

Mitanin Initiative and Nutrition Security Innovation (NSI) Chhattisgarh State, India – An Evaluation*



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Evaluation Supported by Center for Child Health and Nutrition, ICICI Foundation for Inclusive Growth, Mumbai and the State Health Resource Centre, Chhattisgarh *

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* (Evaluation Survey, Data Collection and Statistical Analysis undertaken by Sambodhi Research and Communication Pvt Ltd New Delhi, India)

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1. Background---The Mitanin Initiative of Chhattisgarh State

Chhattisgarh state with 18 districts and 146 community development blocks has a population of 20.8 million. It is estimated that 44 % population of the state comprises children below 18 years of age. The state has primitive tribal communities inhabiting the districts of Dantewada, Bastar, Kawardha, Korba and Surguja. As per the Census 2011, the total literacy rate is 71.04% with female literacy rate of 60.59%.

In early 2001, a state-wide Mitanin (*a local term meaning close female friend*) or community health worker (CHW) initiative was announced by the State Government. In November 2001, the innovative design of the Mitanin Initiative was launched by the State Health Resource Centre (SHRC), Directorate of Health, State Government of Chhattisgarh in selected 14 blocks of the state. In January 2003, following two years of pilot testing, the programme was expanded to 80 blocks and by Jan 2004, the entire state of Chhattisgarh was covered under the innovative Mitanin Initiative..

The key strategy of the Mitanin Initiative is regular family level counselling by Mitanins along with emphasis on strengthening and improving the accountability of public health system and focusing on women's empowerment for collective action in conducting regular dialogues with panchayat for the following actions:

- Health Education and improved public awareness of health issues
- Improved utilization of existing public health care services
- Initiating collective community level actions for health and related development sectors.
- Provision of immediate relief for common health problems.
- Organising women for health action and building up the process as a process for women's empowerment.
- Sensitizing panchayats and build up of its understanding and capabilities in local health planning and programme implementation.

Mitanins are positioned central to the maternal and child health programme for playing a primary role for promoting preventive and promotive health care and with curative care issues remaining supplementary activities. The primary task of Mitanin is to undertake interpersonal communication, with focus on visiting all families of children below three years as well as offering timely consultations by reaching out to families on the day of child birth or on the first day of an episode of diarrhoea, fever or Acute respiratory Infestations (ARIs) with or without drug treatment.

For implementing the above strategy, the operational objectives the Mitanin Initiative are as follows:

- Facilitate a community led selection of community volunteers, the Mitanins (meaning close female friends), and train and deploy these women as health activists in every habitation of the state.
- Ensure effectiveness of Mitanin by ensuring support of women health committees, village health committees, panchayat members as well as of the government employees
- Ensure effectiveness of Mitanin Programme by providing at least 20 days camp based training and 30 days of on the job training.

- Ensure adequate supply of basic drugs required for the first contact care by Mitanins.

Mitanins are married women from community who are often semi-literate or non-literate. The selection of Mitanins is undertaken through an intensive community based process. Mitanins are accountable to the community. Mitanins are volunteers who are not paid salaries but are compensated for the loss livelihood for their part of work. Social mobilisation activities such as *kalajathas* (street plays performed by local folk theatre groups) on themes related to women’s health issues to engage community in the process of selection of Mitanins and disseminate information on women’s health are conducted. Such activities are also organised to help to catalyse the formation of women’s health groups and in mobilizing long term community support to Mitanins.

For effective work with the community, the training of Mitanins focuses on influencing her interests, improving technical knowledge, enhancing communication skills, community organization skills, building confidence and credibility. Instead of one time pre-service training, eight rounds of residential training and twice a month in-service training are organised to reinforce the appropriate learning.

The State Health Society is in-charge of the state level health programme, including Mitanin initiative. The secretary of the Society is the Director of Health services. For assisting the Society, a State Health Resource Centre (SHRC) has been created. SHRC is a supportive structure for the health system, including the evaluation survey Programme. SHRC is in-charge of programme design, development of training materials, state level monitoring and evaluation. The Mitanin initiative, linked to health system, is under the administrative control of the State Coordinator at the SHRC who works with the following persons in a district (Figure II) --- (i) Mitanins at hamlet and village levels (1 per hamlet), (ii) Women’s Health Committee and Prashikshak (a trainer per 20 Mitanins) iii), Field coordinators at the district level (total 25 for the state). There are 2-3 block resource persons for further support.

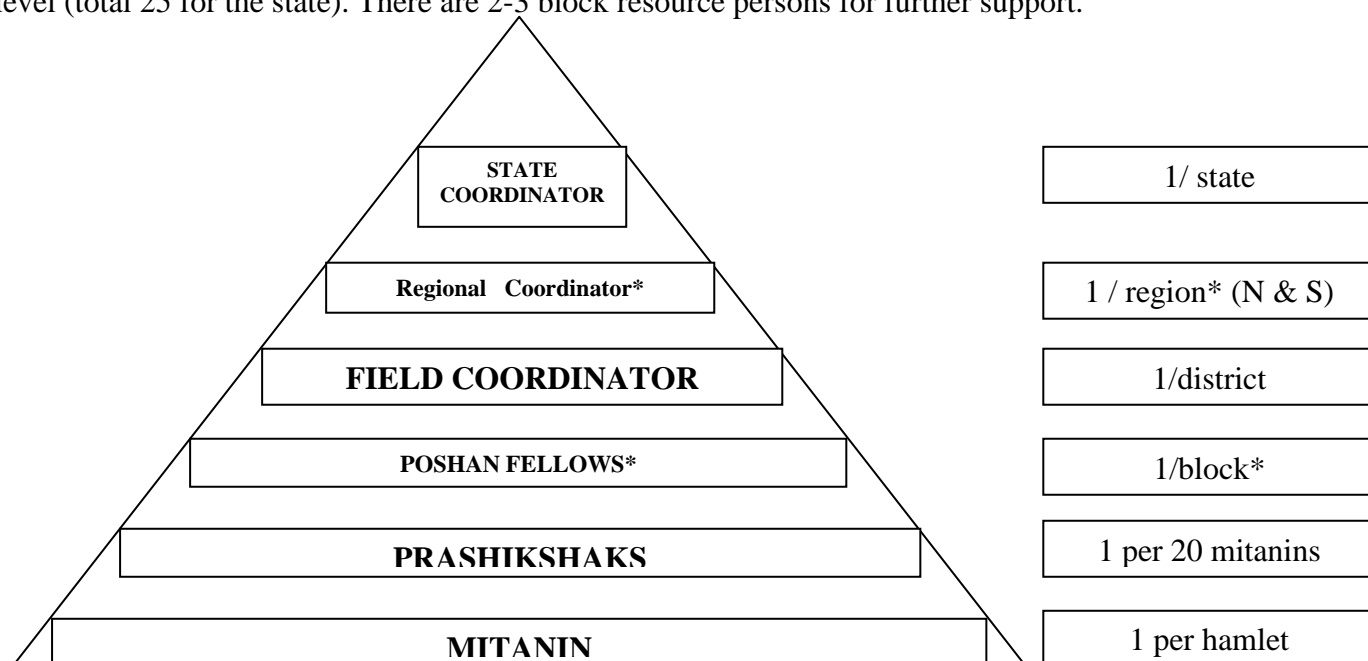


Figure I: Structure of Human Resource for Mitanin Initiative. Poshan Fellows and regional coordinators* only for the add on ICICI supported Nutrition Security Projects

Following 18 months of implementation, in June-August 2004, an internal evaluation was conducted by SHRC to assess achievements of the Mitadin Initiative. The evaluation focused on operational outcomes such as processes of selection of Mitadins, establishment of supportive structure, training support, collective action by women's group and sensitization by panchayat and impact of these actions on increased health knowledge and use of services by community. The evaluation sample comprised 25 blocks and 1219 Mitadins. The evaluation revealed 60 percent Mitadins were good performers and a third of the evaluated blocks were managing the programme well in terms of functioning of Mitadins, the support structure as well as selection, knowledge of health care and access to health care by communities. The reach of Mitadins was considered good since out of the 1516 births recorded in the preceding 3 months of the evaluation, Mitadins had contacted the homes of 68.8 % of the registered newborns.

Following this evaluation, SHRC concentrated on intervention actions such as capacity building of health system to respond to demands created in the community. These included innovative training for various groups, emergency obstetric and gynecological care, use of essential drugs and formulation and implementation of standardized guidelines with recommended norms of service delivery in each health facility level. SHRC strengthened the public health system by creating EQUIP (Enhancing Quality of Primary Health Care) Programme--initially in 32 blocks with a plan to scale up to all 146 blocks of the State. The training comprised the following subjects and the subject of maternal-child nutrition was introduced.

- Child health --- Improving child health services of health and ICDS departments and coordinating for linking services. Identify children needing special care by weight for age assessment and counsel mothers of infants on prevention of infection and optimizing feeding practices, conducting home visits.
- Women's health----understanding causes and determinants of women's health and counseling adolescent girls, ensure pregnancy care is accessible, identify common women's problems and providing relief.
- Organise community initiatives for control of communicable diseases in coordination with health departments.
- Maintain and use a simple medical kit for care of minor illness and first aid.
- Maintenance of women, health committee registers.

On 12th April 2005, with the launch of the National Rural Health Mission (NRHM) 2005-2012, the Mitadins became an integral part of the NRHM when the concept of community based change agents, the Accredited Social Health Activists (ASHAs), at every 1000 population for creating awareness on health and its social determinants and mobilizing community towards utilization of local health services was introduced. However, in the state of Chhattisgarh, the Mitadin nomenclature instead of ASHA continued with the state policy for coverage of population in village and hamlets. By 2006, the total number of Mitadins was about 60,000 covering all the villages/hamlets in the state. Additionally, there were 3000 Prashikshaks, 438 block coordinators and 25 field coordinators appointed as a part of Mitadin initiative.

2. Nutrition Security Innovations (NSI) –An Add on Initiative linked to Mitadin --- Centre For Child Health and Nutrition , ICICI Foundation for Inclusive Growth,

The National Family Health Survey (NFHS) of 2005-2006 of Chhattisgarh state revealed a grim nutrition scenario in women and children of the state. Every second child under three was reported to be underweight and stunted. An annual reduction of less than one percent point absolute decrease was observed since the earlier NFHS survey of 1998-99.

In 2006, the Nutrition Security Innovations (NSI) was initiated as a partnership between the State Health Resource Centre (SHRC) Chhattisgarh and the Centre for Child Health and Nutrition (CCHN) Centre of ICICI. The project aimed to accelerate the impact of reducing undernutrition in children with the goal of improving nutritional status of children in the 0 to 36 months as well as explore the future trajectories of a mature community health worker programme at scale. The Nutrition Security Innovations (NSI) was implemented in selected 23 blocks across 11 districts (*Koriya, Sarguja, Jaspur, Raigarh, Janjgir, Bilaspur, Raipur, Durg, Kanker, Dantewada and Bastar*) of Chhattisgarh (Figure I). The 23 project blocks were selected on the basis of internal evaluation undertaken by SHRC.

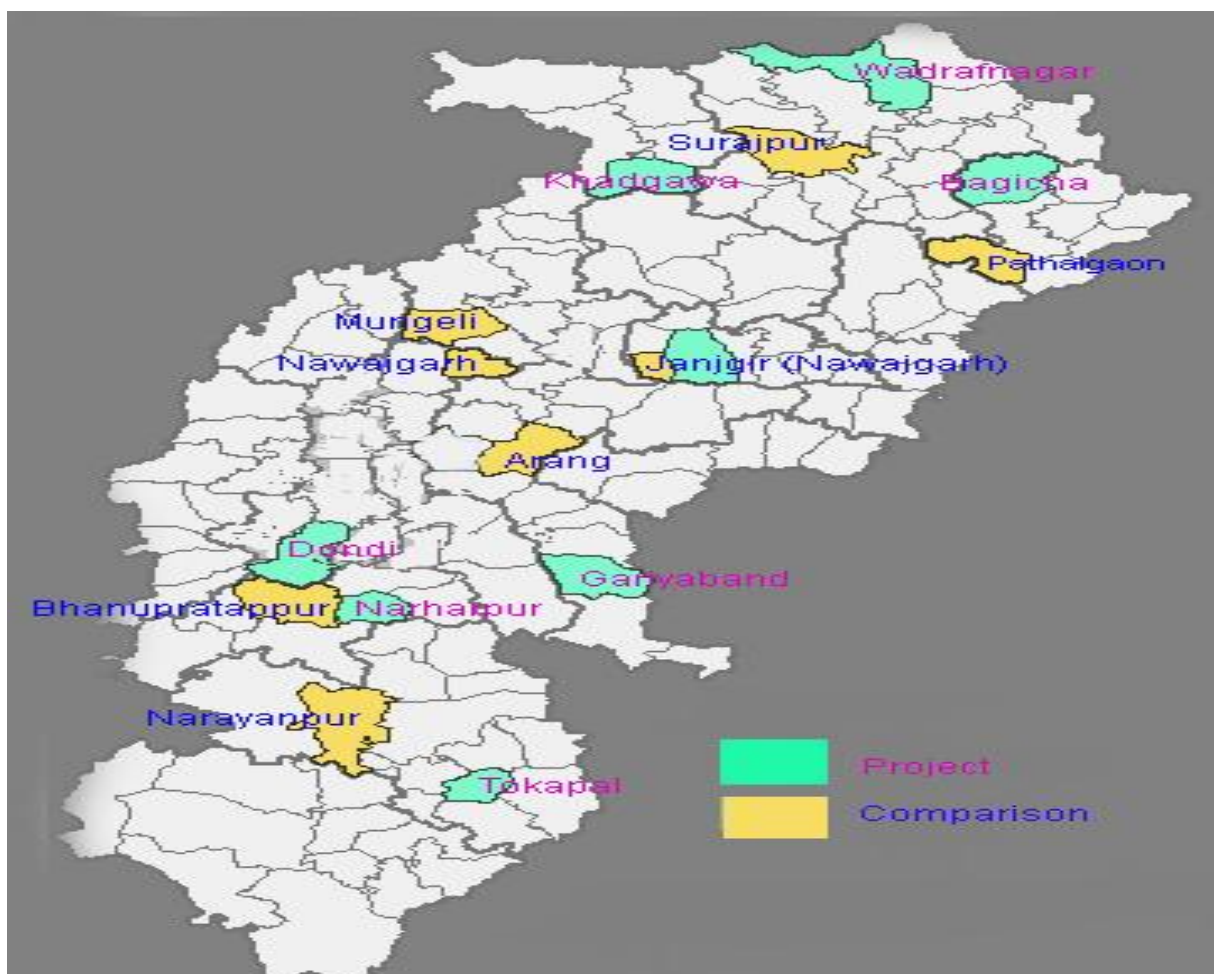


Figure II: Schematic Representation of the Block in the District

The primary hypothesis of the NSI project strategy was “intensive behaviour change communication by community health worker, combined with community based collective

NFHS-3 [2005-2006]. National Family Health Survey. Volume I. IIPS, Mumbai, India: 2007.

NFHS-2 [1998-99]. National Family Health Survey. Volume I. IIPS, Mumbai, India: 1999.

action will lead to an increase in awareness and knowledge about nutrition, improve nutrition related behaviours and practices, improve access to and functioning of food and nutrition schemes and therefore result in better nutritional status of children in the 6-36 months age group.” The project package therefore proposed including awareness building and behaviour change communication to alter dietary knowledge and practices as well as influencing attitudes of the community for demanding services under various schemes and participating in monitoring of services and actions aimed towards improving maternal and child nutrition outcomes.

The primary outcome indicator of the project was to reduce the percentage of undernourished children 6-36 months age group. The secondary outcome indicators included the following:

- Increase in level of knowledge and awareness about nutrition, with a focus on young child nutrition and complementary feeding
- Ensure positive changes in child feeding practices, with a focus on complementary feeding.
- Improve access to households to the entitlement from state food schemes—the public distribution system (PDS), the mid-day Meal (MDM) and the Integrated Child Development Services (ICDS).

The project package of NSI comprised intensive behaviour change communication by Mitanins (community health workers) for promoting appropriate infant and young child feeding. NSI inputs not only focused on promoting early initiation of breastfeeding, exclusive breastfeeding upto 6 months but also appropriate complementary feeding, identification of undernourished children through regular growth monitoring and counseling for care of the identified undernourished children. Additionally, NSI project also stressed on counseling on the importance of maternal nutrition and discouraging harmful practices related to food during pregnancy, distribution and use of IFA tablets , encouraging adequate weight gain during pregnancy and discouraging inequitable intra-household food distribution for preventing poor allocation of food to women and children. The adoption of correct maternal-child feeding practices was encouraged. These NSI projects were built on the ongoing NRHM programme and the Mitanin initiative of promoting health seeking behaviors such as immunization, antenatal care (ANC) services and post natal care (PNC) services.

In addition to the above, the NSI focused on alleviation of nutritional insecurity measures ranging from building awareness about nutritionally rich foods, kitchen gardens with nutritious food for household consumption, discouraging incorrect beliefs in food practices as well as improving access to and functioning of food and nutrition schemes. The latter included access of the households to the entitlements from food schemes---the Public Distribution system, the Mid Day Meal scheme and the Integrated Child Development Scheme (ICDS).

For effective implementation of the NSI initiative, the NSI project supported a new cadre of add on personnel staff---Block level Poshan Fellows and two regional coordinators (north and south) (Figure II) across the state. Training was decentralized with addition of trained personnel attached to the health department. The coordinators were trained to provide guidance and supervision to Poshan Fellows.

The Poshan Fellows were selected at block level (one per block). Their role was defined and aimed to provide leadership in actions related to food and nutrition security and social

inclusion. The Poshan Fellows selected often had a background of RTFC (Right to Food Campaign) and in fact 13 of the 23 blocks the NSI project and the RTFC overlapped. This block level Poshan Fellows were specially trained to address issues of RTFC and were also trainers of the team of Mitans and Prashikshaks on subjects pertaining to food and nutrition security. These add on block staff, along with network of Mitans and Prashikshaks, were expected to undertake the following tasks a) concentrate and intensify support in awareness building and behaviour change communication activities focused on child and maternal feeding and nutrition and b) implement community awareness on entitlement of government food schemes and equip community to monitor these schemes with a view to alleviate nutrition insecurity. The activities pertaining to nutrition security were added on as functions of Mitans and Prashikshak and specifically concentrated on building awareness about entitlements of schemes such as PDS, ICDS and MDMs as well as generating awareness about nutritionally rich foods, kitchen gardens with nutritious vegetables for household consumption, including incorrect superstitions about foods and eating practices.

Community mobilisation actions were planned and executed to improve community monitoring and action regarding information on the intended beneficiaries and entitlements of the food schemes such as under PDS, MDMs and ICDS. The community mobilisation actions were held at hamlet, village and cluster levels. At hamlet level, active women from community supported the Mitans (also referred as Mitan Sahyogies) to support Mitans in this task. At village level, prashikshaks facilitated the tasks of Mitans, community groups and Mitan Sahyogies. At cluster level, focus was on dynamic problem solving actions for attaining nutrition security and members of 4-5 panchayat and community groups were encouraged to be present in cluster level problem sharing. At the cluster level, focus was on formulation of collective actions to monitor regular supply and distribution of food schemes and addressing constraints that promoted unacceptable practices pertaining to unequal household allocation or discrimination against vulnerable groups on the basis of class, caste or tribe in accessing food schemes or as a result of undesirable community behaviours.

