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Delivering for Nutrition in Madhya Pradesh: Insights from a Study on the State of Essential Nutrition Interventions

Report

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ABOUT POSHAN

POSHAN (Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India) is a four-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.

TABLE OF CONTENTS

List of Tables

List of Figures

List of Boxes

Acronyms and Abbreviations

ANC	antenatal care
ANM	auxiliary nurse midwife
ASHA	accredited social health activist
AWC	*anganwadi* center
AWW	*anganwadi* worker
BF	breastfeeding
BPL	Below Poverty Line
CF	complementary feeding
DHFW	Department of Health and Family Welfare
DWCD	Department of Women and Child Development
ENI	essential nutrition intervention
FLW	frontline worker
ICDS	Integrated Child Development Services
IFA	iron and folic acid
IFPRI	International Food Policy Research Institute
IIPS	International Institute for Population Sciences
IYCF	infant and young child feeding
LHV	lady health visitor
NIPI	National Iron Plus Initiative
NRHM	National Rural Health Mission
OBC	Other Backward Class
ORS	oral rehydration solution
POSHAN	Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India
Rs	rupees
SAM	severe acute malnutrition
SC	Scheduled Caste
ST	Scheduled Tribe
THR	take-home ration
USD	United States dollar
VHND	village health and nutrition day

Executive Summary

In India, policies are in place to address the set of nutrition-specific interventions that will accelerate progress in nutrition, if implemented at scale. These interventions include iron and folic acid supplementation during pregnancy, breastfeeding counseling, complementary feeding counseling, vitamin A supplementation, and food supplementation for pregnant and lactating women and young children. However, systematic data on the coverage of these interventions are limited, as are insights into how best they may be designed and delivered to reach full coverage.

Two national programs in India—Integrated Child Development Services (ICDS) and National Rural Health Mission (NRHM)—together are designed to cover all of these nutrition-specific interventions. Frontline workers (FLWs) of these two programs—i.e., *anganwadi* workers (AWWs) (from ICDS) and accredited social health activists (ASHAs) and auxiliary nurse midwives (ANMs) (from Health/NRHM)—are expected to work together to deliver the interventions. However, there are challenges to working across sectors, and there has been historically little horizontal coordination due to vertical structural constraints. Lack of coordination between these two sectors leads to insufficient coverage, inconsistent data reporting, and some redundancy in work. Therefore, in addition to the challenges of policy financing and capacity strengthening, the issue of coordination is a key to successful service delivery at scale in India.

Madhya Pradesh, a state of 73 million people in central India, has taken steps in recent years to enhance service coverage and foster coordination between ICDS and health programs. These include the initiation of *Atal Bal Arogya Evam Poshan* Mission (integrated planning and actions to reduce child malnutrition); Village Health, Sanitation, and Nutrition Committees (for decentralized health planning and collective actions at the village level); and Village Health Centers (*Gram Arogya Kendras*).

This report presents findings of a study conducted in three districts of Madhya Pradesh to examine the state of delivery and use of ten select essential nutrition interventions (ENIs) and the role of intersectoral coordination in their delivery.

Ten select essential nutrition interventions studied

***During pregnancy**:* Counseling on maternal nutrition and care, iron and folic acid (IFA) supplementation, and food supplementation
0–6 months after birth: Counseling on breastfeeding and food supplementation
6–24 months after birth: Counseling on complementary feeding, vitamin A supplementation, pediatric IFA supplementation, food supplementation, and growth monitoring/screening for severe acute malnutrition

Methods

Using a set of indicators on service coverage and household conditions from district-level health survey data from 2006 and 2010, we grouped 50 total districts in Madhya Pradesh into three categories: better-performing districts (i.e., those with a positive change over time), average-performing districts (i.e., no change), and poorly-performing districts (i.e., those with negative change). State officials from the Department of Women and Child Development (DWCD) and the Department of Health and Family Welfare (DHFW) randomly selected one district from each category to be included in our study: Tikamgarh (better performing), Shahdol (average performing), and Dindori (poorly performing).

Then, four blocks (n=12) per district and 25 villages (n=300) from each block were randomly selected. From each village, one *anganwadi* center (AWC) with an AWW, along with the ASHA and the ANM working

in the same area, were included in the study. Four households (two with children 0–5.9 months of age and two with children 6–23.9 months of age) were selected randomly from the list of households at the AWC. Across the three study districts, the study sample included a total of 717 FLWs and 1,136 households.

Household and FLW surveys were conducted between March and April 2014. The household questionnaire gathered data on household conditions, exposure to services and FLW contacts, sources of health and nutrition information, and knowledge of infant and young child feeding (IYCF). The FLW surveys covered topics such as training, knowledge, interactions with other FLWs, types of services provided, and work motivation and satisfaction. Descriptive statistics were used to describe maternal, household, FLW, and AWC characteristics; exposure to interventions; and state of service delivery and coordination.

Results

Characteristics of mothers, households, FLWs, and AWCs

Mothers: The mean age of mothers in our study sample was 25 years. A third of the mothers had middle school education or higher, while almost 30 percent had no schooling. Almost all of the mothers reported to be housewives. In relation to their dietary diversity, mothers consumed *only* two of the nine food groups, on average, reflecting low dietary quality.

Households: The mean household size was 5.4 members. Most households belonged to disadvantaged communities, where 55 percent had a Below Poverty Line (BPL) card to procure staple foods for a low price, and 49 percent had an employment guarantee card issued by the government. Study households had low resources, in terms of assets and infrastructure. On average, households owned about 6 out of 27 asset items and three types of livestock out of a possible five. Half of the households owned their homes, and only 9 percent had a toilet on the premises. While most households were food secure, 21 percent were food insecure (mild to severe), as per the Household Food Insecurity Access Scale. However, twenty percent of the households reported being anxious about availability of food. Furthermore, one in five households reported consuming insufficient quality of food and one in ten households reported consuming smaller meals due to insufficient food. Inter-district variations reflected expected patterns by sampling design.

FLWs: The mean ages for AWWs, ASHAs, and ANMs were 39, 32, and 41 years, respectively. Years of experience on the job among AWWs and ANMs (14-16 years) were more than twice as long as those of ASHAs (5 years). This is as expected, because ASHAs were introduced as frontline cadres in 2006, while the other cadres have existed longer. Nearly 65 percent of AWWs and 50 percent of ASHAs had secondary education or higher, and all ANMs had secondary education or higher, as required by their work position. Nearly all of the FLWs received training. However, there was variability in their exposure to training topics. For example, most AWWs, ASHAs, and ANMs were trained on immunization, recording weight and height, and antenatal care, but more AWWs and ASHAs reported receiving training on breastfeeding and complementary feeding compared to ANMs.

Anganwadi centers: In our study sample, 95 percent of AWCs were open at the time of the survey visit. Nearly 70 percent of the AWCs had a permanent structure, and more than 65 percent had a separate kitchen, space for storage of supplementary foods, and access to potable drinking water. Less than 10 percent of the AWCs had electricity. Overall, the AWCs observed in the study had moderately limited space and structural constraints.

Exposure and delivery of essential nutrition interventions

Exposure to ENIs: Exposure to interventions during pregnancy was high. More than 80 percent of mothers were exposed to counseling on pregnancy care and the importance of IFA supplements, and also received food supplements.

Exposure to interventions during 0–6 months after birth was more variable compared with during pregnancy. Nearly 75 percent of mothers reported being advised on initiating breastfeeding immediately after birth, and 79 percent of mothers reported receiving food supplements. But only 24 percent of mothers received counseling on breastfeeding at home from FLWs.

During 6–24 months after birth, exposure to interventions was even more mixed compared with during pregnancy and 0–6 months after birth. While a majority of the mothers reported receiving food supplements for their young children (96 percent), vitamin A supplementation (62 percent), and growth monitoring (70 percent), there was low exposure to counseling on complementary feeding (less than 10 percent), pediatric IFA supplementation (3 percent), and even full immunization (34 percent) during this age period. Just as high exposure to ENIs was achieved during pregnancy, efforts should focus on improving interventions that are to be delivered through early childhood.

Delivery of ENIs: Two common delivery points for the ENIs are Village Health and Nutrition Days (VHNDs), which are held once a month at AWCs, and home visits. Several of the ENIs (e.g., distribution of food supplements, counseling on IYCF, and growth monitoring) were delivered during VHNDs. Three out of four mothers reported attending VHNDs, and exposure to ENIs at VHNDs was high among those in attendance.

Exposure to ENIs at home was low. Nearly 85 percent of mothers reported being visited by FLWs in the last 3 months, but *less than a quarter* reported receiving any counseling on IYCF practices. Thus, lack of home visits was not a constraining factor affecting the poor reach of counseling. There could be multiple reasons for low exposure to counseling at home, such as lack of time or incentives to provide the service. Given that counseling may be more time intensive than other interventions, FLWs with heavy workloads are likely to face time constraints and may overlook counseling during home visits. Additionally, counseling during home visits is not an incentivized activity for ASHAs, who receive performance-based incentives for other activities. Therefore, ASHAs may focus on services that require home visits but are incentivized. Key reasons for missed opportunities should be identified and addressed to increase home-based counseling.

Coordination in service delivery: Overall, we found positive results on coordination among FLWs. Nearly all of the FLWs reported that they always coordinated to deliver the interventions, and usually by informing each other about the activity or exchanging information, or planning and implementing the activity together. For IFA supplementation of pregnant women, provision of food supplements and vitamin A supplementation, FLWs were aware of their roles and responsibilities. These results largely mirrored the currently available guidelines for FLWs related to delivering these interventions. However, for IYCF counseling, pediatric IFA supplementation and growth monitoring/screening for SAM treatment, FLWs were less clear about who is primarily responsible and their roles in delivering the interventions. These findings were also reflected in the exposure gaps for these ENIs.

Program and Policy Recommendations

Based on our study findings, we identified several priority actions to improve services for nutrition in Madhya Pradesh:

1. Identify and address the reasons for missed opportunities for IYCF counseling during home visits, to close the service delivery gap. Supervisors should review and discuss FLWs' workload, capacities and motivation, and identify strategies to mitigate constraints. For example, supervisors could review FLWs' work responsibilities during monthly meetings and help them organize their schedules to incorporate sufficient time for home-based counseling. Checklists and job aids may be useful to remind them about and reinforce counseling. For ASHAs, who receive performance-based incentives, the possibility of incentivizing IYCF counseling during home visits may be considered.
2. Ensure that all FLW cadres are clear about their roles and responsibilities, particularly for IYCF counseling and pediatric IFA supplementation. Examine the current guidelines on provision of these ENIs to ensure that they articulate clear roles, and invest in orienting all staff at the district, block, and frontline levels of the DWCD and DHFW on the contents of these guidelines.
3. Harmonize key health and nutrition messages, particularly related to IYCF, in the training and materials used for all DWCD and DHFW staff. This would avoid any conflicting information or misinformation provided by different FLW cadres. Furthermore, given that counseling involves more than the provision of key messages and requires communication skills to address barriers to behavior change and negotiate appropriate practices, operational guidelines and training for FLWs should incorporate these critical components.
4. Build in mechanisms, such as improved monitoring and operations research, to assess and track the progress of service delivery and exposure to the ENIs, in order to enhance learning about the process and take corrective actions.
5. Invest simultaneously in efforts to address the underlying determinants of malnutrition, such as poverty, food insecurity, low education, and poor sanitation and hygiene, which will require focusing on multisectoral approaches that intervene at the same time, in the same place, for the same household, mother, and child.

Introduction

Undernutrition among women and children remains a major development challenge across India, and is a substantive challenge in the poorer states of India, including Madhya Pradesh. The global and Indian nutrition literature (Bhutta et al. 2013; Swaminathan 2009) and India's nutrition policies recognize the multifaceted nature of interventions necessary to accelerate progress in nutrition. There are a set of broadly agreed upon nutrition-specific interventions to be delivered along the continuum of care, to improve maternal and child nutrition (Avula et.al. 2013). These include iron and folic acid (IFA) supplementation during pregnancy, breastfeeding (BF) promotion, complementary feeding (CF) education, vitamin A supplementation in early childhood, and food supplementation for pregnant and lactating women and young children. Even though it is acknowledged that investments to improve nutrition must be fundamentally multisectoral in nature, it is also estimated that scaling-up ten of these direct nutrition interventions to 90 percent could reduce stunting by 20 percent and severe wasting by 61 percent (Bhutta et al. 2013), thereby highlighting the importance of attention to strengthening the delivery, reach, and utilization of nutrition-specific interventions.

Although many of the evidence-based nutrition interventions are already being implemented in countries, systematic data on the coverage of these services is limited, as are insights into how best they may be designed and delivered to reach full coverage. Ensuring full coverage and reach requires strengthening policies, providing adequate financing, and building system-wide commitment and capacity for delivering nutrition (Bezanson and Isenman 2009; Gillespie et al. 2013). Furthermore, ensuring large-scale delivery of interventions requires that they be successfully rolled out in subnational settings, including states, districts, and communities, in order to reach all target groups.

In India, two national programs—Integrated Child Development Services (ICDS) and National Rural Health Mission (NRHM)—are designed to cover all of these interventions (Avula et al. 2013). ICDS, under the Ministry of Women and Child Development, and NRHM, implemented by the Ministry of Health and Family Welfare, both aim to improve maternal and child nutrition and health and have extensive reach to potentially cover the entire target population. Across these two programs, cadres of frontline workers (FLWs) are expected to work together to deliver the interventions. Yet, there are challenges to working across sectors, and there has been historically little horizontal coordination due to vertical structural constraints (Mohmand 2012). Although ICDS and NRHM have developed coordination mechanisms through the work of their frontline cadres, there continues to be a need for enforcing them and for more clarity in task definition at the operational level to ensure service delivery. Lack of coordination leads to insufficient coverage, inconsistent data reporting, and some redundancy in work (Kathuria, Orbach, and Anand 2014). While there are reports of close coordination—particularly during service delivery among FLWs, facilitated by interpersonal relationships and shared understanding of actions (Avula et al. in press)—as well as the sense of "teamwork" and building trust with the community (Mishra 2014), elucidating this coordination in the context of delivery and reach of specific interventions may help to reinforce their provision and use.

Madhya Pradesh, a state of 73 million people in central India, has taken steps in recent years to enhance service coverage and foster coordination between ICDS and health programs. These include the initiation of *Atal Bal Arogya Evam Poshan* Mission (for integrated planning and actions to reduce child malnutrition); Village Health and Nutrition Days (VHNDs); Village Health, Nutrition, and Sanitation Committees (for decentralized health planning and collective actions at the village level); and Village Health Centers (*Gram Arogya Kendras*). We conducted a study in three districts of Madhya Pradesh to examine the state of delivery and use of ten select essential nutrition interventions (ENIs) and the role of intersectoral coordination in their delivery. The study covered several critical nutrition interventions across the continuum of care (pregnancy to 2 years of age), ranging from behavior change counseling to

micronutrient supplementation and provision of supplementary food, and their points of delivery (Table 1). The overall objectives of the study were to:

1. Assess the exposure to a select set of ENIs and the state of their service delivery; and
2. Examine the extent to which FLWs coordinate actions related to the delivery of the ENIs.

