Stuti Tripathi
Pooja Sengupta
Abhirupa Das
Marie Gaarder
Urmi Bhattacharya

Mapping implementation research on nutrition-specific interventions in India

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About this working paper

Authors of this working paper consolidate and map implementation evidence available on nutrition-specific interventions aimed at improving maternal and child health in India.

Please direct any comments or queries to Stuti Tripathi at: stripathi@3ieimpact.org.

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Stuti Tripathi
International Initiative for Impact Evaluation (3ie)

Pooja Sengupta
3ie

Abhirupa Das
Consultant, 3ie

Marie Gaarder
3ie

Urmi Bhattacharya
Consultant, 3ie

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Summary

Child malnutrition remains an important global health concern. It is a policy priority particularly for developing nations, such as India, where malnutrition is a major contributor to the disease burden. India's flagship programmes, like the Integrated Child Development Services programme and the more recent National Health Mission, include a focus on interventions that address issues of maternal and child health in the critical 1,000-day window.

Despite the good intent and resources backing these interventions, the literature assessing their effectiveness in improving nutrition outcomes remains debatable. In highlighting the limited success of these interventions, the literature discusses possible implementation failures that prevent programmes from delivering to their potential. Studying programme implementation is therefore critical, as it can shine a light on where improvements may be needed in programme design and delivery for better impact.

This study provides an overview of implementation research on nutrition-specific interventions in India conducted in 2000–2018 and highlights major gaps in the evidence. Our systematic search for relevant literature was carried out across a range of databases, and was supplemented by hand searching websites of organisations that have an impressive body of work on nutrition in India and globally.

Our systematic search of 13 databases and hand search of 32 organisational websites yielded 24,133 records. Subsequent rounds of screening based on population, interventions, comparators, outcomes and study design left 368 papers that met our inclusion criteria.

We focused on nutrition-specific interventions targeting pregnant and lactating women, mothers of children under two years of age, and children under two years of age. Our interventions of interest are broadly classified as: food supplementation, fortification, micronutrient supplementation, behaviour change counselling, severe and acute malnutrition management, weighed during pregnancy, delayed cord clamping and bundled interventions to capture system-level performance indicators. These are mapped against 17 implementation outcomes at programme, frontline worker and participant levels. The barriers and facilitators affecting programme implementation are mapped as cross-cutting themes.

Drawing on the analysis of the 368 included papers, the gap map reveals concentrations of evidence and key gaps, where limited or no evidence exists on implementation outcomes relevant to nutrition-specific interventions aimed at improving maternal and child health.

Key findings

Evidence is significant but unevenly distributed across the interventions and outcomes. While most research focuses on behaviour change counselling, micronutrient supplementation and bundled interventions, the implementation of interventions such as fortification, delayed cord clamping and weighed during pregnancy remains under-studied. Within behaviour change counselling, breastfeeding counselling is the most studied intervention; within micronutrient supplementation, iron and folic acid supplementation is most commonly studied.

Most papers evaluate programmes for implementation outcomes such as participant-level uptake and intervention coverage, followed by frontline worker compliance, programme resources and participant knowledge. Programme access, participant feasibility and quality of frontline worker engagement with beneficiaries remain some of the least studied implementation outcomes.

There is a prominent focus on the Integrated Child Development Services programme. Given that Integrated Child Development Services is one of the largest nutrition programmes in India (reaching out to nearly 20 million pregnant and lactating women and 82 million children), it is perhaps unsurprising that over 60 per cent of the research papers included some assessment of its various components.

Evidence in uneven across Indian states. Uttar Pradesh, Bihar, Gujarat, Odisha and Maharashtra are the five most-studied states, with almost 40 per cent of papers examining interventions in these states.

Research implications

Despite the impressive body of literature that measures implementation outcomes, there remain important limitations that future implementation research needs to address.

There is an absence of systematic approaches to studying programme implementation. In most of the included papers, a systematic examination of programme implementation outcomes was not the primary goal. This is apparent from the skewed interest that researchers showed in only a subset of implementation outcomes such as coverage, uptake and compliance.

A careful assessment of implementation would entail capturing all relevant indicators and outcomes along the programme impact pathway that relate to its design and delivery. Application of this theory-based approach to unpack programme logic and measure relevant indicators is conspicuous by its absence. The papers do not capture relevant programmatic information or use laid-out guidelines or manuals to assess implementation fidelity.

Ascertaining implementation quality remains a challenge, despite data.
While data on implementation outcomes is important, its interpretation poses a challenge and precludes the possibility of making accurate inferences about programme performance, even for the most measured outcomes such as coverage and uptake. First, there is an absence of consensus on what constitutes good performance; and second, papers do not often make explicit how outcomes are computed, thereby making data across papers incomparable.

There is a missing link between programme implementation and nutritional outcomes. There is a paucity of literature that explores the relationship between intervention delivery and change in nutritional outcomes, or identifies critical intervention components that must be in place for the programme to have the desired impact.

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Abbreviations and acronyms

AWC	*Anganwadi* centre
AWW	*Anganwadi* worker
EGM	Evidence gap map
FLW	Frontline worker
ICDS	Integrated Child Development Services
IRGM	Implementation research gap map
NHM	National Health Mission

1. Introduction

Child malnutrition is a major global health concern of the twenty-first century. A recent publication by WHO, UNICEF and the World Bank (2019) shows that globally, 22 per cent of children under the age of five are stunted,[1] while 7.3 per cent suffer from some form of wasting.[2] The same publication shows that South Asia bears the maximum burden of stunting and wasting, with India performing similarly or worse compared to global prevalence, with 38 per cent of children under the age of five being stunted and 21 per cent being wasted (IIPS and ICF 2017).

There is global consensus that the 1,000 days between a woman's pregnancy and her child's second birthday is a period wherein nutritional deficiencies can have a profound impact on a child's ability to grow and thrive (Bhutta 2016; Black et al. 2013; Hoddinott et al. 2013;). Research also shows that reducing stunting by one third can increase per capita income by 11 per cent in 17 countries with a high burden of stunting, including India (Hoddinott et al. 2013).

Addressing child malnutrition has been on the policy agenda in India for some years now, with recent accelerated efforts in the context of the National Nutrition Mission, or POSHAN Abhiyaan, launched in 2018. The central government has had two flagship programmes to direct resources towards the improvement of maternal and child health and nutrition, especially, though not exclusively, in the 1,000-day window:

- Launched in 1975, the Integrated Child Development Services (ICDS) programme under the Ministry of Women and Child Development is possibly the world's largest community-based programme that aims to improve health, nutrition and education for children up to six years of age and their mothers through a multi-pronged approach and a range of services delivered through *Anganwadi* centre (AWC; early childhood care and development centre) workers (AWWs).
- Launched in 2013, the National Health Mission (NHM) housed under the Ministry of Health and Family Welfare includes two sub-missions, namely the National Rural Health Mission, which predates the NHM, and the National Urban Health Mission. Though the NHM has a much broader mandate, reproductive, maternal, neonatal and child health remain salient to its mandate.

Despite these well-intentioned initiatives, India's fight against malnutrition has been far from impressive. The literature on the effectiveness of ICDS in improving nutrition remains mixed, but there is general agreement that it has fallen short of targets and expectations, and some studies attribute this to programme design and implementation (Lokshin et al. 2005). More recent research has highlighted that ICDS has had small but meaningful impacts on child undernutrition (Kandpal 2011; Jain 2015).

[1] Stunting implies that the child has a lower height-for-age caused by poor in vitro and early childhood nutrition. Aside from potentially impairing a child's cognitive development, it can also impact the longer-term outcomes of learning and productivity for these children as adults (Grantham-McGregor et al. 2007). There is evidence to show that stunting can be intergenerational (Özaltin et al. 2010; Engle et al. 2007).

[2] Wasting implies lower weight-for-height, or thinness, making the child susceptible to disease and at increased risk of death.

It is also clear that additional governance and legal reforms after 2005 led to an expansion in the reach of programme services, albeit with much variability across states (Chakrabarti et al. 2019).

While much is said and written about poor implementation of government programmes, the debate would benefit from a more informed understanding about what we know (or do not know) from research on the implementation of nutrition-specific interventions in India delivered by the government or other actors.