Since 2009, many of the NSI interventions operating in only 23 blocks since 2006 were taken to scale in the entire state. As a result of this, the behavioural change communication component of the NSI was intensified in the entire state with a renewed focus on training and implementations of actions by Mitans to promote infant and young child feeding practices and in establishing the model of community participation for strengthening of the public distribution system (PDS). The NSI project support of CCHN of ICICI was discontinued in late 2011. However, Mitan initiative of the state continues to be in operation in the entire state as a part of the NRHM programme with the incorporation of positive lessons emerging from the NSI project.

An end line evaluation of NSI was executed in October-December 2011.

3. The Evaluation of NSI

3.1 Background & Objectives of the Survey

The evaluation involves the following two components:

- a) Measure program implementation and utilization patterns in the NSI project areas and comparable comparison areas.

- b) Examine the role of the Mitanins on use of health, nutrition and food schemes.

3.2 Evaluation Design

The evaluation design and the evaluation survey, tabulation of data and the statistical analysis of data was undertaken by Sambodhi Research and Communication Pvt Ltd, New Delhi. In consonance with the evaluation objective, the proposed study employed a quasi experimental mixed method design for the impact evaluation. Study selected both NSI project sample (referred as Project) and comparison sample (referred as Comparison) as part of the evaluation design and used the Propensity Score Matching Method for assessing impact of project.

3.2.1 Sampling Design & Methodology

The key objective of the study was to measure and compare changes in key project indicators i.e. change in nutrition status. To measure changes, which could have occurred due to project projects, sample size was ensured to be statistically adequate.

The sample size decision for detecting changes depends on the power i.e. efficiency to detect and measure change, besides depending on level of statistical significance. The sample size required to assess change depends on:

- a) Initial value of variable of interest
- b) Expected change programme was designed to make, which needs to be detected – robust enough to even detect a change of 5% at the project level.
- c) Appropriate significance level i.e. assigning probability to conclude that an observed change is a reflection of effort and did not occur by chance i.e. at 95% level
- d) Appropriate power i.e. the probability to conclude study has been able to detect a specified change i.e. at 80 % power.

Based on the above considerations the required sample size (n) for a variable of interest as a proportion for a given group was estimated as follows.

$$n = \frac{D [Z_{1-\alpha} \sqrt{2P(1-P)} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)}]^2}{(P_2 - P_1)^2}$$

Where:

D=Design effect¹; (Assuming a design effect of 1.3)

P₁=the estimated proportion at the time of the first survey;

P₂=the proportion expected at the time of survey

Z_{1-α}=the z-score corresponding to a significance level

Z_{1-β}=the z-score corresponding to the power

As one of the key objectives of the project is to reduce malnutrition, the study computed the sample size which would be sufficient to detect at least a change of 5% from the NFHS malnutrition value of 47.4% for children less than three years of age. The sample size to

detect such desired change at 95% level of confidence and at 80% power was estimated to be around 1830, after accounting for even a design effect of 1.3 at the project and comparison sample level. In the absence of baseline, the evaluation design compared the NSI project block with the non-NSI project. Further, in the absence of any robust baseline, the study proposed to employ a Propensity Score Matching method., hence the evaluation study design sampled around 1800 respondents i.e. children under the age of 3 years across both project and comparison areas.

Another key objective of the study was to assess the change in nutritional indicators across age group; hence, the computed sample size was further distributed across three broad age of category of children ---less than six month, children from 6-23 months age group and children from 24-35 months age group. The section below provides a detailed description of the sample size , selection procedure and sample distribution.

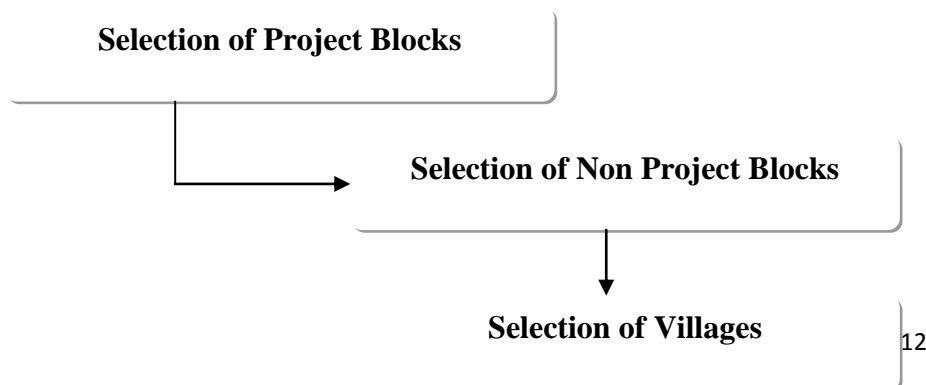
3.3 Sample Selection and Distribution

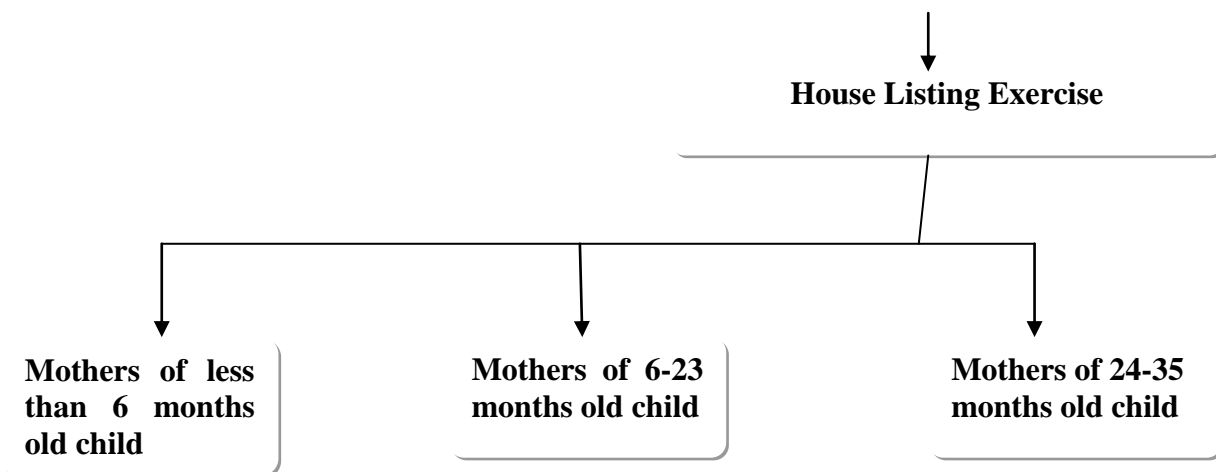
The Nutrition Security Innovations was implemented in 23 blocks across 11 districts of Chhattisgarh. However, for the purpose of evaluation, it was proposed to exclude two districts, Dantewada and Bijapur, for data collection since these districts are prone to disturbances. The project evaluation was therefore undertaken across the following 9 districts of Chhattisgarh state (Table 1 and Fig I).

Table I : Districts and Blocks –Comparison and Project Blocks Covered in the Evaluation Study Selection of Project Blocks

Districts	Comparison	Project
Bastar	Narayanpur	Tokapal
Bilaspur	Mungeli	
Durg	Nawagarh	Dondi
Janjgir	Janjgir (Nawagarh)	Pamgarh
Jashpur	Pathalgaon	Bagicha
Kanker	Bhanupratappur	Narharpur
Koriya		Khadgawa
Raipur	Arang	Gariyaband
Sarguja	Surajpur	Wadrafnagar

Schematic Representation





Step -1: Selection of Project Blocks-

At the first stage, the study selected eight blocks from the list of NSI project districts randomly for the project sample.

Step- 2: Selection of Non- Project Blocks- In congruence with the NSI project block sample drawn , the study sampled eight non-NSI project blocks using apriori matching based on indicators such as SC, ST population and distance from District HQ.

Employing Apriori Matching at Block Level The study employed the Propensity Score Matching (PSM) method for the impact evaluation. Propensity score matching used the socio-economic determinates at household level across project and comparison area to match households. In terms of setting the base for the PSM, a-priori matching was used at the block level.

In terms of block selection, census provides information at the *tehsil* level (in case of Chhattisgarh) and one *tehsil* had one block or more than one block. Hence in terms of sampling the *tehsil* demographic was taken as the surrogate demographic for the block. Further, an attempt was made to collect block level information from the district authorities for the project blocks and comparison blocks wherever available. The three indicators ST, SC population and distance were used in aggregate to select the non project blocks in the nine NSI districts .Hence the combined population of SC and ST across project and comparison block are within the range of +/- 6 percentages.

Step 3: Selection of Villages: To cover the expected sample of 4000 respondents, 20 villages per block were selected using Probability Proportional to the Size of the Population (PPS) on the basis of the Census 2001data. Thus across the blocks, a total of 360 villages were selected. The list of PSUs was shared by the SHRC Chhattisgarh.

3.3.1 Sample Selection Process at Village Level

House-Listing Exercise

House listing in each of the selected village/PSUs was carried out and this was the sampling frame for selecting the respondents for interview.

The house listing exercise included preparation of a working map of the sample depicting all the structures and listing information on desired variables (households with children in the age group of 0-36 months) to serve as a sampling frame. Specific format was developed and right hand thumb rule was followed for listing the households. A sample of 12 respondents (mothers/caregivers of children) were selected per village (4 for each of the three identified category of the respondents) to reach the desired sample size. Thorough training was provided for the listing exercise.

Target Respondents: Target respondents were divided into 2 categories

1. Households with children in the age group of 0-35 months and
 2. Mother of 0-5 months old child
 3. Mother of 6-23 month old child
 4. Mother of 24-35 month old child
2. Service providers
 - a. AWW
 - b. Mitanin
 - c. ANM
 - d. Poshan Fellows

Survey schedules was developed and field tested for mothers of children less than 3 years and the four categories of service providers.

3.4 Service Provider Survey

Besides, assessment at household level, study also used the facilities survey questionnaire was administered to service providers' viz. AWWs, ANMs, Mitanin, and Poshan Fellows. Structured interviews were also conducted with frontline workers and project staff such as Mitanins, ANM and AWW and Poshan (nutrition) fellows. Table 2 presents details of the frontline workers covered under the survey.

Table 2: Service Providers surveyed in the Project and Comparison Blocks

	AWW	Mitanin	ANM	Poshan Fellow
Project	159	149	25	9
Comparison	164	157	26	0*

**The Poshan Fellows were interviewed only in the NSI Project blocks.*

3.5 Training

Training for listing and mapping team

Two day training regarding listing and mapping included practical experience of listing and mapping in field where they are required to work.

Training for survey team

Training for survey team to deliberate investigators, supervisors and field executive on survey objective, survey tools, sampling design and on expected data quality was scheduled for six days.

First day -schedule for training of trainers, wherein professional from Technical Assistance agency were involved in the training survey team professionals, field executives and supervisors on technical aspect of programme and survey (anthropometric data collection).

Next two days training focus was to train investigators on eligible women questionnaire through lectures, mock and demonstration interviews. Hands on training were imparted to the participants to familiarize them with the women questionnaire. Field practice session was scheduled on the fourth day of training programme, which was done among selected non-sampled sites at the district level. Debriefing to assess whether interviewer has understood the question correctly was scheduled to be on fifth day. On sixth day all the supervisors and the interviewers were involved in provider survey and trained. It is important to point that sampling was finalized during the briefing session, based on the House listing exercise. Thus in all probability, house listing exercise was completed before training session ends.

3.6 Quality assurance: Data collection & Processing

Throughout the fieldwork, field staffs along with professional were responsible for observing interviews and carrying out field editing. The interviewers were observed frequently at the beginning of the survey and again toward the end. Further to maintain the quality of data, supervisors checked the performance of interviewers thoroughly at these times.

The scrutiny of all the questionnaires were carried out at all the 3 levels. At least 50% schedules were scrutinized by the Field manager and Supervisor level and the professionals scrutinized the schedules, fieldwork and data collection at a random level.

Spot check and observation

- Some of the interviews were observed, to ensure that investigator is conducting well, asking the questions in the right manner, and interpreting the answers correctly
- Some of the addresses were spot checked that were selected for interviewing to be sure that investigator is interviewing the right household
- Each questionnaire was reviewed to be sure it was complete and internally consistent
- Help was provided in case the investigator had any problems with finding assigned with the households, understanding the concepts in the questionnaire or with difficult respondents

Back check

Field executive/Manager ensured that for all area/calls wherein completion rate was found to be low or any problem, 10% back checks were done by the supervisor of the other team.

Re-interviews

A powerful tool in checking the quality of the data is to systematically check the information for particular households. This was done by conducting a short re-interview in some households and checking the results with what was collected by the investigator. Re-interviews help reduce the types of problems that affect the accuracy of the survey data.

Minimizing non-response

One of the most serious problems in a sample survey of this type is non-response, that is, failure to obtain information for selected households or failure to interview eligible women. At least three visits were made to contact the household members.

3.7 Ethical considerations

In line with the standard protocol followed, the study ensured to follow three basic tenets of ethical considerations listed below.

i) Consent

As per our standard protocol, before beginning an interview, permission was obtained from the respondent for ethical, political and logistical reasons. Every respondent had the right to refuse the interview, or to refuse to answer specific survey questions.

The investigators too were trained to be sensitive to the respondents. A verbal consent was sought from the respondents before starting the interview.

ii) Privacy

All the interviews with each respondent were conducted in a manner that was comfortable for her or him, and in which he was able to speak openly and honestly.

iii) Confidentiality

The interviewers did not discuss the respondents' answers with anyone, except the supervisor when clarification was needed. Respondents' names or other identifying information did not appear on the questionnaire; there was no way to link a specific questionnaire to a specific respondent.

3.8 Data Processing and Management

Editing, Scrutiny and Coding

A strong editing, scrutiny and coding mechanism was put in place to ensure a strong data processing mechanism i.e. after field editing questionnaires were returned to the main survey office for data processing. The processing operation consisted of office editing, coding of others category –open ended questions, data entry, and editing inconsistencies found by the computer programs. While scrutiny, attempts were made to scrutinize schedule in a manner that made it easy to be entered as per the data entry programme. In case of pre-coded response choices, there was a need to list and develop a coding frame for the various 'other' response choices that were offered to respondents whose replies did not fit the codes given. Responses in 'others' category was listed by the investigator after the data had been collected, and then grouped by theme for the development of an appropriate coding frame.


Data Entry and Validation

The data entry and validation work of the Survey was handled in-house by using CSPro software. Once the data was stored in computer readable form, the next task was to eliminate the more obvious errors that would have occurred during the data collection, coding and input stages. An edit program was specified. This provided a look at missing values, skips, range checks and checks for inconsistency. An edit programme was applied with a set of instructions for the computer package used for automatically examining and drawing attention to, any record that appeared to have an error in it.

3.9 Anthropometrics Approach to Study Nutrition

Anthropometric indicators were used to draw nutritional assessments using WHO-ANTHRO software. In order to have robust data, standard anthropometric instruments were used for data collection as presented below:

Anthropometric Instruments Used

Pedestal Weighing Machine	 <p>For mother's weight</p>
Salter's Scale	 <p>For infant weight</p> 
Anthropometric rod / Heightometer	For mother's height
Infantometer	 <p>For infant height</p>

3.10 Data Analytics

The core team members along with the ICICI Foundation team finalized the analysis/ tabulation plan. The required tables were then generated and shared for subsequent rounds of discussion and deliberation. The tabulation plan and analytic plan comprised of Basic analysis and tabulation, Anthropometry analysis and advanced analysis using PSM to assess the attribution of key strategies on all key outcome and impact indicators.

3.10.1 Basic Analysis

- Simple percentage of all variables of interest i.e. proportion of women who received three ANC checkup, 2 Doses of TT etc.
- Parametric test of association to ascertain the statistical significance of existing associations between variables of interest i.e. test of difference between comparison and project area
- Percentage and descriptive statistics for tables of interest such as:
 - ◇ During pregnancy
 - ◇ During delivery

- ◇ After delivery: mother
- ◇ Immediately after delivery: newborn
- ◇ First month of life: newborn
- ◇ 1-12 month of life: Infant
- ◇ Maternal and Reproductive Health
- ◇ Outcome indicators

It is important to point herein that in case of all indicators related to breastfeeding, birth weight and early newborn care , specific questions were asked and analysed for mothers of children less than six months i.e. 0-5 months age group.

3.10.2 Anthropometrics Analytics

Undernutrition (underweight or weight for age (WAZ), height for age or stunting (HAZ) and weight for height or wasting or WHZ) was computed by comparing the weights and heights of children in different age category with the distribution of observed weights/height in a reference population of presumed healthy children using WHO's new standard² i.e. the difference between a child's weight/height and the median value at that age and sex in the reference population, divided by the standard deviation (SD) of the reference population.

3.10.3 Software for anthropometric analysis

Anthropometric software uses raw measurement data to calculate anthropometric indices using reference data, though their analysis function and power is not limited to anthropometric analysis only. For the present study, WHO-ANTHRO software package for anthropometric analysis was used.

Using Filters for computing Malnutrition

While analyzing the nutrition, WHO ANTHRO software was used. The software while analyzing the malnutrition trims down few outlier cases for each indicator i.e. underweight, stunted and wasted. Using the same filters i.e. for underweight wherein WAZ is less than -6 and is greater than +6 whereas in case of stunted and wasted filter is HAZ less than -6 and HAZ greater than +6, WHZ less than -6 and WHZ greater than +6 respectively. Hence a small deviation in case of N across underweight, stunted and wasted was observed and accordingly analysed.

Food Security Analysis --Methodology

Food security is defined as a state in which “all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life.”

USAID's Food and Nutrition Technical Assistance (FANTA) project has supported a series of research initiatives to explore and test different options for meeting this need.

² The new WHO Child Growth Standards are the result of an intensive study initiated by WHO in 1997 to develop a new international standard for assessing the physical growth, nutritional status and motor development in children from birth to five years of age. As a result, The Multicentre Growth Reference Study (MGRS) has been a community-based, multi country project conducted in Brazil, Ghana, India, Norway, Oman, and the United States (http://www.who.int/childgrowth/1_what.pdf)

Household Food Insecurity Access Scale (HFIAS)³, which is an adaptation of the approach used to estimate the prevalence of food insecurity. The HFIAS is a tool to assess whether households have experienced problems in food access in the preceding 30 days. It measures the severity of food insecurity, as reported by the households themselves. HFIA category variable is calculated for each household by assigning a code for the food insecurity (access) category in which it falls. The frequency-of occurrence is coded as 0 for all cases where the answer to the corresponding occurrence question was “no” (i.e., if Q1=0 then Q1a=0, if Q2=0 then Q2a =0, etc.) prior to assigning the food insecurity (access) category codes. The four food security categories were created sequentially, in the same order, to ensure that households are classified according to their most severe response.

