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Improving Maternal Nutrition in India Through Integrated Hot-Cooked Meal Programs: A Review of Implementation Evidence

Report

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

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ACRONYMS AND ABBREVIATIONS

ADI	average dietary intake
ANC	antenatal care
AWC	*Anganwadi* center
AWH	*Anganwadi* helper
AWW	*Anganwadi* worker
CDPO	Child Development Project Officer
ECD	early childhood development
FLW	frontline worker
GP	*Gram Panchayat*
HCM	hot-cooked meal
ICDS	Integrated Child Development Services
IFA	iron and folic acid
IMR	infant mortality rate
INR	Indian rupee
ITBN	insecticide-treated bed nets
JSY	*Janani Suraksha Yojana*
LBW	low birth weight
MMR	maternal mortality rate
NFSA	National Food Security Act
OFM	One Full Meal
PW	pregnant women
RDA	Recommended Dietary Allowance
RDW	recently delivered women
SNP	Supplementary Nutrition Program
SHG	self-help group
THR	Take-Home Ration
UNICEF	United Nations International Children's Education Fund
WCD	Women and Child Department

EXECUTIVE SUMMARY

Background and objectives: A notable approach to addressing maternal undernutrition during pregnancy in India in recent years has been the integration of hot-cooked meals (HCM) for pregnant and lactating women together with the provision of other health/nutrition services. Called the One Full Meal (OFM) program, these efforts aim to improve maternal nutrition and health across India by bundling center-based HCM with other nutrition services and behavior change communication implemented through the Integrated Child Development Services (ICDS) scheme. The program is offered at *anganwadi* centers (AWCs) and has been implemented in eight states in India, including Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Maharashtra, Telangana, Madhya Pradesh, and Uttar Pradesh. Although the OFM program has been implemented since 2013, there is limited consolidated insight on its effectiveness or on broader lessons for implementation. The objectives of this evidence review of the OFM program are, therefore, to (1) compare the different state OFM program models on their objectives, implementation elements, cost norms and monitoring mechanisms; (2) develop program impact pathways on the potential ways in which the program could influence intended outcomes; and (3) examine the availability of evidence underpinning the program's intended pathways to impact.

Methodology: We used a combination of approaches to bring together evidence and implementation insights on the OFM program—a desk review of available program documentation, the development of program impact pathways, an evidence review and a stakeholder consultation. First, a desk review was conducted to understand the design, implementation, and evidence on the OFM program. We examined the program objectives and its elements, duration, implementation scale, and the cost norms across the eight states mentioned above. A range of resources including government orders, government reports, state reports, and findings from any studies or assessments conducted relating to OFM were used and relevant information was summarized for each state. Second, a program impact pathway (PIP) was developed to identify and represent the multiple potential pathways through which the OFM program might have an impact on various intended outcomes. Third, we examined available evidence pertaining to the assumptions in the pathways to impact. Finally, a webinar was convened on March 31, 2020 to review the impact pathways and the evidence gaps on the OFM program and build consensus for developing a research agenda. This report summarizes insights from these efforts.

Findings: The stated objectives of the OFM program are broad and vary across states. In some states the objectives pertain to achieving proximal outcomes such as improving coverage of services and practices such as maternal dietary adequacy and improving birth weight. In other states, objectives pertain to improving distal outcomes such as mortality rates. There were similarities and consistencies in the program models adopted by most states. For instance, the OFM program model typically consists of a mid-day meal for women at the AWC, administration of iron and folic acid (IFA) and calcium, deworming, monitoring of gestational weight gain, monitoring of infant height and weight measurements, and health and nutrition counseling. The HCM itself aimed to provide about 40 percent of recommended dietary allowance (RDA) as per the National Food Security Act (NFSA), with per meal costs ranging from Indian rupees (INR) 8.75 to INR 24.00. Most states noted spending closer to INR 24.00 per meal. Chhattisgarh and Gujarat are the only states which continue to provide Take-Home Ration (THR) alongside OFM. The two main approaches to scaling up the program were observed: some states conducted a pilot and adopted a gradual scale-up model, while others rolled out the scheme to eligible beneficiaries immediately.

Using the available program documentation, a schematic representation of potential pathways to impact was developed. We outline three primary pathways that together encompass the multiple components of the OFM program: the *food pathway*, the *health and nutrition services pathway*, and the *group-based behavior change pathway*.

The evidence review found limited available research on the OFM program, unfortunately. Of the four studies that were found (three implementation research studies and one evaluation study), two implementation research studies used mixed methods while one used only qualitative methods. The scale of the studies varied, ranging from two blocks to a few districts. The studies focused primarily on implementation issues and no impact evaluations were available to assess the extent of the program's impact on maternal nutrition outcomes or on birth weight.

From the stakeholder consultations at the webinar, additional insights emerged on expansion in the focus of the OFM program over time, client-level challenges with time availability and commuting to AWCs for meals, client preferences for THR in place of HCM at an advanced stage of pregnancy, importance of peer support, mobility, and information. Participants noted the limited availability of evidence and called for additional careful research on program implementation and impact.

Recommendations and conclusions: From the implementation and evidence review, and the webinar discussions, it is apparent that the OFM program model has potential to be used as an effective platform for delivering a combination of services to pregnant women, which are essential both for fetal growth and the maternal health. The review identified key areas for program improvement, specifically around addressing known challenges around the food pathway, and investing in further strengthening the nutrition behavior change and health services pathways. Evaluations of the impact of the OFM model on coverage, nutrition behaviors, diets and biological outcomes are limited and further investments in evidence-building can help sustain investments in these programs. The review and consultation both underscored the need to invest in further implementation research on the OFM program to systematically study various program aspects to identify areas that need further strengthening, and to assess the impact of further program refinements. Together, these would help to further understand and address program implementation challenges in diverse contexts and generate evidence on the multiple pathways to impact of the OFM program. Closing evidence gaps can enable program implementers and policymakers to understand the program's benefits and effectiveness in ways that help ensure sustainability of investments in such program models.

1. INTRODUCTION

The significance of maternal nutrition, especially during pregnancy, cannot be overstated, both for fetal growth and the maternal health. The World Health Organization recommends balanced energy and protein dietary supplementation for pregnant women (PW) in undernourished populations to reduce the risk of stillbirths and small-for-gestational-age (World Health Organization 2016). Despite a strong scientific base, a policy framework that recognizes the importance of maternal nutrition and the existence of at-scale platforms for delivery of maternal health and nutrition interventions, coverage, and quality of nutritional care during pregnancy is variable across India.

One programmatic effort aimed at improving maternal nutrition and health is the One Full Meal (OFM) program, which is implemented through the ICDS scheme, at the *anganwadi* centers (AWCs). It bundles center-based hot-cooked meal (HCM) with other nutrition services and behavior change communication targeted at improving maternal nutrition and health. It is intended to be an integrated service delivery platform to deliver essential health and nutrition interventions through the OFM program in all states. Currently, it is only implemented in Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Maharashtra and Telangana. In Madhya Pradesh and Uttar Pradesh, it was implemented for a brief period between 2015 and 2017, and subsequently discontinued.