TABLE 1. SELECT ESSENTIAL NUTRITION INTERVENTIONS AND DELIVERY POINTS STUDIED

Lifecycle stage/age	Intervention type	Delivery point/platform
Pregnancy	1- Counseling on maternal nutrition and care 2- IFA supplementation	• Antenatal care service, including at VHNDs
	3- Food supplementation	• Take-home ration (THR) distribution at *anganwadi* centers (AWCs)
0–6 months	4- Counseling on breastfeeding	• Home visits • VHNDs
	5- Food supplementation	• THR distribution at AWCs
6–24 months	6- Counseling on complementary feeding 7- Vitamin A supplementation 8- Pediatric IFA supplementation	• Home visits • VHNDs
	9- Food supplementation	• THR distribution at AWCs
	10- Growth monitoring/screening for severe acute malnutrition	• VHNDs

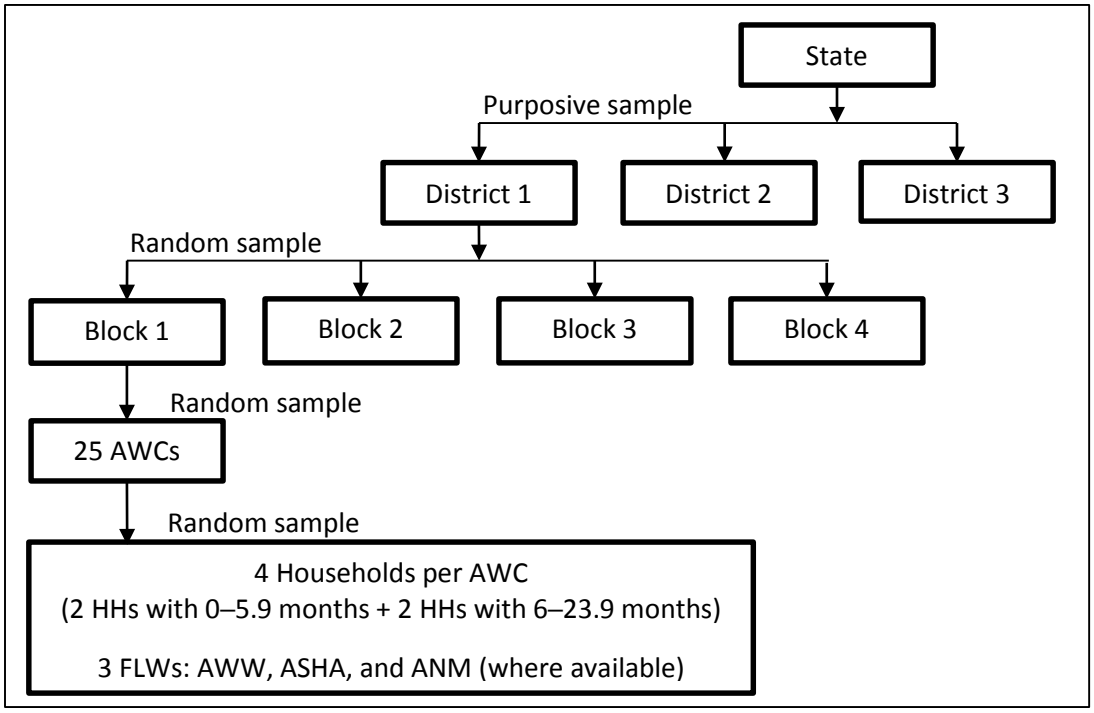
Methods

Surveys with FLWs and households were conducted in three districts of Madhya Pradesh. In this section, we discuss the following aspects of the study methods: sample selection procedure, sample sizes, data collection and analysis.

SAMPLE SELECTION AND SAMPLE SIZE

Three districts were selected from among the 50 total districts in the state (Figure 1). Existing district-level survey data (IIPS 2006, 2010) were used to construct a set of criteria pertaining to service coverage and household factors (e.g., coverage of immunization and vitamin A supplementation, three or more antenatal care visits, and institutional delivery; access to toilet and electricity; and type of cooking fuel) and to examine the changes in these indicators between two survey rounds. All districts were grouped into three categories: better-performing districts (i.e., those with positive change over time), average-performing districts (i.e., no change), and poorly performing districts (i.e., those with negative change). Then, state-level officials from the Department of Women and Child Development (DWCD) and the Department of Health and Family Welfare (DHFW) randomly selected one district from each category: Tikamgarh as better performing, Shahdol as average performing; and Dindori as poorly performing.

FIGURE 1. SAMPLING DESIGN FOR HOUSEHOLD AND FLW SURVEYS



In each district, we randomly selected four blocks (n=12) and 25 villages (n=300) from each block. In each village, there is usually one AWC with an *anganwadi* worker (AWW). The AWW in each village, along with the accredited social health activist (ASHA) and the auxiliary nurse midwife (ANM) working in the same area, were included in the study. Four households (two with children 0–5.9 months of age and two with children 6–23.9 months of age) were selected randomly from the list of households at the AWC. The final sample sizes for the household and FLW surveys are shown in Table 2. Brief descriptions of the cadres of FLWs follow the table.

TABLE 2. SAMPLE SIZES FOR HOUSEHOLD AND FLW SURVEYS, BY DISTRICT

	District			
	Tikamgarh	Shahdol	Dindori	All
Respondent type	N	N	N	N
Household survey sample				
Households with children 0–5.9 months	173	176	129	478
Households with children 6.0–23.9 months	205	199	254	658
Total	378	375	383	1136
FLW survey sample				
Anganwadi worker	99	99	97	295
Accredited social health activist	89	90	90	269
Auxiliary nurse midwife	46	56	51	153
Total	234	245	238	717

Anganwadi worker: The AWW is a female FLW, who has been part of the ICDS program since 1975. The AWW, with the support of an *anganwadi* helper, is responsible for the AWC and delivers health and nutrition services and preschool education under the ICDS program. AWWs are honorary workers selected from the local community. They are considered agents of social change, mobilizing community support for better care of children, girls, and women.[1]

Accredited social health activist: The ASHA is a locally resident female worker, who has been part of NRHM since 2006. The ASHA is expected to undertake three roles: facilitator of health services, mobilizer/activist, and community-level provider for basic health care. The ASHA receives performance-based incentives for delivering specific services. The coverage area of the ASHA and the AWW are co-terminus—i.e., areas with populations of 750–1,000 or fewer in tribal and geographically dispersed areas.

Auxiliary nurse midwife: Also referred to as a multipurpose female health worker, the ANM provides outreach services for a large number of preventive and curative functions, largely focused on mothers and children. A single ANM manages the subcenter, mandated at a population of 3,000–5,000 for rural areas, covering approximately six to eight villages.

DATA COLLECTION

Data collection for the household and FLW surveys was conducted between March and April 2014. The survey applied four separate questionnaires:

1. Household questionnaire
2. FLW questionnaire: AWW
3. FLW questionnaire: ASHA
4. FLW questionnaire: ANM

The household questionnaire focused on exposure to services and FLW contacts and knowledge, while the FLW surveys covered topics such as training, knowledge, interactions with other FLWs, types of services provided, and work motivation and satisfaction.

To examine the state of delivery and use of ENIs and the role of intersectoral coordination in service delivery, we covered ten nutrition-specific interventions (Table 1) provided by FLWs and received by

[1] Ministry of Women and Child Development (http://wcd.nic.in/icds/icdsteam.aspx).

households. To study the extent and nature of coordination among FLWs, we included questions about who provides, leads, and coordinates in the delivery of the interventions, as well as the ways they work together. Table 3 presents an overview of the data collected in the household and FLW questionnaires.

TABLE 3. MODULE/QUESTIONS INCLUDED IN HOUSEHOLD AND FLW QUESTIONNAIRES

Survey type	Questionnaire module/questions	How used
Household questionnaires	• Background information and household roster • Household assets and food insecurity	Describe sample characteristics (at child, maternal, and household levels)
	• Awareness and sources of information about nutrition interventions and services • Awareness of and contact with FLWs during pregnancy, at delivery, or after delivery	Describe mothers' awareness of and sources for nutrition interventions, as well as their contacts with FLWs and facilities
	• Infant and young child feeding (IYCF) knowledge	Describe mothers' knowledge about IYCF and recommended practices
	• Pregnancy and antenatal care • Child immunization • Village Health and Nutrition Days • Supplementary nutrition and other health services • Interventions for adolescent girls • Community groups/gatherings	Present exposure to and reach of various interventions and services received, including as part of a service package or during delivery platforms
FLW questionnaires	• Observations and information about AWC (for AWW questionnaire only)	Describe the conditions of AWC facilities
	• Background information and workload • Training • Supervision and sector meetings • Work incentives and job motivation	Describe FLW characteristics
	• IYCF knowledge	Describe FLWs' knowledge about IYCF and recommended practices
	• Service provision and coordination (e.g., food supplementation, health checkups, referrals, counseling, immunization)	Indicate who provides, leads, and coordinates in the provision of each intervention/service
	• Supplementary nutrition • Home visits • Community nutrition and health education • Referrals • Village Health and Nutrition Days	Describe specific interventions and services provided, including implementation of delivery platforms

Ethical approval

Ethical clearance for this research was provided by IFPRI's Institutional Review Board. The study was also approved by the DWCD and DHFW. Informed consent was obtained from all study participants prior to interview.

DATA ANALYSIS

Quantitative data were analyzed using Stata 12. Descriptive statistics were generated to describe the sample characteristics of mothers, households, FLWs, and AWCs, and to present percentage distributions on service delivery and exposure to and coordination in service delivery.

Results: Sample Characteristics

In this section, we present the main characteristics of the study sample—children, mothers, households, and FLWs (AWW, ASHA, and ANM), as well as the AWCs. Additional household and FLW characteristics are included as supplementary tables in the Annex.

HOUSEHOLD SAMPLE

As a criterion for household sampling, the distribution of children by age group (0–5.9 months and 6–23.9 months of age) was similar in Tikamgarh and Shahdol, but in Dindori, only about a third of the sample was of children 0–5.9 months old. Overall, about 58 percent of the children in the sample were female. The mean age of mothers in our study sample was approximately 25 years. Half of the mothers had middle school education or higher, and a majority reported to be housewives (79 percent) (Table 4). Maternal characteristics were similar across the three districts. In relation to their dietary diversity, mothers consumed about 2.5 of the 9 food groups, on average, reflecting very low dietary quality (Table 4).

TABLE 4. MATERNAL CHARACTERISTICS

Characteristics	Tikamgarh N=378 Mean ±SD/%	Shahdol N=375 Mean ±SD/%	Dindori N=383 Mean ±SD/%	All N=1136 Mean ±SD/%
Age (years)	23.7±3.7	25.0±4.2	24.7±3.5	24.5±3.9
Education level				
No schooling	27.1	28.0	28.5	27.8
Primary (1–5 grade)	21.2	20.8	23.0	21.7
Middle school (6–8 grade)	30.0	29.1	32.1	30.4
Secondary school	15.9	14.7	12.3	14.3
Senior secondary	2.4	2.9	2.6	2.6
College	3.5	4.5	1.6	3.2
Main occupation				
Housewife	83.3	80.5	72.3	78.7
Salaried worker	0.5	0.8	0.8	0.7
Wage employment	2.1	6.1	7.1	5.1
Agriculture/livestock	9.3	4.3	14.6	9.4
Unemployed	1.3	2.7	0.5	1.5
Maternal dietary diversity: Number of food groups consumed (range: 0–9)[a]	2.6±1.1	2.5±1.1	2.5±1.1	2.5±1.2

[a] Maternal dietary diversity was calculated using nine food groups: staples, legumes, nuts, dairy, eggs, flesh foods, dark green leafy vegetables, vitamin A-rich fruits & vegetables, and other fruits and vegetables.

The mean household size in our sample was 5.4 members (Table 5). Caste patterns across districts were different. Most households in Tikamgarh belonged to the Other Backward Class (OBC), indicative of a disadvantaged group, or general caste categories, while most households in Shahdol and Dindori were of the Scheduled Tribe (ST) and OBC categories. The ST category is considered a more disadvantaged group compared with OBC and the general categories.

Overall, study households had low resources in terms of assets and infrastructure (Table 5). Nearly 50 percent of households owned homes, but only 9 percent had a toilet on the premises. Most households who had a toilet facility reported using them. On average, households owned about 6 out of 27 asset items, and three types of livestock out of a possible five. About 55 percent of households had Below Poverty Line (BPL) cards, which are issued by the government to identify households eligible to receive

certain staple foods at a low price, and nearly all reported using BPL cards to procure cereals, sugar, and/or kerosene (cooking fuel). Nearly half of the households possessed an employment card issued by the government, which guarantees work for each household for 100 days during a year. While most households were food secure, 21 percent were food insecure (mild to severe), as per the Household Food Insecurity Access Scale. About 20 percent of the households reported being anxious about their food security and 10 percent reported consuming smaller meals due to insufficient food (Annex Table A1). As expected by a purposively sampling of the districts, interdistrict variations of some household characteristics were observed. For instance, Tikamgarh was more food secure (94 percent) compared with Shahdol (73 percent) and Dindori (70 percent) (Table 5). Fewer households in Shahdol and Dindori had toilet facilities, durable assets, and livestock compared with Tikamgarh.

TABLE 5. HOUSEHOLD CHARACTERISTICS

Characteristics	Tikamgarh N=378 Mean±SD/%	Shahdol N=375 Mean±SD/%	Dindori N=383 Mean±SD/%	All N=1136 Mean±SD/%
Household size	5.6 ± 2.1	5.4 ± 2.1	5.3 ± 1.5	5.4 ± 1.9
Household caste				
Scheduled Caste	13.0	8.0	2.4	7.8
Scheduled Tribe	14.3	45.1	70.2	43.3
Other Backward Class	55.6	13.1	13.1	27.3
General	11.4	7.5	1.3	6.7
Household asset status				
Home and land ownership	54.5	40.0	53.5	49.4
Toilet facility in the household	13.2	9.9	3.7	8.9
Used toilet	88.0	70.3	78.6	80.2
Total number of durable assets (0–27)	7.2±3.3	5.4±3.6	3.9±2.5	5.5±3.4
Total number of livestock	3.0±3.5	1.9±5.9	2.7±4.0	2.6±4.6
With employment guarantee card	23.5	54.4	75.5	51.2
With Below Poverty Line (AAY/BPL) card	54.0	50.4	59.0	54.5
Household food insecurity access scale				
Food secure	93.9	73.1	69.5	78.8
Mildly food insecure	2.9	9.3	19.6	10.7
Moderately food insecure	0.8	6.9	6.8	4.8
Severely food insecure	2.4	10.7	4.2	5.7
Household perception of food security				
Anxious	5.6	21.1	30.6	19.1
Insufficient quality of food	5.8	25.3	30.0	20.4
Insufficient food intake	2.7	16.8	9.7	9.7
BPL card used to procure	**N=204**	**N=189**	**N=226**	**N=619**
Rice	65.7	94.4	92.5	84.7
Wheat	70.8	97.2	91.0	86.6
Any other cereals	14.0	3.9	4.7	7.4
Sugar	50.0	80.3	66.5	65.7
Kerosene/fuel	82.6	57.3	77.4	72.7

FRONTLINE WORKER SAMPLE

Tables 6, 7, and 8 present the basic characteristics of the three FLW cadres in our study. The average age of AWWs and ANMs was about 40 years and that of ASHAs was 32 years. AWWs and ANMs have about 14 years of experience, whereas ASHAs have 5 years of experience in their current positions. This is likely

the result of ASHAs being introduced as a frontline cadre in 2006, while the other cadres have existed for longer periods of time.

Overall, ANMs and AWWs were more educated than ASHAs. This is as expected, since there is a higher education qualification for ANMs as trained paraprofessionals and for AWWs as providers of preschool education. ASHAs were required to have only eighth grade education. However, in some tribal and remote areas where women with even seventh grade education are not found, requirements are less strict. Interdistrict variation was observed in the education levels of FLWs. A greater proportion of AWWs in Tikamgarh (25 percent) had up to college education, compared with those in Shahdol (19 percent) and Dindori (13 percent). In the case of ASHAs, however, greater proportions in Shahdol (65 percent) had secondary school education or higher, compared with those in Tikamgarh (46 percent) and Dindori (42 percent).

A majority of AWWs and ASHAs in Tikamgarh (60 percent) and Shahdol (53 percent) belonged to the general caste category, whereas those in Dindori (52 percent) belonged to the Scheduled Tribe (ST) category. A similar distribution was observed for ANMs as well. The SC category is a more disadvantaged group compared with the OBC and general categories. These caste category differences may be important in the interactions with households, because casteism is still prevalent throughout India.

For more than half of the AWWs (57 percent) and ASHAs (51 percent) in our sample, income generation was a primary motivating factor for becoming a FLW, followed by the motivation to serve their community. In contrast, ANMs reported serving their community (51 percent) and income generation (35 percent) as the primary reasons for becoming ANMs. Few FLWs (4 percent of AWWs, 20 percent of ASHAs, and 1 percent of ANMs) reported engaging in other work or income-generating activities.