The time is opportune for consolidating this evidence, given the appetite at the highest levels in government to tackle India's long-standing problem. As mentioned above, the Indian government launched the National Nutrition Mission or the POSHAN Abhiyaan in 2018. The mission includes an apex body to 'monitor, supervise, set targets and guide the nutrition-related interventions across the various ministries' (National Portal of India, n.d.). It also aims to build convergence across various initiatives, while also introducing measures to strengthen systems in ways that improve last-mile delivery of services in a range of programmes implemented by multiple ministries.

The POSHAN Abhiyaan, given its underlying commitment to create synergies for better delivery of programmes, presents a rare opportunity to systematically consolidate evidence about what we know of factors that influence the effective implementation of nutrition-specific interventions in India, and thereby inform policies and programmes aimed at addressing malnutrition. Implementation research holds the potential to unpack for policymakers why good policy initiatives can fail to deliver on the ground.

> Implementation research helps 'shine a light on the often-bumpy interface between what can be achieved in theory and what happens in practice', given the real-world challenges that affect programme implementation (Peters et al. 2013).

To the best of our knowledge, there has been no systematic effort to consolidate and map existing implementation evidence on nutrition-specific interventions in India. Although studies investigating the impact of some flagship programmes have commented on issues of programme delivery and its impact on programme performance (Kandpal 2011), no attempt has been made to map the full range of implementation outcomes discussed in the literature for these nutrition-specific interventions.

This paper summarises findings from a systematic exercise involving searching, consolidating and mapping evidence that measures implementation-level outcomes for nutrition-specific interventions in India. This implementation research gap map (IRGM) will be a useful tool for a range of nutrition stakeholders who want to learn more about programme implementation in India, while also pointing researchers and research funders to the evidence gaps where further studies are needed.

The remainder of the report is structured as follows: section 2 explains the IRGM methodology, including results from searches and screenings; section 3 elaborates on its scope by presenting the implementation framework and outlining the interventions and outcomes that it maps; section 4 presents findings from examining the stock of included literature; and, finally, section 5 presents conclusions drawn from the findings.

2. Methodology

This implementation gap map builds on the framework of the evidence gap map (EGM), a tool developed by the International Initiative for Impact Evaluation (3ie) to support efforts in evidence-informed policymaking by mapping the available evidence in a sector and identifying gaps that future research needs to address. EGMs are collections of evidence on the effects of development policies and programmes in a particular sector or thematic area (Snilstveit et al. 2017). They provide a visual display of available evidence around a framework of interventions and outcomes.

This exercise differs from a prototype of a 3ie EGM because it maps interventions along the implementation outcomes rather than effectiveness outcomes. In doing so, this map therefore looks at literature beyond impact evaluations, which would traditionally be excluded in EGMs.

Given that this IRGM is a first of its kind globally, substantial time was spent in defining the scope of the exercise as well as identifying outcomes of interest. We conducted a desk review of existing literature and consulted extensively with our partner, the International Food Policy Research Institute, as we fine-tuned our approach.

We presented the scope and framework of the IRGM, outlining the interventions and implementation outcomes, at a stakeholder event in Delhi in July 2018. The event saw participation from donors, practitioners, evaluators, academics and experts in the field of nutrition. The inputs received at the workshop helped to further unpack intervention areas and associated implementation challenges. This was key in adopting a more granular approach, which helped to bring more specificity and nuance to the proposed framework.

Based on the intervention and outcome framework, a database search strategy was developed (detailed search strategies are provided in Appendix B). Drawing on the scope of the IRGM (section 3), a list of key words was drawn up and this informed the setting up of search strings. An information specialist conducted systematic searches across 13 databases to capture both published and unpublished literature.

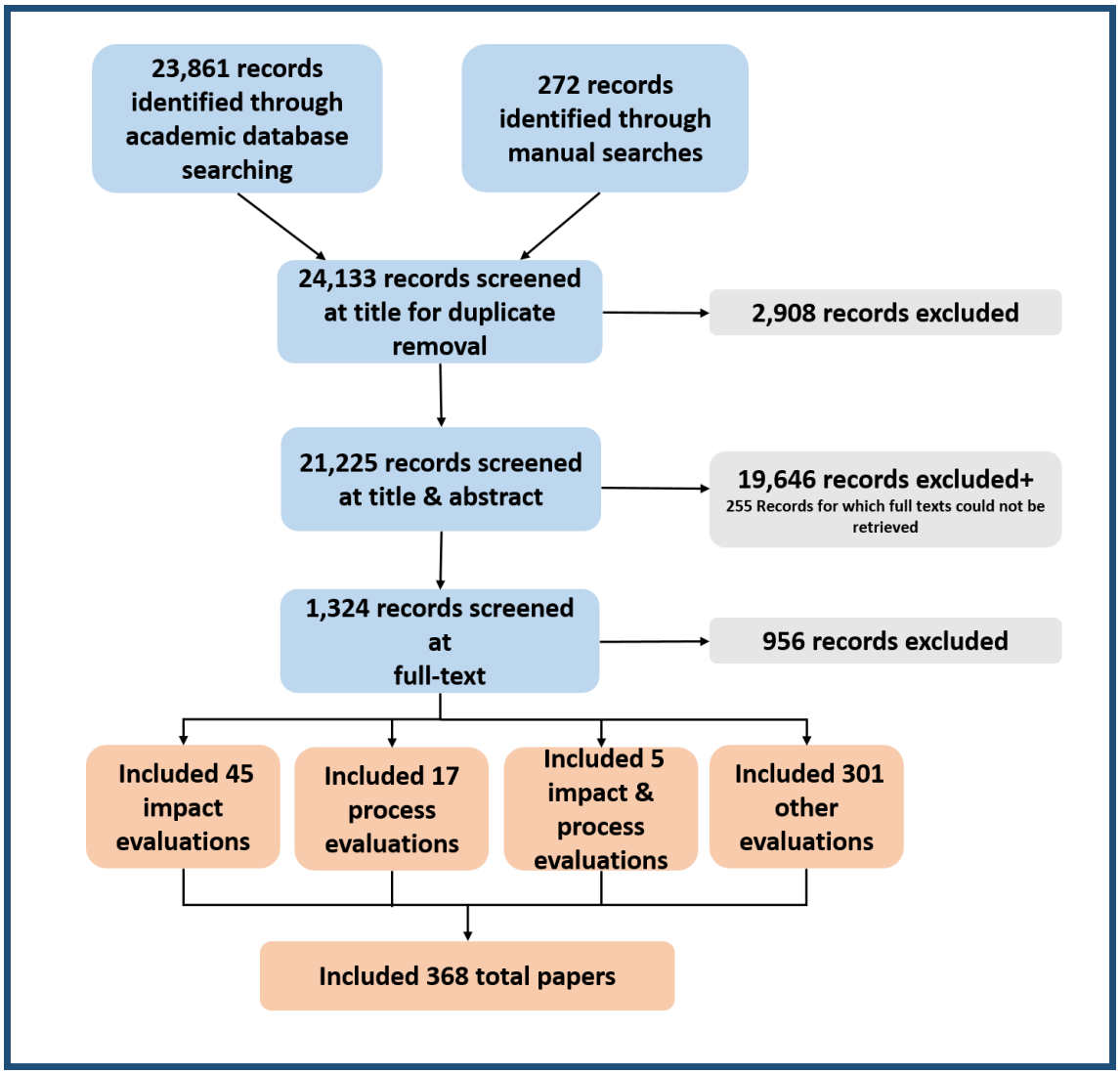
We manually searched 32 websites using keywords from our systematic search. We reached out to 21 experts in 17 organisations, including participants from the 2018 stakeholder consultation workshop in Delhi. The objective was to access any grey literature and process studies that may have been missed in website and database searches. We used snowball search methods to finalise the full data set of papers to be screened.

We followed a step by step screening process starting with removal of duplicates, followed by title and abstract screening, full text screening, and finally full text coding. The records screened at each stage are provided in Figure 1.