Although the OFM program has been implemented for approximately four to eight years in different states, there is limited research on its effectiveness, vis-à-vis the stated objectives. First, the program has a varied range of stated objectives aimed at improving biological outcomes, coverage of interventions, and change in health behaviors. Second, it is not known whether, or how much, this programmatic approach might deliver an added benefit over and above the existing programs for improving maternal nutrition outcomes. Third, it is not known whether, or by how much, the coverage of health services has changed through this approach and if there are any additional positive spill-over effects, including enhanced social capital for women and their mental wellbeing. Finally, and most importantly, in the current context of rising overweight and obesity among women, no study has yet assessed the suitability of the standard caloric content of the OFM program for PW; particularly in the context of the most recently revised dietary recommendations, most recent date September 2020 (Indian Council of Medical Research and National Institute of Nutrition 2020). With these range of “unknowns”, it is pertinent to examine the available evidence on the OFM program systematically. It becomes especially significant in the context of the COVID-19 pandemic when disruptions to the delivery of health and nutrition services have severely impacted PW.

1.1. OBJECTIVES

The objectives of this evidence review of the OFM program are to:

- Compare the different state models on their objectives, implementation elements, cost norms and monitoring mechanisms;
- Develop program impact pathways to examine the potential effects of the program on various outcomes; and
- Examine the availability of evidence related to the assumptions underlying the program’s intended pathways to impact.

2. METHODOLOGY

As a first step, a **desk review** of the OFM program was conducted jointly by the International Food Policy Research Institute (IFPRI) and the United Nations International Children's Education Fund (UNICEF), India. The purpose of this review was to understand the design, implementation, and evidence on the OFM program. First, we examined the program objectives and its elements, duration, implementation scale, and the cost norms. The states included in the review are those currently implementing the program—Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Maharashtra, and Telangana—or have experimented with it in the past—Madhya Pradesh and Uttar Pradesh. For the desk review, we used a range of sources including government orders, government reports, UNICEF state reports, and findings from any studies or assessments conducted relating to OFM. For each state, the most relevant information related to the following elements of the OFM programs was summarized in a matrix format (Table 1).

Second, we developed **program impact pathways** (PIP) to identify and unpack the multiple potential pathways through which the OFM program might have an impact on various intended outcomes. Using the available program documentation, a schematic representation of potential pathways to impact of the OFM program was proposed (Figure 1). Three primary pathways were outlined that encompass the multiple components of the OFM program.

Third, we **examined available evidence** pertaining to the assumptions in the pathways to impact (Table 4). We mapped available evidence onto the pathways to assess the gaps in understanding the impact of the program along the PIP.

Finally, IFPRI along with the National Institute of Nutrition (NIN), Institute for Economic Growth (IEG), and UNICEF convened a webinar on March 31, 2020 to **review the impact pathways and the evidence gaps** on the OFM program and build consensus for developing a research agenda. A presentation of an overview of the program, based on a desk review conducted by IFPRI and UNICEF, was shared in the webinar by Dr. Rasmi Avula from IFPRI. The overview included a description of various state models, the program impact pathways, and the available published evidence on the program. A panel comprising Dr. Avula Laxmaiah, from NIN, Dr. William Joe, from IEG, and Dr. Vani Sethi, from UNICEF, deliberated on the following aspects of the OFM program:

- *Program impact pathways*: Do the three primary pathways (i.e., food, health and nutrition services, and behavior change) cover all the elements of the OFM program adequately? What else should we consider?
- *Emerging evidence*: Are you aware of any additional ongoing research that can contribute to the existing evidence base on the OFM program? Which pathways and/or geographic areas do those studies cover?
- *Evidence gaps*: What are some research questions that should be explored to close the gaps in our collective understanding of the OFM program?

3. FINDINGS

Key findings from the states, in terms of program objectives, programmatic models and elements, cost norms, implementation timeframes and roll-out processes, program impact pathways and evidence around them, are summarized below.

3.1. PROGRAM OBJECTIVES, IMPLEMENTATION ELEMENTS, COST NORMS AND MONITORING MECHANISMS

3.1.1. ONE FULL MEAL PROGRAM OBJECTIVES

The objectives of the One Full Meal (OFM) program are broad and vary across states. In some states the objectives pertain to achieving proximal outcomes including improving coverage of services and practices such as maternal dietary adequacy and improving birth weight, whereas in others they pertain to improving distal outcomes such as addressing mortality rates. They range from an intent to improve biological outcomes (e.g., anemia during pregnancy, low birth weight, infant mortality rate/maternal mortality rate), improving coverage of nutrition and health interventions (e.g., antenatal care, including immunization and weight gain monitoring), to improving behavior change (e.g., consumption of iron supplements).

In states where the program objectives pertain to biological outcomes, they are focused around improving the nutritional status of pregnant and recently delivered women (RDW) and reducing the incidence of infant mortality rate (IMR), maternal mortality rate (MMR), low birth weight (LBW) and anemia. For example, reducing IMR and MMR are the stated objectives in Andhra Pradesh, Karnataka and Telangana. Reducing LBW is a key objective in these three states and in Uttar Pradesh. Reducing anemia during pregnancy is also one of the objectives in Andhra Pradesh and Karnataka.

In addition, there are objectives to improve the coverage of interventions. Three states aim to improve coverage of health and nutrition education (Chhattisgarh, Maharashtra and Uttar Pradesh), four to improve weight monitoring (Andhra Pradesh, Chhattisgarh, Karnataka and Telangana) and one state to improve antenatal care (Karnataka).

Finally, in some states one of the objectives of OFM is to change beneficiary behaviors such as improving consumption of iron and folic acid (IFA) supplements (Karnataka, Maharashtra, Telangana and Uttar Pradesh, Chhattisgarh), ensuring consumption of optimal diet.

3.1.2. PROGRAMMATIC MODELS AND ELEMENTS

To a large extent there are similarities and consistencies in the program models most states have adopted. The OFM program model typically consists of a mid-day meal—providing 40 percent of recommended dietary allowance—as per the National Food Security Act (NFSA) for women at the *anganwadi* center (AWC), administration of IFA and calcium, deworming, monitoring of gestational weight gain, monitoring of infant weight and height measurements, and health and nutrition counseling. All states have similar components of the OFM program, which includes a hot-cooked meal (HCM) for six days a week, providing from 900 kcals

(Chhattisgarh, Maharashtra and Uttar Pradesh) to 1200 kcals (Andhra Pradesh and Telangana).

Meals provided under the OFM typically consist of rice/wheat, lentils, and vegetables with egg and milk provided 5-6 days a week in most states; in Andhra Pradesh and Telangana they were provided 6 days per week. With the exception of Chhattisgarh and Gujarat, Take-Home Ration (THR) was discontinued in all states.

Meals are mandatorily provided at AWCs to avoid intra-household sharing of food. However, some states such as Karnataka and Telangana have made provisions to provide women with OFM at home during the last month of pregnancy and the first month post-delivery. Chhattisgarh and Gujarat are the only states which continue to provide THR alongside OFM.

In all states, *anganwadi* workers (AWW) and *anganwadi* helpers (AWH) have the additional responsibilities of preparing and serving OFM to beneficiaries. AWWs also have the additional responsibilities of managing registers and conducting additional home visits to spread awareness and mobilize eligible women to participate. The scheme is promoted as an integrated service delivery platform to link essential health and nutrition interventions through the OFM in all states.

Through the OFM platform, the states provide IFA supplements, assess weight gain during pregnancy, and distribute bed nets in malaria endemic areas, and provide counseling on health, hygiene and nutrition topics including pregnancy and delivery care and breastfeeding. Further information on state program implementation models is available in Table 1.