TABLE 6. *ANGANWADI* WORKER CHARACTERISTICS

	Tikamgarh N=99	Shahdol N=99	Dindori N=97	All N=295
Characteristics	**Mean ±SD/%**	**Mean ±SD/%**	**Mean ±SD/%**	**Mean ±SD/%**
Age (years)	38.2±6.9	41.1±8.1	38.3±9.0	39.2±8.1
Work experience (years)	12.9±6.4	14.9±7.2	12.7±7.4	13.5±7.1
Married	95.0	86.9	96.9	92.9
Education level				
Middle school (6–8 grade)	25.3	31.3	37.1	31.2
Secondary school	23.2	19.2	23.7	22.0
Senior secondary	26.4	30.3	25.8	27.5
Graduate or higher	25.3	19.2	13.4	19.3
Caste category				
Scheduled Caste	4.0	7.1	4.1	5.1
Scheduled Tribe	8.1	18.2	52.6	26.1
Other Backward Class	27.3	21.2	23.7	24.1
General	60.6	53.5	19.6	44.8
Primary reason for becoming AWW				
Income generation	42.4	72.7	54.6	56.6
Serve community	51.5	23.2	38.1	37.6
Bored/have time	6.1	4.0	7.2	5.8
Engaged in other work for income	6.1	2.0	4.1	4.1

TABLE 7. ACCREDITED SOCIAL HEALTH ACTIVIST CHARACTERISTICS

Characteristics	Tikamgarh N = 89 Mean ±SD/%	Shahdol N=90 Mean ±SD/%	Dindori N=90 Mean ±SD/%	All N=269 Mean ±SD/%
Age (years)	33.7±6.4	31.4±5.7	29.3±4.1	31.5±5.8
Work experience (years)	5.1±2.2	5.0±2.4	4.7±2.5	4.9±2.3
Married	98.9	93.3	95.6	95.9
Education level				
Primary school (1–5 grade)	9.0	3.3	5.6	6.0
Middle school (6–8 grade)	44.9	27.8	52.2	41.6
Secondary school	28.1	37.8	28.9	31.6
Senior secondary	15.7	27.8	13.3	19.0
Graduate and above	2.3	3.3	0.0	1.9
Caste category				
Scheduled Caste	14.6	11.1	6.7	10.8
Scheduled Tribe	10.1	17.8	60.0	29.4
Other Backward Class	32.6	23.3	15.6	23.8
General	42.7	47.8	17.8	36.1
Primary reason for becoming ASHA				
Income generation	52.8	50.0	50.0	50.9
Serve community	37.1	42.2	42.2	40.5
Bored/have time	2.3	0.0	2.2	1.5
Interest in health topic	6.7	7.8	5.6	6.7
Engaged in other work for income	23.6	13.3	24.4	20.5

Nearly all of the FLWs reported receiving job training (Annex Tables A2, A3, and A4). AWWs reported being trained on several topics (Annex Table A2), including immunization (80 percent), recording weight and height (60 percent), antenatal care (51 percent), BF (39 percent), CF (29 percent), handling of complementary foods (34 percent), advising mothers to send children to AWC (52 percent), and maintaining registers (60 percent). Most ASHAs were trained on immunization (88 percent), recording weight and height (67 percent) and antenatal care (69 percent), and more than a third received training on CF, handling of complementary foods, severe acute malnutrition management, family planning, childhood illnesses, adolescent health, and maintaining registers (Annex Table A3). Nearly all of the ANMs reported being trained on immunization (97 percent), and a majority was trained on antenatal care (62 percent) (Annex Table A4). Thus, AWW training focused on nutrition and covered topics from pregnancy through the first two years of life, including maintenance of registers; ASHA training additionally covered adolescent and family health; and ANM training focused on pregnancy, newborn care, and vaccination.

In relation to supervision, most AWWs identified the Lady Supervisor as their supervisor and reported receiving a visit from her, usually once every month (Annex Table A5). A majority of ASHAs (65 percent) identified the Lady Health Visitor as their immediate supervisor and reported receiving supervisory visits nearly twice a month (Annex Table A6).

TABLE 8. AUXILIARY NURSE MIDWIFE CHARACTERISTICS

Characteristics	Tikamgarh N = 46 Mean ±SD/%	Shahdol N=56 Mean ±SD/%	Dindori N=51 Mean ±SD/%	All N=153 Mean ±SD/%
Age (years)	46.8±9.9	36.8±9.1	41.2±11.4	41.3±10.9
Work experience (years)	21.0±10.1	11.6±8.7	15.6±11.1	15.8±10.6
Married	97.8	91.1	94.1	94.1
Education level				
Secondary school	13.0	8.9	17.7	13.1
Senior secondary school	73.9	55.3	49.1	58.8
Graduate or higher	13.0	35.7	33.3	28.1
Caste category				
Scheduled Caste	10.9	10.7	9.8	10.5
Scheduled Tribe	4.4	25.0	58.8	30.1
Other Backward Class	37.0	19.6	17.7	24.2
General	47.8	42.9	13.7	34.6
Primary reason for becoming ANM				
Income generation	32.6	30.4	43.1	35.3
Serve community	56.5	51.8	45.1	51.0
Bored/have time	0.0	0.0	0.0	0.0
Interest in health topic	10.9	17.9	11.8	13.7
Engaged in other work for income	0.0	1.8	2.0	1.3

ANGANWADI CENTERS

AWCs are the platform for delivering the six services (supplementary nutrition program, immunization, health checkups, referral services, health and nutrition education, and non-formal preschool education) under the ICDS scheme. There is one AWC per village or for a population of 400–800, and a mini AWC for a population of 150–400 people.

Under the supplementary nutrition component of ICDS, take-home rations are distributed to pregnant and lactating women and children 6–36 months of age fortnightly or once a month, and hot-cooked meals are provided to 3–6-year-olds every day at the AWC. In addition to provision of supplementary foods, preschool education (for about 25–30 children aged 3–6 years), immunization, health checkups, and health and nutrition sessions are provided at the AWCs. All of these activities require a well-lit and well-ventilated facility with clean and safe storage, cooking, washing, cleaning, serving, and seating areas. However, the conditions of AWC facilities across the country have been reported to be quite variable (Right to Food Campaign 2006).

In our study, 70 percent of AWCs have a permanent structure (Table 9). A majority of AWCs (64 percent) are in their own building, which is high compared to the recent state-representative data (37.5 percent) (MWCD 2015). AWCs in our study appear to have some amenities, such as a separate space for kitchen (93 percent), access to drinking water (69 percent), and a toilet (56 percent). However, less than a quarter of AWCs have other important amenities, such as electricity (10 percent), light fixtures (9 percent), and a garbage bin (29 percent). The AWC facilities in Tikamgarh were slightly better equipped than those in Shahdol and Dindori.

TABLE 9. *ANGANWADI* CENTER STRUCTURES AND FACILITIES

Indicator	Tikamgarh N=73 %	Shahdol N=75 %	Dindori N=81 %	All N=229 %
AWC is located in:				
Its own separate building	79.5	52.0	61.7	64.2
Panchayat (village council)	11.0	4.0	12.4	9.2
A school building	4.1	20.0	7.4	10.5
A villager's home	1.4	13.3	12.4	9.2
AWC is a permanent structure	80.8	65.3	65.4	70.3
AWC has a sign	93.2	85.3	81.5	86.5
AWC is currently open	98.6	90.7	95.1	94.8
	N=72	**N=68**	**N=77**	**N=217**
AWC has:				
Garbage dumps near by	43.1	41.2	31.2	38.3
Garbage bin	22.2	30.9	32.5	28.6
Covered drinking water pot	87.5	85.3	83.1	85.3
Potable drinking water source	81.9	76.5	49.4	68.7
Electricity connection	19.4	7.4	2.6	9.7
Light fixtures and fan	15.3	4.4	7.8	9.2
Separate kitchen space	95.8	88.2	93.5	92.6
Space for storage of supplementary nutrition food	65.3	66.2	67.5	66.4
Toilet facility	66.7	61.8	40.3	55.8

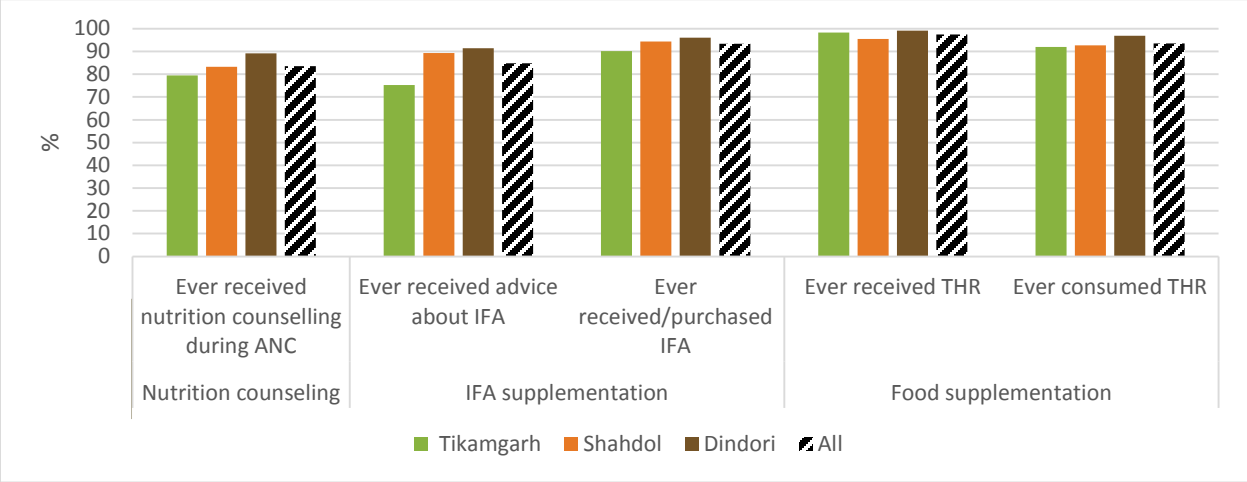
Results: Exposure to and Delivery of Key Nutrition Interventions

In this section, we present the main results of exposure to and delivery of the ten ENIs along the continuum of care, by district and overall. In addition to the ENIs, we feature additional findings about two critical health interventions—antenatal care services (Box 1) and child immunization (Box 2).

NUTRITION INTERVENTIONS DURING PREGNANCY

Overall, exposure to nutrition interventions during pregnancy was high (Figure 2). More than 80 percent of mothers reported exposure to counseling on pregnancy care, IFA supplementation, and food supplementation during pregnancy, likely since several are provided as part of the antenatal (ANC) service package (Box 1).

FIGURE 2. EXPOSURE TO NUTRITION INTERVENTIONS DURING PREGNANCY AMONG MOTHERS WITH CHILDREN 0–5.9 MONTHS OF AGE



Counseling on maternal nutrition and care

Counseling about adequate nutrition, rest, and care during pregnancy usually takes place as part of ANC services, which are provided at a local health facility or the AWC during monthly VHNDs. Nearly all of the FLWs reported counseling pregnant women. A majority of the FLWs demonstrated knowledge of nutrition care during pregnancy. Between 56 and 78 percent of the FLW cadres identified that consuming a variety of foods and resting during the day were important for the health of pregnant women (Annex Tables A7, A8, and A9). In turn, all of the mothers reported receiving counseling about nutrition and care during pregnancy at least once during an ANC visit (Figure 2).

Iron and folic acid supplementation after the first trimester

Distribution of IFA supplements and advising pregnant mothers to consume them usually take place during ANC visits at VHNDs and, when needed, at subcenters. Between 53 to 68 percent of the FLW cadres identified IFA supplementation as part of pregnancy care (Annex Tables A7, A8, and A9). Almost all of the ASHAs and ANMs reported giving IFA supplements, while only 62 percent of AWWs reported doing so. Most mothers (about 90 percent) reported receiving advice about IFA supplementation and receiving or purchasing IFA supplements during pregnancy (Figure 2).

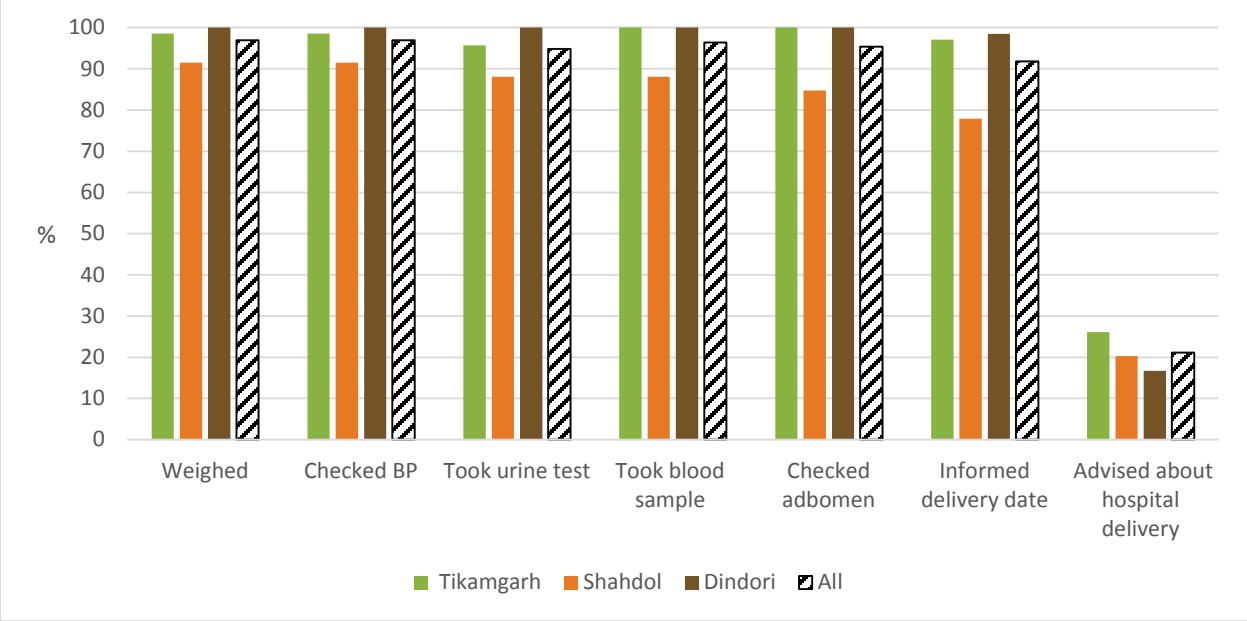
BOX 1. STATUS OF ANTENATAL CARE: AN ESSENTIAL SERVICE PACKAGE DURING PREGNANCY

The FLWs play an important role in ANC delivery, which are provided at the subcenter (where the ANM is located), at AWCs during monthly VHNDs, and at home (follow-up for missed visits) (NRHM 2011-2012). The ANM is primarily responsible for ANC, but both the ASHAs and AWWs provide support to ANMs for this service, particularly during VHNDs and home visits.

Nearly all mothers with children 0-5.9 months of age in our study reported registering their pregnancy with one of the three FLWs (i.e., AWW, ASHA, or ANM) and received at least one ANC visit. Furthermore, mothers usually received their first ANC checkup at three and half months into the pregnancy, and 67.3 percent of mothers reported receiving four or more ANC checkups. Although this figure is not for a state representative sample, it is high compared to the mean coverage of 22.4 percent in Madhya Pradesh in 2013 (MWCD 2015).

During the ANC visit conducted by a FLW, over 90 percent of mothers reported receiving many of the specific components of the package—being weighed and examining blood pressure, urine, blood, and abdomen; while only 20 percent reported receiving advice about hospital delivery (Figure 3). Reported rates of specific care received were consistently lowest among mothers in Shahdol, compared to the other districts, which may reflect lower service access and utilization or simply due to more mothers in this district visiting health or medical professionals other than the FLWs for ANC.

FIGURE 3. SPECIFIC CARE RECEIVED DURING ANC AND ADMINISTERED BY FLWS, RECALLED BY MOTHERS WITH CHILDREN 0–5.9 MONTHS OF AGE



Food supplementation for pregnant women

The Madhya Pradesh State Agro Industries Corporation, a public sector company, is responsible for producing and supplying fortified take-home rations (THR) once a month, based on the demand from the districts. Different varieties of premixes are prepared as THRs for pregnant and lactating women and children 6 months to 3 years of age (MP DICDS 2012). AWWs are responsible for distributing THR once a week.