To ensure intercoder reliability throughout the screening and coding process, we trained all screeners on the same set of papers and double-coded 65 per cent of included papers in the full text coding stage. Contentious papers were discussed in team meetings and a unanimous decision was taken on whether to include or exclude them.

All decisions made were meticulously recorded to ensure consistent application of the same logic across different scenarios. Apart from interventions and outcomes (section 3), we also extracted data on study design, geography, delivery platform and type of implementer, to name a few. The complete coding framework, with close to 20 categories, is provided in Appendix C of the report.

Figure 1: Process for selecting relevant papers



3. Scope

The key objective of the IRGM is to map implementation research on nutrition-specific interventions in India. Since we focus on interventions aimed at improving maternal and child health in the first 1,000-day window, our population of interest includes:

- Pregnant and lactating women;
- Mothers of children below two years of age; and
- Children below two years of age.

During the coding phase, we added three additional target population groups. We coded for frontline workers (FLWs) and health workers given that many papers studied interventions which provided inputs such as FLW training. We also added 'women with a

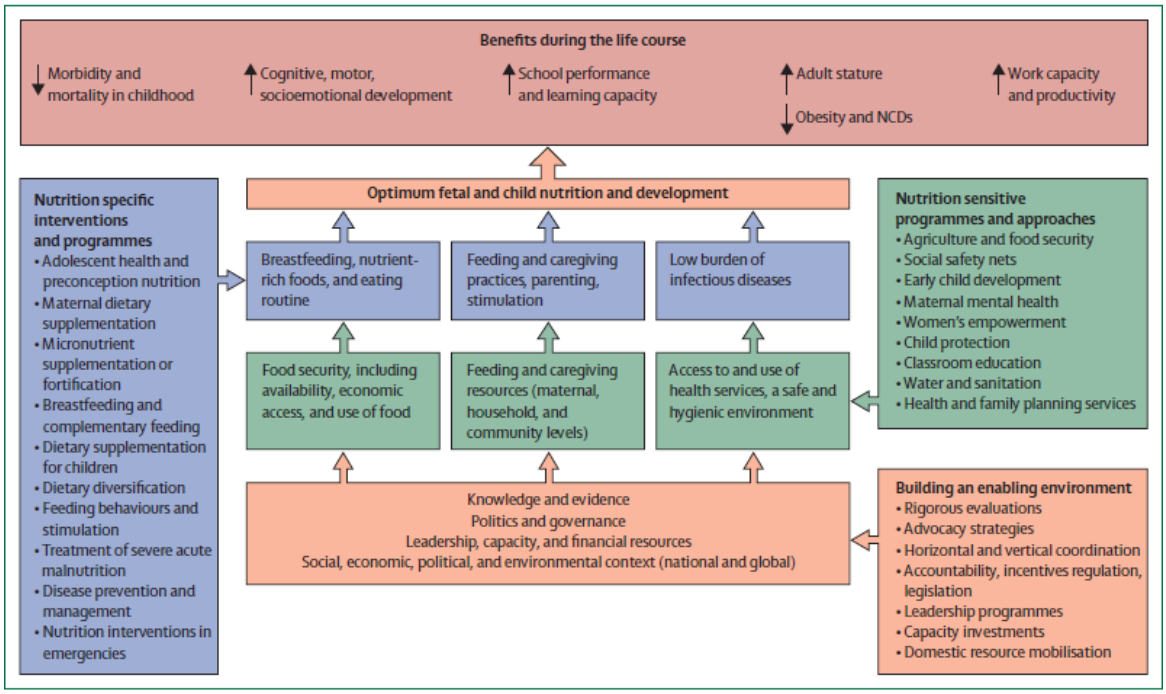
child (age group other)' and 'children (age group other)'. This was meant to accommodate programmes such as ICDS that target children aged between 0–6 years, and instances in which papers did not parse out programme reach and coverage by children's ages. Since the 0–6-year age group subsumed our target population of interest, and given the relevance of programmes like the ICDS, such papers were included in the map.

We focused on implementation research conducted in India in 2000–2018 and looked at both published and unpublished literature obtained through electronic and hand searches. We reviewed literature on the effectiveness of nutrition-specific interventions (Bhutta et al. 2008; Black et al. 2013) to understand the causal pathways of programme impact and identify underlying assumptions related to programme implementation. This, together with conceptual papers on implementation research (Peters et al. 2013; Menon et al. 2014; Tumilowicz et al. 2016), helped us to identify implementation outcomes relevant to nutrition-specific interventions in India.

3.1 Implementation framework

The Lancet 2013 series on maternal and child nutrition evaluates issues of undernutrition as well as overweight and obesity among women and children in low- and middle-income countries. It uses an expansive framework (Figure 2) to capture the underlying determinants (e.g. food security, household resources, access to health services and environmental factors) that affect caregivers' ability to adopt desirable dietary and health behaviours (Black et al. 2013). These underlying determinants in turn depend upon a range of social, economic, political and environmental contextual factors at national and global levels, as well as factors such as capacity and financial resources, governance and accountability mechanisms, and available knowledge and evidence. The differentiating aspect of the framework lies in its detailed mapping of nutrition-specific and nutrition-sensitive interventions that need to work in tandem in an enabling environment to achieve optimum foetal and child nutrition and development, as opposed to only unpacking the determinants of undernutrition, as in UNICEF's conceptual model (Adamu et al, 2016).

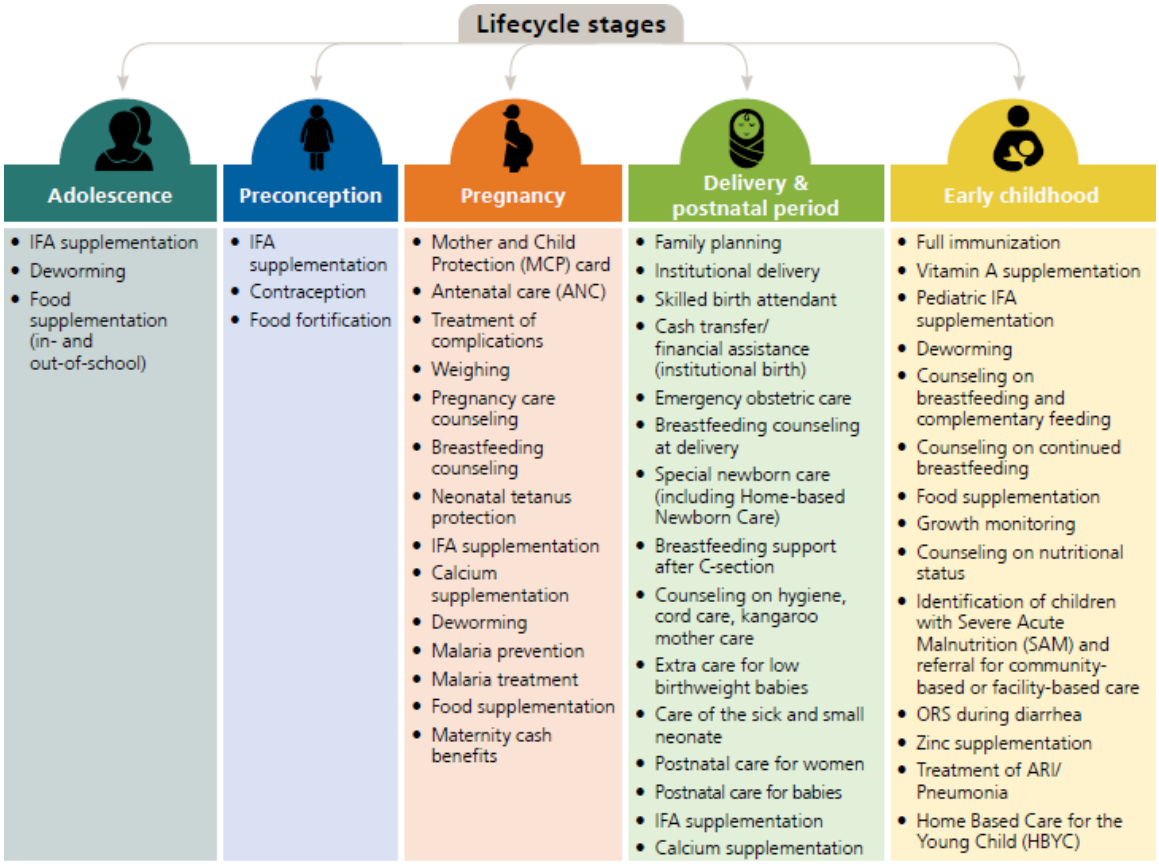
Figure 2: *The Lancet* framework for achieving foetal and child nutrition and development



Note: NCDs = non-communicable diseases.
Source: Black et al. 2013.