TABLE 1. PROGRAM IMPLEMENTATION MODEL BY STATE

State	Andhra Pradesh *Anna Amrutha Hastham*	Chhattisgarh *Mahtari Jatan Yojana*	Gujarat *Poshan Sudha Scheme*	Karnataka *Mathrupoorna Yojana*	Madhya Pradesh *Atal Bihari Vajpayee Bal Arogya Poshan Yojana*	Maharashtra *APJ Kalam Amrut Aahar Yojana*	Telangana *Arogya Lakshmi*	Uttar Pradesh *Hausla Poshan Yojana*
Objectives	• Provide HCM at AWCs. • Increase enrolment at AWC. • Ensure food is consumed by women only. • Bridge the gap in energy and protein requirements for PW and LW. • Reduce number of anemic and undernourished PW and LW. • Reduce LBW & undernourished children. • Reduce IMR and MMR.	• Provide special care of PW. • Provide nutrition and health education to PW. • Provide information on pregnancy care and institutional delivery. • Weight gain monitoring.	• Improve the nutritional status of PW and LW. • Provide HCM daily at AWCs.	• Increase AWC registration of PW/RDW. • Ensure food is consumed by women only. • Ensure consumption of 100+ IFA tablets. • Ensure ANC, health check-ups and immunization. • Bridge the gap between RDA and ADI. • Improve nutritional status of PW and LW. • Reduce number of LBW & undernourished children. • Reduce number of anemic PW and LW. • Reduce IMR/MMR.	• Improve health and nutritional status of PW/RDW.	• Increase registration of all eligible PW/RDW in AWC catchment area. • Provide HCM for PW/RDW in AWCs under Scheduled and tribal areas. • Provide IFA & other medicines. • Ensure health check-ups children. • Promote health and nutrition education.	• Increase registration at AWCs. • Ensure food is consumed by women only. • Enhance quality of food supplements through HCM. • Bridging the gap between RDA and ADI. • Ensure micronutrient consumption. • Ensure health check-ups, immunization. • Reduce anemia & undernutrition in PW and LW. • Reducing LBW & undernutrition among children. • Reduce IMR and MMR.	• Bridge the calorie and protein gap. • Ensure micronutrient consumption. • Promote health and nutrition education. • Improve malnutrition among PW. • Prevent LBW.
Program elements	• 6 days /week: HCM + egg +200ml milk for PW/RDW. • Administer IFA &calcium.	• 6 days /week: HCM for PW. • Distribute IFA tablet. • THR provision (450grams/week per PW) continued.	• Daily one-time HCM at the AWC to pregnant and lactating women. • Administer IFA.	• 6 days/week: HCM for PW/RDW. • Mandatory consumption of IFA at AWC after meal. • Deworming.	• One HCM for PW&RDW women • PW/RDW provided with fruit/laddu prepared using	• 6 days/week: HCM for PW/RDW. • Counsel on care during pregnancy,	• 6 days/week: HCM + egg for pregnant and lactating women. • 30 days: 200ml milk. • 100+ IFA tablets.	• HCM only for PW. • Administering of IFA. • Counseling on institutional

State	Andhra Pradesh *Anna Amrutha Hastham*	Chhattisgarh *Mahtari Jatan Yojana*	Gujarat *Poshan Sudha Scheme*	Karnataka *Mathrupoorna Yojana*	Madhya Pradesh *Atal Bihari Vajpayee Bal Arogya Poshan Yojana*	Maharashtra *APJ Kalam Amrut Aahar Yojana*	Telangana *Arogya Lakshmi*	Uttar Pradesh *Hausla Poshan Yojana*
	• Distribute ITBN in malaria areas. • Check gestational weight gain + Hb. • Health and nutrition counseling. • Conduct additional home visits. • THR discontinued for PW/RDW. • Nutrient information: Energy= 1053 kcal; protein = 33 grams; calcium= 500 mg. (Provides ≥40 percent daily requirement of energy, protein, and calcium for PW and LW. • Responsible personnel: AWW/AWH.	• Nutrient information: • Full meal: Energy= 913.7 kcal; protein= 21.5 grams • THR: Energy= 308 kcal; protein= 9.6 grams • Total: Energy=1221.7 kcal; protein= 31.0 grams. • Responsible personnel: AWW/AWH.	• Counseling on nutrition and health. • Check gestational weight gain.	• 4 ANC, post-natal care. • Monthly growth monitoring for women. • Health and nutrition counseling. • Link beneficiaries to JSY. • THR discontinued.	THR/halwa every afternoon. • THR provided. • Counseling on health and nutrition. • *Nutrient information:* Energy= 1157kcal; protein= 31grams.	breastfeeding practices. • Growth monitoring of PW and newborn children. • *Nutrient information*: Energy= 910kcal; protein= 29.54 grams; fat= 33.48 grams; calcium= 91.35mg; iron= 6.57mg. • THR discontinued for PW/RDW. • AWH to deliver meals at home for women in their last month of pregnancy and for one month after delivery.	• Calcium and deworming. • Check gestational weight gain + Hb. • Additional home visit from 20th–40th week for women with <3kgs weight gain. • Nutrition and health counseling. • Community sensitization, joint capacity development of FLWs and women groups. • THR discontinued for PW/RDW. • *Nutrient information:* Energy= 1192 kcal; protein= 37 grams; calcium= 579 mg. • RDA met: Energy= 40 percent; protein= 50 percent; calcium = 100 percent; average 47 percent RDA. • *Responsible personnel:* AWW/AWH.	deliveries and breast feeding. • *Nutrient information*: Energy= 863.33kcal; protein= 28.66 grams. • *Responsible personnel:* Gram Pradhan for getting the food prepared and AWW for distributing it.

State	Andhra Pradesh *Anna Amrutha Hastham*	Chhattisgarh *Mahtari Jatan Yojana*	Gujarat *Poshan Sudha Scheme*	Karnataka *Mathrupoorna Yojana*	Madhya Pradesh *Atal Bihari Vajpayee Bal Arogya Poshan Yojana*	Maharashtra *APJ Kalam Amrut Aahar Yojana*	Telangana *Arogya Lakshmi*	Uttar Pradesh *Hausla Poshan Yojana*
Program roll out	• Launched in 2013 in 102 ICDS projects. • Extended in 2014 to 104 additional ICDS projects. • Universalized in 2017.	• Launched in May 2016 in one district and then scaled-up to all 28 districts.	• Launched in 2017, as a pilot project in six Vikassheel Taluka of five tribal districts (Chhotaudepur, Mahisagar, Dahod, Valsad and Narmada). • Approximately more than 26000 pregnant and lactating women are enrolled.	• Launched in 2017 in 5 ICDS projects in 4 districts. • Decision to scale-up to entire state in October 2017.	• Launched in August 2015. • Piloted in 5 districts: 39 projects.	• Launched in 2015 in all AWCs under scheduled and tribal areas. • 16 districts: 85 ICDS projects in scheduled areas; covers 16,030 AWCs and 2,013 mini AWCs.	• Launched in 2013. • Universalized in December 2014.	• Launched in June 2016 as a trial in 7840 *gram sabhas*.
Currently implemented	Yes	Yes	Yes	Yes	Discontinued February 2017	Yes	Yes	No - discontinued in 2017
Costs/allocations	• *Meal cost:* INR 23.50. • *Other costs/allocation*: INR 173 crores for extension. • *Current budget allocation:* INR 800 crores	• *Meal cost:* INR 9.50 per meal/day • *THR:* INR 3.75/100grams.	• *Meal cost:* INR 11 per mother + supplies of grains through PDS.	• *Meal cost:* INR 21. • *Infrastructure*: INR 500–7000 for utensils; INR 1500 for weighing scales. • *Worker incentives:* INR 500/mini-AWC for additional helper; increase in honorarium for AWW (INR 2000) and AWH (INR 1000). • *Other costs:* INR 18 lakhs on capacity building during pilot phase; INR 302 crores for extension to 30 districts.		• *Meal cost:* INR 25. • *Infrastructure:* INR 1000 one-time allocation for utensils. • *Worker incentives:* INR 250 per month for AWW/AWH.	• *Meal cost:* INR 24. • *Worker incentives (INR): INR* 250 per month to AWH. • *Other costs: A*dditional INR 94 crores to extend to all AWCs (2014).	• *Meal cost:* INR 18.