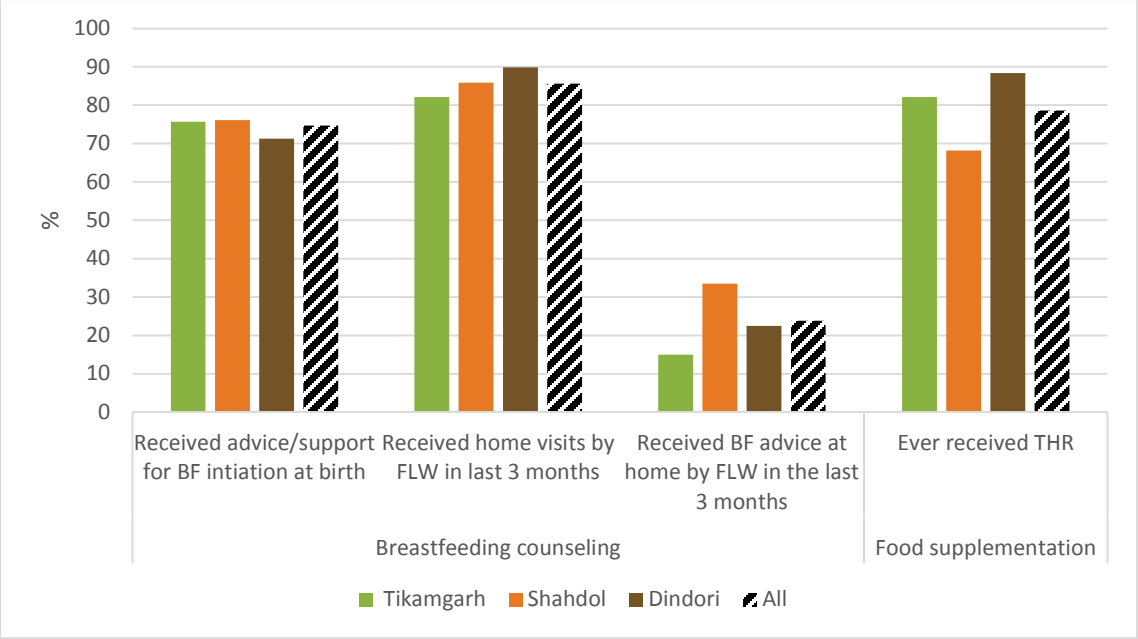
Nearly all mothers reported receiving THR at least once during pregnancy (Figure 2). On average, mothers started receiving THR after 3.2 months into their pregnancy and received it for approximately 5.7 months.

While 94 percent of mothers also reported consuming THR, the primary reason for not consuming it was cited to be its poor quality.

NUTRITION INTERVENTIONS DURING LACTATION/0-6 MONTHS

Exposure to nutrition interventions during infancy varied for different interventions (Figure 4). However, major differences were not observed across the three districts. Nearly 75 percent of mothers reported receiving advice or support for initiation of BF at birth, but only 24 percent of mothers received BF advice during subsequent home visits. Seventy nine percent of the mothers continued to receive THR during lactation.

FIGURE 4. EXPOSURE TO NUTRITION INTERVENTIONS AMONG MOTHERS WITH CHILDREN 0–5.9 MONTHS OF AGE



Counseling on breastfeeding

A component of AWWs' role in nutrition and health education is counseling mothers on infant and young child feeding (IYCF), including information about BF and CF during group discussions and home visits. Under NRHM's Reproductive, Maternal, Newborn, and Child Health + Adolescents initiative, ASHAs are also expected to provide IYCF counseling during group discussions and home visits. Thus, VHNDs and home visits are important platforms for IYCF counseling.

Nearly all of the FLWs in all three districts reported providing BF counseling. Most of the FLWs had good overall knowledge about BF. Almost all of the FLW cadres (80-100 percent) knew about early initiation of BF, feeding colostrum, and not giving water even when the weather is hot (Annex Tables A7, A8, and A9). While 36 percent of AWWs, 41 percent of ASHAs, and 42 percent of ANMs knew that mothers who think that their babies are not getting enough breast milk should breastfeed more frequently, over 50 percent of the AWWs, ASHAs, and ANMs also reported that the mother needs to eat more food. Only 12–14 percent of the FLW cadres reported incorrectly that the babies less than 6 months of age should be given other liquids or foods. Although over 40 percent of all the FLWs identified correctly that a baby needs to be fed whenever it wants, a majority (over 80 percent) incorrectly identified crying to be a sign for baby's hunger. Over 90 percent of the FLWs also demonstrated knowledge about increasing milk production through frequent BF, and about 46 percent of AWWs, 47 percent of the ASHAs, and nearly 45 percent of

ANMs correctly identified infrequent BF to be the cause of hard or sore breasts. These results indicate that BF knowledge among FLWs should be strengthened to close gaps and address specific misinformation.

More than 90 percent of mothers reported hearing about timely initiation of BF and exclusive BF (Annex Table A10). FLWs were a major source of information for mothers. In particular, over 60 percent of mothers identified FLWs as their source of information on initiation of BF and for not giving water for the first six months of their child's life (Annex Table A12).

Exposure to BF counseling as reported by mothers with children 0-5.9 months of age varied depending on the timing and location (Figure 4). For instance, over 75 percent of mothers reported receiving advice or support for initiation of BF at birth, but only 24 percent received advice from any FLW during a home visit after giving birth. Although 86 percent of mothers reported receiving FLW home visits in the last three months, exposure to home-based counseling remained low (Figure 4). Nearly 66 percent reported receiving BF advice at VHND (Figure 6). Thus, there is a coverage gap for this intervention during VHNDs and home visits.

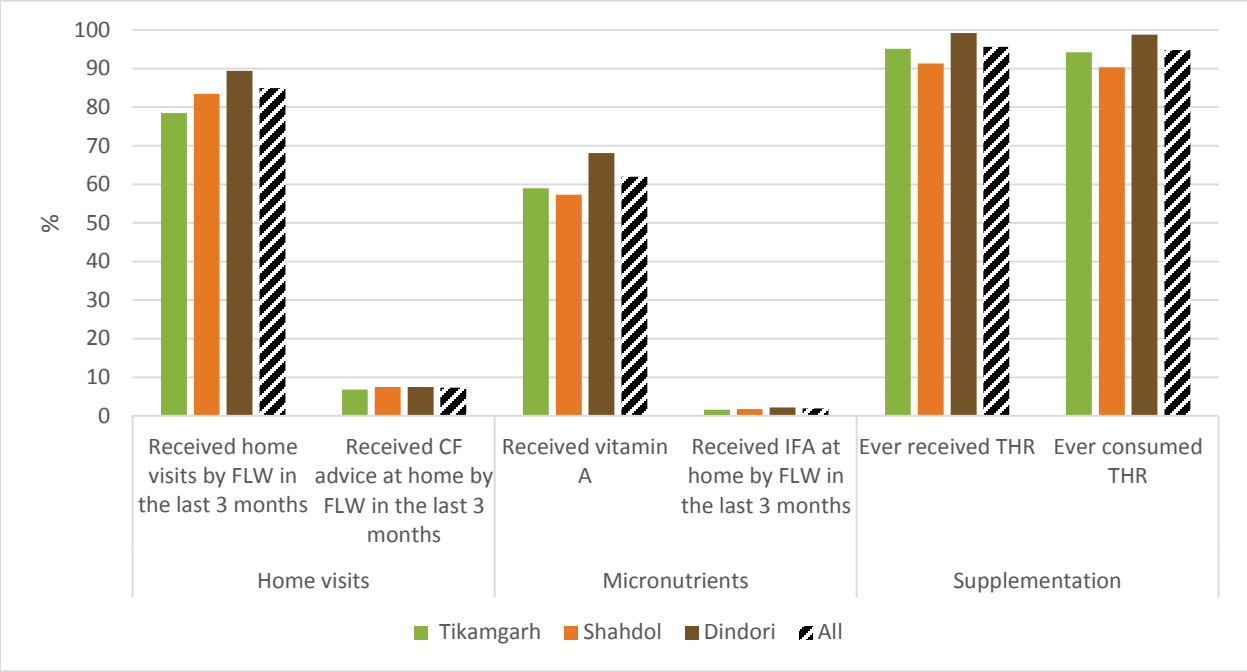
Food supplementation for lactating mothers (with children aged 0-5.9 months)

As with food supplementation for pregnant women, AWWs distribute THR to lactating mothers once a week. All of the AWWs in the three districts confirmed distribution of food supplements, and 79 percent of mothers confirmed having received THR during this period (Figure 4).

NUTRITION INTERVENTIONS DELIVERED BETWEEN 6 AND 24 MONTHS

Exposure to nutrition interventions during early childhood period was varied; receipt of THR was high, but lower for vitamin A supplementation and alarmingly low for -IFA supplementation and home-based counseling for CF (Figure 5). There were only small differences in exposure across the three districts.

FIGURE 5. EXPOSURE TO NUTRITION INTERVENTIONS AMONG MOTHERS AND CHILDREN 6-23.9 MONTHS OF AGE



Counseling on complementary feeding

Similar to BF counseling, counseling on CF is conducted during home visits and at VHNDs. More than 80 percent of FLWs knew about introducing various complementary foods at 6 months of age, but 40 percent of FLWs reported the correct age for feeding other milk and egg. Only 5 percent of AWWs and 11 percent of ASHAs and ANMs knew of the correct timing for introducing meat to a child's diet. Furthermore, FLWs demonstrated limited understanding of feeding after illness. Only 20 percent of AWWs, 22 percent of the ASHAs, and 11 percent of ANMs identified that children should be fed more than usual after illness (Annex Tables A7, A8, and A9). Poor knowledge on introduction of animal-source foods and addressing feeding after illness has implications for promoting and helping mothers to implement appropriate IYCF practices.

Similar to BF, FLWs were a major source of CF information for mothers. More than 70 percent of mothers identified ASHAs and AWWs, and about 60 percent identified ANMs to be their sources of information for the timing of initiation of CF, frequency of feeding, feeding of animal-source foods, and feeding during illness (Annex Table A12). However, CF knowledge among mothers varied; 67 percent of mothers reported hearing about the timing for introducing complementary foods, 59 percent knew about correct feeding frequency, and 33 percent knew about feeding animal-source foods for children older than 6 months of age (Annex Table A10). Nearly 67 percent of mothers identified six to eight months to be the correct timing for introducing semi-solid foods, but less than a quarter identified it to be the right timing for introducing animal-source foods (Annex Table A11).

Exposure to CF counseling during home visits, as reported by mothers of children aged 6-23.9 months, was extremely low (Figure 5). Although 85 percent of mothers reported receiving home visits from FLWs in the last three months, less than 10 percent had received counseling about CF. This raises an important concern for improving CF practices, which usually requires interpersonal communication and counseling during home visits to address a set of knowledge and behaviors related to purchasing or obtaining specific foods, preparation and utilization of foods, feeding frequency and amounts, and other feeding methods. About 63 percent of mothers reported being exposed to CF counseling at VHNDs. Measures to strengthen maternal contact with FLWs, to ensure counseling during such contacts, and to improve FLW knowledge are important to ensure appropriate CF messaging and promote adoption of CF practices.

Vitamin A supplementation

Vitamin A supplements are intended to be administered once every six months in May and November (fixed months) at the AWC or sub-center to children 9 months to 5 years of age, in conjunction with the measles vaccine (MHFW 2006). Nearly all of the ANMs, as well as approximately 84 percent of ASHAs and 70 percent of AWWs, reported providing vitamin A supplementation regularly. However, 35 percent of mothers reported hearing about vitamin A supplementation, with FLWs being the main source of information (Annex Table A10). Also, only 62 percent of mothers confirmed that their children received vitamin A supplements at least once (Figure 5).

Pediatric iron and folic acid supplementation

Pediatric IFA supplements are expected to be given to children 6 months to 5 years of age during home visits. More than 80 percent of all FLWs demonstrated knowledge of physical signs to detect anemia among children under 2 years, and almost 75 percent of AWWs and ASHAs and 90 percent of ANMs identified a daily dose of iron to be one of the strategies for treating pediatric anemia. Also, nearly 95 percent of ANMs, 87 percent of the ASHAs, and 61 percent of the AWWs reported providing IFA supplements.

About 20 percent of mothers had heard about IFA supplements for children under two years. Nearly 65 percent of mothers identified AWWs and ANMs and 71 percent identified ASHAs as their source of information. However, exposure to pediatric IFA supplements was exceptionally low, with only 3 percent

of mothers confirming that their children received them (Figure 5). There was a large gap in the reported delivery of and exposure to this intervention, which may be due to the policy on pediatric IFA supplementation being fairly new (National Iron Plus Initiative 2013) and its implementation being at a nascent stage at the time of this study. It is also possible that some FLWs responded about providing this intervention based on their understanding of IFA supplementation for pregnant women and not specifically for children.

Food supplementation for children aged 6-24 months

As with the exposure to food supplementation among pregnant and lactating mothers, exposure to THR for young children was also high. Nearly 96 percent of mothers reported receiving THR specifically for their children, and almost all who reported receiving it also reported feeding it (Figure 5).

BOX 2. STATUS OF CHILD IMMUNIZATION

In Madhya Pradesh, immunization is intended to be provided regularly during VHND. However, child immunization status in our study sample was low. Only 35 percent of the children reported being fully immunized (Table 10). The immunization rate in our study sample was even lower than the mean rate of full immunization (53.4 percent) for Madhya Pradesh in 2013 (MWCD 2015[a]). The low immunization rate was driven particularly by the drop in polio 3 vaccination, suggesting the need for focused efforts to improving the delivery and exposure to this vaccination dose.

TABLE 10. IMMUNIZATION STATUS AMONG CHILDREN 12—24 MONTHS OF AGE

	Tikamgarh	Shahdol	Dindori	All
	N=106	N=115	N=141	N=362
		%		
Tuberculosis	94.3	94.8	99.3	96.4
Polio 0	96.2	90.4	92.2	92.8
Polio 1	82.1	87.0	88.7	86.2
Polio 2	78.3	71.3	82.3	77.6
Polio 3	31.1	38.3	42.6	37.9
DPT 1	87.7	88.7	95.0	90.9
DPT 2	86.8	87.0	93.6	89.5
DPT 3	79.3	72.2	78.0	76.5
Measles	86.8	77.4	90.1	85.1
Full Immunization	29.3	33.9	39.0	34.5

*Full immunization: BCG, three doses of DPT, three doses of polio vaccine and one dose of the measles vaccine by the age of 12 months.

[a] Ministry of Women & Child Development. 2015. Rapid survey on children (RSOC) 2013-2014. Fact sheets. http://www.wcd.nic.in/.

Growth monitoring/screening for severe acute malnutrition

Growth monitoring, which involves using regular anthropometric measurements to track changes in children's physical development, is an important tool to provide individual care (e.g., nutrition counseling), detect problems in child growth, and screen for severe acute malnutrition (SAM) treatment (facility- or community-based care). Growth monitoring is usually conducted during monthly VHND. Almost 97 percent of AWWs reported measuring growth monthly, and 13 percent reported making referrals for SAM treatment. Seventy percent of ASHAs reported conducting growth monitoring, and 13 percent reported making referrals for SAM treatment.

Almost all mothers of children under 2 years who attended VHND reported that their children were measured (Table 11). However, 70 percent of the respondents attended VHND. Since growth monitoring and screening for SAM referral take place at VHND, nearly 30 percent of the children may not be reached for this service. As VHND is a monthly activity, children who do not attend the VHND may have to wait another month to be screened. This has implications for receiving timely care and services for addressing acute malnutrition. Therefore, efforts should be placed on mobilizing the community to attend VHNDs as well as identifying strategies to reach those that could not attend.

TABLE 11. EXPOSURE TO GROWTH MONITORING AMONG MOTHERS OF CHILDREN 0–24 MONTHS OF AGE

Indicator/age group	Total N	Tikamgarh %	Shahdol %	Dindori %	All %
Ever participated in VHND	1136	73.2	69.9	78.7	74.3
Ever participated in growth monitoring[a] (full sample)					
0-6 months	478	61.3	57.9	79.1	64.9
6-24 months	658	68.3	64.3	74.4	69.5
Even participated in growth monitoring during VHND (among those who attended VHND)					
0-6 months	320	95.5	97.1	98.1	96.9
6-24 months	474	97.2	94.1	97.4	96.4

[a] Growth monitoring refers to being weighed at VHND

Summary of findings on delivery and use of key nutrition interventions

Our findings indicate good overall delivery of key nutrition interventions in Madhya Pradesh, particularly during the period of pregnancy. Mothers reported receiving a majority of the interventions during pregnancy, including counseling on maternal care, IFA supplementation, and food supplementation. Nearly all mothers made at least one ANC visit, and most had received four or more ANC visits. During ANC visits, mothers reported receiving most of the services.