The National Nutrition Mission or the POSHAN Abhiyaan includes the nutrition-specific interventions identified in *The Lancet* framework, and more, in order to comprehensively address the issue of undernutrition in India. Figure 3 lists the POSHAN Abhiyan interventions by life stage as mapped by Menon and colleagues (2020) in a recently published policy note, and demonstrates the Indian government's commitment to using multi-pronged approaches to address the immediate determinants of undernutrition.

Figure 3: POSHAN Abhiyaan interventions



Source: Menon et al. 2020.

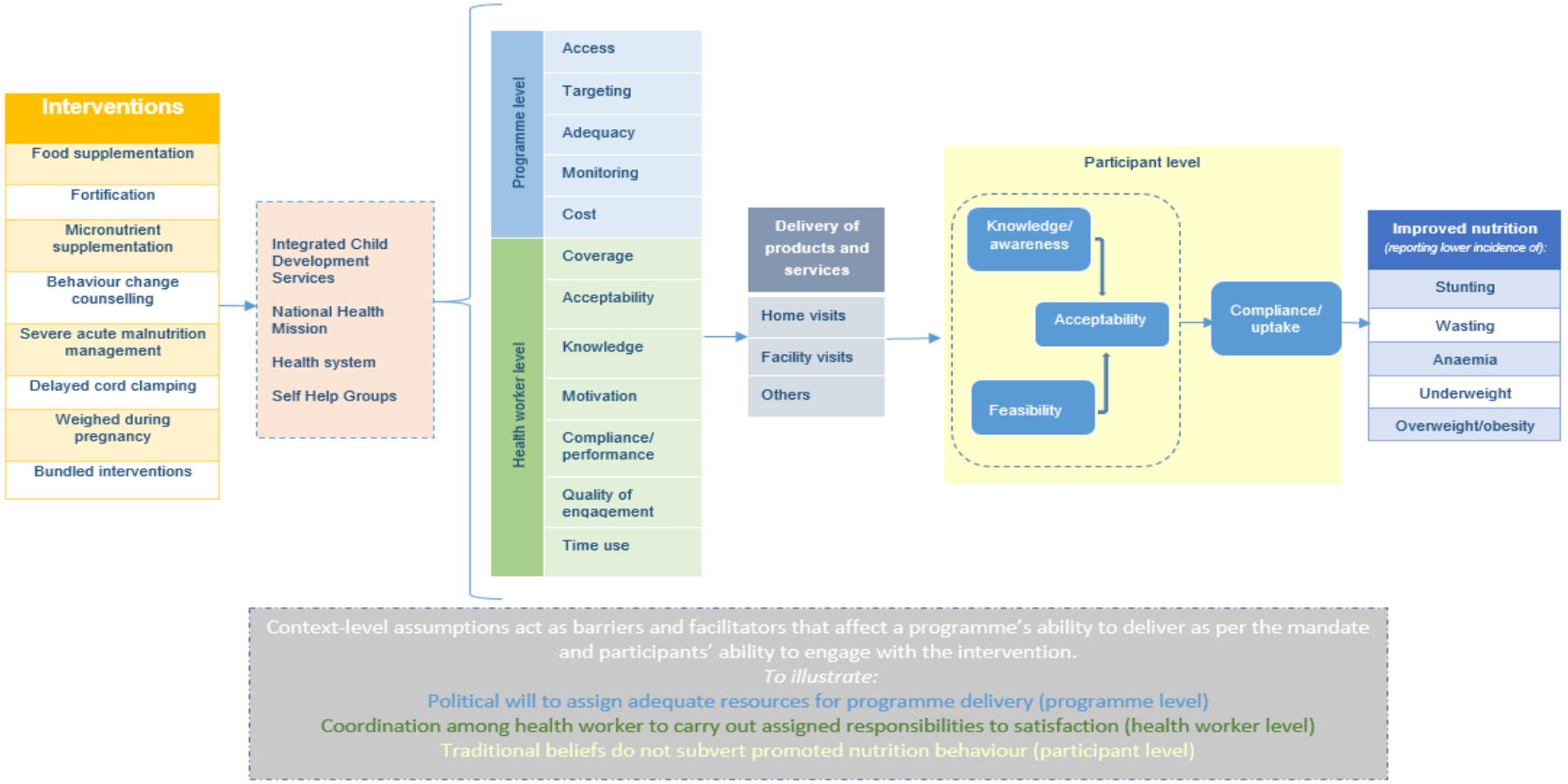
This IRGM focuses on a subset of nutrition-specific interventions identified in the POSHAN Abhiyaan that are targeted towards pregnant and lactating women, mothers of children below two years of age, and children below two years of age.

Figure 4 provides an India-specific framework for the implementation of nutrition interventions, highlighting implementation outcomes at programme, health worker and participant levels that are either key indicators or determinants of programme implementation fidelity. We list the various interventions included in the IRGM, which, as the literature suggests, are primarily delivered through ICDS and the NHM, with self-help groups supplementing ongoing efforts.

However, presence or absence of assumptions acts as barriers or facilitators to influence programme and health worker performance in the delivery of products and services. Factors at the caregiver level, including quality of service provided and the cost of participation, affect their engagement with the programme and use of the services offered.

In measuring relevant implementation outcomes, implementation research can help assess the extent to which a programme was implemented as intended and its potential therefore to impact nutritional outcomes of interest. Exploring the link between programme implementation and improved nutrition, however, is beyond the scope of the IRGM.

Figure 4: Implementation framework



Note: In addition to the seven categories listed above, our framework uses one more category that was added later. We call this 8th category 'bundled interventions', which was included to accommodate papers that measured implementation outcomes at the system level such as quality of AWCs (centres promoted under ICDS programme) and FLW job satisfaction, which in turn affect the delivery and uptake of interventions.

3.2 Interventions

The IRGM focuses on the following nutrition-specific interventions targeted at mothers and children in the 1,000-day window:

- Food supplementation;
- Fortification;
- Micronutrient supplementation;
- Behaviour change counselling;
- Severe acute malnutrition management;
- Delayed cord clamping; and
- Weighed during pregnancy.

This categorisation is based on the specific service or product the intervention provides to its targeted beneficiaries or clients. The intervention may use a range of mechanisms to promote delivery and uptake, including training of FLWs, use of information and communication tools, provision of nutritional supplements, awareness generation campaigns and more.

In addition to the seven categories listed above, our framework uses one more category that was added later. We call this eighth category *'bundled interventions',* which was included to accommodate papers that measured implementation outcomes at the system level, such as quality of AWCs (centres promoted under ICDS) and FLW job satisfaction, which in turn affect the delivery and uptake of interventions.

As mentioned earlier, the interventions may be delivered through various platforms such as:

- Home visits, which include door-to-door visits by FLWs of both ICDS and the NHM system;
- Facility visits, which include visits by beneficiaries to, for example, AWCs, primary health centres or hospitals; and
- Others, which include mass media campaigns through radio, television and billboards, using local announcements in the community, and village health and nutrition days.

Table 1 describes each of the included interventions and notes the large-scale government programmes through which they are delivered in India.