Source: (Department for Women 2017a, b, 2012, Government of Andhra Pradesh Representative 2017, United Nations Children's Fund 2017a, b, Department of Women and Child Development Representative 2017a, Department of Women and Child Development 2016a, Indian Institute of Public Health Gandhinagar n.d., Deepa Cholan 2017, Department of Women and Child Development 2016b, 2017a, b, Department of Women and Child Development and United Nations Children's Fund 2017, Department of Women and Child Development Representative 2017b, Department of Women and Child Development n.d., Schedule Tribe Development Division 2015, 2016b, a, Department of Women Development and Child Welfare Representative n.d., Department for Women 2014, 2015b, a, Department for Women Development and Child Welfare Representative 2017, United Nations Children's Fund 2017c)

Note: In Telangana and in Andhra Pradesh the Women, Child, Disabled and Senior Citizens Department was responsible for the implementation of the program, while in the remaining states it was the Women and Child Development Department. ADI = Acceptable daily intake; AWC = *Anganwadi* center; AWH = *Anganwadi* helper; AWW = *Anganwadi* worker; Hb = Hemoglobin; HCM = Hot-cooked meal; IFA = Iron and folic acid; IMR = Infant mortality rate; LBW = Low birthweight; LW = Lactating women; MMR = Maternal mortality rate; PW = Pregnant women; RDW = Recently delivered women; THR = Take-Home Ration; ANC = Antenatal care; ICDS = Integrated Child Development Services; JSY = *Janani Suraksha Yojana*; ITBN = Insecticide-treated bed net.

3.1.3. COST NORMS

The per meal costs ranged from INR 8.75 to INR 24.00, with most states spending closer to INR 24.00. Additional costs in some states included incentives to FLWs, utensils, and weighing scales. Table 2 below summarizes the cost information available for the states covered in this review.

TABLE 2. ONE FULL MEAL COST NORMS, IN INR

State	Meal costs (INR)	Infrastructure costs (INR)	Worker incentives (INR)	Other costs/allocations (INR)	Department responsible
Andhra Pradesh	21	—	—	173 crores for extension. Current budget allocation: 800 crores	Women, Child, Disabled and Senior Citizens Department
Chhattisgarh	9.50/meal 3.75 for 100 g THR	—	—	—	Women and Child Development
Gujarat	11/mother + supplies of grains through PDS	—	1 per beneficiary 6days/week to AWW and to AWH	—	Woman and Child Development
Karnataka	21	7000/AWC or 5000/mini-AWC for utensils; 1500 per AWC for weighing scales	500/mini-AWC for additional helper	18 lakhs on capacity building during pilot phase 302 crores for extension to 30 districts	Women and Child Development
Madhya Pradesh	—	—	—	—	Women and Child Development
Maharashtra	25	1000 one-time allocation for utensils	250 per month to AWW/AWH	—	Schedule Tribe Development Division
Telangana	21	—	250 per month to AWH	Additional 94 crores to extend to all AWCs(2014)	Women, Child, Disabled and Senior Citizens Department
Uttar Pradesh	18	—	—	—	Women and Child Development

Source: (Department for Women 2017a, b, 2012, Government of Andhra Pradesh Representative 2017, United Nations Children's Fund 2017a, b, Department of Women and Child Development Representative 2017a, Department of Women and Child Development 2016a, Indian Institute of Public Health Gandhinagar n.d., Deepa Cholan 2017, Department of Women and Child Development 2016b, 2017a, b, Department of Women and Child Development and United Nations Children's Fund 2017, Department of Women and Child Development Representative 2017b, Department of Women and Child Development n.d., Schedule Tribe Development Division 2015, 2016b, a, Department of Women Development and Child Welfare Representative n.d., Department for Women 2014, 2015b, a, Department for Women Development and Child Welfare Representative 2017, United Nations Children's Fund 2017c)

Note: — = No information; AWC = *Anganwadi* center; AWH = *Anganwadi* helper; AWW = *Anganwadi* worker; THR = Take-Home Ration; PDS = Public Distribution System.

3.2. IMPLEMENTATION TIMEFRAMES AND ROLL-OUT PROCESSES

There is substantial variation in models adopted by states. Two main approaches were observed: some states conducted a pilot and adopted a gradual scale-up model, while others rolled out the scheme to eligible beneficiaries immediately (Table 3). Pilots were conducted by Karnataka, Andhra Pradesh, Telangana, and Madhya Pradesh prior to a decision to scale-up. Of these, Madhya Pradesh was the only state which discontinued the scheme after a trial. In Gujarat, the scheme started on a pilot basis in selected tribal blocks. There is no information about pilots conducted or staged scale-up processes in Maharashtra, and Uttar Pradesh. Table 3 below summarizes the timeframes and approaches to the roll-out of OFM across states.

TABLE 3. IMPLEMENTATION TIMEFRAME AND ROLL-OUT PROCESS

State	OFM launch	Roll-out process	Present status
Andhra Pradesh	January 2013	• Launched in 2013 in 102 ICDS projects • Extended in 2014 to 104 additional ICDS projects • Universalized in 2017 to entire state	OFM currently implemented
Chhattisgarh	May 2016	• Initially launched in one district and later scaled-up to entire state	OFM currently implemented
Gujarat	2017	• Launched as a pilot project in 6tribal blocks of 5 districts	OFM currently implemented
Karnataka	January 2017	• Piloted in 5 ICDS projects across 4 districts prior to scale-up • Decision to scale-up to entire state in October 2017	OFM currently implemented
Madhya Pradesh	August 2015	• Pilot conducted in 5 tribal districts • Decision to discontinue OFM post-pilot	OFM discontinued in February 2017
Maharashtra	December 2015	• Launched to all AWCs under scheduled and tribal areas, no staged-scale up process	OFM currently implemented
Telangana	January 2013	• Scale-up process identical to Andhra Pradesh prior to bifurcation in 2014 • Universalized in December 2014 to entire state	OFM currently implemented
Uttar Pradesh	June 2016	—	OFM discontinued in 2017

Source: (Department for Women 2017a, b, 2012, Government of Andhra Pradesh Representative 2017, United Nations Children's Fund 2017a, b, Department of Women and Child Development Representative 2017a, Department of Women and Child Development 2016a, Indian Institute of Public Health Gandhinagar n.d., Deepa Cholan 2017, Department of Women and Child Development 2016b, 2017a, b, Department of Women and Child Development and United Nations Children's Fund 2017, Department of Women and Child Development Representative 2017b, Department of Women and Child Development n.d., Schedule Tribe Development Division 2015, 2016b, a, Department of Women Development and Child Welfare Representative n.d., Department for Women 2014, 2015b, a, Department for Women Development and Child Welfare Representative 2017, United Nations Children's Fund 2017c)

Note: — = No information; AWCs = *Anganwadi* centers; OFM = One Full Meal; ICDS = Integrated Child Development Services.