Computing HFIAS Category

The HFIA category *variable* was calculated for each household by assigning a code for the food insecurity (access) category in which it falls. The code for frequency-of-occurrence was given ‘0’ for all cases where the answer to the corresponding occurrence question was ‘no’ (i.e. if Q1=0 then Q1a=0, if Q2=0 then Q2a=0 etc.) prior to assigning the food insecurity (access) category codes. The four food security categories were created sequentially, in the same order (as mentioned below) to ensure that households were classified according to their most severe response. (Source: *Household Food Insecurity Access Scale Indicator Guide, v.3*)

HFIA Category	Calculate the Household Food Insecurity Access category for each household. 1 = Food Secure, 2=Mildly Food Insecure Access, 3=Moderately Food Insecure Access, 4=Severely Food Insecure Access
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Computing Food Security score

The statistical procedure that determines a household’s scale value depended on the number of indications of food security as indicated by affirmative responses to the increasingly severe sequence of questions.

General categories	Labels	Description of conditions in the household
Food security	High food security	No reported indications of food-access problems or limitations
		One or two reported indications—typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake
Food insecurity	Low food security	Reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake

³ (Source: *FOOD AND NUTRITION TECHNICAL ASSISTANCE PROJECT-FANTA Household Food Insecurity Access Scale (HFIAS) for measurement of food access; Version 3; August 2007*)

	Very low food security	Reports of multiple indications of disrupted eating patterns and reduced food intake i.e. Adults ate less, Adults cut the size of meals or skipped meals
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A set of food security questions included in the survey were combined into a single overall measure called food security scale. This was a continuous, linear scale which measured the degree of food insecurity experienced by a household. These scale values varied across a wide range that expresses the range of food security/ insecurity. The unit of measure used for the scale was a matter of convention. To determine the households' scores on the food security scale, the response to each question was coded as '*affirmative*' '*moderate*' or '*negative*'.⁴ For example in case of affirmative questions the responses were scaled in a reverse manner on an index with the lowest response score of:

'0' (Mostly),

'1' (Often/ Sometimes) and

'2' (Rarely/ Never)

In case of negative response a comparable but opposite scoring was followed such as coding:

'2' (Mostly),

'1' (Often/ Sometimes) and

'0' (Rarely/ Never)

These scores were further indexed and divided into three following categories :

- *Very low food security*
- *Low food security and*
- *High food security*

For example, a household with a scale value of 16 has responded affirmatively to more, and typically to more indicators of food security than a household with a scale value of 4. Therefore, the household with the scale value in the range of 12-16 was graded as high food security and the household with the scale value in the range of 4-8 was categorized as very low food security.

3.10.4 Analytics to Estimate Impact: Employing Propensity Score Matching

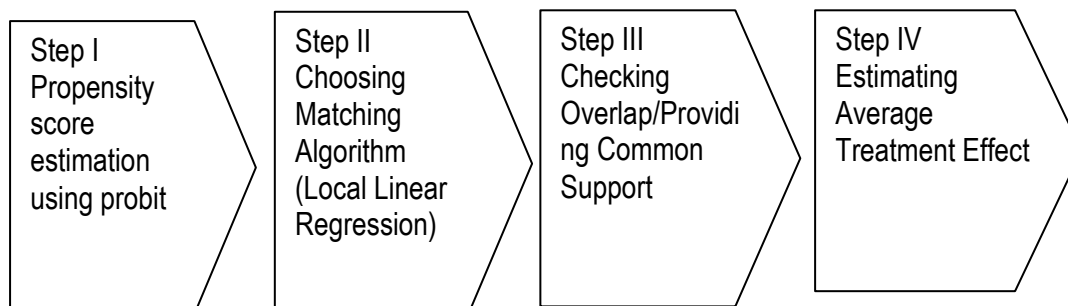
Besides basic analysis plan mentioned above, study computed the significance of all outcome and impact related indicator and also computed the impact using the Propensity Score Matching method.

The apriori matching was used just to set the base of Propensity score matching wherein a set of 32-34 indicators were used to match household to compute average impact across project and comparison area at household level.

In order to attribute change to project, study used propensity score matching (PSM) method of impact estimation using broad steps:

⁴ (Source: *FOOD AND NUTRITION TECHNICAL ASSISTANCE PROJECT-FANTA Household Food Insecurity Access Scale (HFIAS) for measurement of food access; Version 3; August 2007*)

- ✓ Created a dichotomous variable for the two group i.e. project and comparison area.
- ✓ Generating propensity score using probit estimation using pscore module of STATA to give each household a propensity score
- ✓ Balancing the matched set of household to ensure equality of means across block
- ✓ Compute Average treatment effect using Local linear regression matching and ensuring common support.



3.11 Software used

The choice and nature of data analysis was based on several factors such as type of variable, nature of variable and mode of analysis performed. Both the SPSS 17.0 and STATA 10.0 were used for analysis. SPSS 17.0 was used for basic analysis and for generating tabulated reports, descriptive statistics, and complex statistical analyses. Beside SPSS, STATA was used for some advanced analysis such as Propensity Score Matching⁵.

4. [Survey Results and Emerging Findings](#)

(a) Profile of Households and Women (mothers of 0 – 35 months children): A total of 3626 households of children < 3 years from 9 districts were studied – 1825 from CHNC supported Nutrition Security Innovative (NSI) project 8 blocks (referred as project) and 1801 from evaluation survey project 8 blocks with no NSI inputs (referred as comparison blocks). Table 3 presents the profile of households.

Table 3: Profile of Household (HH) studied

	Project (1825)	Comparison (1801)
Caste of head of HH (%)		
General	3.5	7.1
SC	18.0	21.0
ST	51.0	34.3
Others	27.1	32.0
OBC	0.5	0.6
Type of Family		
Nuclear	58.5	52.9
Extended	3.2	4.3
Joint	38.4	42.8

⁵ Besides, SPSS and STATA, EPI Anthro was used for doing the nutritional assessment. As part of nutritional assessment process, EPI anthro uses the filter set by WHO anthro i.e. including only observation WAZ>-6 and WAZ<6 and also excluding few cases wherein age has crossed 35 months because of time lag between listing and Main survey.

Religion		
Hindu	96.6	97.2
Muslim	0.8	0.8
Sikh	1.0	0.8
Christian	1.5	0.7
Others (specify)	0.1	0.6
Education		
No formal schooling but can read and write	5.5	1.9
No formal schooling completed primary schooling	32.5	34.7
completed middle school	29.2	30.0
completed secondary school or and higher education.	24.0	24.2
	8.8	9.8
Ration card holder (%)	42.6	39.9
Marginal farmers (%)	48.6	50.8
Livestock ownership	71.8	63.7
Radio listenership	14.8	20.0
Television viewership	45.0	53.6
Print media	16.3	20.3

Table 4: Age Distribution of the Respondent (%)

Age (Years)	Project	Comparison
16 - 19	2.1	2.1
20 - 24	39.4	41.2
25 - 29	39.8	35.6
30 - 34	13.4	14.6
35 - 39	4.1	4.5
40 - 45	1.2	1.9
Total	1,825	1,801

Table 5: Age distribution of children in the households

Age (range) of the index child (youngest)	Project (N=1825)	Comparison (N=1801)
0-6 months	33.2 (606)	33.3 (600)
> 6 -23 months	36.2 (661)	35.8 (645)
> 23-36 months	30.6 (557)	30.9 (556)

As presented in Table 3 half of the families were marginal farmers and 40-42 percent were ration card holders. The percentage of combined SC and ST respondents were higher in project block – 69% as against 55.3% in comparison blocks. Almost 80% mothers in both the groups were in the age group of under 30 years. Over 40% of these women married below 18 years (Table 6). On intervening mothers of infants 0-6 months, it was observed that the percentage of women giving birth below 18 years was 9.4 percent as against 13.7% in comparison blocks.

Table 6: Profile of mothers with an infant 0-6 months

	Project (605)	Comparison (599)
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Age at marriage		
< 15	1.3	2.8
15 -18 years	37.5	41.6
18-20 years	44.6	44.7
> 20 years	16.5	10.9*
Age at the first child birth		
15-18 years	9.4	13.7*
18-20 years	52.4	53.1
> 20 years	38.2	33.2

* p < 0.05 - significant

(b) Frontline Workers: The findings ,based on mothers' response, revealed that in the last 12 months Mitanins and AWWs were the primary contacts with mothers (Table 7). The visit by Supervisors was significantly higher in the project blocks. In the project blocks, the attitude as well as satisfaction of Mitanins was much more positive.

Table 7: Contacts of women with infants 0-6 months with health – ICDS workers & Mitanins

	Project (605)	Comparison (599)
Visited by a worker in last 1 year	93.2	83.3*
Type of worker who visited	N=564	N=499
ANM	50.4	45.3
Mitanin	89.0	83.2
AWW	85.3	84.2
Prashikshak	1.2	1.2
Supervisor	2.8	0.6*
Attitude very sympathetic	59.8	50.6*
with Mitanin satisfied	89.0	80.1*

* p < 0.05 - significant

Over 85% Mitanins in both the project and comparison blocks had been in position for over a year. Over half of the Mitanins in Project area were from ST class compared to a quarter in comparison blocks. The profile of Mitanins revealed that cent percent Mitanins (N=268) interviewed lived in their own villages and over 70% Mitanins covered a population of less than 500 and on an average were dealing with about five pregnant mothers and over >10->20 children under five years. A higher percentage of Mitanins in project area covered less than a population of 250. The profile of Mitanins revealed that over 50 percent in the project area belonged to the scheduled tribe. Only 15 percent expressed monetary factors or incentives as the primary motivating factors (Table 8).

Table 8: Profile of Mitanin

	Project (N=131)	Comparison (N=137)
Educational qualification		
4 th std pass	69.5	56.9
10-12 th std pass	29.8	40.8
graduate and above	0.8	2.2
Caste / tribe		

general	1.5	10.2
SC	13.7	24.8
ST	55.8	26.3
OBC & Others	29.8	38.7
Period of working as Mitanin		
< 1 year	7.6	14.6
1-4 years	26.7	25.5
> 4-8 years	45.8	47.4
> 8 years	20.0	12.0
Live in same village	100.0	100.0
Work beside Mitanin		
Agriculture	81.7	80.3
Handicrafts	0.8	0.7
NREGA work	6.9	5.8
Construction work	-	0.7
Other	10.7	12.4
Population covered by Mitanin		
< 250	48.9	38.0
250-500	38.2	35.0
> 500	13.0	27.0
Pregnant woman covered in area		
< 5	80.9	60.6
5-10	12.2	26.3
> 10	6.9	13.1
Children < 3 years covered		
< 5	12.2	8.8
5-10	21.4	14.6
> 10-20	34.4	27.0
> 20	32.1	49.6

About 60 percent Mitanins in the two groups were in position for over four years. Mitanins in both project and comparison blocks, perceived their roles as a mobiliser and counselors of health and nutrition issues and as an assistant to government functionaries such as ANM or AWW. A higher percentage of Mitanins in project blocks (71.7%) as compared to the comparison blocks (54.5%) undertook home visits in the 30 days preceding the survey of mothers of infants under 6 months.

As per the interview of mothers, it was observed that over 60 percent Mitanins visited homes of families once a week. Regarding the topics discussed, it was noted that Mitanins in the project area counseled more often on complementary feeding, weight monitoring and gain in weight, care of severely undernourished child, advice on benefits of IFA by pregnant women. Surprisingly, the percentage of Mitanins discussing issues regarding maternal care during lactation as well as on establishment of kitchen gardens remained low in the project group despite NSI emphasis.

Table 8A: Mitanins perceptions of their roles in maternal, child health and nutrition care

	Project % (N=131)	Comparison % (N=137)
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➤ Perceived service delivery role		
As a community Mobiliser for health and nutrition	61.1	60.6
As a functionary of health system	31.3	31.4
As a counselor on nutrition related issues	20.6	16.8
As a counselor on health related issues	24.4	26.3
Curative care givers	29.8	27.0
Assistant to ANM / AWW	61.1	67.9
➤ Common topic advised to mothers / caregivers at home visit		
Immunization	96.9	97.8
Breastfeeding practices	73.3	72.3
Complementary feeding practices	43.5	38.7
Nutritious diet with local food	10.7	8.8
Discuss child's weight	24.4	19.0
Advice to pregnant women about ANC	32.1	31.4
Advice on maternal nutrition issues	19.8	19.7
Advice on IFA benefits	41.2	29.2
➤ Areas where most significant changes made in child health, feeding and maternal care		
Immunization	84.3	85.3
Breastfeeding practices improved	36.1	45.9
Improved complementary feeding practices	18.5	11.9
Care during pregnancy improved	34.3	39.4
Nutrition care during pregnancy	29.6	32.1
Use of THR for women and children is better	19.4	24.8

Over 20 percent Mitanins of both the project and the comparison areas contacted an ANM once a week while almost 100 percent contacted an AWW once a week.

In both the groups, Mitanins perceived themselves playing a significant contributing role for both immunization and child feeding (Table 8A). However, reference to the contribution to complementary feeding and food-nutrition schemes was expressed by a higher percentage of Mitanins in the project area. Mitanins in project areas expressed a poor demand and response to the food-nutrition schemes, including THR of ICDS, compared to comparison blocks. The responses of Mitanins from project blocks on these issues reflects that these Mitanins being specially trained on these subjects under the NSI project, were possibly more aware of such issues and responded with more confidence. The regularity of food supplies of SNP scheme

for 6-36 months was also reported to be better in the project area which further supports the fact that possibly a higher emphasis was placed on creating demands and responding to SNP services in the project areas by Mitanins. However, provision of food supplements to severely undernourished children or pregnant women remained rather low in the project group despite NSI project emphasis.

According to Mitanins, over 80% reported that contacts with supervisors was at least once a month (Table 8B). The findings also revealed that in the project area, a higher percentage of Mitanins reported discussing child feeding practices, IFA consumption, nutrition requirements during pregnancy. Over 80 % of the supervisors in both the project and comparison blocks spent over 30 minutes -3 hours with Mitanins.

Table 8B: Frequency and Time Spent by Supervisors (Prashikshaks) with Mitanins

	Project % (N=131)	Comparison % (N=137)
Frequency of meeting		
Once a week	18.3	11.7
Once per month	72.5	82.5
Once in 2-6 weeks	8.4	5.8
Other	0.8	0.0
Time spent at each visit		
30 min – 1 hr	49.6	40.1
2-3 hours	42.0	51.8
> 3 hrs	0.0	0.7
Cluster meetings held		
Yes	93.1	19.7
Cluster meetings organized		
Once a month	72.1	55.6
Once in 3 months	23.7	37.0
Once in \geq 6 months	4.1	7.4
Frequency of attending cluster meetings		
	N=122	N=27
Once per month	67.2	48.1
Once in 2 months	13.1	14.8
Once in 3 months and above	15.6	37.0
Participants		
	N=122	N=27
Mitanin from all cluster villages	70.5	66.7
ANM	59.5	55.6
AWWs	68.9	77.8

Cluster meetings were organized much more frequently by Mitanins with supervisors and Poshan Fellows—72.1% communicated that cluster meetings were held once a month as compared to 55.6% in comparison blocks. Higher percentage of Mitanins and Prashikshak attended the meeting. The issue of problems faced during delivery was almost double in the project blocks.

Auxiliary Nurse midwife (ANMs)

A total of 51 ANMs were interviewed. 92.9% ANMs stayed in the subcentre (SC) villages as against 78.3% in comparison blocks. Over 90 percent ANMs reported visiting the villages of SC at least once a month.

Coordination with Mitanins and integrated Child Development Services (ICDS) was reported by 100 percent of ANMs. At least 5 Mitanins were attached to two-thirds of ANMs. Most of the Mitanins (78.6 % in the project area and 95.7% in the comparison blocks) viewed Mitanins to be assistants of ANMs. Interestingly, a much higher percentage of ANMs in project areas viewed Mitanins as community mobilisers (64.3%) as compared to only 39.1% in comparison blocks. However, the role of Mitanins in curative services was much lower in project areas (17.9%) against comparison blocks (34.8%). ANMs did not routinely meet Mitanins in project areas (Table 8C).

Table 8C: Responses of AWW and ANM regarding the actions that made a difference

	Project 5 (N=1030)	Comparison % (N=119)
AWWs response		
Mitanin	87.0	84.0
Awareness in community by Mitanin	69.6	67.2
Poshan fellow	15.7	12.5
Training in food and nutrition to Mitanin	24.3	35.3
Others	2.6	3.4
ANM response		
	N=22	N=18
Mitanin	95.5	88.9
Awareness in community	81.8	83.3
Poshan fellow	27.3	5.6
Training in food and nutrition	45.5	44.4
Others	18.2	0.0

Only about a third of ANMs in both project area (26.1%) and comparison blocks (39.3%) expressed satisfaction regarding involvement of Mitanins. This was despite the fact that ANMs recognized the contribution of Mitanins in influencing breastfeeding and complementary feeding practices, antenatal care services, routine immunization, improved Take Home Ration (THR) and increased focus on growth of children.

The role of Mitanins in supporting ANMs in identifying pregnant women was mentioned by over 80% ANMs while the role of AWWs was viewed as much lower. The improved coverage of services and changes noted were attributed to roles of Mitanins and Parishikshaks. Undernutrition management, complementary feeding, vitamin A supplements (VAS) and iron-folic acid (IFA) supplement benefits received much more attention in the project blocks as compared to comparison blocks while counseling on breastfeeding was comparable. Home visits by ANMs increased significantly with inputs of Mitanins and Poshan Fellows.

ANMs in project area paid more attention to management of undernutrition, VAS, IFA benefits and nutrition care during ANC (Table 8D).