Table 1: Interventions

Intervention category	Intervention description	Flagship programmes delivering intervention by life cycle stage	
Food supplementation	Provision of hot-cooked meals, take-home rations, balanced energy supplements and any type of complementary food supplementation	Pregnancy	ICDS
		Early childhood	ICDS
Fortification			
Micronutrient powder	Provision of multiple micronutrient powders for home fortification of foods consumed	Included in guidelines from the Food Safety and Standards Authority of India	
Fortification of commonly consumed goods	Provision of fortified commonly consumed goods with micronutrients like iron, iodine, folic acid, vitamin B12, and vitamins A, D and any other fortifiers		
Micronutrient supplementation			
Iron and folic acid supplementation	Provision of iron and folic acid tablet/syrup to beneficiary	Pregnancy	NHM (under NIPI)
		Delivery and postnatal	NHM (under NIPI)
		Early childhood	NHM (under NIPI)
Vitamin A supplementation	Provision of vitamin A to beneficiary	Early childhood	NHM
Calcium supplementation	Provision of calcium supplementation to beneficiary	Pregnancy	NHM
		Delivery and postnatal	NHM
Zinc supplementation	Provision of zinc (with or without oral rehydration therapy) to beneficiary	Early childhood	NHM
Other micronutrient supplementation	Provision of any other supplementation to beneficiary		
Behaviour change counselling			
Breastfeeding counselling	Counselling on early initiation of breastfeeding, continuation of exclusive breastfeeding, feeding low birthweight infants	Pregnancy	ICDS and NHM
		Delivery and postnatal	ICDS and NHM
		Early childhood	ICDS and NHM
Kangaroo mother care counselling	Counselling on kangaroo mother care – a method of care for low birthweight infants that includes early and prolonged skin-to-skin contact with the mother (or a substitute caregiver) and exclusive and frequent breastfeeding. This skin-to-skin contact is different from what is needed immediately after birth	Delivery and postnatal	ICDS and NHM

Intervention category	Intervention description	Flagship programmes delivering intervention by life cycle stage	
Complementary feeding counselling	Counselling on complementary feeding; timely introduction of exclusive complementary food; hygienic food handling; timely introduction of complementary food; age-appropriate feeding including frequency, diversity, animal-source foods, iron-rich foods	Early childhood	ICDS and NHM
Growth monitoring and counselling	Growth monitoring and counselling programme for children	Early childhood	ICDS
Other interventions			
Severe acute malnutrition management	Programme aimed at screening, referral, and management of severe acute malnutrition	Early childhood	ICDS and NHM
Delayed cord clamping	Includes delayed cord clamping but not counselling on delayed cord clamping		
Weighed during pregnancy	Weighing of women during pregnancy	Pregnancy	NHM

Note: NIPI = National Iron Plus Initiative.

Inputs provided as part of the various interventions included: service provider training; incentives for service providers or beneficiaries; improved monitoring (including use of ICT); better practices in product procurement, storage and management; and information campaigns to improve uptake of services and products among beneficiaries.

3.3 Outcomes

Table 2 provides the implementation outcomes measured in the IRGM. All outcomes included are measurable, except for cross-cutting outcomes, which are often only discussed but not measured in the literature. We used the research of Peters and colleagues (2013) as our starting point to organise implementation outcomes into categories and subcategories that are applicable across a diverse range of interventions and delivery mechanisms. The implementation outcomes cover the following broad categories:

- Programme level;
- FLW and health worker level;
- Participant level; and
- Cross-cutting themes.

'Participant' refers to the ultimate beneficiary of the intervention, who is usually at the household or individual level. Table 2 details each subcategory of the implementation outcomes.

Table 2: Implementation outcomes

Implementation outcomes	Sub-implementation outcomes	Description of implementation outcomes
Programme level	Programme access	Factors affecting participant's access to programme, such as distance from facility
	Programme targeting	Accurately identifying programme participants
	Programme adequacy	Measures the adequacy or sufficiency of resources needed for programme delivery at any point in the delivery system
	Programme monitoring	How well the programme is monitored
	Programme cost	Includes a diverse range of estimates like cost-effectiveness of the intervention, financial resources budgeted for the intervention, funds released and so on
FLW and health provider level	FLW coverage	Participation of FLWs in training programmes
	FLW acceptability	Acceptability of the intervention among FLWs
	FLW knowledge	Knowledge, beliefs and awareness of FLWs about benefits of the intervention and how and when to deliver the intervention
	FLW motivation	The motivation level of FLWs or their job satisfaction as a function of compensations and incentives provided
	FLW compliance/performance	The degree to which FLWs comply with the correct protocols
	FLW quality of engagement	The quality of interactions with participants
	FLW time use	Time allocation of FLWs across various activities
Participant level	Participant coverage	Outreach of the interventions
	Participant acceptability	Acceptability or palatability of the intervention to the participant
	Participant knowledge	Knowledge of participant about the benefits of the intervention
	Participant feasibility	Costs associated with programme participation, monetising benefits
	Participant uptake/compliance	The degree to which participants comply with the correct protocols
Cross-cutting	Barriers	Contextual factors at various levels that act as facilitators to smooth implementation of the intervention
	Facilitators	

3.4 Limitations

The study has a few limitations and it is important to spell these out as it presents important caveats on how the findings should be interpreted.

The foremost issue we faced was the quality of the literature. Our initial plan was to assess all included papers for methodological rigour and quality. However, once we had a bird's eye view of the literature (when screening our search results for title and abstract and then full papers), we realised that the majority of papers use methods for which there are no established standards for rigour.

In the absence of such standards, we worried about coder subjectivity in screening papers in and out of the IRGM leading to a biased representation of gaps in the evidence. We therefore included all papers as long as they studied interventions that had at least one measurable implementation outcome.

We excluded papers on design only if they were prevalence papers or examined correlations between population demographics and practices like breastfeeding without mentioning any intervention. We also excluded papers that provided national-level figures on coverage (e.g. iron and folic acid coverage), but did not attribute this coverage to either a programme or a health facility.

This IRGM does not synthesise findings from included papers to draw generalised trends on implementation of nutrition-specific interventions along the various outcomes. Attempts at synthesising quality evidence would benefit from methodological churning in the field of implementation research that sets quality benchmarks and promotes rigorous methods that conform to these standards of robustness and integration of quantitative and qualitative data.

The absence of clear benchmarks regarding what constitutes *good implementation* – and how that might be different for different implementation outcomes – presents challenges to synthesising findings across different papers on a particular outcome and drawing conclusions about quality of programme implementation across different contexts. For example, it remains ambiguous as to what counts as good coverage. While literature on programme effectiveness has protocols and standards for what counts as impact, the implementation research field is still evolving in this respect.

Given that the IRGM framework is informed by existing literature, it is possible that it failed to identify and map outcomes that the current literature does not measure. However, aside from literature on nutrition, we also looked at conceptual papers on implementation research to define and fine-tune the implementation outcomes identified, and tried to minimise the chances of this kind of oversight.

Additionally, given the underlying data and the papers included, this IRGM is unable to say which implementation outcome matters more for intervention effectiveness. Answering this question would require papers to explore and measure effectiveness of different implementation strategies to increase participant uptake. However, effectiveness studies constitute only a very small subset of papers, and in most cases they examine the effectiveness of nutritional outcomes rather than implementation strategies.

Coding certain interventions, especially those related to fortification of commonly consumed goods, posed a challenge as they are targeted at household level rather than the population of our interest.

Finally, the IRGM includes only papers in English. However, since most academic publications in India are in English, we doubt this is a severe limitation.

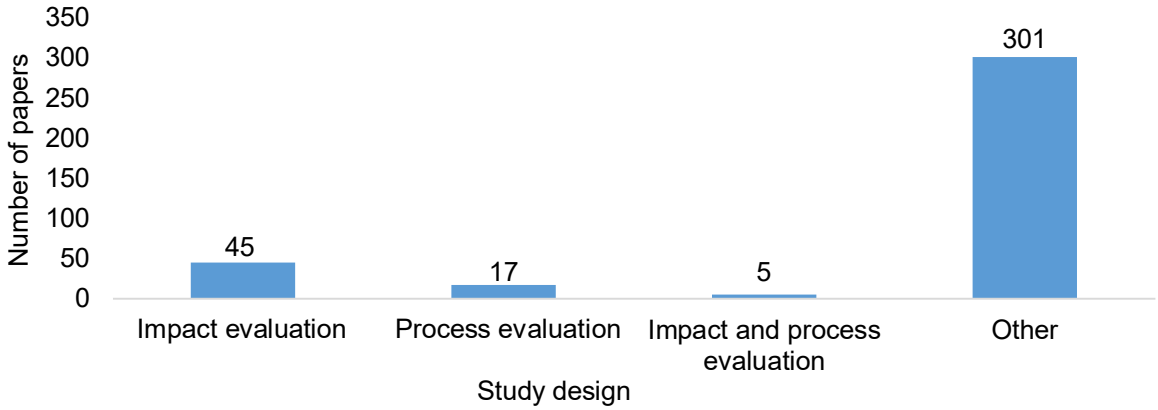
4. Findings

In this section, we will discuss the evidence landscape of implementation research for nutrition-specific interventions in India and undertake a deep dive into some papers to illustrate interesting and illuminating trends. All the findings presented are from single studies. For systematic reviews that met our inclusion criteria, we looked for single studies included in those reviews. This was because reviews often do not go beyond providing pooled effects and rarely discuss study-specific barriers and enablers to implementation for the measured outcome.