3.3. PROGRAM IMPACT PATHWAYS

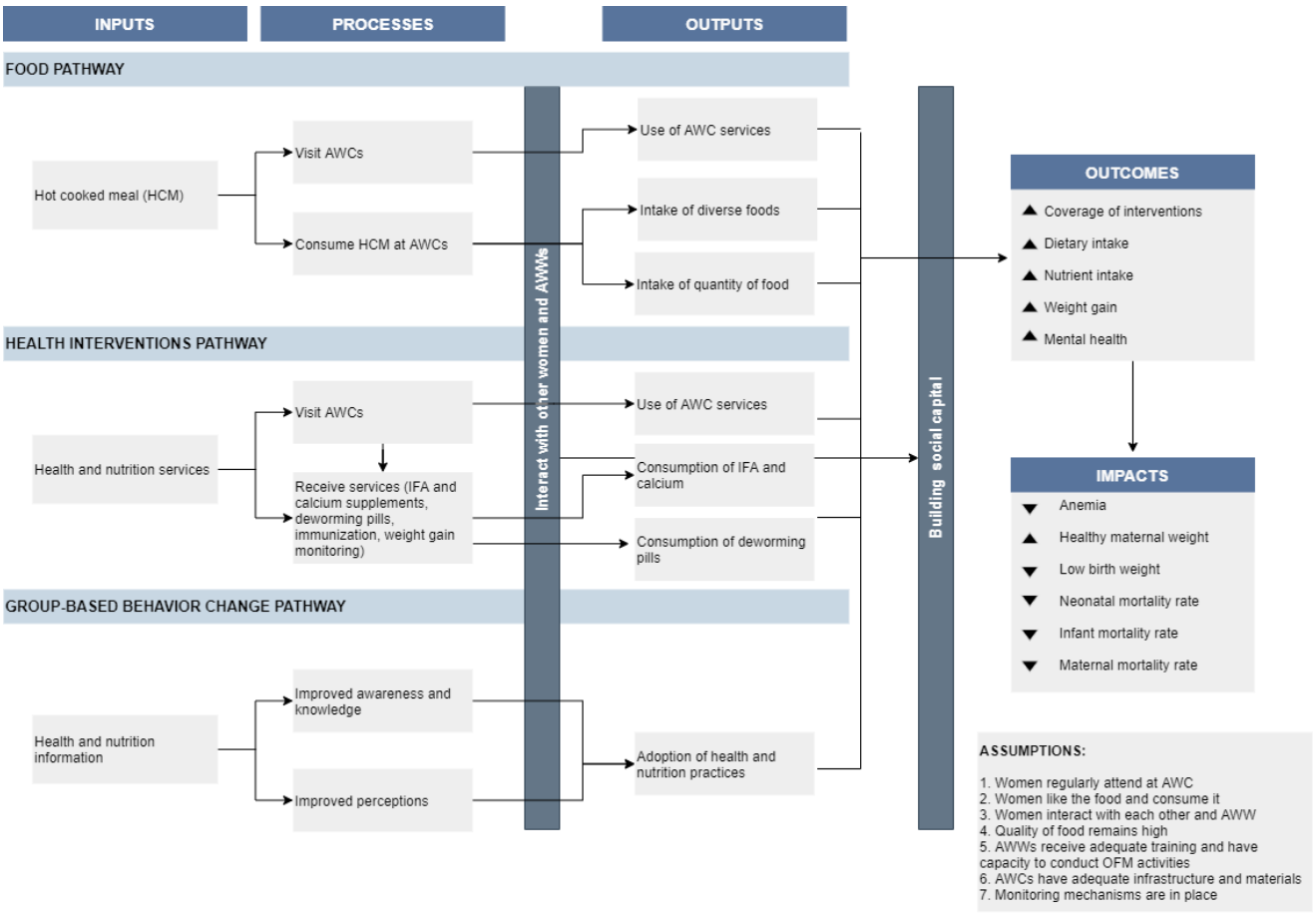
Impact pathways describe causal pathways showing the linkages between the sequence of steps in getting from inputs to impact. The starting point in a pathway is its input. In the case of the OFM these inputs comprise HCM, health and nutrition services and information. These inputs are expected to trigger a set of processes, specific to each of the inputs e.g., because HCM is served, women visit AWCs and they consume the meal, which are then expected to lead to the outputs, which in this case are use of AWCs increases. These together lead to the expected outcomes and impact, as envisioned by the programmatic goals.

Using the available program documentation, a schematic representation of potential pathways to impact of the OFM program was proposed (Figure 1). Three primary pathways were outlined that encompass the multiple components of the OFM program:

- ***The food pathway*:** In this pathway, the HCM is prepared and made available for women at the AWC; women visit the AWC to consume the meal, which contributes to their dietary diversity and subsequently better nutritional outcomes.
- ***The health and nutrition services pathway*:** In this pathway, a range of health and nutrition services, including micronutrient supplements, weight monitoring are made available at the AWC. Women visit the AWC, and receive these services, which increases the coverage of the services and contributes to better nutritional outcomes.
- ***The group-based behavior change pathway*:** In this pathway, women attend the AWCs in groups and receive their meals together with behavior change communication sessions, gaining more exposure to, and awareness of key health and nutrition concepts, and improving their knowledge and practices at home.

Key cross-cutting elements of the impact pathways are the range of interactions with other participants both at mealtime and during the group-based discussions that are anticipated to create **social capital** and contribute to **social support** and **mental wellbeing** among women.

FIGURE 1. PROPOSED PATHWAYS TO NUTRITION IMPACT



Source: IFPRI analysis.

Note: AWC = *Anganwadi* center; AWW = *Anganwadi* worker; IFA = Iron and folic acid; HCM = Hot-cooked meal; OFM = One Full Meal.

3.3.1. EVIDENCE ON PROGRAM IMPACT PATHWAYS

An impact pathway makes the programmatic assumptions explicit. The assumptions behind the linkages need to be described and examined. These pathways then need to be vetted by the program implementers and finalized. This section will present the available evidence from studies along each of the impact pathways (Table 4).

There is limited research on the OFM program. Of the four studies (three implementation research studies and one evaluation study) conducted on the program, two implementation research studies used mixed methods and one only used qualitative methods. The scale of the studies varied as well ranging from two blocks to a few districts. A combination of household surveys, review of program management and information systems (MIS) and qualitative interviews were used. The only available impact evaluation study was an ex-post quasi-experimental evaluation; it did not include a pre-post design. In the states where OFM was discontinued (Madhya Pradesh and Uttar Pradesh), there was limited availability of information on the reasons why the programs were initiated and then stopped.

Mapping the available evidence onto the impact pathways (Table 4), we find that most studies focused on the **food pathway**. Findings pertaining to the evidence on the food pathway indicate women regularly consuming HCM at the AWCs and most studies also indicated that women were satisfied with the quality of food. One study identified marginally lower per capita distribution of different foods and fewer number of feeding days compared to the program norms.

There was only one study examining the **health and nutrition services pathway**. It reported low consumption of IFA along with HCM. No other study reported findings related to this pathway. On the **group-based behavior change pathway**, only one study reported gaps in counseling of women. No other study reported findings related to this pathway.

All four studies reported on a range of supply- and demand-side barriers to implementation of the program. These include infrastructure constraints at the AWCs (e.g., lack of utensils, potable water, toilet facilities, etc.), delays in payment to procure ingredients, and increased workload for AWWs and AWHs. On the demand side, cultural barriers, food taboos, caste issues, family restrictions and beliefs pertaining to movement of pregnant and lactating women, lack of community awareness, and inconvenient distances or timings were barriers to the uptake of the program.