Table 8D: Auxiliary Nurse Midwives and Mitanins –Inputs during pregnancy and newborn care

	Project % (N=28)	Comparison % (N=23)
Total number of Mitanins in the operation area of ANM		
Less than 5	7.1	30.4
5-10	42.9	34.8
10 and above	50.0	34.8
Support to ANM in pregnancy identification		
By Mitanins and prashikshaks	78.6	82.6
By AWWs	60.7	30.4
Support to ANMs in tracking newborns		
By mitanins, prashikshaks	64.3	82.6
By AWWs	39.3	30.4
% of ANMs taking follow up actions on ANC (TT, IFA)	60.7	43.5
% ANMs advising newborns on exclusive breastfeeding	96.4	95.7

(c) Counseling and services to mothers by health workers and Mitanins

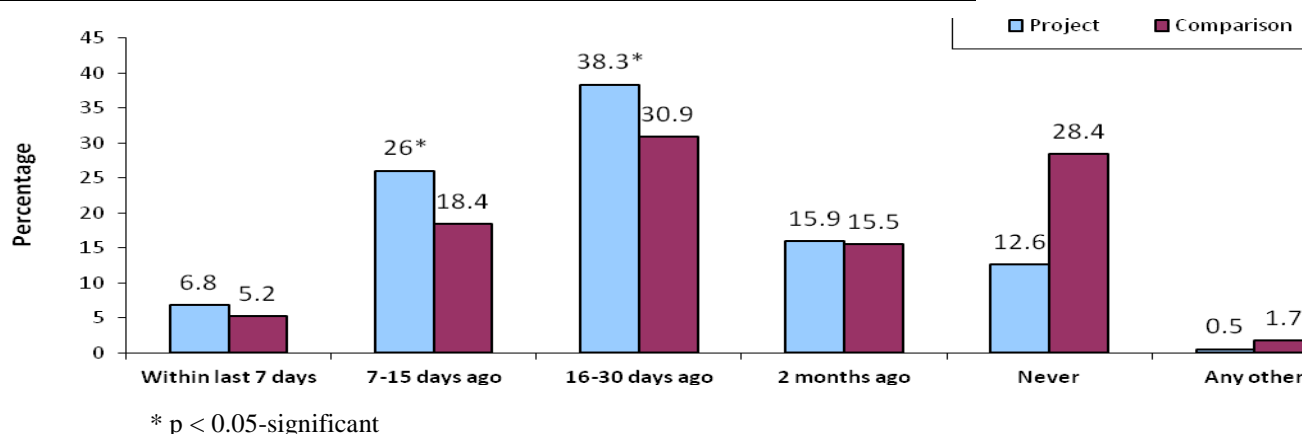
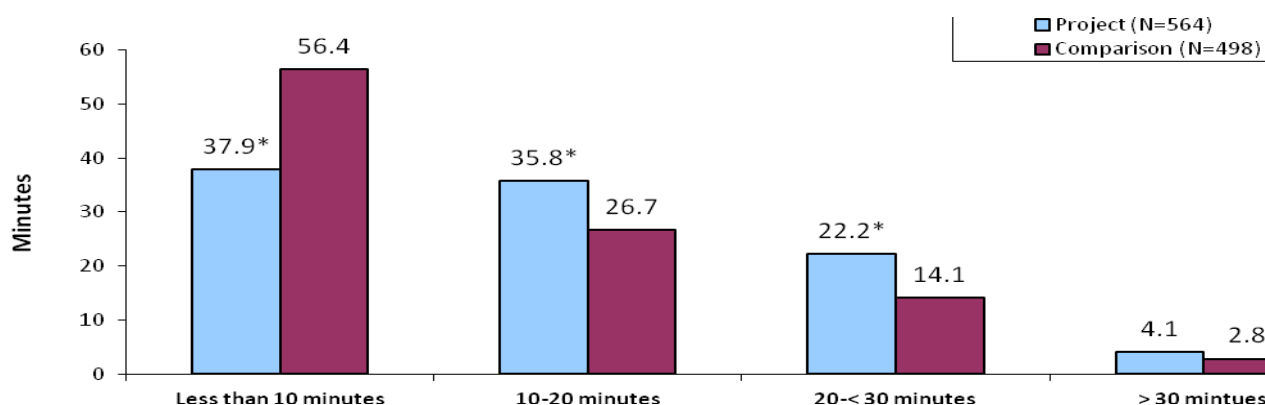


Figure III: Frequency (%) of home visits by Mitanin in the Project (N=605) and Comparison blocks (N=599)

The frequency of contacts of health workers such as AWW or mitanin with mothers, as presented in Table 4, was over 80 percent. The time spent by Mitanin with family at home level was significantly higher (figure IV) and this is also reflected in the higher levels of satisfaction regarding Mitanins expressed by mothers of the project group (Table 7).

Mothers of both the groups – project and comparison – revealed that the child care issues discussed by Mitanin were comparable except for the subject regarding weight of child – 42.9% in project as compared to 32.7% in comparison group (Table 9). Similarly advice on special food to be consumed during pregnancy was significantly different with 3.7 percentage of Mitanin in project group compared to only 0.3 percent in the comparison group discussed this subject. Unlike immunization issues being discussed by both the groups, emphasis on vitamin A supplements was significantly higher in the comparison group.



* p < 0.05-significant

Figure IV: Percentage of Mitanins according to time spent with mothers of 0-6 months at home level in Project (N=564) and comparison blocks (N=498)

Table 9: Issues discussed by Mitanins as reported by % mothers of 0-36 months

Subjects issued discussed by Mitanin	%Project (1825)	%Comparison (1801)
breastfeeding	34.6	31.3
complementary feeding	28.2	27.3
immunisation	68.1	58.8
vitamin A supplement	7.3	11.2*
diet during pregnancy and lactation	13.1	11.8
advised or special food consumption	3.7	0.3*
weight of child	42.9	32.7*
weight gain during pregnancy	12.8	11.0
minimum 2 day hours rest	14.9	16.3
antenatal care	23.4	21.3
institutional delivery	25.5	25.3
handwashing / hygiene	15.4	13.7
safe drinking water	16.0	14.5
oral rehydration	3.0	4.6

* p < 0.05 – significant

(d) Child and Maternal Health Services: The child health and maternal health services reported by mothers of infants 0-6 months was similar (Table 10) except for service provided regarding weight measured during pregnancy (project 80.6% and comparison 73.3%) and counselling regarding IFA supplements (75.5 percent project and 68% for comparison blocks) and day rest during pregnancy. Interestingly, contrary to normal practice of avoiding early registration for ANCs, over 60 percent women with the help of Mitanins sought ANC services in the first trimester itself (Table 10).

The findings regarding the percentage of mothers contacting for the first trimester ANC check ups, women with three ANCs and institutional delivery reported by mothers of infants 0-6 months is presented against the NFHS 3 (2005-6) and CES (Coverage Evaluation Survey,2009) in Figure V. A sharp rise in institutional delivery and ANCs is evident between 2005 and 2009 and this could be due to Mitanins being in position and working with families. The findings regarding three ANC check ups and institutional delivery reported by mothers

of infants 0-6 months was higher in this 2011 survey as compared to that reported by the 2009 CES data. The findings, however, revealed significantly higher institutional delivery in the project group.

Table 10: Antenatal services during pregnancy (% of mothers 0-6 months) and delivery

	Project (N=605)	Comparison (N=599)
Antenatal care services (ANC)	93.7	94.5
Reason for seeking ANC	N=567	N=566
problem	15.5	11.5
routine check	84.5	88.5
Mitanin helped in seeking ANC service	7.9	4.1*
Stage of pregnancy	N=567	N=566
first trimester (0-12 weeks)	69.0	61.5*
2 nd trimester (12-24 weeks)	26.8	31.4
3 rd trimester (> 24 weeks)	4.2	7.1*
Food consumption pattern		
More than usual	16.5	20.9
Less than usual	6.0	7.7
Same as usual	77.5	70.1*
Do not know	0	1.3*
Mitanin accompanying for ANC	13.6	7.2*
ANC cards received		
total number with ANC card	69.4	68.8
3 ANCs as per the card (N=306 for project and 302 for comparison)	72.9	71.9
ANC services	N=571	N=565
weight measured during ANC	80.6	73.3*
Height measured	44.7	37.5*
Blood pressure checked	49.0	51.2*
Blood test	76.2	64.6*
ANC advice received	N=571	N=565
Diet during ANC	84.1	80.5
New born care	41.5	34.2
colostrum feeding	32.2	37.5
early initiation of breastfeeding	32.7	31.5
exclusive breastfeeding	38.4	42.8
importance of weight gain during pregnancy	32.2	35.8
importance of IFA tablet consumption	75.5	68.1*
Rest during pregnancy	36.3	43.7*
Institutional delivery	65.4	49.4*

* p < 0.05 – significant

Only about 40 percent mothers of infants 0-6 months could report on weight gain during pregnancy. During the entire pregnancy, nil mothers reported weight gain of over 9 kg while majority of mothers reported gaining weight of less than 5 kg during the entire pregnancy (Table 11).

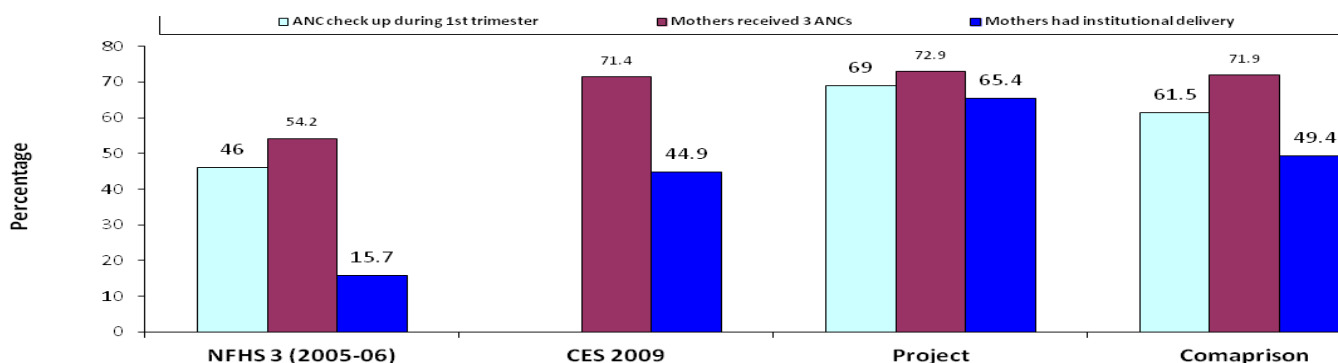


Figure V: Trends in utilization of ANC services by pregnant mothers (%) in Chhattisgarh since 2005-06

Table 11: Weight gain during pregnancy and Birth weight

% of mothers weight gain during pregnancy	Project (N=605)	Comparison (N=599)
< 5 kg	23.0	20.5
> 5 - 8 kg	13.4	16.2
9 kg and above	2.1	4.2*
Do not know	61.5	59.1
% Birth weight reported by mothers of under 6 months		
Birth weight	Project (N=474)	Comparison (N=402)
< 2.5 kg	51.1	43.5
2.5-3 kg	32.9	36.1
> 3 kg	16.0	20.4

* p < 0.05 – significant

Regarding health care practices of children, only 55-56 percent reported receiving measles vaccines while coverage of vitamin A supplement dose was less than 3 percent (Table 12). Interestingly, 93-94 percent children had no diarrhoea in the last 2 weeks. The correct practices of continuing to feed breast milk were followed by 78-79 percent mothers of 0-36 months in both the project and comparison groups. However, the practices of increasing food intake during or after diarrhoea were followed by 4-5 percent of caregivers of 0- 36 months. Similarly, feeding ORS or gruel made from rice was practiced by 35-47 percent caregivers as indicated in table 11. The use of homemade fluids during episode of diarrhoea was much higher in project blocks (42.1 percent) compared to the comparison blocks (27 percent).

Table 12: Child health services – immunisation, vitamin A supplements and diarrhoea management services

Services	%Project (836)	%Comparison (846)
Immunisation 12-23 months %		
BCG – Polio	100.0	100.0
measles	56.0	55.4
mitanin advised on child immunisation	10.8	15.1
vitamin A dose administered ever 6-23 months	28.4 (N=1784)	26.0 (N=1754)
Diarrhoea episode and management in	Project (1825)	Comparison (1801)

children < 36 months		
No diarrhoea in the last 2 weeks (%)	94.6	93.1
Diarrhoea cases	N=95	N=122
breastfeeding continued (%)	77.9	79.5
ORS given %	47.4	45.1
home made fluid (%)	42.1	27.0
gruel made from rice ((%)	35.8	37.7
amount of fluid increased (%)	3.2	7.4
Amount of food intake increased (%)	5.3	4.1
Mitanin advising on diarrhoea management	8.8	17.9

Mothers of infants 0-6 months were also interviewed for signs of vitamin A deficiency such as Nightblindness, clinical signs of anaemia and ANC services. The responses from mothers revealed that 3.0 percent mothers in project blocks and 4.7 percent in comparison blocks reported signs of vitamin A deficiency such as nightblindness while clinical signs of anaemia were reported by less than 20 percent mothers (Table 13).

IFA tablets were received by a higher percentage of mothers in project blocks (91.9 percent) as compared to in comparison blocks (82.8 percent). However, almost half of the women did not receive the prescribed number of 100 tablets (table 13). Less than 10 percent in project blocks complained of nausea / stomach upset – side effects reported were much less in project blocks despite the fact the interaction with mitanin was very similar. Impact of IFA tablets on quality of blood was noted to be the primary reason reported by women for taking IFA tablets. The practice of giving deworming tablets was almost negligible while cent percent women reported for ANC received tetanus injections (Table 13).

Table 13: Nightblindness, anaemia signs, IFA tablets and ANC services Reported by Mothers of under 6 months infants

	% Project (N=605)	%Comparison (N=599)
Nightblindness (vitamin A deficiency)	3.0	4.7
Anaemia signs	18.2	14.0
IFA tablets received	(N= 556)	(N= 496)
<100	46.9	50.0
100-120	51.4	49.2
> 120	1.6	1.0
% supplied IFA	91.9*	82.8*
% information about IFA	(N=556)	(N= 599)
Advice on importance of IFA intake %	75.5	68.1
Number of tablets consumed		
All tablets received	84.9	74.0*
Daily consumed IFA	88.0	82.1*
Mitanin informed mothers about IFA	16.0	16.3
Mitanin advised on daily IFA tablet consumption schedule	13.8	12.8
Mother advised on importance of IFA	75.5	68.1
Reasons for taking IFA		

health	26.4	26.0
quality of blood	67.3	63.5
health of foetus	30.2	34.9
safe delivery	9.5	9.1
others	1.8	2.0
Nausea /stomach upset reported with IFA tablets	8.5	14.4
Lack of enough IFA supplies	0.5	0.8
deworming tablets given	1.2	1.3
TTgiven	94.6	91.3

* p < 0.05 – significant

The consumption of IFA tablets reported in the project and comparison block was almost four fold of the findings reported under CES 2009. (Figure VI)

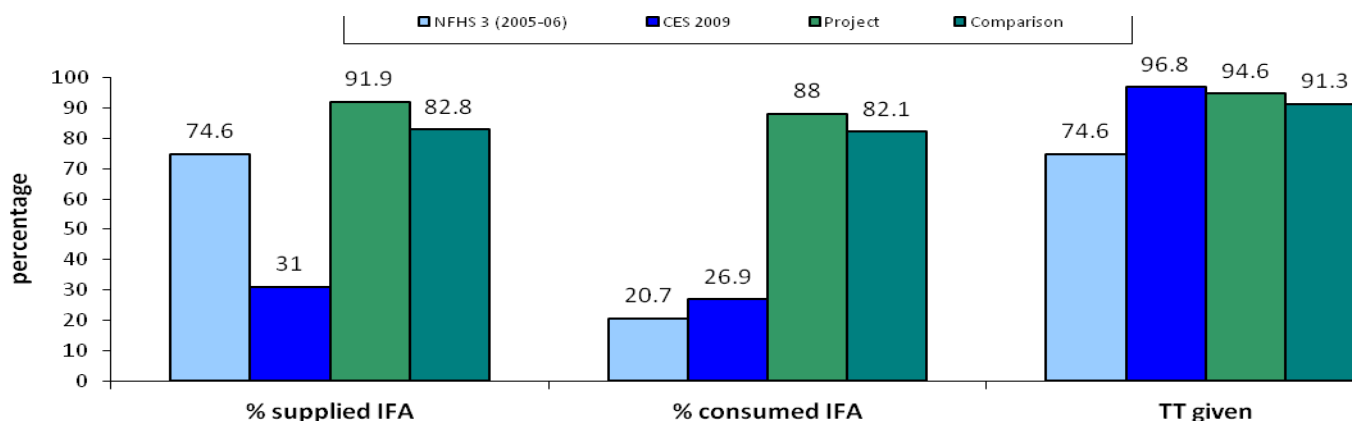


Figure VI: IFA and TT services (%) Reported in the Project and Comparison blocks

The practices of new born care such as weighing soon after birth and not bathing newborn immediately after delivery were much better in the project blocks.

Percentage of women in project (38.8%) and comparison blocks (44.4%) married below 18 years was comparable. Percentage with child birth below 20 years was also very high -- 61.8% in the project group compared to 66.8% in the comparison group.

Most women were reached by Mitanins and AWWs –a much higher in the project (93.2%) as against the comparison blocks (83.3%). Mothers of both the groups expressed satisfaction with the services provided.

UNICEF. Coverage Evaluation Survey [CES], all India report, 2009.

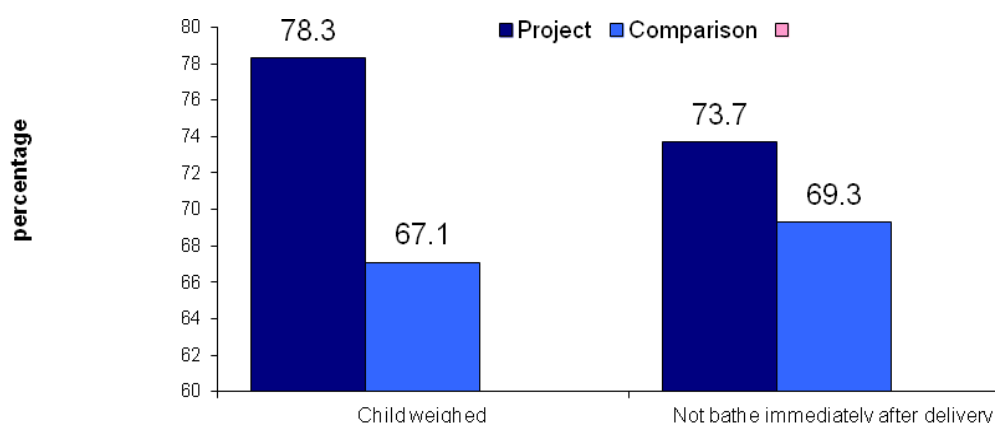


Figure VII: Early Newborn Care (%)

The feeding patterns of mothers revealed that almost 70% consumed GLV at least once a week. Pulses was the major source of proteins but frequency of consumption was much lower than of the desirable frequency of daily consumption---49.5 in the project blocks and 54.8% in comparison areas. Less than 15% avoided any food during pregnancy and these were primarily urad dal (a specific type of pulse) and fruits like guava, papaya and jackfruits.

(e) Infant and Young Child Feeding Practices

Breastfeeding of infant appeared to be almost universal (Table 14). Only 16 mothers (Project 7 and comparison 9) out of 1209 reported not breastfeeding the child. The reason presented was mainly related to child's weakness or ill health or breast / nipple problem. Insufficient milk was also given as a reason for not breastfeeding by 5 of the 16 women who did not breastfeed their infants.

The impact of project by Mitadin on IYCF practices on early initiation of breastfeeding and knowledge of colostrum feeding was significantly higher in project group (Tables 14-17).

Table 14: Infant feeding practices(%)

	Project (N=605)	Comparison (N=599)
Breastfed the youngest child	98.8	98.5
Reasons for not even breastfeeding	N=7	N=9
low birth weight	14.3	0.0
insufficient milk	14.3	33.3
child refused	42.9	-
mother / child ill	42.9	66.6
nipple / breast problem	42.9	0.0

Table 15: Early initiation of breastfeeding practice (%)

Particular	NFHS 3	CES 2009	Project	Comparison
Early initiation of breastfeeding			N=605	N=599
Immediately within half an hour of birth	22.7		22.2	22

Within 1 hr of birth	24.8	44.0	52	44.6*
Combined			74.2	66.6
Within 2 hours of birth			16.1	16.9
More than 2, less than 24 hours	62.9	81.0	2.2	5.3*
More than 24 hours			7.5	10.5*

* p < 0.05 – significant

Table 16: Knowledge of colostrum feeding

Particular	%Project	%Comparison	%CES 2009
Newborn should be given the milk excreted in the first 2-3 days	94.6	91.4	-
Milk was squeezed out from the breast before putting your youngest child to the breast	64.2	58.1	-
Mother feeding colostrum	-	-	88.2

The impact on exclusive breastfeeding was comparable – though marginally higher in the project group (Table 17, The decline in percentage of mothers breastfeeding dropped sharply between 4-5 months (Figure VIII).