Exposure to interventions during the 0–6 month period was more varied compared to during pregnancy. A majority of the mothers received advice on initiating BF immediately after birth, but had low exposure to counseling during subsequent home visits. However, the gap was not due to a lack of home visits by FLWs, but, rather, not providing IYCF counseling during those home visits. Therefore, strategies should be developed to ensure counseling during existing home visits. A majority of mothers reported receiving food supplements during lactation, as in the pregnancy period.

Exposure to interventions in the 6–24 month period was also mixed. A majority of the mothers reported receiving food supplements but exposure to vitamin A supplementation and immunization were low, followed by exposure to counseling on CF and pediatric IFA supplementation. Home visits are intended to be a key delivery platform for these interventions, and while home visits are taking place, intended services do not appear to be provided adequately during the visits. As FLWs are a major source of health and nutrition information to mothers, there is a great potential to improving IYCF practices by improving the frequency and quality of their contacts with mothers. IFA supplementation for children is a relatively new policy initiative that is in its initial implementation phase, thereby potentially accounting for its low exposure. Also, attendance at VHNDs is the key to getting measured and screened for SAM. Hence, efforts should focus on mobilizing communities to attend VHNDs.

Results: Coordination in Service Delivery

The results in this section describe the type and extent of coordination in service delivery for the select interventions. As noted in the methods, convergence was assessed by asking FLWs a set of questions for each service about (1) whether or not they provided the intervention; (2) who *led* service delivery for that intervention (with the assumption that a clear "lead" among the FLWs helps to identify who is primarily responsible for ensuring service delivery and addressing gaps); and (3) how they coordinated delivery with other FLWs.

Coordination in counseling on maternal nutrition and care

Across the three districts, nearly all of the FLWs reported counseling pregnant women on nutrition (Table 12). However, there was no clear person primarily responsible for the service; each FLW identified herself as leading this service. While most FLWs reported always coordinating on counseling of pregnant women, it was usually by informing each other only about the activity or by planning and implementing the activity together. Patterns of coordination were similar in the three districts.

TABLE 12. COORDINATION IN THE DELIVERY OF COUNSELING ON MATERNAL NUTRITION AND CARE AMONG FLWS

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
Provides the service[a]:				
AWW (ICDS)	97.0	93.9	99.0	96.6
ASHA (Health)	100.0	98.9	100.0	99.6
ANM (Health)	100.0	100.0	100.0	100.0
Identifies "self" as leading service[a]:				
AWW	99.0	78.5	94.8	90.9
ASHA	97.8	85.4	97.8	93.7
ANM	100.0	98.2	96.1	98.0
Always coordinates to provide service[a]:				
AWW	87.7	84.1	85.3	85.6
ASHA	89.2	87.0	92.5	89.6
ANM	97.4	96.4	94.1	95.9
	N=217	**N=285**	**N=285**	**N=787**
Usual ways of coordinating service[b]:				
Inform only	69.2	53.9	67.0	62.9
Observe or attend	8.3	2.8	7.3	5.9
Give/receive instructions and transfer data	18.8	23.0	10.1	17.1
Plan together but implement separately	21.8	36.0	33.5	31.2
Plan and implement together	45.1	43.8	41.3	43.3

[a] Proportion of responses by each FLW type: AWW (N=96, 93, and 96 for Tikamgarh, Shahdol, and Dindori respectively), ASHA (N=89, 89, and 90), and ANM (N=46, 56, and 51).

[b] Proportion of pooled responses among all FLWs; multiple responses possible for each respondent.

Coordination in IFA supplementation after the first trimester

Nearly all of the ASHAs and ANMs reported providing IFA supplements to pregnant women, while 62 percent of AWWs reported providing them (Table 13). Administration of tests and checkups and provision of inputs during ANC visits are conducted usually by the ANM with the support of the ASHA. Thus, ASHAs and ANMs also identified themselves as being primarily responsible for providing IFA supplements, with all the FLWs reported working together. FLWs reported coordinating in different ways; they planned

and/or implemented the activity together or separately, exchanged instructions and data, or simply informed one another about the activity. Patterns of coordination were similar in the three districts.

TABLE 13. COORDINATION IN IFA AND FOOD SUPPLEMENTATION FOR PREGNANT WOMEN AMONG FLWS

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
IFA Supplementation				
Provides the service[a]:				
AWW	60.6	58.6	68.0	62.4
ASHA	98.9	98.9	98.9	98.9
ANM	97.8	100.0	100.0	99.4
Identifies "self" as leading service[a]:				
AWW	0.0	6.9	4.6	3.8
ASHA	88.6	87.6	95.5	90.6
ANM	97.8	96.4	100.0	98.0
	N=281	**N=302**	**N=338**	**N=921**
Usual ways of coordinating service[b]:				
Inform only	39.6	23.4	31.4	31.0
Observe or attend	2.6	2.7	4.7	3.4
Give/receive instructions and transfer data	43.5	38.6	41.6	41.1
Plan together but implement separately	47.4	46.7	49.2	47.8
Plan and implement together	49.4	52.7	55.7	52.8
THR Distribution				
Provides the service[a]:				
AWW	99.0	100.0	100.0	99.7
ASHA	14.6	33.3	22.2	23.4
ANM	0.0	7.1	3.9	3.9
Identifies "self" as leading service[a]:				
AWW	100.0	100.0	100.0	100.0
ASHA	0.0	6.9	10.0	6.5
ANM	0.0	0.0	0.0	0.0
	N=168	**N=192**	**N=177**	**N=537**
Usual ways of coordinating service[b]:				
Inform only	26.3	20.3	20.7	22.2
Observe or attend	1.0	2.3	2.6	2.0
Give/receive instructions and transfer data	55.6	43.0	48.3	48.4
Plan together but implement separately	47.5	46.9	42.2	45.5
Plan and implement together	39.4	35.9	38.8	37.9

[a] Proportion of responses by each FLW type: AWW (N=96, 93, and 96 for Tikamgarh, Shahdol, and Dindori respectively), ASHA (N=89, 89, and 90), and ANM (N=46, 56, and 51).

[b] Proportion of pooled responses among all FLWs; multiple responses possible for each respondent.

Coordination in food supplementation for pregnant women, lactating mothers, and children

FLWs demonstrated clear understanding of their roles related to food supplementation. Among the FLWs, AWW was identified as being primarily responsible for providing THR, and all AWWs confirmed providing this service (Table 13). Although the AWW is clearly responsible, ASHAs reported providing support as often as possible at the time of distribution. The patterns of service provision and coordination among FLWs for the delivery of nutritional supplements were the same for all target beneficiaries (i.e., pregnant and lactating women and children 6-36 months of age). The patterns of different coordination methods were similar to that for IFA supplementation.

Coordination in counseling on breastfeeding

Across the three districts, nearly all of the FLWs reported providing BF counseling, but as was the case in nutritional counseling for pregnant women, most of the FLWs identified themselves as leading this service (Table 14). There does not appear to be a clear lead role for this service. The main method of coordination was informing one another about the activity only. Patterns of coordination were similar in the three districts.

TABLE 14. COORDINATION IN COUNSELING ON BREASTFEEDING AMONG FLWS

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
Provides the service[a]:				
AWW	99.0	98.0	99.0	98.6
ASHA	100.0	97.8	100.0	99.3
ANM	100.0	100.0	100.0	100.0
Identifies "self" as leading service[a]:				
AWW	99.0	89.7	100.0	96.2
ASHA	88.8	77.3	91.1	85.8
ANM	89.1	96.4	100.0	95.4
	N=171	**N=276**	**N=256**	**N=703**
Usual ways of coordinating service[b]:				
Inform only	77.1	59.7	67.5	66.8
Observe or attend	8.3	2.3	10.8	6.9
Give/receive instructions and transfer data	7.3	18.1	10.2	12.6
Plan together but implement separately	11.9	36.8	28.7	27.7
Plan and implement together	52.3	44.4	44.6	46.5

[a] Proportion of responses by each FLW type: AWW (N=96, 93, and 96 for Tikamgarh, Shahdol, and Dindori respectively), ASHA (N=89, 89, and 90), and ANM (N=46, 56, and 51).

[b] Proportion of pooled responses among all FLWs; multiple responses possible for each respondent.

Coordination in counseling on complementary feeding

Nearly all of the FLWs across the three districts reported providing CF counseling (Table 15), and most of the FLWs indicated being primarily responsible for delivering the intervention (Table 15). FLWs usually informed each other about the activity. Patterns of coordination were similar in the three districts.

A similar pattern of results as that of BF counseling is indicative of a common issue pertaining to home-based counseling. It appears that without a clear lead, it is possible that there is shifting of responsibilities or assumptions about the service being delivered by someone else, potentially resulting in a service delivery gap. In this case, IYCF counseling does have a big gap.

Coordination in vitamin A supplementation

Although most of the ANMs reported providing vitamin A supplementation, 85 percent of ASHAs and 69 percent of AWWs also reported providing this intervention (Table 16). However, nearly all of the ANMs (98.7 percent) identified themselves to be delivering the intervention. FLWs interacted in various ways, with no main method of coordinating on this service. Patterns of coordination were similar in the three districts.

TABLE 15. COORDINATION IN COUNSELING ON COMPLEMENTARY FEEDING AMONG FLWS

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
Counselling on complementary feeding				
Provides the service[a]:				
AWW	98.0	98.0	98.0	98.0
ASHA	91.0	95.6	94.4	93.7
ANM	95.7	100.0	100.0	98.7
Identifies "self" as leading service[a]:				
AWW	100.0	95.9	99.0	98.3
ASHA	65.4	54.7	75.0	64.9
ANM	90.9	92.9	100.0	94.7
	N=194	**N=249**	**N=271**	**N=714**
Usual ways of coordinating service[b]:				
Inform only	74.0	49.4	68.1	63.2
Observe or attend	11.4	7.7	8.3	8.9
Give/receive instructions and transfer data	11.4	17.3	10.7	13.2
Plan together but implement separately	22.8	32.1	29.6	28.6
Plan and implement together	38.2	53.2	43.8	45.5

[a] Proportion of responses by each FLW type: AWW (N=96, 93, and 96 for Tikamgarh, Shahdol, and Dindori respectively), ASHA (N=89, 89, and 90), and ANM (N=46, 56, and 51).

[b] Proportion of pooled responses among all FLWs; multiple responses possible for each respondent.

Coordination in pediatric IFA supplementation

Pediatric IFA supplementation was provided by 94 percent of ANMs, 85 percent of ASHAs, and 61 percent of AWWs (Table 16). No clear lead was identified for delivering the intervention. Most ANMs (97.9 percent), ASHAs (91.7 percent), and AWWs (77.7 percent) identified themselves as leading the intervention. However, all reported coordinating to provide the intervention. FLWs interacted in various ways, with no main method of coordinating on this service. However, all of them reported coordinating to provide the intervention. Patterns of coordination in providing this service were similar to that of vitamin A supplementation.

TABLE 16. COORDINATION IN MICRONUTRIENT SUPPLEMENTATION FOR CHILDREN AMONG FLWS

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
Vitamin A supplementation				
Provides the service[a]:				
AWW	75.8	63.6	68.0	69.2
ASHA	83.2	91.1	78.9	84.4
ANM	100.0	98.2	98.0	98.7
Identifies "self" as leading service [a]:				
AWW	0.0	0.0	0.0	0.0
ASHA	0.0	0.0	0.0	0.0
ANM	97.8	100.0	100.0	99.3
	N=330	**N=307**	**N=319**	**N=956**
Usual ways of coordinating service[b]:				
Inform only	30.7	25.9	27.2	27.9
Observe or attend	1.1	3.2	4.9	3.0
Give/receive instructions and transfer data	48.4	38.1	36.4	41.0
Plan together but implement separately	47.3	49.7	52.7	49.9
Plan and implement together	50.0	45.5	52.2	49.2

(continued)

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
IFA supplementation for children				
Provides the service[a]:				
AWW	62.6	54.6	65.0	60.7
ASHA	84.3	88.9	81.1	84.8
ANM	89.1	98.2	96.1	94.8
Identifies "self" as leading service[a]:				
AWW	71.0	77.8	84.1	77.7
ASHA	93.3	87.5	94.5	91.7
ANM	95.1	100.0	98	97.9
	N=262	**N=271**	**N=291**	**N=824**
Usual ways of coordinating service[b]:				
Inform only	34.0	25.3	35.5	31.5
Observe or attend	2.7	2.4	3.6	2.9
Give/receive instructions and transfer data	45.6	37.6	33.1	38.4
Plan together but implement separately	39.5	54.2	45.8	46.8
Plan and implement together	55.8	44.0	57.2	52.2

[a] Proportion of responses by each FLW type: AWW (N=96, 93, and 96 for Tikamgarh, Shahdol, and Dindori respectively), ASHA (N=89, 89, and 90), and ANM (N=46, 56, and 51).

[b] Proportion of pooled responses among all FLWs; multiple responses possible for each respondent.

Coordination in growth monitoring/screening for severe acute malnutrition

Most of the AWWs (97 percent), followed by ASHAs (70 percent) and ANMs (54 percent), reported providing growth monitoring service (Table 17). However, 91 percent of AWWs and 88 percent of ANMs reported that they led growth monitoring. FLWs coordinated in different ways to provide this service.

TABLE 17. COORDINATION IN GROWTH MONITORING AMONG FLWS

Indicator	Tikamgarh %	Shahdol %	Dindori %	All %
Provides the service[a]:				
AWW	98.0	93.0	99.0	96.6
ASHA	65.2	68.9	76.7	70.3
ANM	40.0	66.7	57.1	54.3
Identifies "self" as leading service[a]:				
AWW	85.6	90.2	97.9	91.2
ASHA	0.0	0.0	0.0	0.0
ANM	76.5	87.5	94.1	88.0
	N=247	**N=274**	**N=327**	**N=843**
Usual ways of coordinating service[b]:				
Inform only	31.9	18.6	34.1	28.1
Observe or attend	3.0	4.8	3.3	3.7
Give/receive instructions and transfer data	53.3	46.7	42.7	47.1
Plan together but implement separately	47.4	55.1	52.2	51.9
Plan and implement together	43.7	38.9	47.3	43.4

[a] Proportion of responses by each FLW type: AWW (N=96, 93, and 96 for Tikamgarh, Shahdol, and Dindori respectively), ASHA (N=89, 89, and 90), and ANM (N=46, 56, and 51).

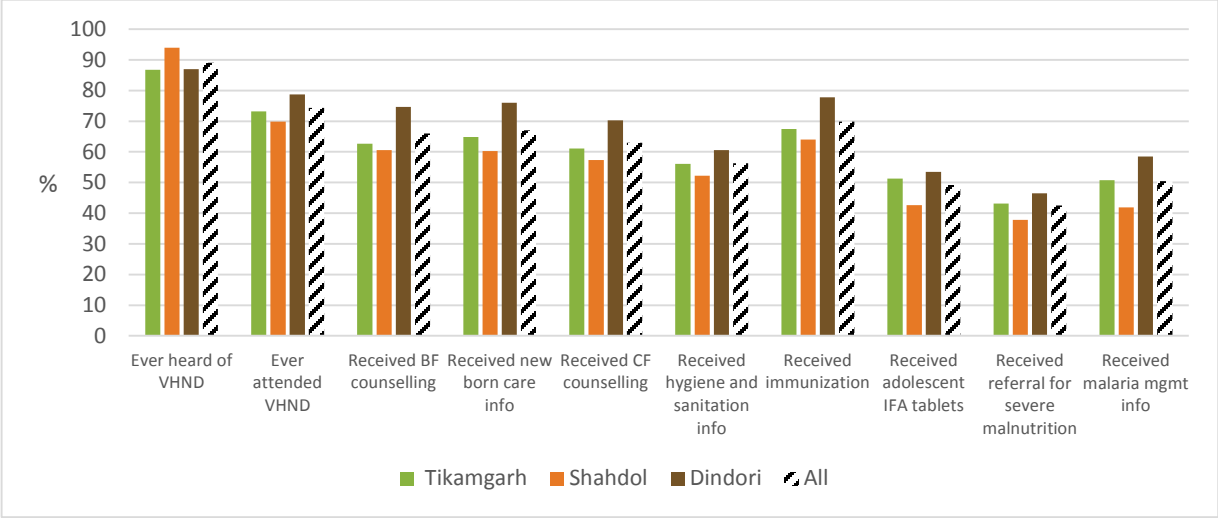
[b] Proportion of pooled responses among all FLWs; multiple responses possible for each respondent.