On evidence on impact of the OFM program on outcomes, one study reported lower diet diversity among women in tribal areas compared to rural areas among women who participated in the program. One study reported higher pregnancy weight gain and another study reported delivery of marginally high birth-weight babies among OFM program participants. However, these results are based on adequacy and weak plausibility because the study designs did not include a control group or used opportunistic control groups, respectively. Hence, results should be interpreted as indicative of the potential benefits of the program but not as causal or conclusive evidence of the impact of the program.

TABLE 4. AVAILABLE EVIDENCE BASE ON THE ONE FULL MEAL PROGRAM

State	Andhra Pradesh & Telangana[1]	Andhra Pradesh *Anna Amrutha Hastham*[2]	Chhattisgarh *Mahatari Jatan Yojana*[3]	Gujarat *Poshan Sudha Scheme*[4]	Karnataka: *Mathrupoorna*	
					Ethnographic study[5]	Mixed methods study[6]
Objectives	• Understand implementation. • Understand stakeholder perspectives to improve program.	• Assess effect of HCM on nutritional status of pregnant and lactating women and their children <3years of age. • Understand implementation.	• Assess the coverage of PW under *Mahatari Jatan Yojana.* • Monitor and document implementation. • Document stakeholder and beneficiary perspectives.	• Conduct concurrent evaluation of the *Poshan Sudha* scheme	• Review pilot implementation of program and uptake by beneficiaries.	• Estimate the impact of HCM on: 1) improving weight through each trimester. 2) increasing mean hemoglobin percentage compared to baseline. 3) weight-for-length in the infants whose mothers availed HCM during pregnancy.
Study design	• Cross-sectional. • No control groups.	• Ex-post quasi-experimental design • Systematic random sampling. • Two arms: Treatment (HCM) and control (THR) group.	• Cross-sectional mixed methods study in 10 districts (Gariabandh, Koria, Rajnandgaon, Durg, Bastar, Bilaspur, Dantewada, Dhamtari, Raigarh and Sarguja). • No comparison arm.	• Cross sectional mixed methods study: No control group; 6 *talukas* in 5 districts- Chhotaudepur, Mahisagar, Dahod, Valsad and Narmada	• Cross-sectional ethnographic study conducted in the pilot phase: Implementation blocks= H.D. Kote (Mysore) and Jamakhandi (Bagalkote district) • No control group.	• Cohort study design/Mixed methods study: 4 *taluks* (Manvi (Raichur), HD Kote (Mysore), Saundatti (Belgaum) & Pavagada (Tumkur). • No control group. • Two groups: Women who consumed HCM for more than 75 days; women who consumed HCM for less than 75 days
Data sources	• Quantitative survey	• Quantitative survey.	• Household survey.	• Quantitative survey.	• Qualitative methods.	• Quantitative survey with women.

State	Andhra Pradesh & Telangana[1]	Andhra Pradesh *Anna Amrutha Hastham*[2]	Chhattisgarh *Mahatari Jatan Yojana*[3]	Gujarat *Poshan Sudha Scheme*[4]	Karnataka: *Mathrupoorna*	
					Ethnographic study[5]	Mixed methods study[6]
	• 24-hour dietary recall in 59 women. • MIS. • Open-space work and informal interviews with ICDS staff.	• 24-hour dietary recall with 516 women. • In-depth interviews • Institutional diet survey in 128 AWCs. • Existing records used to examine weight gain and birth weight.	• MIS (AWC register used to check weight gain). • Qualitative interviews.	• Focus group discussions.		• Qualitative method (in-depth interviews (N = 9), focus group discussions (N = 6)) with AWWs and women.
Sample size	• 360 PW& 360 LW. • 60 AWCs.	• 578 PW and 956 LW in treatment areas. • 538 PW and 1034 LW in control areas. • 131 AWWs, 109 ICDS supervisors and 58 CDPOs	• 800 PW & 200 LW;10 districts.	• 88 AWCs • 503 beneficiaries (251 PW& 252 LW). • 88 AWWs. • 12 *Mukhya Sevikas.* • 7 CDPOs. • 4 Program Officers.	• 10 AWCs.	• 1257 PW from 321 AWCs.
Findings	Food pathway: • MIS results: On average, food was consumed for 17 to 22 days Services pathway: No evidence. Information pathway: • Gaps in counselling Implementation issues: • Lack of community ownership • Issues with basic cooking, water, and	Food pathway: • Institutional diet survey at AWCs indicated that per capita distribution of different foods and nutrients under HCM program was marginally lower than program norms. • Total number of feeding days for PW (102) and LW (130) were lower than the norm of 150 days. • 78 percent PW and 80 percent LW consumed meals	Food pathway: • Higher proportion of beneficiaries from tribal and rural households consumed the meals. • BPL, OBC more likely to use the program. • Sixty-five percent of women consumed the meals 4 to times per week. Services pathway: No evidence. Information pathway: No evidence.	Food pathway: • More than 80 percent of PW and LW consumed food at AWCs. • Almost 83 percent of PW and 91 percent of LW were satisfied with the quantity of food; 88 percent of PW women and 97 percent of LW were satisfied with the quality of food. Services pathway: No evidence.	Food pathway: No evidence. Services pathway: No evidence. Information pathway: No evidence. Implementation issues: • Varied uptake across two blocks • H.D. Kote block: Beneficiaries made a written appeal refusing to cooperate with the scheme and	Food pathway: No evidence. Services pathway: No evidence. Information pathway: No evidence. Implementation issues: • AWWs perceived cultural beliefs, caste system, family restrictions and distance from home to AWCs as barriers to participation. • Lack of potable water, toilet facilities and lack

State	Andhra Pradesh & Telangana[1]	Andhra Pradesh *Anna Amrutha Hastham*[2]	Chhattisgarh *Mahatari Jatan Yojana*[3]	Gujarat *Poshan Sudha Scheme*[4]	Karnataka: *Mathrupoorna*	
					Ethnographic study[5]	Mixed methods study[6]
	sanitation infrastructure. • Low beneficiary attendance. Outcomes: • Minimum dietary diversity lower in tribal areas compared to rural areas. • Estimated mean weight gain between the 2nd & 9th month of pregnancy ranged from 8.3 to 9.7 kg.	under supervision of AWWs. • Women felt that quality of food was moderate to good. Services pathway: • Low consumption of IFA along with cooked meals. Information pathway: No evidence. Implementation issues: • Only 34 percent AWWs received training on the HCM program. • AWWs expressed concerns about poor quality of rice and irregular supply of food grains. Outcomes: • Consumption of *all* foods except cereals lower than RDI and nutrient intakes lower than RDA. • Mean gestational weight gain marginally higher in control areas.	Implementation issues: • Distance to AWC, caste, and food taboos were deterrents to use of the program. Outcomes: No evidence.	Information pathway: No evidence. Implementation issues: • Almost 80 percent of the AWWs reported that they received training for *Poshan Sudha.* • Seventy five percent of the AWWs were satisfied with the quality of ration that they received for *Poshan Sudha*. • Forty one percent of women had some food taboos. Outcomes: No evidence.	preferring THR over HCM. • In one of the 5 AWCs, HCM program functioned well where the right combination of infrastructure, worker-beneficiary relationships, and caste composition was favorable. • Political and vested interests for THR at the district and panchayat levels were sabotaging HCM implementation. • Infrastructure gaps, human resource issues: Lack of gas cylinders (AWH used her home resources to prepare food for women), washing facilities, utensils, water and toilets. • In the absence of an AWH (e.g., mini AWCs) workload increased for AWWs. AWWs had to maintain additional registers and also visit homes in the afternoon to call women to eat the food.	of infrastructure were other barriers. • Along with several other duties, cooking and maintaining records related to HCM was perceived as extra work by AWWs and it interfered with their other responsibilities. Qualitative study findings showed: • AWWs perceived availability of free nutritious food, improvement in weight and hemoglobin, opportunity for mental wellbeing and psychological support as facilitators to participation in the program. Outcomes: Mothers who consumed HCM>75 days had: • improved weight gain (total average from 1st to 3rd trimester 10.27 kgs.) • an increase in hemoglobin (average 0.52 percent from 1st to 3rd trimester)