4.1 Evidence landscape

We included 368 papers in the implementation map. As indicated by Figure 5 below, a majority of the papers included in the gap map are 'other evaluations' with very few impact evaluations and process evaluations. We labelled a study as a process evaluation only if it called itself a process and formative evaluation. The study team did not make a determination on the study type based on the study objectives or the methodology.

Figure 5: Distribution of papers by study type

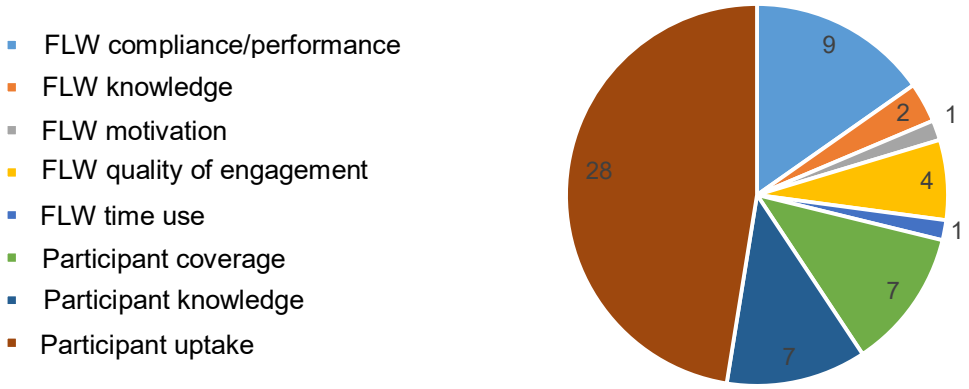


The majority of the papers in 'other evaluations' are either pre-post papers or cross-sectional papers. Papers were not assessed for quality and therefore were not excluded on this count. Cross-sectional papers included in the IRGM often did not make explicit the sampling strategy, which made it difficult to assess study quality.

Not all papers that called themselves impact evaluations were coded as impact evaluations by the study team. Only papers that had a valid counterfactual using methods like randomisation, regression discontinuity and matching were categorised as impact evaluations. Even where papers are categorised as impact evaluations, only a small subset use counterfactual to measure implementation outcomes.

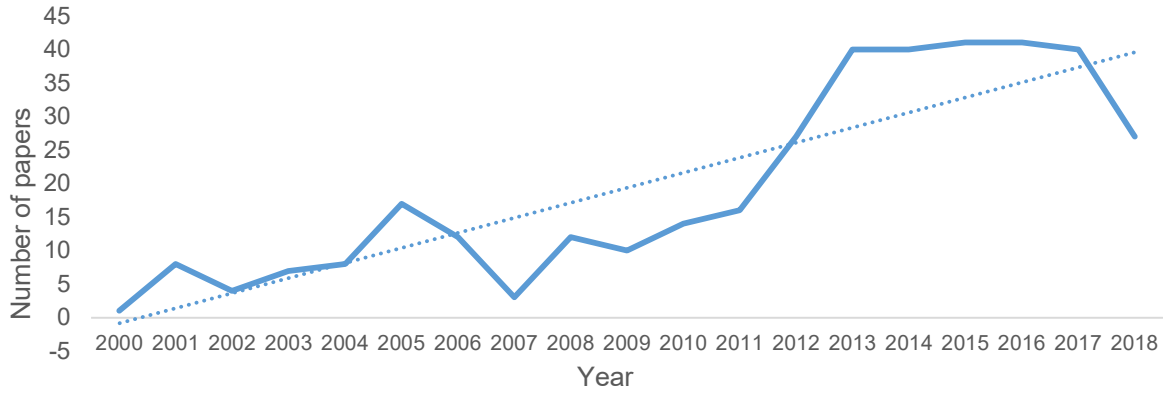
Of the 17 implementation outcomes, included papers only assess the effectiveness of eight. Figure 6 shows that participant uptake was the most studied implementation outcome measured in 28 papers, followed by FLW compliance/performance.

Figure 6: Number of papers studying implementation outcomes using impact evaluation methods



We plotted the included papers by year in Figure 7 to see if there is an upward trend with a rising number of papers examining implementation outcomes. As the figure suggests, while there is an overall steady increase in literature measuring implementation outcomes, the trend is not uniform across the years.

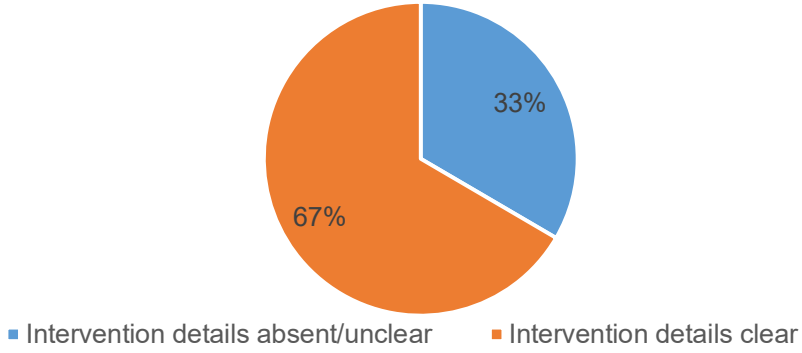
Figure 7: Evidence distribution by years



While implementation papers are a relatively new area of research, there is a significant amount of literature looking at implementation outcomes like coverage and uptake, which are regularly tracked for large-scale flagship programmes to measure progress.

A discussion on programme design and the rollout plan is an important prerequisite for research that seeks to assess programme implementation.

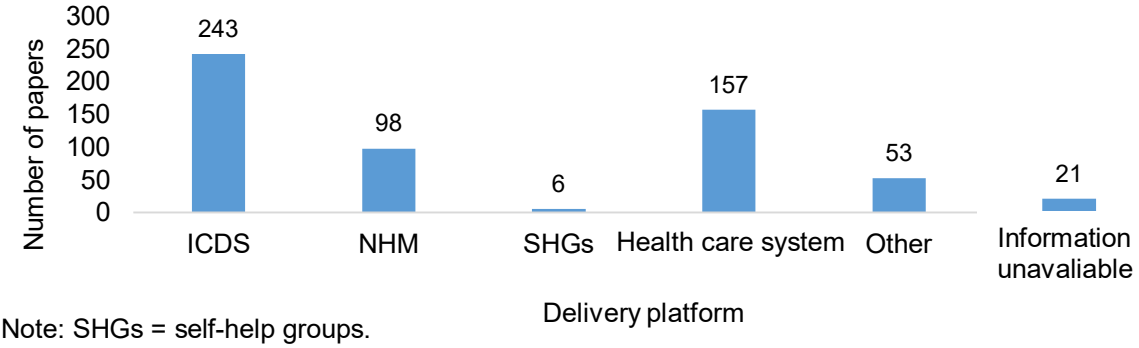
Figure 8: Papers by presence or absence of intervention details



However, as seen in Figure 8, over one third of the literature that we include is unclear on intervention details. This includes papers that study flagship programmes like ICDS and the NHM but provide little to no detail on programme model and delivery. Papers are coded as 'intervention details unclear' when, for example, the paper does not detail activities performed by AWWs but measures implementation outcome indicators such as the number of AWWs maintaining records or doing home visits.