BOX 3. STATUS OF VILLAGE HEALTH AND NUTRITION DAYS: A KEY PLATFORM FOR BASIC HEALTH SERVICES AND NUTRITION INTERVENTIONS IN INDIA

Village Health and Nutrition Day (VHND) is a common, fixed day and fixed service platform for Health ICDS and the community, to provide various health and nutrition interventions targeted at pregnant and lactating mothers, and children under 5 years of age. Among the services, there is a focus on ensuring early registration, identification, and referral of high-risk children and pregnant women; and providing information to families on care of mothers and children through discussion of various health and nutrition topics. VHND is intended to be organized once a month in every AWC on a fixed day, with joint efforts of the ANM, ASHA, and AWW.

All of the FLWs in our study confirmed that VHND is conducted monthly at their respective AWCs, and 70 percent of mothers with children 0-24 months of age confirmed ever attending VHND (Figure 6). Lack of time was the most common reason (55 percent) for not attending VHND. Overall exposure to the different services during VHND was about 50 percent for most services. The details of FLWs' report of the VHND services are presented in the Annex Table A13.

FIGURE 6. SERVICES RECEIVED DURING VHND AMONG MOTHERS WITH CHILDREN 0–24 MONTHS OF AGE



Summary of findings on coordination

Overall, we found positive results on coordination among FLWs. Nearly all of the FLWs reported that they always coordinated to deliver the interventions. However, there was no clear or uniform method of coordination across the three districts. For services involving counseling, FLWs usually informed each other of their activity. A strong sense of role clarity was demonstrated by the FLWs in delivering food supplements, vitamin A supplementation, and monitoring growth/screening for SAM treatment. For food supplementation, AWWs were clearly in the lead. For IFA supplementation of pregnant women, ASHAs and ANMs were identified as being responsible, while ANMs were recognized as the lead for vitamin A supplementation of children. These results largely mirrored currently available guidelines for FLW roles related to delivering nutrition interventions. For growth monitoring of children, AWW and ANMs were identified as being responsible. For all counseling activities and pediatric IFA supplementation, there was ambiguity among FLWs about who was primarily responsible for delivering the intervention, and these

results also reflected in the findings on the relatively low exposure compared to other interventions. For interventions where clear operational guidelines do not exist, particularly for IYCF counseling, there remained ambiguity of roles and responsibilities.

Summary and Discussion

This report presents the findings on the state of delivery and use of ten select ENIs in three districts of Madhya Pradesh and the extent and nature of coordination among FLWs in delivering the interventions, which are summarized as follows:

1. **Exposure to ENIs:** Overall exposure to interventions during pregnancy was high. Most mothers had received counseling on pregnancy care, IFA supplementation, and food supplements. Furthermore, nearly 67 percent of mothers received four or more ANC visits, and more than 90 percent received a majority of the services during ANC, which included several ENIs during the pregnancy period.

   Exposure to interventions during the 0–6 months after birth was varied. Nearly 75 percent of mothers reported receiving advice or support for initiation of BF immediately after birth, and a similar proportion of mothers received food supplements. But only 24 percent of mothers received BF counseling during subsequent home visits by FLWs.

   During the 6–24 months period, exposure to interventions was also mixed. While a majority of the mothers reported receiving food supplements for their children, vitamin A supplementation, and growth monitoring, exposure to pediatric IFA supplementation, BF and CF counseling, and even full immunization were low. A plausible explanation for low exposure to interventions during this period is that the focus on the first 1,000 days, including CF and pediatric IFA supplementation, has been recent. The National Iron Plus Initiative (NIPI) is also a new health program that includes IFA supplementation to children starting at 6 months of age. The IYCF guidelines were released recently by the DHFW. While NIPI requires procurement and functioning supply systems as well as the ability of FLWs to reach children twice a week, IYCF counseling may be more readily implemented through existing contacts and already familiar to FLWs. In comparing the exposure to ENIs during this age period with other health interventions, such as child immunization, we found a similar pattern of varied exposure in our study sample. While exposure to most vaccinations was high, there was low exposure to full immunization (35 percent), particularly driven by a drop in polio-3 vaccination. Thus, focused efforts are required on those interventions or services that are lagging in coverage, in order to improve exposure to all essential interventions across this important age period.

2. **Delivery of ENIs:** The two common delivery points for the ENIs were VHNDs, which are held once a month at the AWCs, and home visits. Most of the ENIs (e.g., IFA supplementation, distribution of food supplements, and growth monitoring) were delivered during VHNDs. Exposure was very high for ENIs delivered during VHNDs, and 75 percent of mothers reported attending them.

   However, exposure to ENIs during home visits was low. While over 80 percent of mothers reported being visited by FLWs in the last three months, less than a quarter reported receiving counseling on IYCF practices. Thus, the lack of FLW home visits was not the limiting factor for at-home counseling. There are potentially multiple reasons for low exposure to counseling at home, such as lack of time or incentives. Counseling is time-intensive, so FLWs with heavy workloads are likely to face time constraints and might overlook counseling during home visits. Additionally, counseling during home visits is not an incentivized activity for ASHAs. Therefore, ASHAs might focus on services that require home visits but are incentivized. To increase home-based counseling, the main reasons for missed opportunities should be identified and addressed.

3. **Coordination in delivering ENIs:** Overall we found positive results on coordination among FLWs. Nearly all of the FLWs reported that they always coordinated to deliver the interventions.

However, FLWs did not use a single method of coordination, but rather a mix of strategies, such as exchanging information, simply informing one another, and planning together and implementing together or separately. Strategies differed for different types of services. For services involving counseling, FLWs usually informed each other only of their activity.

A strong sense of role clarity was demonstrated by the FLWs in delivering food supplements, IFA supplementation, and vitamin A supplementation. These results largely mirrored currently available guidelines for FLW roles related to delivering nutrition interventions. However, for pediatric IFA supplementation, IYCF counseling and growth monitoring/screening for SAM treatment there was ambiguity among FLWs about who was primarily responsible for delivering the intervention, and these results are also reflected in the findings on low exposure compared to other interventions.

4. **Frontline worker training and knowledge and implications for the delivery of ENIs:** Nearly all of the FLWs reported receiving job training. However, there was variability in exposure to training topics. For example, most of the FLWs were trained on ANC and nutrition care during pregnancy, but less than half received training on BF and CF, with more AWWs and ASHAs trained compared to ANMs. Inadequate training may lead to poor technical knowledge, thereby hindering effective counseling and communication between the FLWs and mothers. FLW knowledge of the ENIs may be indicative of training sufficiency and quality. Although most FLWs broadly identified correct information pertaining to the ENIs, some did not demonstrate adequate knowledge of key CF practices, for instance. As FLWs are a major source of information for mothers and variability of knowledge among FLWs could lead to conflicting information or misinformation, steps should be taken to harmonize messages and strengthen FLW knowledge and skills, to improve counseling and communication between FLWs and beneficiaries.

Our study has assessed several aspects related to the conditions of service delivery and use and in doing so, has highlighted several potential steps that could be taken to help close the gap in delivery of these critical nutrition interventions. At the same time, our study has also highlighted the challenging conditions related to several underlying household and community-level determinants of maternal and child health and nutrition, especially poverty, household insecurity and poor sanitation. Overall, therefore, to improve nutritional outcomes, it will be important to consider actions within the health and WCD sectors to improve the delivery of essential nutrition interventions as well as actions in other sectors to reduce poverty, improve food security, water and sanitation.

STUDY LIMITATIONS

There are limitations to our study. We examined only ten select essential nutrition interventions, specifically counseling on maternal nutrition and care, IFA supplementation, and food supplementation during pregnancy; BF counseling and food supplementation during the first six months after birth; and CF counseling, vitamin A supplementation, pediatric IFA supplementation, food supplementation, and growth monitoring/screening for SAM from six months to two years after birth. This does not capture the full extent of delivery and exposure to certain interventions. For example, we assessed whether or not children were measured as part of growth monitoring intervention, specifically as a SAM screening measure, but we did not include assessments of referrals and treatment, which are difficult to capture in a cross-sectional study. We did not study supply-chain constraints to delivering interventions for interventions that involved products such as IFA supplements, vaccines, and food supplements, and demand-side challenges such as compliance to recommended dosage, adhering to vaccination schedules, and consuming food supplements. Last, we studied the conditions of service delivery and use in three districts; therefore, our findings are not representative of the state of Madhya Pradesh.

PROGRAM AND POLICY RECOMMENDATIONS

Based on our study findings, we identified several priority actions to improve services for nutrition in Madhya Pradesh:

1. Identify and address the reasons for missed opportunities for IYCF counseling during home visits, to close the service delivery gap. Supervisors should review and discuss FLWs' workload, capacities, and motivation, and identify strategies to mitigate constraints. For example, supervisors could review FLWs' work responsibilities during monthly meetings and help them organize their schedules to incorporate sufficient time for home-based counseling. Checklists and job aids may be useful to remind them about and reinforce counseling. For ASHAs, who receive performance-based incentives, the possibility of incentivizing IYCF counseling during home visits may be considered.
2. Ensure that all FLW cadres are clear about their roles and responsibilities, particularly for IYCF counseling and pediatric IFA supplementation. Examine the current guidelines on provision of these ENIs to ensure that they articulate clear roles, and invest in orienting all staff at the district, block, and frontline levels of the DWCD and DHFW on the contents of these guidelines.
3. Harmonize key health and nutrition messages, particularly related to IYCF, in the training and materials used for all DWCD and DHFW staff. This would avoid any conflicting information or misinformation provided by different FLW cadres. Furthermore, given that counseling involves more than the provision of key messages and requires communication skills to address barriers to behavior change and negotiate appropriate practices, operational guidelines and training for FLWs should incorporate these critical components.
4. Build in mechanisms, such as improved monitoring and operations research, to assess and track the progress of service delivery and exposure to the ENIs, in order to enhance learning about the process and take corrective actions.
5. Invest simultaneously in efforts to address the underlying determinants of malnutrition, such as poverty, food insecurity, low education, and poor sanitation and hygiene, which will require focusing on multisectoral approaches that intervene at the same time, in the same place, for the same household, mother, and child.

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Annex: Additional Results Tables

TABLE A1. PERCEPTIONS OF HOUSEHOLD FOOD SECURITY AS DETERMINED BY THE HOUSEHOLD FOOD INSECURITY ACCESS SCALE

	Tikamgarh N=378	Shahdol N=375	Dindori N=383	All N=1,136
Perceptions	**%**	**%**	**%**	**%**
Worry that your household would not have enough food	5.6	21.1	30.5	19.1
Household member(s) unable to eat preferred kinds of foods because of a lack of resources	5.8	23.5	29.2	19.5
Household member(s) ate just a few kinds of food day after day because of a lack of resources	4.5	22.1	27.7	18.1
Household member(s) ate food that you did not want to eat instead of other foods because of a lack of resources	2.4	18.4	19.1	13.3
Household member(s) ate a smaller meal than you felt you needed because there was not enough food	2.7	15.5	8.9	9.0
Household member(s) ate fewer meals in a day because there was not enough food	2.1	14.4	6.5	7.7
No food in the household because of no resources	2.1	10.7	4.2	5.6
Household member(s) went to sleep at night hungry because there was not enough food	2.1	10.4	3.7	5.4
Household member(s) did not eat anything for a whole day because there was not enough food	1.9	10.4	3.7	5.3

TABLE A2. AWW REPORT OF EXPOSURE TO TOPICS DURING TRAINING

Indicators	Tikamgarh N=99	Shahdol N=99	Dindori N=97	All N=295
AWWs received training (%)	100.0	97.0	100.0	99.0
Training topics:	**%**	**%**	**%**	**%**
Immunization	83.8	85.4	71.1	80.1
Recording weight and height	66.7	63.5	50.5	60.3
Antenatal care	49.5	57.3	46.4	51.0
Breastfeeding	41.4	43.8	33.0	39.4
Complementary feeding	27.3	35.4	24.7	29.1
Hygienic handling of complementary foods	33.3	41.7	27.8	34.3
Pediatric anemia and iron tablets for children	19.2	20.8	10.3	16.8
Iron tablets to adolescent girls	27.3	41.7	30.9	33.2
Take Home Ration	51.5	47.9	38.1	45.9
Vitamin A dose	10.1	16.7	7.2	11.3
Diarrhea management	11.1	11.5	12.4	11.6
Severe acute malnutrition management	32.3	33.3	24.7	30.1
Intestinal parasites and deworming	8.1	9.4	8.2	8.6
Malaria management and prevention	9.1	16.7	13.4	13.0
Pregnancy care	59.6	69.8	52.6	60.6
Family planning counseling/service provision	23.2	30.2	21.7	25.0
Advice about sending children to school/AWC	43.4	49.0	65.0	52.4
Maintaining registers	53.5	63.5	62.9	59.9
Village Health and Nutrition Day	9.1	9.4	2.1	6.8
Laadli Lakshmi scheme	19.2	30.2	24.7	24.7
Childhood illnesses	30.3	32.3	24.7	29.1
Adolescent girls' health, hygiene, and sanitation	28.3	31.3	33.0	30.8

TABLE A3. ASHA REPORT OF EXPOSURE TO TOPICS DURING TRAINING

	Tikamgarh N=89	Shahdol N=90	Dindori N=90	All N=269
ASHAs received training (%)	98.9	97.8	93.3	96.7
Training topics:	**%**	**%**	**%**	**%**
Immunization	88.6	90.9	83.3	87.7
Recording weight and height	63.6	75.0	63.1	67.3
Antenatal care	67.1	71.6	69.1	69.2
Breastfeeding	48.9	51.1	39.3	46.5
Complementary feeding	28.4	38.6	35.7	34.2
Hygienic handling of complementary foods	23.9	46.6	27.4	32.7
Pediatric anemia and iron tablets for children	20.5	31.8	27.4	26.5
Iron tablets to adolescent girls	20.5	34.1	32.1	28.9
Take Home Rations	6.8	11.4	6.0	8.1
Vitamin A dose	13.6	18.2	13.1	15.0
Diarrhea management	23.9	21.6	29.8	25.0
Severe acute malnutrition management	30.7	40.9	26.2	32.7
Intestinal parasites and deworming	14.8	8.0	9.5	10.8
Malaria management and prevention	18.2	29.6	32.1	26.5
Pregnancy care	72.7	80.7	71.4	75.0
Family planning counseling/service provision	30.7	31.8	36.9	33.1
Advice about sending children to school/AWC	5.7	4.5	2.4	4.2
Maintaining registers	46.6	37.5	36.9	40.4
Village Health and Nutrition Day	14.8	12.5	20.2	15.8
Laadli Lakshmi Scheme	4.5	10.2	2.4	5.8
Childhood illnesses	35.2	31.8	39.3	35.4
Adolescent girls' health, hygiene, and sanitation	31.8	34.1	26.2	30.8

TABLE A4. ANM REPORT OF EXPOSURE TO TOPICS DURING TRAINING

	Tikamgarh N=46	Shahdol N=56	Dindori N=51	All N=153
ANMs received training (%)	97.8	100.0	100.0	99.4
Training topics:	**%**	**%**	**%**	**%**
Immunization	100.0	96.4	96.1	97.4
Recording weight and height	13.3	17.9	5.9	12.5
Antenatal care	62.2	64.3	58.8	61.8
Safe abortion	48.9	23.2	15.7	28.3
Delivering a child	37.8	25.0	17.7	26.3
Newborn care	35.6	48.2	25.5	36.8
Breastfeeding	8.9	12.5	13.7	11.8
Complementary feeding	6.7	5.4	3.9	5.3
Hygienic handling of complementary foods	2.2	0.0	2.0	1.3
Pediatric anemia and iron tablets for children	4.4	8.9	5.9	6.6
ICDS functions	4.4	5.4	3.9	4.6
Vitamin A dose	8.9	5.4	2.0	5.3
Diarrhea management	6.7	10.7	7.8	8.6
Severe acute malnutrition management	15.6	17.9	9.8	14.5
Intestinal parasites and deworming	2.2	3.6	0.0	2.0
Malaria management and prevention	8.9	12.5	23.5	15.1
Pregnancy care	24.4	28.6	7.8	20.4
Family planning	24.4	37.5	27.5	30.3
Village Health and Nutrition Day	4.4	3.6	0.0	2.6
Childhood illness	28.9	19.6	9.8	19.1
Adolescent girls' health, hygiene, and sanitation	8.9	17.9	2.0	9.9