State	Andhra Pradesh & Telangana[1]	Andhra Pradesh *Anna Amrutha Hastham*[2]	Chhattisgarh *Mahatari Jatan Yojana*[3]	Gujarat *Poshan Sudha Scheme*[4]	Karnataka: *Mathrupoorna*	
					Ethnographic study[5]	Mixed methods study[6]
		• Prevalence of LBW similar in both areas (13 percent).			• Need for adequate training of FLWs. • Need for consensus building with district level staff, FLWs, and community members. • Taste preferences, superstitions, caste prejudices, distance from AWC, better quality food at home were some factors resulting in low attendance for the HCM. Outcomes: No evidence.	• delivered babies with nearly 10 grams higher birth weight (2.84 v/s 2.74 kg) • Six percent decrease in symptoms of depression

Source: ([1]Sethi et al. 2019, [2]National Institute of Nutrition 2016, [3]Institute of Economic Growth and United Nations Children's Fund 2019, [4]Indian Institute of Public Health Gandhinagar n.d., [4]Giridhara R Babu et al. 2020, [5]United Nations Children's Fund and Centre for Budget and Policy Studies 2017)

Note: ANC = Antenatal care; AWC = *Anganwadi* center; AWH = *Anganwadi* helper; AWW = *Anganwadi* worker; BPL = Below poverty line; CDPO = Child Development Project Officer; FLW = Frontline worker; HCM = Hot-cooked meal; ICDS = Integrated Child Development Services; IFA = Iron and folic acid; THR = Take-Home Ration; LW = Lactating women; MIS = Management information system; OBC = Other backward classes; OFM = One Full Meal; PW = Pregnant women; RDA = Recommended dietary allowance. .

To further discuss the evidence base for community-based maternal nutrition programs that include HCM for pregnant and lactating women, and gather deeper insights into the program, a webinar was organized on March 31, 2020. The event, titled "*Improving maternal nutrition: A review of evidence on the One Full Meal program*" was co-hosted by the ICMR-National Institute of Nutrition (NIN), Hyderabad, Institute of Economic Growth (IEG), International Food Policy Research Institute (IFPRI), and UNICEF. The webinar was used as a platform to receive inputs from the participants on the program impact pathways.

The following insights emerged from the webinar discussions:

- ***Expansion in program focus over time*:** When the OFM program was initiated in 2013, it started in very poor and food insecure areas, as are placement meal for THR. Hence the focus was primarily on the food pathway. After 2017, components of behavior change, and health services were added. From 2019 onwards, gender and mental health pathway are also being explored, with a focus on peer learning, women's employment and helping women in situations of domestic violence.
- ***Problems with time availability and commuting to AWCs for meals*:** From an evaluation conducted by the Indian Institute of Public Health, Gandhinagar (Gujarat), it emerged that in tribal areas, where most mothers are working as agricultural workers, they are not available in the house or at the AWCs when OFM is provided. A similar finding emerged from the tribal areas in Chhattisgarh, where coming to the AWCs was a challenge for PW because the hamlets and communities are remote and scattered.
- ***Preference for THR in place of HCM at an advanced stage of pregnancy*:** Evidence from Chhattisgarh showed that although PW were pleased with the HCM served in *aakarshak thali*, those in their third trimesters preferred receiving THR as it could be delivered at home and did not involve a commute to the AWC.
- ***Peer support, mobility & information*:** Findings from small process evaluation conducted by the Centre for Policy and Budget in four districts of Karnataka, showed that PW valued their interactions with other PW at the AWCs, providing them with not only much needed community support, but also valuable information about different government schemes.
- ***Limited availability of evidence*:** From the existing studies, evidence was mostly available on the food pathway. There was very little evidence on the health interventions pathway or the group-based behavior change pathway, and almost none on the cross-cutting social capital pathway. In general, there is limited independent research examining the OFM program and nearly no rigorous evidence on the impact of the program on its multiple stated objectives. The research conducted has been variable in scale, rigor, and depth.
- ***Limited information on the reasons for discontinuation*:** In Madhya Pradesh and Uttar Pradesh, the OFM program was implemented for a brief period between 2015 and 2017, and subsequently discontinued. There is some information available from a UNICEF assessment report for Madhya Pradesh (Box 1). However, no such information is available in the case of Uttar Pradesh.

BOX 1. ATAL BIHARI VAJPAYI BAAL AAROGYA EVAM POSHAN MISSION – ONE FULL MEAL PROGRAM IN MADHYA PRADESH

In Madhya Pradesh (MP), the OFM program was piloted through the *Atal Bihari Vajpayi Baal Aarogya Evam Poshan Mission*, from August 2015 to February 2017, in the fivetribal districts of Alirajpur, Barwani, Dindori, Satna and Umaria.

Objective: The objective was to improve the health and nutritional status of pregnant and lactating (P&L) mothers by improving their BMI and reducing anemia.

Program elements: A hot-cooked meal, a fruit or a *laddu* prepared using the Take-Home Ration were provided to pregnant and lactating (P&L) mothers once a day along with counselling on health and nutrition. In addition, mothers received Take-Home Ration (THR). The food was prepared by the self-help group (SHG) members who provide food for the school meals program.

Program assessment: A study was conducted between July and August 2017 to identify gaps and challenges in implementation of the OFM program to make recommendations to address them. The study was conducted with technical support from UNICEF. The district program officers (N=5), the child development project officers (N=15), supervisors (N=15), *anganwadi* workers (N=15), and SHG members (N=15) were interviewed, and five focus group discussions were conducted with P&L mothers. Some of the study results were as follows:

- **Planning, preparations and inception of OFM**: The OFM program was implemented across all the five tribal districts and a high percentage of P&L women were covered in all the districts (between 83-93 percent). Most of the respondents felt that the time was not adequate for planning or for any other preparations. The majority agreed that the guidelines were clear, while some attested to a few gaps, including lack of clarity in mode of payments and supply of PDS rice and wheat to SHGs; absence of training provision and specific directives for orientation; and inflexibility in the menu.
- **Community awareness and beneficiary sensitization**: Community mobilization or beneficiary sensitization was either poor or could not be conducted due to lack of time.
- **OFM coverage and continuity in implementation**: Respondents reported continuous implementation of the scheme in less than half of the AWCs. Coverage was poor across survey districts. This could have been due to staff's poor understanding of the scheme, poor community participation and lack of community awareness.
- **Infrastructure of AWCs**: In the majority of the AWCs visited, the SHG providing the OFM was situated within the village. Most of the AWCs were large enough to host counselling sessions for P&L women and provided them with space to rest, as reported by AWWs and beneficiaries.
- **Meal timings, menu, quantity & quality:** The reasons for non-adherence to the menu varied, from SHGs not following the menu to the menu not been shared with them or their cooks. Some respondents indicated that the food was insufficient. The reasons for insufficiency included lack of funds by SHG, SHGs not functioning properly, higher attendance, and no information. The majority of the beneficiaries found the food hot and tasty.
- **Financial disbursements**: Most of the respondents agreed that the SHG payments were not done in timely manner. Some of the reasons included delayed submission of information by supervisors, delay at the district level, and the file not being cleared.
- **Other challenges**: There was poor monitoring and follow-up at the field level and lack of convergence with other departments. There was power dynamics at the level of DPO/CDPO and non-cooperation between AWWs and SHGs. Along with reports of inaction in response to feedback provided after supervisory visits, there were issues of political intervention as well.