Table 17: Exclusive breastfeeding (%)

Age in months	< 2	2-3	4-5	Total
Project	92.0	87.2	80.3	83.9
Total (N)	75	188	335	598
Comparison	91.6	82.1	73.8	79.5
Total (N)	95	201	294	590
Significance	0.921	0.160	0.052	0.046*

* p < 0.05 – significant

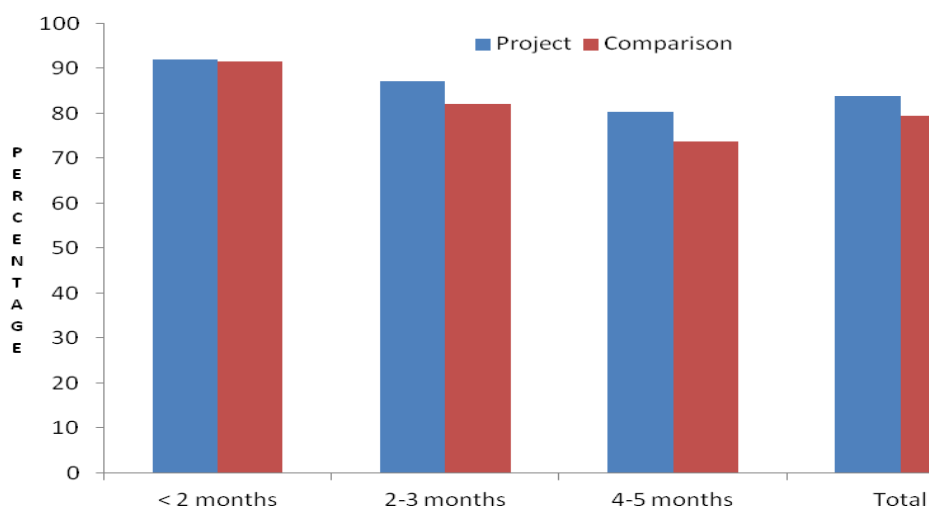


Figure VIII: Exclusive breastfeeding (%)

Exclusive breastfeeding practices were studied with reference to education and caste (Table 18 and Table 19). The percentage of mothers practicing exclusive breastfeeding was

significantly higher in the project group as compared to the comparison group but no statistically significant difference was observed in the context of education level or to the caste that the mothers belonged.

Table 18: Exclusive breastfed (till 6 months) with mother's education(%)

Type	No education	< 5	5-9	10+	Total
Project	82.8	85.2	83.1	85.1	83.9
Total (N)	215	189	147	47	598
Non – project	78.9	85.3	75.9	72.9	79.5
Total (N)	185	184	162	100	590
Total	81.0	85.3	79.3	78.3	81.7
Total (N)	400	373	304	106	1188
Significance	0.325	0.969	0.125	0.104	0.046*

* p < 0.05 – significant

Table 19: Exclusive breastfed (till 6 months) with caste (%)

Type	General	SC	ST	OBC	Total
Project	83.0	80.7	86.3	82.9	83.9
Total (N)	24	114	300	158	598
Non – project	81.2	79.4	81.9	76.9	79.5
Total (N)	48	126	215	199	590
Total	79.2	80.0	84.5	79.6	81.7
Total (N)	72	240	515	357	1188
Significance	0.828	0.796	0.167	0.160	0.046*

* p < 0.05 – significant

Plain water, powdered milk, animal milk and juice were the other food items introduced to infants below 6 months.

The data on Breastfeeding was compared with NFHS 3 and CES 2009 data (Figure IX).

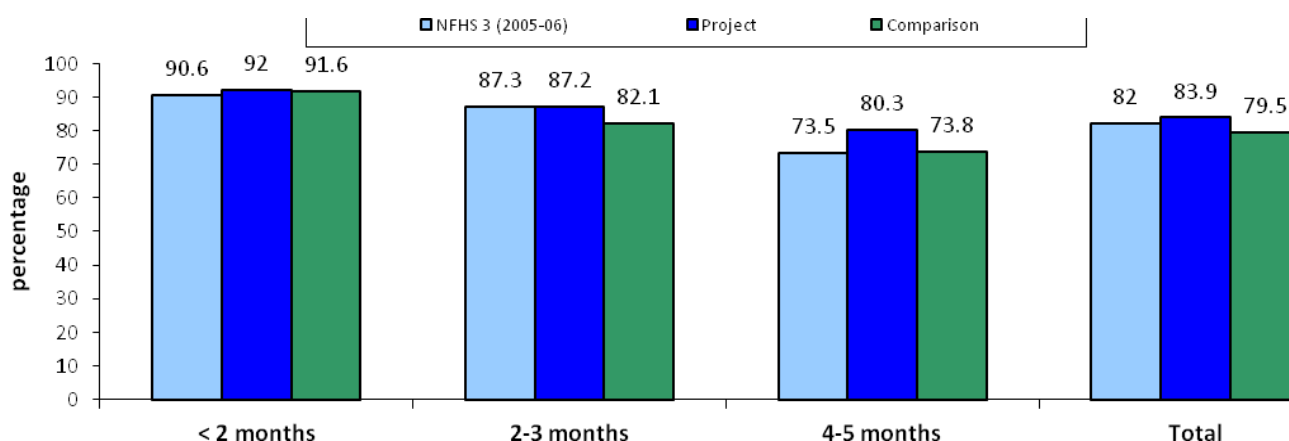


Figure IX: Trends (%) in exclusive breastfeeding in Chhattisgarh (2005-2011)

Seven out of 10 children introduced semi-solid food or **complementary food** to an infant at the age between 6-8 months (table 20). This practice was marginally higher in the project blocks but this was not statistically significant. It was noted that there was about 8-10 percentage points increase in the practice of introduction of complementary feeding between 8th and 9th months.

Table 20: Complementary feeding (introduction of semi solid) with age of the child

Type	Project %	Comparison %	Total	Significance
Complementary feeding	73.0	67.8	70.7	0.193
Total (Age 6-8 months)	74	59	133	
Complementary feeding	81.1	77.3	79.4	0.203
Total (Age 6-9 months)	111	100	211	

The practice of feeding energy dense food by introduction of additional extra fat and oil in child's feed was significantly higher in the project blocks. Similarly feeding mashed food to child 6-35 months was significantly higher in the project group. The percentage practicing responsive feeding was higher in the project group. The child was primarily fed by mothers. Interestingly in the project group, a much higher percentage of fathers participated in feeding of their children (Table 21).

Table 21: Child Feeding: Advice and Feeding Practices (Mothers of 6- 35 months)

Particular	Project % (N=1194)	Comparison % (N=1182)	Difference
Add extra oil/ sugar / ghee in child's food	33	27.3	0.000*
Give mashed food to the child	52.2	39.4	0.000*
No. of times the child ate solid / semi solid foods other than liquids during day / night	N=1194	N=1181	
0-2 times	32.7	31.5	0.5
2-6 times	60.9	57.1	0.5
More than 6 times	0.3	0.4	0.7
Don't know	6.2	11	0.000*
Sufficient food in the household for the child			
Yes	94.2	93.5	0.455
No	5.8	6.5	0.455
Child is fed by (responses of mothers of children 6-35 months)	N=1194	N=1181	
Mother	86.4	76.5	0.000*
Grandmother	10.1	10.4	0.82
Older sibling	2.0	.1	0.08
Father	1.3	6.9	0.00*
Others	13.5	21.7	0.00*

* p < 0.05 – significant

About 80 percent mothers reported no difficulty in feeding a child (table 22). For those finding it difficult to feed, the reasons stated were poor appetite, disinterest in food, preference for milk, not interested in sitting at one place and eating as well as being interested

in playing were the primary reasons which caused difficulty in feeding. These reasons were given by a significantly higher percentage of mothers in the comparison group. Time taken to feed the child varied. In the project group, a higher percentage of mothers spent 30-45 minutes for feeding. Encouragement to eat was practiced by a higher percentage of mothers in the project group (Table 22). Higher percentage of mothers in the project group also stated that their children ate adequate amount of food every day.

Table 22: Response of mothers (6-35 months children) regarding child feeding practices and experiences

Practices observed	Project (%)	Comparison(%)	Difference
Easy to feed the child	N=1194	N=1181	
Yes	81.9	79.3	0.11
No	15.9	17.6	0.27
Don't know	2.2	3.0	0.22
Reasons for difficulty in feeding	N=190	N=208	
Poor appetite	7.4	13.9	0.03*
Does not like to eat	15.3	24.0	0.03*
Likes to drink milk only	24.7	13.0	0.003*
Mostly sick	1.6	2.9	0.38
Needs a particular person for feeding	3.2	3.4	0.90
Wants to play	35.3	36.1	0.86
Cannot sit in one place	50.0	28.8	0.00*
Others	2.1	4.8	0.14
Time taken to feed	N=1193	N=1180	
15-30 minutes	59.3	61.3	0.32
30-45 minutes	28.4	23.9	0.01*
45 minutes – 1 hour	9.1	11.5	0.06
1 hour	0.6	1.3	0.08
Feeding not started	0.3	0.4	0.72
Don't know	2.3	1.6	0.25
Talk / sing / entertain the child to encourage feeding	N=1193	N=1180	
Yes	60.9	62.5	0.00*
No	30.1	37.5	0.00*
Child eats enough everyday	83.8	77.5	0.00*

* p < 0.05 - significant

Over 75 percent stated that hand washing was practiced before feeding –however it was significantly higher in the project group (Table 23).

Table 23: Mothers (%) (6-35 months children) practicing hand-washing and washing utensils

Practices	Project	Comparison	Difference
Hand washed before feeding a child	N=1194	N=1181	
Yes	82.9	75.0	0.00*
No	7.5	4.9	0.08
Did not feed the child	9.6	20.1	0.00*
Washing utensils before cooking / feeding purposes			

Yes	93.1	94.9	0.06
No	6.9	5.1	0.00*
Practice of washing hands after defecation	96.4 (N=1825)	96.8 (N=1801)	
Material used for washing hands	N=1760	N=1744	
Washed hands with soap and water	59.8	66.9	
Washed hands with ash	19.1	12.4	
Washed hands with mud	15.8	12.8	
Washed hands with water	5.3	12.8	

* P < 0.05 - significant

The practice of washing hands could not be compared since NFHS3 and CES 2009 surveys do not report on hygiene practices. However, the data available from recent HUNGaMA for the three categories of districts surveyed indicate a much poorer scenario of washing hands. The data does not include Chhattisgarh state. The habit of washing hands was poor with less than a quarter population in best of districts reported hand washing habits among children 0-59 months who had diarrhoea in the 7 days prior to the survey (Fig X). The prevalence of undernutrition was higher in household with no toilets.

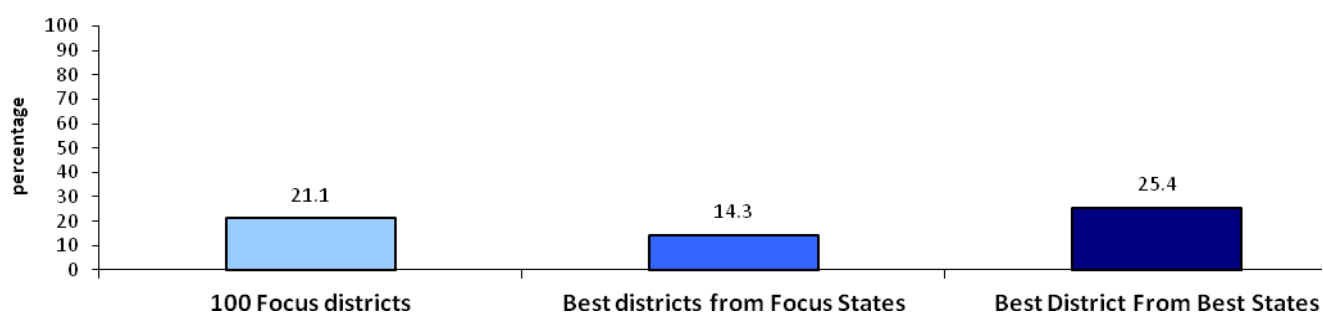


Figure X: Hand washing habits after defecation (%) among children 0-59 months who had diarrhoea in the 7 days prior to the survey

f) Food Security: Food security exists when all people at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active healthy life.

Indicators to measure improvement in food security status of participant households, as a result of interventions were studied using a food security scale. Food security scale contribute, a direct measure of food access at the household level, was assessed by studying a set of conditions, experiences and behaviour patterns that consistently characterize the phenomenon of food insecurity and hunger. The following three aspects of food security were assessed.

- Supplying of household food
- Altering quality of diet
- Reducing quantity of food consumed

HUNGaMA Fighting Hunger and Malnutrition, The HUNGaMA Survey Report 2011, Naandi Foundation

FANTA, Food security and nutrition indicators for impact assessment by Marie Claude Dop and Tevi Ballard, Nutrition and Consumer Protection Division, FAO

The responses were also scored to indicate the level of food insecurity. Food security was evaluated using the Household Hunger Scale (HHS) and this was validated from Household Food Insecurity Access Scale or HFIAS.

The food security profile of the two groups is presented in Table 24. The findings revealed that a higher percentage of mothers in project area consumed three meals every day (85.3 percent) while in the comparison group it was significantly lower (79.2 percent). However, in both the groups, the frequency to eat less food by women respondents so that to increase food available for family was reported by less than 2 percent (Table 24).

It was noted that the situation when food was not eaten the entire day by women was primarily in special disaster situations such as floods, drought, lean period and others. Similar findings were reported for children (Table 25) with less than 1.5 percent households reporting that a child did not eat the entire day and the reasons were attributed to floods, drought etc. Lack of money to buy food for children was reported by 8 percent mothers of children in project blocks and 10.2 percent in comparison blocks.

Table 24: Women situation (%) regarding food security profile of the last 12 months of the project and comparison blocks

Practices	Project (1825)	Comparison (1801)	Difference
Square meals the family eats each day			
Three meals everyday	85.3	79.2	0.00*
Three meals 4-6 days per week	9.6	9.4	0.83
Frequency to eat less food so that increased food for family			
> 5 times / months	0.7	0.5	0.41
Often (15-30 times / year)	1.1	0.9	0.53
Sometimes (7-12 times / year)	3.2	4.9	0.00*
Rarely (1-6 times / year)	13.9	12.0	0.08
Never	81.1	81.7	0.65
Food sacrificed for children < 5 years	42.1	41.6	0.37
Not eating the entire day			
> 5 times / month	0.2	0.2	0.98
15 – 30 times / year	0.4	0.3	0.58
Sometimes (7 – 12 times / year)	1.0	1.3	0.41
Rarely (1-6 times / year)	7.8	6.8	0.24
Never	90.5	91.3	0.42
Period when food was not eaten for the entire day			
Floods	4.6	3.8	0.21
Drought	15.6	23.1	0.00*
Lean period	49.7	48.1	0.33
Others	30.1	25.0	0.00*

* p < 0.05 – significant

Using the score system of FANTA, about 60 percent households in both the groups were food secure and a third were found to be food insecure (Table 25).

Table 25: Food security situation of children in project and comparison blocks

	Project (N =1825)	Comparison (N =1801)	Difference
Frequency of child not eating the entire day (%) because there was no food	0.2	0.4	0.42
Mostly (about 5 times / month)	0	0	-
Often (about 3 or more times / month)	1.2	1.4	0.62
Sometimes (7-12 times / year)	2.8	4.1	0.03*
Rarely (1-6 times / year)			
Never	95.8	94.4	0.05*
Period when the child did not eat the entire day as there was no food(%)	N=76	N=195	
floods	6.5	11.0	0.29
drought	19.7	29.0	0.11
lean period	47.3	26.0	0.00*
others	26.3	34.0	0.23
Households food security status (%)	N=1825	N=1801	
food secure	62.5	60.8	0.29
food insecure	30.7	34.0	0.03*
food insecure with hunger	6.8	5.2	0.04*

* p < 0.05 – significant

Analysis of HFIAS indicators ie meal pattern and resources of project and comparison blocks revealed that only about 14 percent families reported eating limited variety of foods due to lack of resources (Table 26). Of these, almost a quarter forgo rice / wheat whiles a third sacrificed pulses/dals in such a situation. As presented in Table 26, the number of mothers reporting eating fewer meals due to lack of food was 12.4 percent in comparison block and 13.2 percent in project blocks.

Table 26: HFIAS - Meal pattern and resources (%)

HFIAS indicators	Project (1825)	Comparison (1801)	Difference
➤ Eat limited variety of foods due to lack of resources	N=1825	N=1801	
Yes	14.0 (255)	14.9 (269)	0.46
➤ Food items forgo	N = 255	N=269	
Rice / wheat	27.8	22.7	0.17
dal	33.7	28.3	0.17
vegetables	24.7	33.8	0.58
fruits	5.5	3.7	0.33
oil	0.0	0.4	0.33
➤ Frequency to forgo certain food items	N=255	N=269	
often	6.7	7.8	0.61
sometimes	19.6	26.0	0.08
rarely	73.7	66.2	0.05
➤ Eat fewer meals due to lack of food	(N=1825) 13.2	(N=1801) 12.4	
➤ Self / households members eat	N=1825	N=1801	

certain foods because of lack of resources			
Yes	12.7	11.8	0.41

Table 25 presents the meal patterns when there was not adequate food .Frequency to eat smaller meals as there was not enough food was about 14 percent in both the project and comparison group. The frequency to eat smaller meals in such situations was significantly higher in the comparison group (Table 27)

Table 27: Household Food Insecurity Access Scales (HFIAS) indicators – Meal pattern and food resources (%)

HFIAS indicators	Project (1825)	Comparison (1801)	Difference
➤ Self / household had to eat smaller meals as there was not enough food	N=1825	N=1801	
Yes	14.1	14.3	0.83
➤ Frequency to eat smaller meals as there was not enough food	N = 258	N=257	
Often	0.4	4.3	0.003*
Sometimes	15.1	24.9	0.005*
Rarely	84.5	70.8	0.001*
➤ Eating smaller meals due to lack of food is seasonal in nature	N=258	N=257	
Yes	23.6	28.8	0.18
➤ Household members eat fewer meals as there was not enough food	N=1825	N=1801	
Yes	13.2	12.4	0.46
➤ Frequency to eat fewer meals is seasonal in nature	N=241	N=223	
Often	2.5	6.3	0.044*
Sometimes	12.4	22.0	0.006*
Rarely	85.1	71.7	0.005*
➤ No food to eat in household due to lack of resources	N=1825	N=1801	
Yes	7.2	5.4	0.026*
➤ Frequency not enough of food in household seasonal in nature	N=132	N=98	
Often	3	15.3	0.000*
Sometimes	8.3	23.5	0.11
Rarely	88.6	61.2	0.00*
➤ Frequency of household members sleep hungry as there was not enough food	N=124	N=95	
Often	4.8	9.5	0.18

Sometimes	5.6	25.3	0.00*
Rarely	89.5	65.3	0.00*
➤ Household members go a whole day (24 hours) without eating as there was not enough food	N=1825	N=1801	
Yes	6.2	4.6	0.035*
➤ Frequency of household members to go a whole day without eating as there was not enough food	N=114	N=83	
Often	6.1	15.7	0.03*
Sometimes	9.6	28.9	0.00*
Rarely	84.2	55.2	0.00*

* p < 0.05 - significant

(g) Entitlement to Food/Employment Schemes of the Government. --The project focused on increasing knowledge of population on their entitlements to subsidized food from the Public Distribution System (PDS) and guaranteed employment for minimum 100 days under the MNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) scheme. PDS was functioning very well with over 90 percent card holders in both the groups receiving items of food in correct amounts despite awareness regarding entitlement was rather low. The findings (Table 28) reveal that a much higher percentage (level of significance) of mother in the project blocks (41.5%) were aware of the entitlement of PDS food while only 31.7% were informed of this in the comparison blocks. A higher percentage in project blocks also received correct PDS (entitlement 96.3% in project blocks and 91.1% in comparison blocks). PDS foods received included rice (93.7%), wheat (61.1 %)sugar (90.1%),pulse /soys/chana (16.9%),salt (78.3%)and kerosene (93.4%). Mitanins in project blocks were observed to be the primary persons responsible for increasing awareness regarding PDS.

