfed within one hour of birth.

Exclusive breastfeeding: Percentage of infants 0–5 months old who were exclusively breastfed.

Full immunization: Percentage of children 12–23 months old who received BCG, measles, and three doses each of DPT and polio vaccine (excluding polio vaccine given at birth).

Girls married before age of 18: Percentage of women 20–24 years old married before age of 18.

High blood pressure: 15–49 year old men and women with systolic ≥140 mm of Hg and/or diastolic ≥90 mm of Hg.

High blood sugar: 15–49 year old men and women with blood sugar level >140 mg/dl.

Improved drinking water: Percent distribution of households with an improved drinking water source.

Improved sanitation: Percent distribution of households using improved sanitation facilities.

Institutional delivery: Percentage of births delivered in a health facility for births in the last 5 years.

Janani Suraksha Yojana (JSY) availed: Percentage of women who received financial assistance under JSY for births delivered in an institution for the last birth in the last 5 years.

Low birth weight: Percentage of live births in the last 5 years weighing less than 2,500 grams at birth.

Mother child protection (MCP) card: Percentage of registered pregnancies for which the mother received an MCP card.

Open defecation: Percentage of household having no sanitation facilities.

ORS during diarrhea: Percentage of children below 5 years of age who received ORS during diarrhea.

Overweight/obesity: 15–49 year old men and women with body mass index ≥25 kg/m^2.

Prevalence of acute respiratory infection (ARI): Percentage of children below 5 years of age with symptoms of ARI in 15 days preceding the survey.

Prevalence of diarrhea: Percentage of children below 5 years of age who had diarrhea in 15 days preceding the survey.

Severe wasting: Percentage of children 0–59 months old who are below <-3SD from median weight for height of the WHO Child Growth Standards.

Skilled birth attendant: Percentage of births assisted by a doctor/nurse/LHV/ANM/other health personnel.

Stunting: Percentage of children 0–59 months old who are <-2SD from median height for age of the WHO Child Growth Standards.

Supplementary food (children): Percentage of children 6–35 months old covered by AWC who received supplementary food provided at the AWC in the last 12 months.

Supplementary food (lactation): Percentage of mothers with children under age 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during lactation.

Supplementary food (pregnancy): Percentage of mothers with children under age 6 years in areas covered by an Anganwadi center (AWC) who received supplementary nutrition from the AWC during pregnancy.

Timely introduction of complementary foods: Percentage of infants 6–8 months old who received solid and semi-solid foods and breastmilk.

Vitamin A: Percentage of children 9–59 months old who received vitamin A supplements in the last six months.

Wasting: Percentage of children 0–59 months old who are below <-2SD from median weight for height of the WHO Child Growth Standards.

Women who are literate: Percentage of women who are literate.

Women with at least 10 years of education: Percentage of women 15–49 years old having at least 10 years schooling.

Women with low body mass index (BMI): Percentage of women 15–49 years old with BMI less than 18.5 kg/m^2.

Zinc during diarrhea: Percentage of children below 5 years of age who received zinc during diarrhea.

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ABOUT POSHAN

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) is a multi-year initiative that aims to build evidence on effective actions for nutrition and support the use of evidence in decision-making. It is supported by the Bill & Melinda Gates Foundation and led by IFPRI in India.

ABOUT POLICY NOTES

POSHAN Policy Notes aim to provide evidence-based guidance to support policy and program actions for nutrition in India.

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