TABLE A5. AWW REPORT OF AWARENESS OF AND CONTACT WITH SUPERVISOR

Indicators	Tikamgarh N=99	Shahdol N=99	Dindori N=97	All N=295
AWW identifies Lady Supervisor as her supervisor (%)	95.0	99.0	96.9	97.0
AWW received a visit from her immediate supervisor (days) (Mean ±SD)	30.2±34.1	28.3±24.8	34.5 ± 29.3	31.0±29.7

TABLE A6. ASHA REPORT OF AWARENESS OF AND CONTACT WITH SUPERVISOR

Indicators	Tikamgarh N=89	Shahdol N=90	Dindori N=90	All N=269
ASHA identifies ANM as her supervisor (%)	7.9	1.1	1.1	3.4
ASHA identifies LHV as her supervisor (%)	67.4	57.8	71.1	65.4
ASHA received a visit from her immediate supervisor (days) (Mean ±SD)	18.0±12.0	15.1±12.3	18.5±11.6	17.1±12.0

TABLE A7. AWW KNOWLEDGE OF PREGNANCY CARE, INFANT AND YOUNG CHILD FEEDING AND HEALTH PRACTICES

Topics	Tikamgarh N=99 %	Shahdol N=99 %	Dindori N=97 %	All N=295 %
Care during pregnancy				
Consume a variety of foods	69.7	47.5	51.6	56.3
Consume more food than normal diet	48.5	53.5	39.2	47.1
Take at least 2 hours of rest during the day	67.7	77.8	76.3	73.9
Take iron and folic acid supplements	66.7	69.7	70.1	68.8
Breastfeeding				
Initiate BF immediately after birth	98.0	99.0	99.0	98.6
Mother should give colostrum to her baby	100.0	100.0	100.0	100.0
Babies under 6 months should not be given water if the weather is hot	100.0	99.0	100.0	99.7
To get enough breast milk, mother should				
Breastfeed more frequently	36.4	36.4	34.0	35.6
Give baby other liquids/foods	8.1	22.2	7.2	12.5
Mother needs to drink more water	15.2	19.2	13.4	15.9
Mother needs to eat more food	64.7	57.6	53.6	58.6
Mother needs to eat food that increases milk production	64.7	56.6	73.2	64.8
Breastfeeding frequency				
Whenever baby wants	56.6	30.3	42.3	43.1
When you see the baby is hungry	18.2	33.3	21.7	24.4
When the baby cries	88.9	71.7	82.5	81.0
If a mother has a young baby (less than 6 months) and needs to be away from her baby, what should the baby be fed when hungry?				
Mother's expressed breast milk	13.1	30.3	25.8	23.1
Cow's milk	87.9	71.7	79.4	79.7
Semolina/four	1.0	2.0	0.0	1.0
Signs of baby's hunger				
Baby sucks his/her fingers	37.4	30.3	28.9	32.2
Baby becomes agitated	17.2	18.2	10.3	15.3
Baby looks for the breast	4.0	15.2	7.2	8.8
Baby cries	92.9	83.8	92.8	89.8
Breastfeeding problem solving				
Mother with small breasts can produce enough milk	98.0	95.0	95.9	96.3
Mother who is not well fed can produce enough breast milk	29.3	56.6	34.0	40.0
Frequent BF during the night as well as the day increase milk production	93.9	98.0	95.9	95.9
Reason for over-full breasts, hard, sore breasts is not BF often enough	45.5	50.5	40.2	45.4
Reason for over-full breasts, hard, sore breasts is poor attachment	43.4	39.4	48.5	43.7
Stop BF an under 6 month child if mother becomes pregnant	41.4	37.4	34.0	37.6
Timing of introduction of foods (children 6–8 months)				
Water	100.0	100.0	100.0	100.0
Rice/bread	84.9	86.9	79.4	83.7
Daal	79.8	87.9	81.4	83.1

Topics	Tikamgarh N=99 %	Shahdol N=99 %	Dindori N=97 %	All N=295 %
Green leafy vegetables	68.7	63.6	69.1	67.1
Vitamin A-rich vegetables	58.6	51.5	62.9	57.6
Fruit	61.6	56.6	68.0	62.0
Meat	8.1	6.1	2.1	5.4
Egg	38.4	43.4	44.3	42.0
Other milk	61.6	54.6	57.7	58.0
Knowledge of introduction of foods (summative score of 9 items, 0–9)	5.6	5.5	5.6	5.6
Reasons for children becoming malnourished				
Do not eat enough food/poor appetite	42.4	58.6	28.9	43.4
Do not eat frequently	39.4	28.3	21.7	29.8
Illness (e.g. diarrhea)	57.6	44.4	55.7	52.5
Abrupt weaning	42.4	29.3	33.0	34.9
Child is not fed with affection	10.1	10.1	13.4	11.2
Insufficient quantity of food	38.4	51.5	54.6	48.1
Poor quality /not balanced food	36.4	32.3	29.9	32.9
Determining if a child is undernourished				
Using a growth chart	77.8	77.8	69.1	74.9
Child looks too small	36.4	33.3	30.9	33.6
Child looks too thin	48.5	47.5	50.5	48.8
Child looks too fat	14.1	14.1	15.5	14.6
Child looks weak	63.6	64.7	70.1	66.1
If a child is malnourished, then AWW				
Gives medicine	53.5	47.5	50.5	50.5
Refer to health subcenter (hsc)	4.0	5.1	2.1	3.7
Refer to hospital	56.6	63.6	57.7	59.3
Scold the parents	12.1	6.1	4.1	7.5
Give nutritional advice/information	39.4	42.4	42.3	41.4
Register the child for THR	7.1	22.2	11.3	13.6
Refer to ANM	4.0	9.1	2.1	5.1
Refer to ASHA	3.0	5.1	1.0	3.1
Refer to pushtikor diwas	10.1	16.2	13.4	13.2
Physical signs of anemia (children <24 months)				
Unusual paleness (pallor) of the skin of the soles and palms	88.9	84.9	72.2	82.0
Treatment for anemia (children <24 months)				
Daily dose of one iron tablet	72.7	80.8	74.2	75.9
One deworming tablet once in six months	11.1	6.1	10.3	9.2
Feed iron rich foods	28.3	35.4	39.2	34.2
What should a mother do when her child under 2 years has diarrhea?				
Give ORS/home-prepared solution ORS	90.9	90.9	90.7	90.9
Feed less than usual	10.1	11.1	7.2	9.5
Continue BF	31.3	37.4	40.2	36.3
Breastfeed more often	16.2	24.2	14.4	18.3
Give syrups	39.4	25.3	30.9	31.9
Give traditional medicine	8.1	16.2	18.6	14.2
Give treated water	34.3	30.3	25.8	30.2
Give carrot juice or rice water	3.0	7.1	1.0	3.7

Topics	Tikamgarh N=99 %	Shahdol N=99 %	Dindori N=97 %	All N=295 %
What should a mother do AFTER her child has recovered from diarrhea or another illness?				
Feed less than usual	18.2	19.2	11.3	16.3
Feed as much food as usual	44.4	47.5	55.7	49.2
Feed more than usual	23.2	23.2	12.4	19.7
Feed an extra meal every day for 2 weeks	12.1	15.2	14.4	13.9
Give more liquids than usual	31.3	45.5	30.9	35.9
Continue BF	55.6	32.3	54.6	47.5

TABLE A8. ASHA KNOWLEDGE OF PREGNANCY CARE, INFANT AND YOUNG CHILD FEEDING AND HEALTH PRACTICES

Topics	Tikamgarh N=89 %	Shahdol N=90 %	Dindori N=90 %	All N=269 %
Care during pregnancy				
Consume a variety of foods	60.7	56.7	51.1	56.1
Consume more food than normal diet	65.2	46.7	53.3	55.0
Take at least 2 hours of rest during the day	62.9	66.7	67.8	65.8
Take iron and folic acid supplements	51.7	50.0	58.9	53.5
Breastfeeding				
Initiate BF immediately after birth	100.0	98.9	98.9	99.3
Mother should give her colostrum to her baby	98.9	88.9	98.9	95.5
Babies under 6 months should not be given water if the weather is hot	56.2	85.6	71.1	71.0
To get enough breast milk, mother should				
Breastfeed more frequently	46.1	36.7	41.1	41.3
Give baby other liquids/foods	7.9	25.6	6.7	13.4
Mother needs to drink more water	10.1	10.0	8.9	9.7
Mother needs to eat more food	65.2	65.6	64.4	65.1
Mother needs to eat food that increases milk production	62.9	51.1	52.2	55.4
Breastfeeding frequency				
Whenever baby wants	51.7	38.9	46.7	45.7
When you see the baby is hungry	6.7	30.0	24.4	20.5
When the baby cries	92.1	78.9	84.4	85.1
If a mother has a young baby (less than 6 months) and needs to be away from her baby, what should the baby be fed when hungry?				
Mother's expressed breast milk	20.2	37.8	28.9	29.0
Cow's milk	86.5	64.4	73.3	74.7
Semolina/four	0.0	1.1	1.1	0.7
Signs of baby's hunger				
Baby sucks his/her fingers	36.0	27.8	34.4	32.7
Baby becomes agitated	13.5	18.9	14.4	15.6
Baby looks for the breast	5.6	11.1	11.1	9.3
Baby cries	96.6	87.8	86.7	90.3
Breastfeeding problem solving				
Mother with small breasts can produce enough milk	100.0	96.7	97.8	98.1
Mother who is not well fed can produce enough breast milk	29.2	27.8	30.0	29.0
Frequent BF during the night as well as the day increase milk production	96.6	98.9	95.6	97.0
Reason for over-full breasts, hard, sore breasts is not BF often enough	48.3	46.7	44.4	46.5
Reason for over-full breasts, hard, sore breasts is poor attachment	40.5	44.4	45.6	43.5
Stop BF an under 6 month child if mother becomes pregnant	36.0	27.8	35.6	33.1
Timely introduction of foods at 6–8 months				
Water	95.5	100.0	98.9	98.1
Rice/bread	80.9	85.6	84.4	83.6
Daal	84.3	86.7	82.2	84.4

Topics	Tikamgarh N=89 %	Shahdol N=90 %	Dindori N=90 %	All N=269 %
Green leafy vegetables	69.7	70.0	71.1	70.3
Vitamin A-rich vegetables	56.2	56.7	58.9	57.3
Fruit	61.8	53.3	64.4	59.9
Meat	3.4	17.8	11.1	10.8
Egg	34.8	46.7	42.2	41.3
Other milk	61.8	62.2	54.4	59.5
Knowledge of introduction of foods [summative score of 9 item (0–9)]	5.5	5.8	5.7	5.7
Reasons for children becoming malnourished				
Do not eat enough food/poor appetite	39.3	46.7	37.8	41.3
Do not eat frequently	46.1	31.1	30.0	35.7
Illness (e.g. diarrhea)	53.9	44.4	52.2	50.2
Abrupt weaning	37.1	22.2	35.6	31.6
Child is not fed with affection	5.6	8.9	4.4	6.3
Insufficient quantity of food	55.1	54.4	46.7	52.0
Poor quality /not balanced food	36.0	37.8	28.9	34.2
Determining if a child is undernourished				
Using a growth chart	58.4	61.1	65.6	61.7
Child looks too small	55.1	32.2	30.0	39.0
Child looks too thin	59.6	48.9	46.7	51.7
Child looks too fat	22.5	20.0	16.7	19.7
Child looks weak	59.6	57.8	63.3	60.2
If a child is malnourished, then AWW				
Gives medicine	62.9	42.2	42.2	49.1
Refer to health subcenter (hsc)	4.5	7.8	4.4	5.6
Refer to hospital	52.8	78.9	56.7	62.8
Scold the parents	15.7	7.8	3.3	8.9
Give nutritional advice/information	27.0	40.0	31.1	32.7
Register the child for THR	3.4	13.3	2.2	6.3
Refer to ANM	2.2	6.7	3.3	4.1
Refer to ASHA	0.0	0.0	0.0	0.0
Refer to pushtikor diwas	16.9	11.1	12.2	13.4
Physical signs of anemia (children <24 months)				
Unusual paleness (pallor) of the skin of the soles and palms	93.3	85.6	75.6	84.8
Treatment for anemia (children <24 months)				
Daily dose of one iron tablet	88.8	66.7	71.1	75.5
One deworming tablet once in six months	6.7	8.9	13.3	9.7
Feed iron rich foods	23.6	32.2	31.1	29.0
What should a mother do when her child under 2 years has diarrhea?				
Give ORS/home-prepared solution ORS	88.8	83.3	72.2	81.4
Feed less than usual	10.1	12.2	5.6	9.3
Continue BF	33.7	31.1	38.9	34.6
Breastfeed more often	12.4	26.7	16.7	18.6
Give syrups	42.7	28.9	31.1	34.2
Give traditional medicine	11.2	16.7	16.7	14.9
Give treated water	29.2	26.7	21.1	25.7
Give carrot juice or rice water	0.0	3.3	0.0	1.1

Topics	Tikamgarh N=89 %	Shahdol N=90 %	Dindori N=90 %	All N=269 %
What should a mother do AFTER her child has recovered from diarrhea or another illness?				
Feed less than usual	10.1	21.1	10.0	13.8
Feed as much food as usual	36.0	51.1	52.2	46.5
Feed more than usual	22.5	27.8	15.6	21.9
Feed an extra meal every day for 2 weeks	16.9	4.4	7.8	9.7
Give more liquids than usual	36.0	38.9	30.0	34.9
Continue BF	58.4	32.2	57.8	49.4

TABLE A9. ANM KNOWLEDGE OF PREGNANCY CARE, INFANT AND YOUNG CHILD FEEDING AND HEALTH PRACTICES

Topics	Tikamgarh N=46 %	Shahdol N=56 %	Dindori N=51 %	All N=153 %
Care during pregnancy				
Consume a variety of foods	71.7	64.3	62.8	66.0
Consume more food than normal diet	78.3	41.1	43.1	52.9
Take at least 2 hours of rest during the day	76.1	76.8	82.4	78.4
Take iron and folic acid supplements	43.5	50.0	74.5	56.2
Breastfeeding				
Initiate BF immediately after birth	100.0	100.0	100.0	100.0
Mother should give her colostrum to her baby	97.8	96.4	100.0	98.0
Babies under 6 months should not be given water if the weather is hot	80.4	75.0	82.4	79.1
To get enough breast milk, mother should				
Breastfeed more frequently	52.2	41.1	33.3	41.8
Give baby other liquids/foods	4.4	25.0	11.8	14.4
Mother needs to drink more water	15.2	7.1	13.7	11.8
Mother needs to eat more food	69.6	60.7	49.0	59.5
Mother needs to eat food that increases milk production	65.2	67.9	70.6	68.0
Breastfeeding frequency				
Whenever baby wants	60.9	33.9	39.2	43.8
When you see the baby is hungry	19.6	42.9	11.8	25.5
When the baby cries	89.1	82.1	82.4	84.3
If a mother has a young baby (less than 6 months) and needs to be away from her baby, what should the baby be fed when hungry?				
Mother's expressed breast milk	30.4	48.2	31.4	37.3
Cow's milk	76.1	53.6	74.5	67.3
Semolina/four	0.0	0.0	0.0	0.0
Signs of baby's hunger				
Baby sucks his/her fingers	52.2	51.8	25.5	43.1
Baby becomes agitated	37.0	30.4	15.7	27.5
Baby looks for the breast	4.3	30.4	0.0	12.4
Baby cries	97.8	82.1	96.1	91.5
Breastfeeding problem solving				
Mother with small breasts can produce enough milk	100.0	87.5	86.3	90.9
Mother who is not well fed can produce enough breast milk	21.7	26.8	29.4	26.1
Frequent BF during the night as well as the day increase milk production	95.7	96.4	90.2	94.1
Reason for over-full breasts, hard, sore breasts is not BF often enough	43.5	42.9	49.0	45.1
Reason for over-full breasts, hard, sore breasts is poor attachment	56.5	57.1	51.0	54.9
Stop BF an under 6 month child if mother becomes pregnant	26.1	48.2	35.3	37.3
Timely introduction of foods at 6–8 months				
Water	100.0	100.0	100.0	100.0
Rice/bread	76.1	82.1	82.4	80.4