Table 28: Access and participation in Public Distribution System (PDS) and MNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) schemes

PDS schemes	%Project (1825)	% Comparison (1801)	Difference
➤ Avail / purchase foods from PDS (%)	99.8 (N=845)	99.9 (N=745)	
➤ Aware of entitlement of PDS food*(%)	41.5 (N=845)	31.7 (N=745)	0.00005*
➤ Knowledge about PDS entitlement given by (%)	N=350	N=236	
Mitanin	54.6	44.5	0.01*
Prashikshak	2.0	2.5	0.66
Mitanin sahyogi	5.1	3.4	0.31
Pradhan	26.0	37.7	0.002*
Others	12.3	11.9	0.3
➤ Supply of food items regular (%)	N=845	N=745	

Yes	1.7	2.0	0.59
➤ Receive correct PDS entitlements (%)	96.3	91.1	0.008*
NREGA (%)			
Ever self employed in NREGA last 12 months	53.8	47.5	0.001*
Ever family member employed in last 12 months	61.7	50.8	0.00*
Spent on food for family and child	86.3	89.6	0.54
Food for the child	4.6	6.9	0.03*

* p < 0.05 – significant

Mothers of the project group were also most often employed in NREGA schemes – 53.8 percent in project blocks and 47.5 percent in comparison blocks (Table 28). Similar trend of higher employment of a family member was noted in project blocks – 61.7 percent in project blocks and 50.8 percent in comparison blocks (Table 28). The difference was significant. The data reveals a significant positive impact of the project on knowledge and use of PDS and NREGA schemes by the mothers of the project blocks (Table 28).

(h) Kitchen Gardens One of the project activity was on promoting cultivation of kitchen gardens. The findings of the survey revealed that a much higher percentage of households in project blocks cultivated kitchen garden and also cultivated vegetables and green leafy vegetables as against the comparison blocks (Table 29). The difference was significant revealing the impact of project. The Project group used the kitchen garden significantly more for cultivation of vegetables and tubers. Regarding growing of green leafy vegetables, there was no significant difference. Almost all women used kitchen gardens for household consumption. However, the use of produce of kitchen gardens for commercial purposes was slightly higher in the comparison blocks (Table 29 and 30).

Table 29: Kitchen garden in project and comparison household

	Project (1825)	Comparison (1801)
Kitchen garden cultivation % (N)	46.6 (850)	32.5 (585)*
Crops cultivation by those mini kitchen garden		
vegetables	90.6	83.6*
green leafy vegetables	45.3	40.7
tubers / kunda	21.5	23.2*
fruits	29.9	19.8
Purpose of kitchen garden		
household consumption	97.5	94.9
commercial purpose	2.2	4.3

* P= 0.00

Table 30: Birth weight reported by mothers of under 6 months

Birth weight	Project (N=474)	Comparison (N=402)
< 2.5 kg	51.1	43.5
2.5-3 kg	32.9	36.1

> 3 kg	16.0	20.4
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(i) Health and Nutrition Services The services were similar in the two groups with reference to vitamin A dosage (Figure XI) and immunization coverage of children 12-24 months (Table 31A and 31B). Vitamin A supplement (VAS) coverage was rather poor with less than one third receiving at least one dose of VAS. Only half the children received measles vaccine. The percentage of children administered vaccines improved for all the vaccines except measles when the coverage was compared with NFHS 3 data of 2005-6 and CES data of 2009.

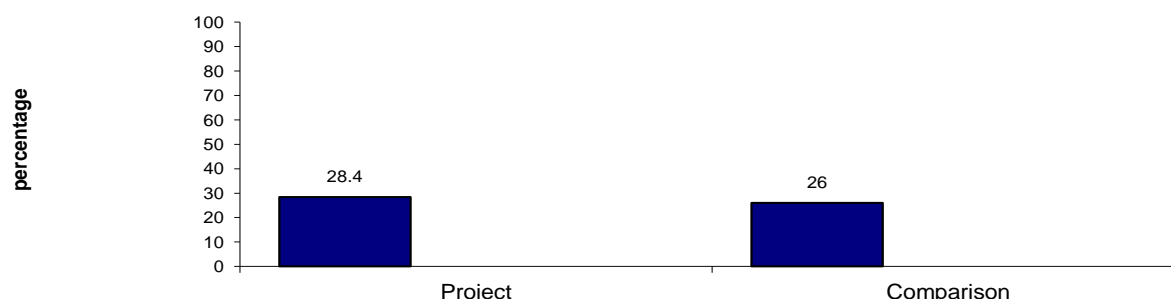


Figure XI: Vitamin A Dose administration (%)

Table 31A: Immunization Status (%) based on recall by Mitanins

Vaccines	NFHS 3	CES 2009	Project 2011	Comparison 2011
BCG	84.6	84.8	100	100
Polio 0	37.0	62.8	100	100
DPT 1	87.2	77.2	99.2	99.3
DPT 2	77.4	71.6	96.2	94.4
DPT 3	62.8	66.5	90.4	87.8
Polio 1	96.7	80.0	99.2	99.3
Polio 2	93.8	73.7	96.2	94.4
Polio 3	85.1	66.5	90.4	87.8
Measles	62.5	73.1	56	55.4
Total (N)			836	846

Based on available records, the percentage of women receiving three antenatal care services and immunization were similar in the two groups (Table 32 and 33).

Table 31B: Immunization card (Figures in %)

Vaccines	Project (220)	Comparison (242)	Total (448)	Significance
BCG	88.6	90.1	89.5	0.61
Polio 0	65.0	71.1	68.6	0.16
DPT 1	84.5	87.6	86.3	0.34
DPT 2	80.0	84.3	82.4	0.22
DPT 3	75.0	75.2	75.6	0.95
Polio 1	82.3	83.1	82.6	0.82
Polio 2	78.2	81.8	80.3	0.32
Polio 3	74.5	73.1	74.2	0.73
Measles	60.5	60.7	60.0	0.94

The trend of percentage of children with undernutrition was same – almost a quarter of infants were underweight at 0-5 months. Between 12-23 months, 38.7 percent in project blocks and 39.9 percent in comparison blocks were underweight (Table 35, Figure XII). Over 25 percent infants at 6 months were undernourished. The sharpest increase in underweight prevalence rate in both the groups was between 6 -12 months. The difference in prevalence rates was not significant.

Table 35: % Underweight (without Propensity Score Matching -PSM) in children in various age groups

% underweight (-2SD)	0-5 Months	6-11 Months	12-23 months	24-35 Months	Total*
Project	27.0	39.9	38.7	39.3	35.0
(N)	(601)	(173)	(481)	(540)	(1795)
Comparison	26.6	41.4	39.9	41.7	36.4
(N)	(595)	(152)	(484)	(536)	(1767)
Total Underweight	26.8	40.6	39.3	40.5	35.7
(N)	(1196)	(325)	(965)	(1076)	(3562)
NFHS 3					47.4* (860)

* p < 0.05 – significant

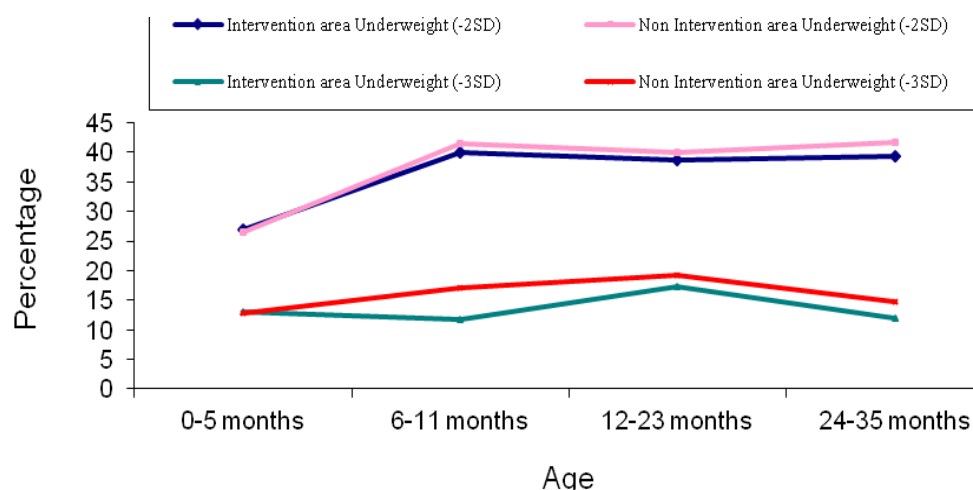


Figure XII: Underweight prevalence in project and non project areas

Only 4 out of 10 mothers were aware of the weight of the child (Table 36). AWW was the primary frontline worker who weighed the children. Weighing was significantly better in the project group (Table 36).

Table 36: Percentage of mothers (0-35 months) knows the weight of the child and person weighing the child

	Project	Comparison	Difference
Knows the weight	N=219	N=1200	
Yes	41.6	41.3	0.897
No	58.4	58.8	0.832
Advice on weighing the child regularly was given by	N=906	N=822	
ANM	14.1	11.7	
Mitanin	9.4	8.6	
ANM	75.5	78.3	
Poshan fellow	0.1	0.0	
Others	0.9	1.3	
Health workers who weighs the child	N=507	N=495	
ANM	13.6	14.5	0.67
Mitanin	12.0	13.9	0.37
AWW	73.6	66.9	0.02*
Poshan fellow	0.0	0.2	0.31
Others	0.8	4.4	0.00*

* p < 0.05 – significant

Tables 37 indicates underweight percentage prevalence rate was lower in the when the most disadvantage criteria of education and caste was analysed. The project group had a much lower prevalence of underweight when a comparison was made of children of two groups where mothers with no education. Similarly, a significantly lower percentage prevalence rate of underweight was noted in the schedule tribe children of the project group as compared to the comparison group.

-

Table 37: Underweight Crosstab by Mother's Education and Caste

Particular	% Project	% comparison	Sig.	Total
Mother's Education				
No education	37.6	41.4	0.17843	38.6
<5	33.2	33.3	0.98365	33.2
5-9	33.0	34.0	0.70833	33.4
10+	35.7	32.4	0.19774	29.8
Caste				
General Category	34.9	30.4	0.07700	35.2
SC	35.7	34.3	0.60061	34.5
ST	35.0	41.3	0.01898	36.4
OBC	34.2	32.9	0.64753	33.4
Others (Specify)	55.6	45.5	0.00033	34.9
Total (N)	629	643		1229

Severe underweight percentage prevalence rate was higher in comparison blocks but the difference was not significant (Table 38 and Figure X). At the age of 0-5 months itself, about 13 percent infants were severely underweight in both the groups. The overall rate of prevalence of severe underweight was 1.8 percentage points higher in comparison group compared to the project group.

Table 38: Percentage with Severe Underweight

% severely underweight	0-5 Months	6-11 Months	12-23 months	24-35 Months	Total
Project	13.0	11.8	17.4	12.0	13.8
(N)	(586)	(169)	(470)	(533)	(1758)
Comparison	12.9	17.2	19.3	14.7	15.6
(N)	(575)	(171)	(482)	(524)	(1732)

The percentage of stunted children (0-36months) was higher in comparison blocks (35.5 percent) than in project blocks (34.2 percent) with almost a quarter (23.1 percent in comparison and 24.1 percent project blocks) being stunted at 0-5 months itself (Table 39).

Table 39: Percentage prevalence Rate of Stunting (Height by age) in various age groups

% stunted (-2SD)	0-5 Months	6-11 Months	12-23 months	24-35 Months	Total
Project	24.1	28.1	44.2	38.5	34.2
(N)	(593)	(171)	(477)	(535)	(1776)
Comparison	23.4	31.1	45.7	40.8	35.5
(N)	(590)	(151)	(481)	(529)	(1751)
Total	23.8	29.5	45.0	39.6	34.8
(N)	(1183)	(322)	(958)	(1064)	(3527)
NFHS 3					55.1 (860)

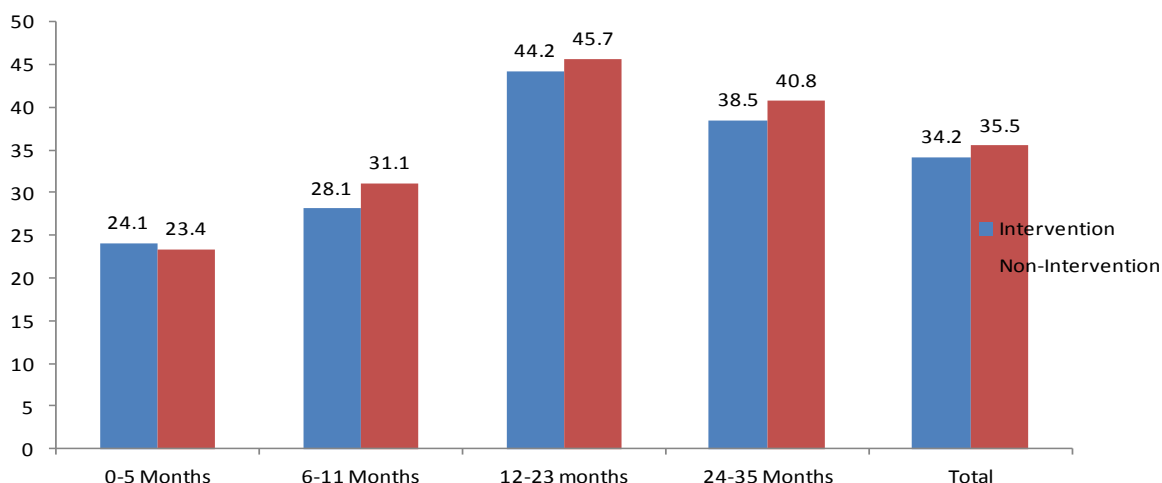


Figure XIII: Stunting by age in project and non project blocks

The trend in stunting seemed to increase and was highest between the age 12-23 months (Figure XIII). There was no statistical difference in the overall prevalence of stunting using

the PSM. In both the groups 19.1 percent children 0-35 months were severely stunted (Figure XIV).

Figure XIV presents the rate of severe stunting --the rate of prevalence was very similar except for 12-23 months.

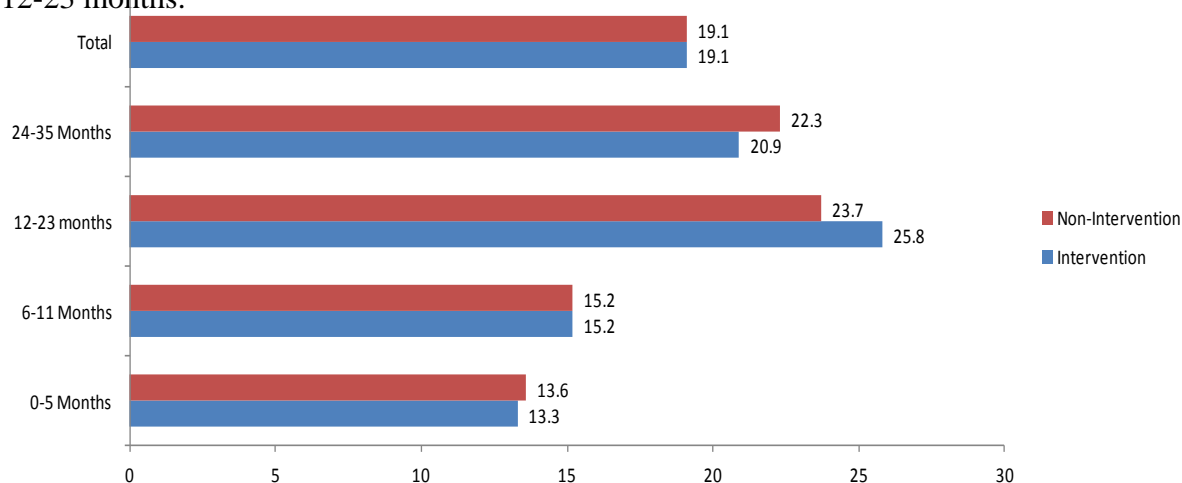


Figure XIV: Severe stunting by age in Project (NSI project) and comparison (comparison) blocks (%)

Unlike underweight, there was a significant lower percentage prevalence of stunting in comparison group with education level of ten plus years. There was no impact of type of cast on stunting prevalence rate (Table 40).

Table 40: Stunting Crosstab by Mother's Education and Caste(%)

Particular	Project	Comparison	Sig.	Total
Education				
No education	36.5	40.6	0.14311	38.6
<5 years	32.1	34.2	0.44161	33.2
5-9	33.6	33.2	0.88757	33.4
10+	34.0	25.6	0.00121*	29.8
Caste				
General Category	37.7	32.8	0.07732	35.2
SC	32.5	36.5	0.14165	34.5
ST	34.0	38.7	0.09365	36.4
OBC	35.4	31.5	0.15804	33.4
Others (Specify)	33.3	36.4	0.24362	34.9
Total	608	621.0		1229.0

* p < 0.05 – significant

Wasting in children was similar in two groups. About a third of the children 0-36 months surveyed were wasted in the first 5 months itself and the prevalence rate increased sharply between 6-11 months (Table 35). There was no statistical difference following the PSM estimate.

Table 41: Percentage of wasted children under 0-35 months in various age groups in project and comparison blocks

% wasted	0-5 Months	6-11 Months	12-23 months	24-35 Months	Total
Project	28.9	34.1	29.0	26.6	28.7
(N)	(585)	(173)	(480)	(537)	(1775)
Comparison	29.3	34.9	30.2	28.5	29.8
(N)	(581)	(152)	(483)	(533)	(1749)
Total	29.1	34.5	29.6	27.5	29.2
(N)	(1166)	(325)	(963)	(1070)	(3524)
NFHS 3					24.3 (860)

As indicated in Table 37, education and caste had no significant impact on prevalence rate of wasting.

The trend in percentage prevalence rate of severe wasting indicated an increase upto 6-11 months and then a decrease (Figure XIV).