The study team coded for delivery platform and given that some interventions used a combination of platforms, it was coded 578 times for 368 papers. Sixty-six per cent of the included papers examine ICDS, making it the most studied delivery platform, followed by health care systems. The 'health care system' code is coded for papers that study intervention delivery in a hospital setting or a primary health care centre. Figure 9 illustrates the delivery platforms for included interventions.

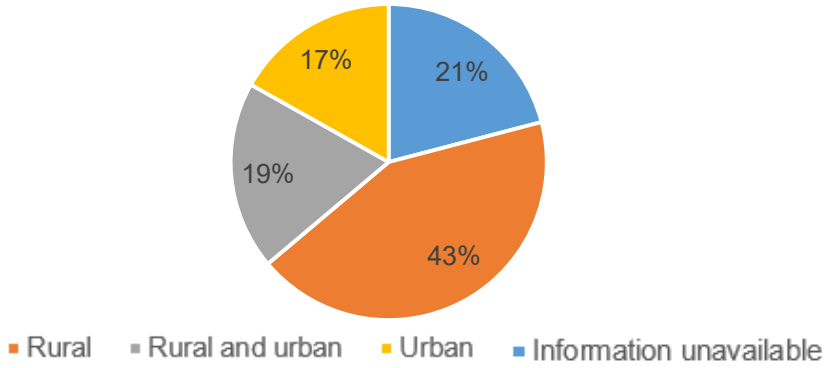
Figure 9: Distribution of papers by delivery platform



Note: SHGs = self-help groups.

In exploring the rural-urban divide, we find that the majority of the papers have been carried out in rural settings. This is not surprising given that most of the development literature tends to be focused on rural areas. This is similar to the findings of an EGM on water, sanitation and hygiene developed by 3ie (2018).

Figure 10: Distribution of papers studying rural and urban programmes



It is interesting that nearly 36 per cent of papers discuss programmes in urban areas, which, for development literature, would be on the higher side as compared to other sectors. Though we did not specifically code for it, this could possibly be because a range of papers looked into the implementation of pilot programmes in the field study areas of hospitals and medical colleges located in major cities. Another interesting aspect to highlight is that almost one fifth of the papers did not have information on whether the study happened in a rural or urban area.

In terms of distribution across states, the evidence is encouraging. Uttar Pradesh, Gujarat, Bihar, Odisha and Maharashtra are the five most studied states (Figure 11). The evidence distribution corresponds closely to state performance (or lack thereof) on child nutrition indicators (as indicated by National Family Health Survey data [IIPS and ICF 2017] on stunting among children aged between 0–59 months) (Figure 12). States in the north-east remain neglected, with only seven papers looking at interventions in the region. Thirty-four papers examine implementation outcomes across all of India.

Figure 11: State distribution of evidence

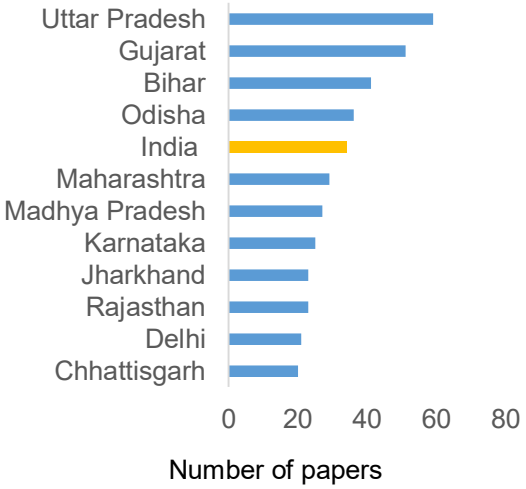
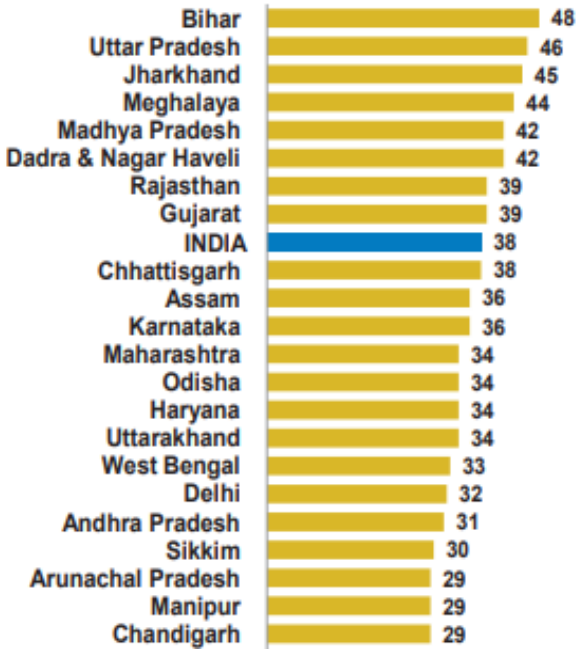


Figure 12: Percentage of children (0–59 months) stunted across states



Source: IIPS and ICF (2017).

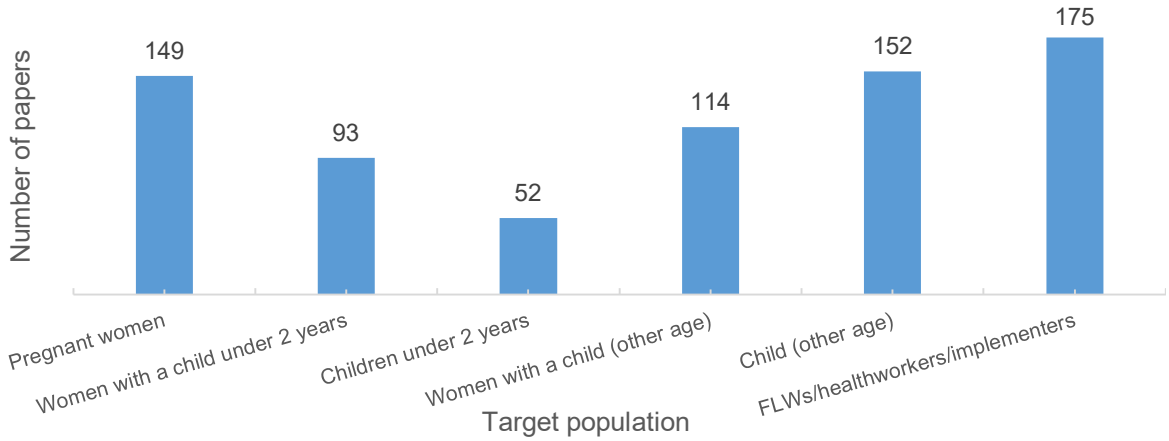
Initially we only planned to look at programmes targeting pregnant and lactating women, mothers with children below two years of age, and children below two years of age, but we expanded this initial target population to include three more categories, namely:

1. Children 0–6 years;
2. Mother of children 0–6 years; and
3. FLWs and health workers.

We expanded the age categories of children since many papers talk about ICDS programme delivery, which targets children aged between 0–6 years and their mothers. We did not think it appropriate to drop these papers, since at the time of screening it was difficult to foresee how much literature we would miss by focusing only on papers with a categorical mention of children of 0–2 years.

Additionally, we anticipated that, given our interest in programme implementation, it would be important to capture literature that looks at the performance and motivation of FLWs and other health staff – given that it has a direct bearing on the quality of programme implementation. FLWs and health workers were coded as the target population when the paper looked at implementation outcomes connected to them. In Figure 13 we provide a breakdown of the target population for the included papers.