Source: Godha, D. "Assessment report of One Full Meal scheme". n.d. UNICEF, Madhya Pradesh.

4. RECOMMENDATIONS

The recommendations that emerged from the implementation research and the webinar discussions are as follows:

On implementation, the review and the stakeholder consultations highlighted the need to address **identified program implementation challenges to** further improve the program itself. Identifying, and if necessary, testing solutions to some key challenges that have already been identified could help achieve high quality, stable implementation and high program uptake.

- ***Infrastructure to support effective implementation:*** Ensure appropriate infrastructure set-up is available at AWCs for food preparation (gas cylinder, stove, utensils, potable water) and cleaning. This includes efforts to ensure potable water and toilet facilities are available on the premises of AWCs for beneficiaries and staff to use.
- ***Staffing:*** In centers where Anganwadi helpers are not available, ensure AWWs have additional help to prepare and serve food.
- **Supplies:** Ensure that both supply and quality of raw ingredients for the food component remains stable.
- ***Demand creation:*** Raise community awareness about benefits of the OFM program and also to counter food taboos and other community beliefs that preclude or limit women from using the program. Seek collaboration from communities to help address the caste barriers that affect program use.

On implementation research, we conclude that further evidence is needed on all pathways of the OFM model, in different contexts, and on the full range of potential outcomes.

- **Invest in implementation research on all potential pathways of the One Full Meal (OFM) program**: Currently, there is limited available evidence on the OFM program and its multiple impact pathways. The available evidence is primarily focused on the food pathway. The research agenda should consider the spill-over effects, both positive (in terms of diets, social capital and other outcomes) and negative impacts (compromise in counseling and early childhood development services), considering the full range of impact pathways.
- **Generate evidence on the OFM program in different contexts:** The available implementation experiences and evidence is primarily from rural areas and tribal populations. Given rapid urbanization and high food insecurity in poor urban areas, it would be useful to generate evidence on the OFM program in an urban context. Additionally, several elements of the program – both the food pathway and the behavior change communications pathway - likely need to be updated for areas where the prevalence of overweight and obesity is high. It would be useful to generate evidence on the implementation of the OFM program with adaptations during COVOD-19 (Box 2).
- **Invest further in assessing program effectiveness**: Building on the limited impact evidence and consensus across stakeholders, we call for improving the overall evidence base on the program's effectiveness in achieving its stated objectives.

- Design robust impact evaluations in collaboration with implementation partners to assess the impact of the OFM model on coverage, nutrition and health behaviors, diets, social and biological outcomes. This will help to assess the added impact of the OFM program on maternal nutrition and birth outcomes, compared to the use of standard food supplements (take-home rations).
- Assess the cost effectiveness of the OFM program compared to existing maternal nutrition interventions in achieving positive maternal nutrition and birth outcomes.

BOX 2. STATE-SPECIFIC ADAPTATIONS TO THE ONE-FULL MEAL PROGRAM DURING THE COVID-19 PANDEMIC

The COVID-19 pandemic posed unprecedented challenges for health and nutrition service delivery across the country. When lockdown was announced in March 2020, the local administration in certain states introduced ingenious adaptations to ensure that the One Full Meal (OFM) program could continue to reach its beneficiaries. A few state-specific examples are given below.

Chhattisgarh
Prior to the pandemic, under the *Mahatari Jatan Yojana,* 2,50,000 pregnant women (PW) registered with the *anganwadi* centers (AWCs) were receiving hot-cooked meals (HCM) every day for six days a week. When the AWCs were closed and HCM was discontinued during lockdown, the Women and Child Development Department ***doubled*** the quantity of *Take-Home Ration (THR)* to ensure continuity of provision of food and proper nutrition to PW. This dry ration which replaced HCM, included cereal grains, pulses, vegetables and soya chunks/eggs. The *Mitanins* and Auxiliary Nurse Mid-Wife (ANMs) continued their home visits practicing the social distancing measures and delivered THR, and ***IFA*** and ***calcium supplements.*** The *Mitanins* and AWWs also initiated ***counselling through WhatsApp*** based audio and video messages.

During lockdown an additional initiative for supplementary nutrition in the state, *Mukhya Mantri Suposhan Abhiyaan*, which provides additional nutrition to address anemia, was also disrupted and replaced with provision of dry ration and semi perishable food such as vegetables. The ICDS and health field functionaries in Chhattisgarh are the 'unsung heroes' in COVID times, as evident in the images below.

Source: *Thakur, P., S. Sharma, M. Prajapati, F. Saiyed, and J. Zachariah. "Nourishing Wombs During Lockdown in Chhattisgarh".*

Telangana
Similarly, in Telangana, the AWCs were closed due to lockdown. In compliance with the National Food Security Act (NFSA), the Women Development and Child Welfare department started ***the doorstep delivery of THR*** for all program beneficiaries covered under the ICDS.

In Telangana, under the *Arogya Lakshmi* scheme, pregnant and lactating mothers are provided OFM a day for 25 days in a month. Each meal includes 125 gm of rice, 30 gm of lentils, and 50 gm of vegetables and condiments. In addition, an egg is given every day for 25 days and 200 ml of milk is given per day for 30 days. In the context of COVID-19, each beneficiary received 4 kg of rice, 1 kg of lentil, 500 ml of oil, 5 litres of milk, and 25 eggs.

As next steps during the pandemic, the state is developing a ***digital nutrition counselling strategy*** to deliver key nutritional messages for all ICDS program beneficiaries across the state. The state will also ***strengthen the supply chain for essential services/goods*** under the ICDS.

Below are some images from field sites in Telangana that show the continuity of the *Arogya Lakshmi* scheme.

Source: Adapting maternal nutrition services in the context of COVID-19: Telangana's story

5. CONCLUSION

Despite substantial implementation experiences, there remain limited consolidated insights about the OFM program's objectives, implementation challenges, and its impact on maternal nutrition outcomes. This review, which was accompanied by a stakeholder consultation, fills that gap. It highlights that the One Full Meal (OFM) program has immense potential to be used as an effective platform for delivering a combination of services to pregnant and lactating women which are essential both for fetal/child growth and maternal health. Improving the program implementation and uptake itself will, however, require attention to a range of factors such as infrastructure, staffing, food supplies and demand creation. Furthermore, given that the program has multiple pathways to impact, strengthening the program will require attention to all three pathways – the food pathway, the services pathway, and the behavior change pathway.

Given the limited evidence on implementation research across these multiple pathways to impact of the program, the research community in India, especially in the states implementing the OFM program, should study all aspects of the program systematically. This will help assess how well all pathways are working and where improvements are necessary to achieve the programs's multiple objectives. In addition, in systematic impact evaluation, to examine the multiple potential impacts of the program model across all three pathways, can help shed light on the multi-dimensional impacts. Evidence on impacts remains limited.

A thoughtful implementation research agenda, accompanied by routine learning engagements among implementers and researchers, can strengthen insights on the program. Evidence on the range of potential benefits and cost-effectiveness, together with insights on how best to support implementation, can also provide a strong basis to fast-track program success and improve India's progress on maternal and child health and nutrition.

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