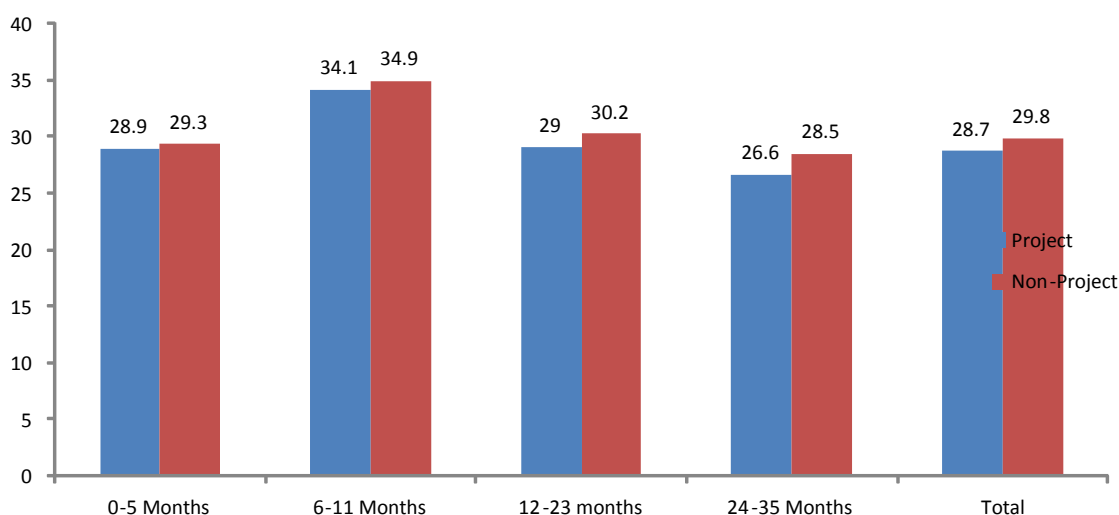


Figure XV: Severe Wasting by age in project and non project blocks

As presented in Table 42, the percentage of children 0-35 months with severe wasting was much higher in comparison blocks (15.3 percent) as compared to project blocks (11.1 percent). The difference was statistically non-significant.

Table 42: Percentage children with Severe Wasting by Age in Project and Comparison Groups

% severely wasted	0-5 Months	6-11 Months	12-23 months	24-35 Months	Total
Project	16.8	18.5	14.2	12.7	11.1
(N)	(585)	(173)	(480)	(537)	(1775)
Comparison	16.0	21.7	14.3	13.7	15.3

(N)	(581)	(152)	(483)	(533)	(1749)
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(k) Nutritional status of Women

The nutritional status of mothers was similar in the two groups – 46.11 percent in project blocks and 47.0 percent in comparison blocks were undernourished with body mass index (BMI) less than 18.5 (Table 43). There was negligible change in percentage of mothers with low BMI since the last national survey NFHS 3. Overweight in woman was almost negligible.

Table 43: BMI of Mothers (%) in Project and Comparison Groups.

Particular	NFHS 3	Project	Comparison
BMI Thin (Less than 18.5)	43.4	46.1	47.0
BMI Overweight (More than or equal to 25)	5.6	2.5	2.6
Total (N)	-	1775	1749

(l) BMI of Mothers and Nutritional status of Children

Nutritional status of children (stunting and underweight rates) was studied against BMI of mothers (Table 44A). Mothers with lower BMI of less than 18.5 had higher percentage of children with stunting and underweight. The difference was statistically significant in case of underweight in children.

Table 44A: Nutritional Status of Children 0-35 months and the BMI of mothers in Project Group and Comparison Group (%).

Nutritional status [Children 0-35 months]	Project N=1775	Comparison N=1749
Underweight	35.0	36.4
Severe underweight	13.8	15.6
Stunted	34.2	35.5
Severe stunting	19.1	19.1
Wasting	28.7	29.8
Severe wasting	11.1	15.3
Undernutrition in mothers		
BMI < 18.5	46.1	47.0
BMI ≥ 25.0	2.5	2.6
BMI of mother and % of underweight in children < 3 years		
BMI > 18.5	32.5*	33.3*
BMI < 18.5	38.0*	39.8*
BMI of mothers and % of stunting in children < 3 years		
BMI > 18.5	32.4	33.9
BMI < 18.5	35.7	37.2

* P < 0.05 significant

(m) Low Birth-Weight of Children and BMI of Mothers –As presented in Table 44B, 45-55 percent newborns were reported to be low birth weight. There was a high percentage of LBW newborns in case of mothers with BMI of less than 18.5 as compared to mothers with

normal BMI, This was noted in both the project and comparison groups. However, the difference was significant only in case of the mothers with low BMI in the project group.

Table 44B: Association of incidence of Low Birth Weight [<2.5 kg] in under 6 months infants with BMI of mothers in the Project Group and Comparison Group.

Birth weight	Project [N=480] % of newborns		Comparison [N=414] % of newborns	
	BMI > 18.5 [N=258]	BMI < 18.5 [N=222]	BMI > 18.5 [N=205]	BMI < 18.5 [N=209]
< 2.5 kg	45.7	55	46.3	49.3
≥ 2.5 kg	54.3	45	53.7	50.7
Significance [within group i.e. < 2.5 kg and ≥ 2.5 kg within BMI < 18.5 and BMI ≥ 18.5	0.05275	0.03678*	0.13845	0.76916

* p < 0.05 significant

(n) Birth-weight of children and current nutritional status:

Table 44 C presents the birth weight details of children below three years in the total child population of 2529 under threes. Percentage of children with low birth weight (< 2.5 kg) was rather high—43.6%. Underweight and stunting prevalence rates were statistically significantly higher in case of children who were born with birth weight of less than 2.5 kg (Table 44 C).

Table 44C : Birth weight (%) and its association with undernutrition rate in children 0-35 months in the total under three children of combined Project and Comparison Groups [N=2529] #

Birth weight	Underweight [-2SD] N=870 [% in children < 3 years]	Not underweight N=1629 [% in children < 3 years]
	< 2.5kg	46.2
2.5-3.0 kg	41.9	42.2
> 3 kg	11.9	15.6
	Stunting [-2SD] N=870 [% in children < 3 years]	Not stunted N=1659 [% in children < 3 years]
	< 2.5kg	47.6
2.5-3.0 kg	40.3	43.0
> 3 kg	15.4	12.1**

** p < 0.05

43.6% low birth weight in the total sample studied

(o) Emerging Trend in Nutritional Status of Children and Women as compared to other available state surveys

The impact of evaluation survey programme on the trend in nutritional status of children under three years in Chhattisgarh state was studied by comparing the total prevalence rate (combined prevalence rate data of the project and comparison blocks) for underweight,

stunting and wasting emerging data of the evaluation survey with NFHS 3 data (Figure XVI). Moreover, the earlier trend in prevalence of undernutrition was also assessed by comparing the two NFHS surveys of 1998-99 and 2005-6.

Both the absolute and relative percentage prevalence rates for these two periods were estimated for the two following periods a) for the seven year span period between 1998-99 and 2005-6 by comparing the NFHS 2 and NFHS3 data and b) for the six year span period between 2005-6 and 2011 by comparing NFHS3 with the current evaluation survey findings of 2011. These are presented in Table 45.

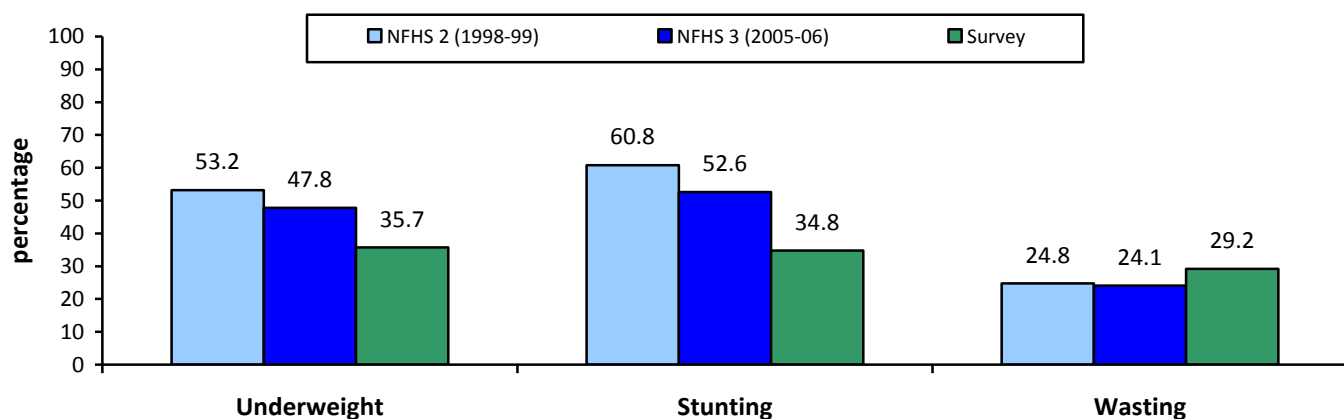


Figure XVI: Trends in nutritional status of children (%) in Chhattisgarh in the periods 1998-99 (NFHS 2) , 2005-6 (NFHS 3) and 2011 (Evaluation Survey)

Based on the relative percentage rate, the average annual reduction rate (AARR) was calculated for the two periods mentioned above. The AARR for underweight was 4.22 as compared to only 1.45 in the earlier phase of 1998-99 and 2005-6. The AARR for stunting and wasting was 5.64 and 3.53 for the last six years while the corresponding AARR for the earlier phase of 1998-2005-6 was much lower at 1.93 and 0.40 (Table 45).

Table 45: Trend in Prevalence Reduction of Undernutrition in the period 1998-99 and 2005-6 as compared to the Prevalence Reduction Between 2005-6 and 2011

	Stunting		Underweight	
	- 3 SD	- 2SD	- 3 SD	- 2SD
NFHS 2 (1998-99)	40.5	60.8	25.6	53.2
NFHS 3 (2005-06)	26.6	52.6	17.6	47.8
Absolute % reduction (NFHS 2 – NFHS 3, 7 years)	-23.9	-8.2	-8.0	-5.4
Relative % decrease	59.01	13.49	31.25	10.15
Annual average reduction rate (AARR)	8.43	1.93	4.46	1.45
	Stunting		Underweight	
	- 3 SD	- 2SD	- 3 SD	- 2SD
Evaluation survey 2011 (Project + comparison)	19.1*	34.8	*	35.7

NFHS 3 (2005-06)	26.6	52.6	17.6	47.8
Absolute % reduction (NFHS 3 – evaluation survey, 2005-2011, 6 years)	7.5	17.8	-	12.1
Relative % decrease	28.1	33.84	-	25.3
Annual average reduction rate (AARR)	4.69	5.64	-	4.22

The BMI of women in this evaluation survey for the entire state i.e. combined prevalence rate for project and comparison groups when compared to NFHS 3 indicated a small increase of 2.7 percentage points. In Chhattisgarh state, every second woman is undernourished and the prevalence rate is much higher compared to all India figure of 35.6 percent reported in the NFHS 3 survey of 2005-6.

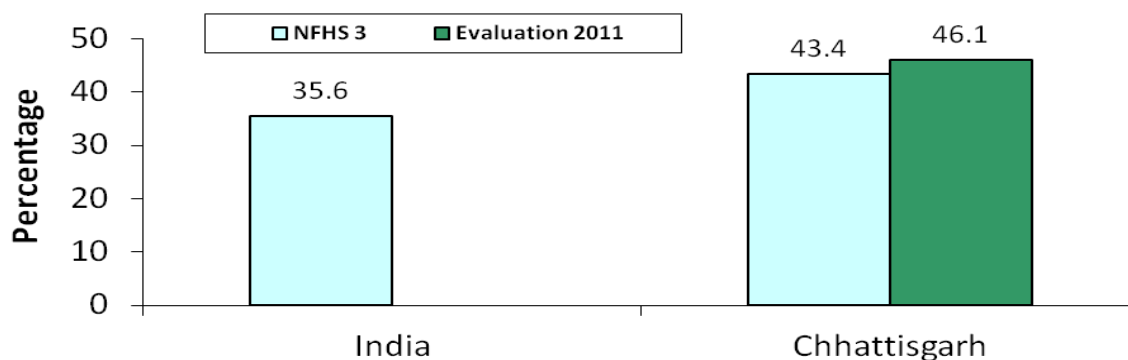


Figure XVII: Trends in undernutrition in women (BMI < 18.5) in Chhattisgarh in the last six years

The overall trend in early initiation of breastfeeding noted in this evaluation finding for the state was compared with data of earlier surveys i.e. NFHS 3, DLHS2 and CES 2009. The increase in acceptance of recommended breastfeeding practices was noted for both the indicators i.e. early initiation of breastfeeding within one hour of birth and exclusive breastfeeding for 6 months (Figure XVIII and Figure XIX). The impact of evaluation survey strategy in accelerating the positive change in the state is evident from these comparative data.

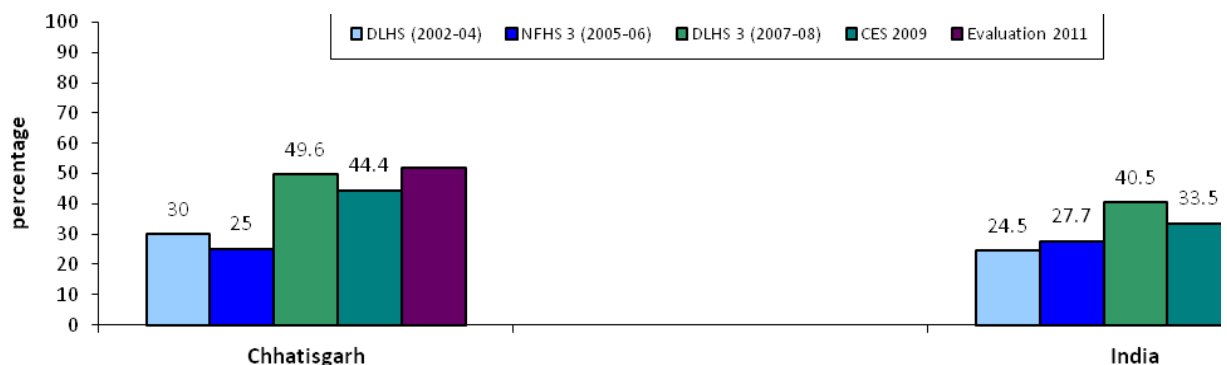


Figure XVIII: Trends in early initiation of breastfeeding in children in India and Chhattisgarh

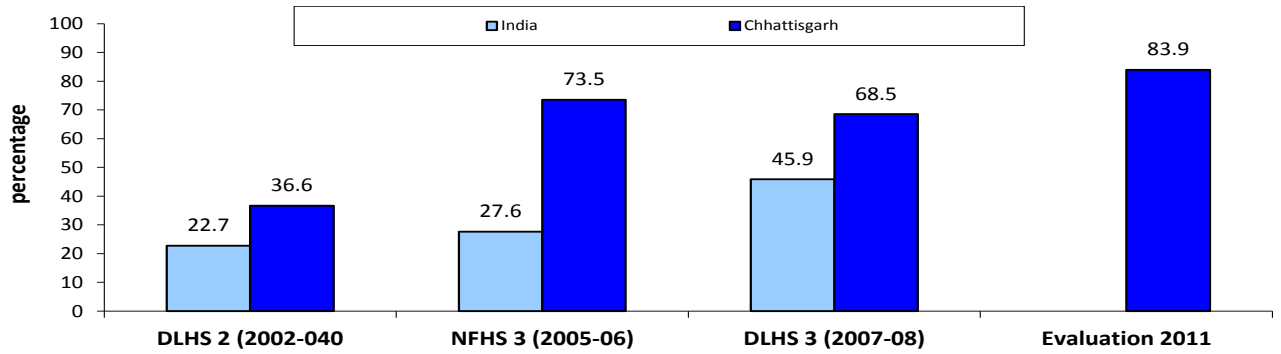


Figure XIX: Trends in % exclusive breastfeeding rate in Chhattisgarh compared to India

Similarly positive trend in timely introduction of complementary feeding was also observed (Figure XX) when the evaluation findings were compared with the state data of NFHS3 of 2005 survey and CES 2009.

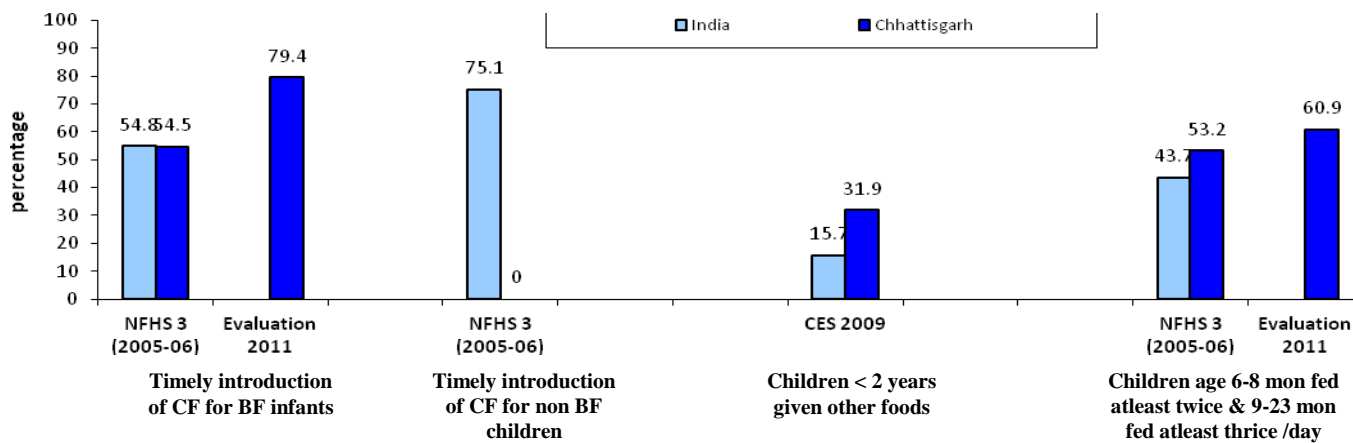


Figure XX: Trends in complementary feeding practices in children in Chhattisgarh and India

The first 1000 days of life, from conception to the end of second year is the critical window of opportunity for addressing undernutrition. The percentage of children covered with the selected essential recommended high impact nutrition interventions remain far below the goal of 100% (Figure XXI).

As presented in the figure XXI, the coverage for these projects are poor. In Chhattisgarh, there is improvement in the indicators of breastfeeding and complementary feeding as compared to the all India figures for 2005-6. However, the percentage of caregivers following hygiene practices and practice of additional feeding to children with illness/diarrhoea remains much below the all India figure for 2005-6.

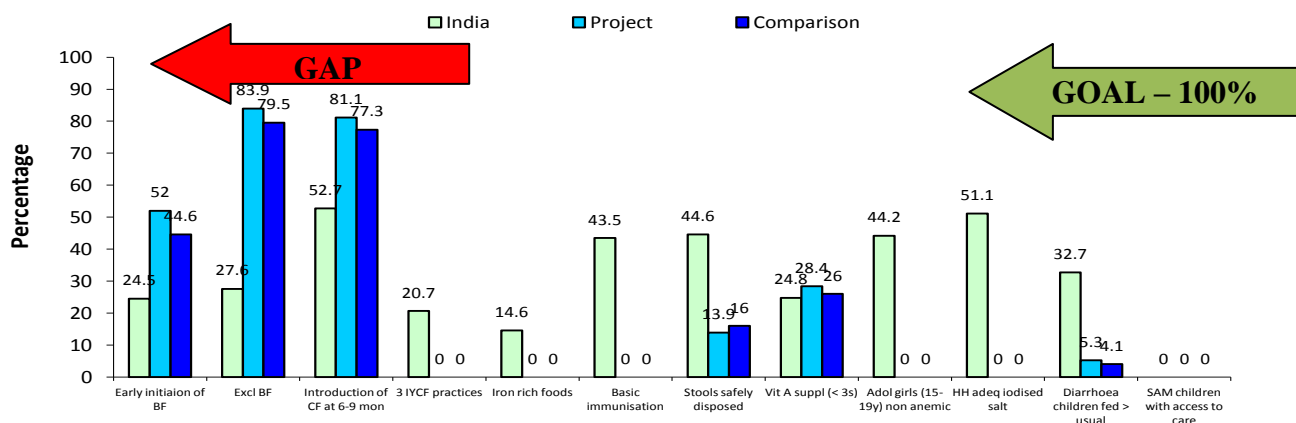


Figure XXI: Coverage of essential nutrition projects to reduce stunting in India and Chhattisgarh

5. Evaluation Findings –An Analysis

The primary objectives of the NSI project were to reduce undernutrition, improve child feeding practices and increase awareness to entitlement to schemes (Public Distribution System (PDS) and Mahatma Gandhi National Rural Employment Scheme (MNREGA) for improving food security. The NSI project activities 2005-2011 in selected 23 blocks was an add on to the ongoing state wide Mitandin Initiative launched by the State Health and family Welfare Department in 2002. As per the initiative, the Mitandins, the community based volunteers, were in charge of providing maternal and child counseling and services and were in-charge of 250-500 population.