Topics	Tikamgarh N=46 %	Shahdol N=56 %	Dindori N=51 %	All N=153 %
Daal	82.6	75.0	92.2	83.0
Green leafy vegetables	67.4	60.7	76.5	68.0
Vitamin A-rich vegetables	56.5	51.8	64.7	57.5
Fruit	65.2	50.0	70.6	61.4
Meat	4.3	14.3	11.8	10.5
Egg	41.3	50.0	37.3	43.1
Other milk	65.2	57.1	74.5	65.4
Knowledge of introduction of foods (summative score of 9 items, 0-9)	5.6	5.4	6.1	5.7
Reasons for children becoming malnourished				
Do not eat enough food/poor appetite	52.2	66.1	41.2	53.6
Do not eat frequently	56.5	30.4	27.5	37.3
Illness (e.g. diarrhea)	56.5	41.1	56.9	51.0
Abrupt weaning	54.4	28.6	37.3	39.2
Child is not fed with affection	15.2	7.1	11.8	11.1
Insufficient quantity of food	63.0	62.5	74.5	66.7
Poor quality /not balanced food	0.0	0.0	0.0	0.0
Determining if a child is undernourished				
Using a growth chart	76.1	80.4	70.6	75.8
Child looks too small	67.4	37.5	31.4	44.4
Child looks too thin	52.2	39.3	51.0	47.1
Child looks too fat	39.1	21.4	33.3	30.7
Child looks weak	80.4	69.6	76.5	75.2
If a child is malnourished, then AWW				
Gives medicine	71.7	48.2	45.1	54.3
Refer to health subcenter (hsc)	4.3	10.7	11.8	9.2
Refer to hospital	50.0	76.8	60.8	63.4
Scold the parents	23.9	3.6	7.8	11.1
Give nutritional advice/information	30.4	44.6	49.0	41.8
Register the child for THR	4.3	10.7	3.9	6.5
Refer to other ANM	2.2	1.8	2.0	2.0
Refer to ASHA	0.0	0.0	0.0	0.0
Refer to pushtikor diwas	19.6	3.6	7.8	9.8
Physical signs of anemia (children <24 months)				
Unusual paleness (pallor) of the skin of the soles and palms	100.0	100.0	98.0	99.4
Treatment for anemia (children <24 months)				
Daily dose of one iron tablet	91.3	92.9	88.2	90.9
One deworming tablet once in six months	21.7	3.6	7.8	10.5
Feed iron rich foods	23.9	28.6	25.5	26.1
What should a mother do when her child under 2 years has diarrhea?				
Give ORS/home-prepared solution ORS	87.0	78.6	78.4	81.1
Feed less than usual	15.2	16.1	9.8	13.7
Continue BF	58.7	53.6	31.4	47.7
Breastfeed more often	23.9	30.4	27.5	27.5
Give syrups	58.7	35.7	33.3	41.8
Give traditional medicine	6.5	7.1	23.5	12.4

(continued)

Topics	Tikamgarh N=46 %	Shahdol N=56 %	Dindori N=51 %	All N=153 %
Give treated water	52.2	26.8	17.6	31.4
Give carrot juice or rice water	2.2	12.5	7.8	7.89
What should a mother do AFTER her child has recovered from diarrhea or another illness?				
Feed less than usual	19.6	23.2	15.7	19.6
Feed as much food as usual	52.2	44.6	51.0	49.0
Feed more than usual	23.9	26.8	13.7	21.6
Feed an extra meal every day for 2 weeks	19.6	7.2	15.7	13.7
Give more liquids than usual	50.0	26.8	27.5	34.0
Continue BF	67.4	51.8	64.7	60.7

TABLE A10. MATERNAL AWARENESS OF HEALTH AND NUTRITION MESSAGES

Health and nutrition messages	Tikamgarh	Shahdol	Dindori	All
Breastfeeding messages (children 0–6 months)	**N=173**	**N=175**	**N=129**	**N=477**
	%	**%**	**%**	**%**
Putting baby to breast immediately after birth	95.4	94.9	94.6	95.0
Not putting anything into the child's mouth before breast milk or colostrum (no pre-lacteals)	90.8	84.0	89.2	87.8
Feed only breast milk up to six months	92.5	90.3	92.3	91.6
Not giving the child any water or other liquids up to six months	67.1	79.4	78.3	74.6
Complementary feeding messages (children 6–24 months)	**N=205**	**N=200**	**N=254**	**N=659**
	%	**%**	**%**	**%**
Feeding semi-solid and solid family foods from 6 months	58.1	75.5	66.5	66.6
Feeding a child at least 3 times a day	55.1	67.0	55.5	58.9
Feeding eggs, meat, chicken other animal source food to children older than 6 months	26.3	38.5	33.9	32.9
Washing hands with water and soap before food preparation of feeding the child	67.3	73.0	69.3	69.8
Feeding child during illness	55.6	61.5	56.3	57.7
About vitamin A doses	26.3	45.0	35.4	35.5
Giving IFA tablets to children under two years	22.4	21.0	19.7	20.9
Other messages (children 0–24 months)	**N=378**	**N=375**	**N=383**	**N=1,136**
	%	**%**	**%**	**%**
Giving ORS or ORS and Zinc supplements during diarrhea	66.1	53.6	56.9	58.9
Severe acute malnutrition	31.5	29.3	32.1	31.0
Intestinal parasites and deworming	48.4	42.1	45.7	45.4

TABLE A11. MATERNAL KNOWLEDGE OF INTRODUCTION OF FOODS TO CHILDREN AT 6-8 MONTHS OF AGE

Foods	Tikamgarh N=378 %	Shahdol N=375 %	Dindori N=383 %	All N=1,136 %
Water	61.9	53.1	54.6	56.5
Non-breast milk liquids (sugar/glucose water, tea, fruit juice etc.)	67.7	60.8	58.2	62.2
Other milk (Cow/Goat/Buffalo/powder milk)	66.4	64.0	59.3	63.2
Gruels (wheat/rice)	73.8	63.2	60.1	65.7
Semi-solid foods (soft rice, khichuri, mashed potato, ripe banana, other mashed family foods etc.)	76.2	61.9	64.2	67.4
Solid foods (rice, wheat, puffed/pressed rice, etc.)	75.4	54.7	66.1	65.4
Fish	29.1	16.3	19.3	21.6
Meat (chicken, mutton, beef, etc.,)	24.3	13.6	19.3	19.1
Eggs	25.1	23.5	22.7	23.8
Legumes (pulse, peas, etc)	47.6	38.9	41.5	42.7
Leafy green vegetables	51.9	46.9	40.2	46.3
Snack foods (chanachur, chips, peanuts)	51.6	46.1	43.9	47.2

Note: Percentages reported are for mothers who answered 'yes' to the timely introduction of the foods.

TABLE A12. MATERNAL SOURCES OF NUTRITION AND HEALTH MESSAGES

Source of information	Tikamgarh	Shahdol	Dindori	All
Breastfeeding messages (children 0-6 months)				
Message: Putting baby to breast immediately after birth	**N=153**	**N=164**	**N=120**	**N=437**
	%	**%**	**%**	**%**
Doctor	5.9	14.0	5.0	8.7
Nurse	12.4	25.0	10.0	16.5
ANM	70.6	48.8	73.3	63.2
AWW	75.8	51.8	64.2	63.6
ASHA	59.5	65.9	67.5	64.1
Message: Not putting anything into the child's mouth before breast milk or colostrum (no pre-lacteals)	**N=140**	**N=139**	**N=112**	**N=391**
	%	**%**	**%**	**%**
Doctor	2.9	10.8	0.9	5.1
Nurse	13.6	15.8	11.6	13.8
ANM	70.0	46.8	67.9	61.1
AWW	73.6	55.4	64.3	64.5
ASHA	61.4	74.1	68.8	68.0
Message: Feed only breast milk up to six months	**N=143**	**N=153**	**N=117**	**N=413**
	%	**%**	**%**	**%**
Doctor	3.5	9.8	4.3	6.1
Nurse	6.3	17.7	6.0	10.4
ANM	65.0	45.1	68.4	58.6
AWW	72.7	54.3	68.4	64.7
ASHA	70.6	69.9	69.2	70.0
Message: Not giving the child any water or other liquids up to six months	**N=106**	**N=133**	**N=101**	**N=340**
	%	**%**	**%**	**%**
Doctor	4.7	9.8	2.0	5.9
Nurse	7.5	12.8	5.0	8.8
ANM	67.9	42.9	66.3	57.7
AWW	71.7	56.4	73.3	66.2
ASHA	74.5	74.4	72.3	73.8
Complementary feeding messages (children 6-24 months)				
Message: Feeding other semi-solid and solid family foods from 6 months	**N=112**	**N=146**	**N=164**	**N=422**
	%	**%**	**%**	**%**
Doctor	3.6	6.8	1.2	3.8
Nurse	5.4	8.9	1.2	5.0
ANM	72.3	41.1	61.0	57.1
AWW	80.4	72.6	77.4	76.5
ASHA	67.9	73.3	74.4	72.3
Message: Feeding eggs , meat, chicken other animal source food to children older than 6 months	**N=51**	**N=67**	**N=75**	**N=193**
	%	**%**	**%**	**%**
Doctor	0.0	7.5	2.7	3.6
Nurse	2.0	4.5	1.3	2.6
ANM	82.4	43.3	69.3	63.7
AWW	82.4	65.7	81.3	76.2
ASHA	84.3	73.1	73.3	76.2

(continued)

Source of information	Tikamgarh	Shahdol	Dindori	All
Message: Feeding a child at least 3 times a day	**N=101**	**N=129**	**N=133**	**N=363**
	%	**%**	**%**	**%**
Doctor	3.0	11.6	1.5	5.5
Nurse	2.0	11.6	2.3	5.5
ANM	70.3	38.0	69.2	58.4
AWW	79.2	65.9	81.2	75.2
ASHA	74.3	67.4	73.7	71.6
Message: Washing hands with water and soap before food preparation of feeding the child	**N=123**	**N=136**	**N=165**	**N=424**
	%	**%**	**%**	**%**
Doctor	1.6	11.0	0.6	4.2
Nurse	2.4	8.8	1.8	4.2
ANM	72.4	44.9	70.3	62.7
AWW	81.3	62.5	78.2	74.1
ASHA	77.2	69.9	73.9	73.6
Message: How to feed your child when he/she is sick	**N=101**	**N=119**	**N=139**	**N=359**
	%	**%**	**%**	**%**
Doctor	4.0	12.6	2.2	6.1
Nurse	4.0	15.1	1.4	6.7
ANM	71.3	47.1	72.7	63.8
AWW	78.2	58.0	79.1	71.9
ASHA	70.3	68.1	70.5	69.6
Message: Giving IFA tablets to children under two years	**N=45**	**N=41**	**N=50**	**N=136**
	%	**%**	**%**	**%**
Doctor	6.7	17.1	2.0	8.1
Nurse	0.0	29.3	4.0	10.3
ANM	66.7	43.9	82.0	65.4
AWW	73.3	56.1	70.0	66.9
ASHA	75.6	70.7	68.0	71.3
Message: Vitamin A doses	**N=51**	**N=87**	**N=88**	**N=226**
	%	**%**	**%**	**%**
Doctor	5.9	17.2	1.1	8.4
Nurse	0.0	14.9	8.0	8.9
ANM	78.4	55.2	86.4	72.6
AWW	88.2	58.6	75.0	71.7
ASHA	60.8	57.5	62.5	60.2
Other messages (0-24 months)				
Message: Giving ORS or ORS and Zinc supplements during diarrhea	**N=237**	**N=195**	**N=216**	**N=648**
	%	**%**	**%**	**%**
Doctor	8.9	15.4	4.2	9.3
Nurse	9.3	10.3	6.0	8.5
ANM	65.4	43.1	71.8	60.8
AWW	79.3	60.0	77.8	73.0
ASHA	65.8	72.8	73.6	70.5
Message: Intestinal parasites and deworming	**N=164**	**N=156**	**N=173**	**N=493**
	%	**%**	**%**	**%**
Doctor	5.5	10.9	1.7	5.9
Nurse	9.1	9.0	4.6	7.5
ANM	58.5	46.8	72.8	59.8
AWW	77.4	65.4	81.5	75.1

(continued)

Source of information	Tikamgarh	Shahdol	Dindori	All
ASHA	61.6	72.4	67.1	66.9
Message: Severe acute malnutrition	**N=116**	**N=104**	**N=123**	**N=343**
	%	%	%	%
Doctor	0.9	16.4	0.8	5.5
Nurse	3.4	11.5	4.9	6.4
ANM	67.2	49.0	85.4	68.2
AWW	87.9	57.7	75.6	74.3
ASHA	73.3	72.1	74.0	73.2

Note: ANM = Auxiliary Nurse Midwife; AWW = *Anganwadi* Worker; ASHA=Accredited Social Health Activist.

TABLE A13. FLWS' REPORT OF SERVICES PROVIDED DURING VILLAGE HEALTH AND NUTRITION DAYS

Services	*Anganwadi* Worker				Accredited Social Health Activist				Auxiliary Nurse Midwife			
	Tikamgarh N = 99	Shahdol N = 99	Dindori N = 97	All N = 295	Tikamgarh N = 89	Shahdol N = 90	Dindori N = 90	All N = 269	Tikamgarh N = 46	Shahdol N = 56	Dindori N = 51	All N = 153
						%						
Antenatal care	61.6	57.6	48.5	55.9	70.8	63.3	70.0	68.0	82.6	64.3	82.4	75.8
Pregnancy care	79.8	59.6	70.1	69.8	80.9	64.4	70.0	71.8	78.3	69.6	56.9	68.0
Counseling on breastfeeding	25.3	17.2	18.6	20.3	20.2	36.7	27.8	28.3	26.1	30.4	37.3	31.4
Counseling on complementary feeding	19.2	21.2	18.6	19.7	15.7	24.4	15.6	18.6	21.7	26.8	15.7	21.6
Counseling on hygienic handling of complementary foods	32.3	28.3	24.7	28.5	22.5	24.4	17.8	21.6	23.9	25.0	19.6	22.9
Immunization/vaccination	90.9	86.9	96.9	91.5	94.4	85.6	95.6	91.8	97.8	96.4	88.2	94.1
Provide iron tablets to children aged 6 months to 2 years	21.2	18.2	20.6	20.0	18.0	24.4	17.8	20.1	37.0	23.2	23.5	27.5
Provide vitamin A doses	16.2	12.1	6.2	11.5	13.5	21.1	10.0	14.9	39.1	32.1	19.6	30.1
Growth monitoring	67.7	50.5	53.6	57.3	66.3	61.1	60.0	62.5	47.8	53.6	47.1	49.7
Provide ORS	7.1	8.1	4.1	6.4	11.2	21.1	10.0	14.1	8.7	21.4	21.6	17.7
Counseling on severe acute malnutrition management	22.2	23.2	19.6	21.7	31.5	27.8	24.4	27.9	45.7	42.9	29.4	39.2
Provide deworming tablets	14.1	12.1	8.2	11.5	13.5	33.3	11.1	19.3	8.7	23.2	21.6	18.3
Educate about malaria management and prevention	5.1	5.1	9.3	6.4	13.5	21.1	18.9	17.8	28.3	30.4	31.4	30.1
Referral to nutrition rehabilitation center	3.0	3.0	3.1	3.1	2.2	11.1	3.3	5.6	6.5	10.7	11.8	9.8
Provide iron tablets to adolescent girls	45.5	40.4	35.1	40.3	41.6	50.0	31.1	40.9	37.0	53.6	31.4	41.2
Provide Take Home Rations	49.5	65.7	49.5	54.9	25.8	36.7	27.8	30.1	13.0	19.6	19.6	17.7
Family planning counseling and contraceptives	43.4	38.4	46.4	42.7	44.9	58.9	51.1	51.7	52.2	50.0	41.2	47.7
Advice about sending children to school/*Anganwadi* center	16.2	28.3	16.5	20.3	3.4	14.4	5.6	7.8	2.2	0.0	3.9	2.0