The NSI project focused on improvement of the functioning of Mitandins by introduction of additional training on maternal and child nutrition, improving supportive supervision and strengthening food security schemes by appointment of a new cadre of block level *Poshan Fellows*. Interestingly positive elements of the NSI such as intensive training in young child feeding, counseling techniques for family actions on maternal-child care and feeding as well as regular dissemination of information on PDS services were introduced in the entire state from 2009 onwards. Such a move resulted in the entire state giving a renewed thrust on promotion of infant and child feeding practices and PDS. Since 2008, an effort was also made by the ICDS Directorate of the state government to promote appropriate infant and young child feeding practices in the entire state.

With the above referred inputs in the state, the evaluation findings revealed that there was an overall positive impact of the Mitandin initiative in the entire state with a remarkable decrease in undernutrition prevalence. It was also observed that the impact on reduction of undernutrition in children (prevalence of underweight and stunting) was observed in both NSI project area and comparison area. The impact was higher in the NSI group but was not statistically significantly higher as compared to non-NSI group. This is considered a very positive outcome in the NSI project blocks since the NSI project blocks had started with the disadvantage of significantly higher tribal population and possibly a much higher percentage of undernourished children as compared to the non-NSI blocks with a much lower tribal population. Moreover, the difference in

the impact of NSI and non-NSI was not statistically significant due to the fact that the Health Department had taken actions for promoting NSI initiatives such as promotion of young child feeding practices in the entire state while the state government had given a very high political priority and streamlined the PDS in the entire state..

In the absence of baseline data on undernutrition of under three children in the state, the survey findings of the prevalence rates of undernutrition in the entire state (combined project and comparison blocks) were compared with the NFHS 3 and NFHS 2 survey findings of Chhattisgarh state in 1998-99 and 2005-6. The evaluation findings revealed that in absolute point percentage decrease of 12.1 percent (annual rate of 2.0 percent) in underweight prevalence rate in the six years period between NFHS 3 data of 2005-6 and the current evaluation state prevalence rate of 2011. Compared to this, the corresponding decrease was only 5.4% (annual rate of 0.77) in the earlier phase of seven years between 1998-99 (NFHS2) and 2005 NFHS-3. In terms of stunting, the absolute point percentage decrease was 17.8 % (annual rate 2.96%) between NFHS-3 and the current evaluation findings while the corresponding decrease was only 8.2% (annual rate 1.17) between the NFHS 2 and NFHS-3 surveys. The absolute decrease in percentage points for both underweight and stunting observed in the last 7 years (between 2005 and 2011), with the establishment of Mitadin initiative, was almost double of that observed in the seven years period between 1998-2005. The percentage prevalence rate of severe wasting or severe acute malnutrition (SAM) in the project area was 11.1 percent and 15.3 % in the comparison group. Severe wasting had in fact was almost double of what was observed in under threes in NFHS 2 (6.8 percent) and NFHS 3 (7.8 percent).

In relative terms, the percentage decrease between NFHS 3 and evaluation findings of 2011 for underweight was 25.3 and for stunting 33.84. The corresponding decrease in between NFHS 2 (1998-99) and NFHS3 (2005-6) was 10.15 and 13.49 percent indicating the rate of percent relative decrease in underweight had doubled in the last six years while the stunting prevalence rate was almost three times of the earlier seven years. The relative average annual reduction rate (AARR) in the last six years between NFHS 3 and evaluation survey was 4.2 percent for underweight and 5.6 percent for stunting compared to the corresponding AARR of 1.4 and 1.9 in the seven years period between NFHS 2 and NFHS 3. The AARR in the last six years being almost four times for the two indicators of undernutrition. This rapid rate of decrease in underweight prevalence rates of 4.2 percent observed under the Mitadin initiative for the entire state for the period 2005-2011 is much higher than the AARR of 2.9 % reported for the same period for the selected 100 focus districts of six states in the HUNGaMA survey of 2011. The higher impact of Mitadin strategy in accelerating reduction in undernutrition prevalence rate in Chhattisgarh state is therefore evident from these findings.

Chhattisgarh state is the only state in the country where since 2002 community based workers, referred as Mitadins, were introduced as an integral part of the state health project. These Mitadins are in-charge of not more than 250-500 population and act primarily as community based mobilisers and family level counselors. The Mitadins are primarily responsible for ensuring maternal-child health services and for promoting appropriate child feeding practices. Mitadins therefore primarily address the immediate causes of undernutrition in children (Figure XXII).

Mitadins are trained to make home visits, undertake one to one counseling sessions and organise

NFHS-3 [2005-2006]. National Family Health Survey. Volume I. IIPS, Mumbai, India: 2007.
NFHS-2 [1998-99]. National Family Health Survey. Volume I. IIPS, Mumbai, India: 1999.

cluster meetings for influencing family and community maternal and child care practices as well as for increasing awareness regarding health and nutrition services provided through the government system. Additionally, Mitans being an integral part of health system, follow up with health workers to ensure that health services are provided. Additionally, Mitans organise cluster meetings and reach out to ICDS workers and panchayat members.

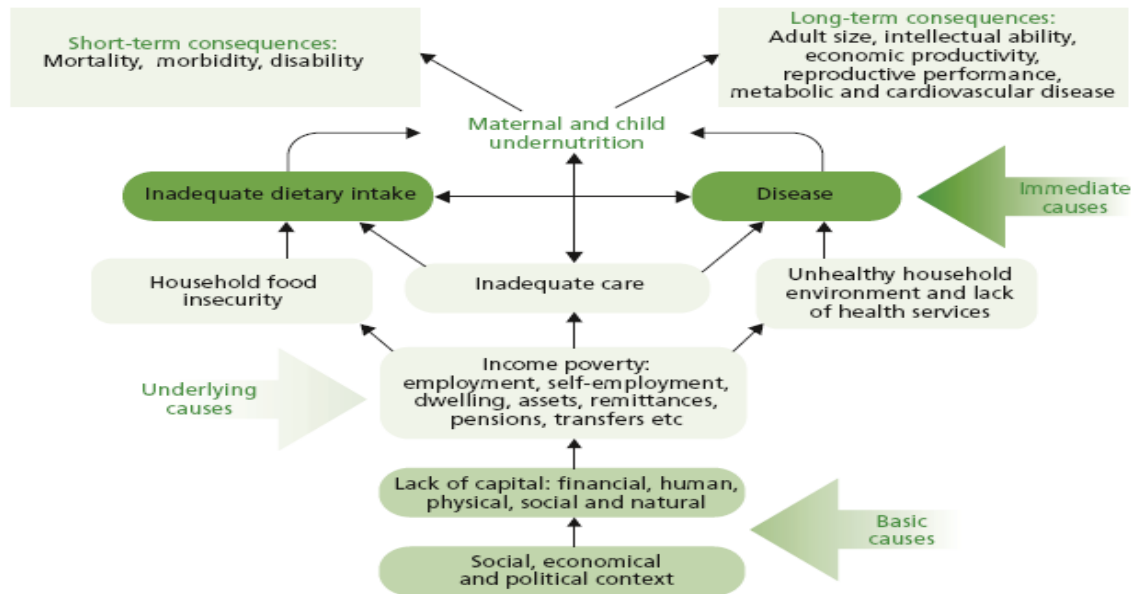


Figure XXII: Conceptual framework of malnutrition

The evaluation findings revealed that all Mitans were always from their own villages and majority of them regularly visited families, especially those with pregnant women and newborns. The evaluation indicates that the performance of Mitans was better in the project area in terms of making regular home visits, organising cluster meetings etc. The percentage of Mitans making home visits at least once a month was higher in the NSI project blocks. Moreover, the quality of home visits in the NSI Project area was also better as compared to comparison area. The evaluation findings revealed that a higher percentage of Mitans spent a longer time of 30-60 minutes with families during home visits as compared to the comparison area. The improved performance of Mitans in organising cluster meetings was also evident in the NSI project areas from the evaluation data. These positive performance of Mitans observed in the NSI Project area can be attributed to improved supportive supervision at district levels as a result of improved training of the Mitan supervisors or *Prashikshit* and appointment of a new cadre of district officers referred as *Poshan Fellows*. Additionally, the intensive and continuous training, organised under the NSI initiative, possibly contributed in enhancing interest of Mitans in their tasks and a higher level of respect and recognition of their work by the community and senior staff which motivated them in undertaking their tasks with higher level of zeal. Additionally, the contribution of supervisors and add on cadre of *Poshan Fellows* in providing supportive supervision possibly contributed to significantly improving the interest and performance of the Mitans in the project area.

The Mitan initiative had a significant impact in improving child and maternal health care practices. Compared to the 2005-06 NFHS survey findings and the subsequent Coverage Evaluation survey findings of 2009, the impact on appropriate practices of breastfeeding, hand

washing was evident in both the NSI project and comparison blocks. However, the impact was significantly higher in the NSI project blocks. The higher emphasis on infant and child feeding practices in the NSI project blocks resulted in significantly higher percentage of mothers following the desirable breastfeeding practices such as early initiation of breastfeeding, exclusive breastfeeding up to six months as well as demonstrated better knowledge regarding the significance of feeding colostrum. The semi-solid food intake pattern was also much better in the NSI project area since the project actions specifically focused on training Mitans on promotion of correct complementary feeding practices which included timely introduction of semi-solid food in right frequency, appropriate consistency of food prepared for child feeding, maximizing energy/calorie density of food fed to young children. Regarding increasing energy density of food, the NSI training of Mitans stressed on addition of extra oil/ghee in the semi-solid feed mixture prepared for a child. The evaluation findings revealed that a significantly higher percentage of caregivers were found to follow the positive feeding practices of an addition of oil /ghee in the portion of feed prepared for young children or mashing of food fed to children in the NSI project area. The positive practice of responsive feeding was also much better in the NSI project areas.

The evaluation survey revealed that regular counseling had positive impact on the practice of washing hands after defecation and prior to child feeding. Washing hands prior to feeding was significantly higher in the NSI group. However, use of soap for washing hands was noted to be comparatively low in both NSI project and comparison groups.

The health services coverage for three antenatal care (ANC) services and routine immunization (RI) coverage for both the NSI and non-NSI project areas were comparable. Such a result was expected since under the NRHM Programme in the state, there has been special effort to improve the coverage of these health services in the entire survey. With the Mitans strategy in operation, the coverage of these health services were noted to have improved substantially in the entire state as revealed in the current survey as well as the last national survey (NFHS 3 survey) of 2005-6 and Coverage Evaluation Survey (CES) of 2009.

It is important to note that about 30% reduction in undernutrition prevalence rates in under three children can be achieved when the coverage of selected high impact health and nutrition services (*comprising primarily appropriate infant and young child feeding practices, identification and care of SAM children, routine immunisation, antenatal care services, adolescent and maternal anemia*) is at least 90 percent. Of these proposed selected high impact interventions, the state had made significant progress in adoption of correct practices such as timely introduction of breast milk and exclusive breastfeeding practices. With high percentage of mothers following exclusive breastfeeding in the first 6 months, the incidence of diarrhoea was observed to be very low. It was evident that such universal adoption of child-maternal care behaviours at family level had helped in breaking the infection-nutrition cycle. Additionally, promotion of use of safe water source and use of proper methods of safe water storage and safe method of drawing water at home level possibly contributed to further reducing the occurrence of diarrhoea and other water-borne infections.

The evaluation findings revealed almost half of women were undernourished with a BMI of less than 18.5 and remained one of the important underlying causes of undernutrition (Figure XXII). The health and social status of women was very poor. Early marriage below 18 years was almost 40 percent while conception prior to 20 years was reported in 6 out of 10 women. Every second

women was undernourished. Poor nutritional status of mother, high incidence of anemia and poor weight gain during pregnancy are known to be detrimental in the growth of the foetus and increases the incidence of Low Birth Weight (LBW).

The incidence of LBW was high---43.6 percent children were born less than 2.5 kg or LBW. A significantly higher percentage of children under three years who were LBW were reported to be underweight (46.2% underweight prevalence rate in under threes in LBWs and 42.2 % in non-LBW) and stunted (47.6 % stunted children in under threes in LBWs and 41.5 % in non-LBW). It is well known that the chances of LBWs growing into normally nourished young children are lower. In the recent HUNNGaMA survey 2011 findings, it was noted that the prevalence of underweight is significantly higher among children who were born with a birth weight below 2.5 kg –the prevalence rate being 49.9 % among low birth weight children and 33.5 percent among normal birth weight children. Similarly, the chance of LBW children remaining stunted is much higher unless special measures are taken to prevent LBW. It is therefore important to ensure that women are supported to prevent conception below 20 years, enter pregnancy with adequate body mass index (BMI) and gain body weight of at least 10-12 kg during the pregnancy period for increasing the chances of giving birth to a baby who is not low birth weight (LBW).

In the NSI project, as a part of ANC services, effort was made to encourage pregnant mothers to increase intake of quantity and quality of food during pregnancy but the impact was not noted on appropriate weight gain. It is important to ensure that women enter pregnancy with acceptable height and weight and are not anemic. All adolescent girls on a fixed day of the week should be provided with weekly supply of Iron-folic acid (IFA) tablets and counseled to adhere to weekly fixed day consumption. The NSI project inputs were noted to have increased the percentage of women weighed and also increased the percentage of mothers counseled for additional food intake. However, impact on maternal weight gain remained rather poor. The supply and consumption of IFA tablets was noted to be significantly improved in the NSI project blocks but the consumption of minimum recommended 100 IFA tablets remained rather low possibly due to inadequate IFA supply.

The NSI project also aimed to address the underlying cause of undernutrition by addressing the problem of inadequate access to essential food items by creating awareness of the entitlement to services of the Public Distribution System (PDS) and promotion of kitchen gardens. For this add on activities, block level persons referred as *Poshan Fellows* were recruited and positioned as a part of the NSI project strategy. Though one third households in both the project and comparison blocks were found to be food insecure, a much better scenario was observed in the NSI project areas---a higher percentage of families (85.3 percent) had minimum three square meals each day in the project blocks as compared to non-NSI blocks (79.2 percent). The frequency of times that less food was eaten by women so that there is more food for the rest of the family was reported be rare or never by over 93 percent women in both the project and the comparison blocks. The overall positive food security situation observed in the entire Chhattisgarh state can be attributed to the very high political priority that has been accorded to streamlining the food security programme of the PDS. The dissemination of information on entitlement to PDS in the NSI project area was significantly higher but made no significant additional difference since the state PDS system was very well organised.

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6. Conclusion:

The NSI project 2005-2010 achieved the following three primary and secondary outcomes ---i) reduction in the percentage of undernourished children under 36 months –underweight reduction of 12.1 percent in absolute terms and 25.3 percent in relative terms ii) significant increase in knowledge and practice regarding child feeding and iii) improved access to household food security measures such as the knowledge and access to the Public Distribution System (PDS).

The Mitanin Initiative has been in operation in the entire state since 2002 and there has been an effort to merge the positive elements of the innovative NSI projects in the entire state. The improvement in nutritional status in the entire state was therefore evident in both the NSI as well as non-NSI comparison blocks .The impact was noted to be slightly better in the NSI project blocks but was not statistically significant. The findings indicate that regular monthly visits by Mitanins to selected families i.e. families having pregnant women, newborns and infants can make a significant difference in addressing the immediate and underlying causes of undernutrition, The contribution of Mitanins could be further strengthened by helping them to plan regular home visits to families who are at the highest risk of undernutrition i.e. families with pregnant women, children under two years, newly weds and with severe undernourished children below five years..

In Chhattisgarh state, programme inputs for improving education, health, nutrition and social status of women appears critical for further improving the nutrition scenario. In fact, the very high incidence of low birth weight reported in the state emphasize the need to address the nutritional status of women throughout the life cycle, with special care of adolescent girls and ensuring girls enter pregnancy after gaining optimum height and weight. Further, the state needs to direct efforts for universally imparting at least middle school education to all girls and delaying the age of first conception to over 20 years.

The first 1000 days of life from conception to the second year of life a child is the most critical period for taking measures to reduce undernutrition. There is an urgent need to bridge the existing gaps and ensure universal coverage of beneficiaries with identified selected high impact nutrition actions . For accelerating such coverage, community based volunteers such as Mitanins could continue to play a very positive role. Promotion of appropriate quality child feeding practices (with a much higher attention on promotion of appropriate complementary feeding practices such as use of food items from at least 2-3 food groups , frequent feeding, improving density of food and feeding during illness), ensuring universal routine child immunisation for disease prevention and timely and complete antenatal care is critical for further accelerating the rate of reduction of undernutrition in the state. Additionally, training and involving Mitanins in identifying and managing cases of severe acute malnutrition (SAM) is important. Community based detection and care of SAM cases should be made an integral part of functions of Mitanins.

The findings reveal successful implementation of the PDS in state. The findings emphasize that PDS and food security interventions need to be combined with special emphasis on appropriate child feeding practices and care of women in reproductive age. The evaluation findings reconfirm that there is an urgent need to follow the lessons learned from the Mitanin initiatives by the Health and Family Welfare Departments of the states for spearheading the implementation of selected nutrition actions in the first 1000 days of life. Today, the NRHM programme of the Health sector in the country is systematically working towards universal coverage of all pregnant women with antenatal care and institutional delivery services as well as universal coverage of infants with complete routine immunisation. There is a need to build on these service contacts for selected

nutrition actions in the first 1000 days and accelerating in reducing undernutrition prevalence rates in children.

The Mitadin Initiative demonstrates the central role that can be played by ASHAs of NRHM programme in health and nutrition care of under twos and in influencing family maternal-child care practices. ASHAs training could be further strengthened by appropriate inputs in micro-planning of home visits to selected families who are at the highest risk of undernutrition---pregnant mothers, children below two years, newlyweds. For ASHAs to be effective counselors and community mobilisers, the desirable ratio to population coverage should be 1: 500. Moreover, training in NRHM should ensure that as in the case of Mitadins, ASHAs should be trained for planning and undertaking frequent home visits to select identified families for promotion of child feeding and maternal care practices and for linking up of these families with ANMs for coverage of health services such as routine immunization, vitamin A supplements, antenatal care, care of newborns, care and feeding of LBWs, identification and management of cases of Severe Acute Malnutrition (SAM) and administration of weekly iron-folic acid supplements (WIFS) to adolescent girls.