Figure 13: Distribution of papers by target population[3]

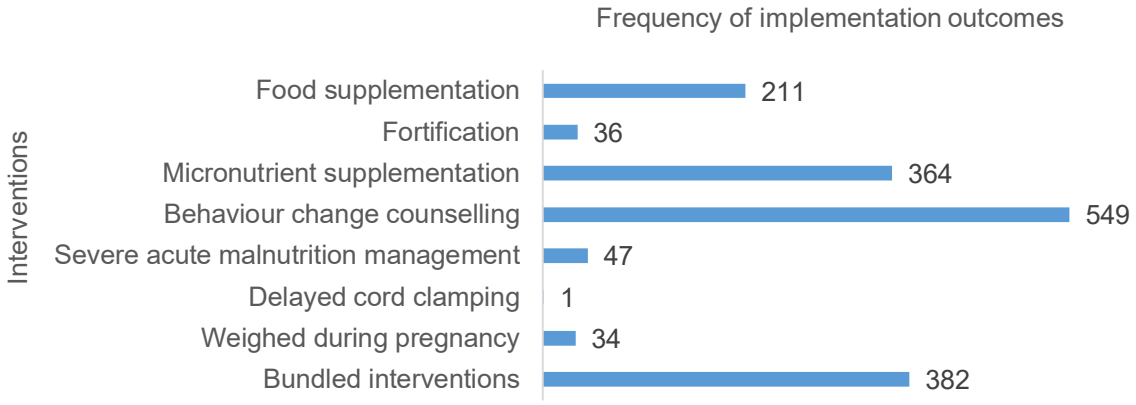


Among the included interventions, behaviour change counselling is the most studied intervention, as depicted in Figure 14. Within the counselling intervention, breastfeeding counselling is studied as many as 159 times in the included papers, followed by growth monitoring and counselling (N=89 times) and complementary feeding (N=81 times). Micronutrient supplementation is also a fairly well-studied intervention, and this is primarily driven by the literature on iron and folic acid supplementation, which accounts for 48.7 per cent of the papers in this intervention category.

A very small number of papers look at counselling on kangaroo mother care and we found only 39 instances in which it is measured. Kangaroo mother care also presented challenges at the time of coding, as the literature often used it interchangeably with skin-to-skin care and thermal care (only the former, however, was included in this category).

[3] A paper may have more than one targeted population. The sum of this figure is therefore greater than the total number of 368 included papers.

Figure 14: Distribution of intervention by outcome[4]



In bundled interventions, we categorised papers that did not specifically look at the delivery of any one particular intervention, but instead measured, for example, FLW perceptions of their workload (Salutagimath and Nithya Shree 2014), programmatic delays in making payments for services or goods (OPM 2015), infrastructure quality at AWCs (Chudasama et al. 2016) or participants' assessments of service quality (Saxena et al. 2015).

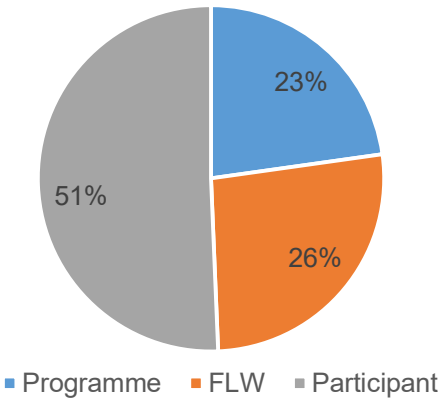
Implementation outcomes related to delayed cord clamping were discussed in only one paper, which makes it the least studied intervention.

4.2 Implementation outcomes

The framework divided the implementation outcomes into three broad categories, capturing the supply aspects at the programme, and FLW and health worker levels, and the demand side at the participant level.

As indicated in Figure 15, implementation outcomes at the participant level are those most frequently studied. We code for implementation outcomes for a total of 1,624 times, 922 of which constitute outcomes at the participant level.

Figure 15: Distribution of papers across key implementation outcomes

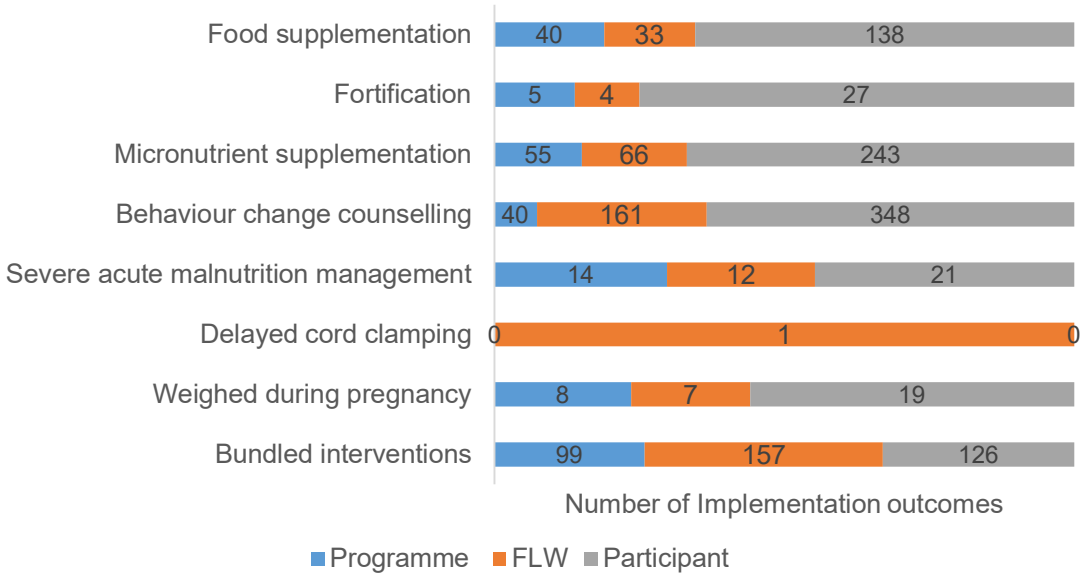


[4] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total 368 included papers.

When looking at the distribution of evidence between implementation outcomes across key intervention categories, we find that – except for bundled interventions where FLW-level outcomes are the most studied – participant-level outcomes are uniformly higher for all intervention categories.

As indicated in Figure 16, the bulk of included literature refers to micronutrient supplementation, food supplementation and counselling at the participant level. We unpack these implementation outcomes further in the subsequent sections. In total, we coded for implementation outcomes 1,624 times across all intervention categories. This also meant that one paper may be coded for one or more implementation outcomes.

Figure 16: Interventions and key implementation outcomes matrix[5]



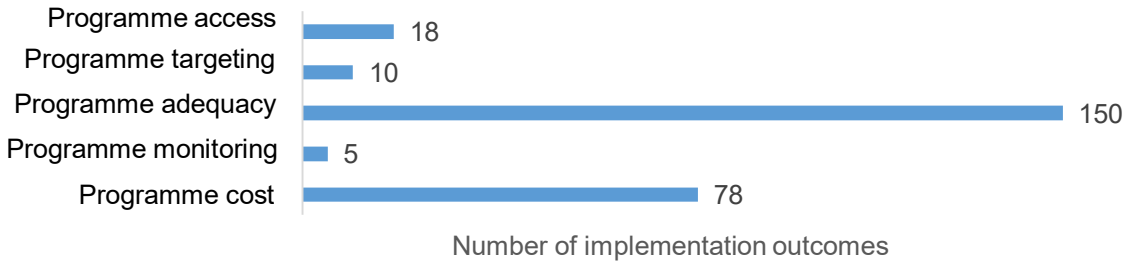
4.2.1 Programme level

At the programme level, we looked at five implementation outcomes, namely 'programme adequacy', 'programme access', 'programme targeting', 'programme monitoring' and 'programme cost'.

Figure 17 illustrates the distribution of evidence across the implementation outcomes. We find that 'adequacy of resources' is the most studied among the five, with 'cost' a remote second. Though it may be seen as worrisome as to how little attention is paid to other outcomes, it is important to note that 'adequacy of resources' remains an important precondition for how the programme performs with regard to other indicators, and is therefore a very important piece of information from the programme implementation perspective.

[5] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total 368 included papers.

Figure 17: Programme-level implementation outcomes[6]



Of the papers that look at 'adequacy of resources', a majority (N=45 times) explore system level inputs such as percentage of AWCs housed in *pucca* (permanent) buildings (Gupta et al. 2013); availability of counselling material at AWCs (Saxena et al. 2015); presence of electricity (Singh and Masters 2016; Avula et al. 2015); AWCs functioning for the requisite number of hours (Dutta and Ghosh 2017; Avula et al. 2015); or health worker presence at the AWC (Das et al. 2018) as reported by programme participants (Pati et al. 2016).

The papers therefore use a combination of observation and participant feedback to assess the adequacy of resources. Though observations likely use mandated guidelines in making the assessment, this is rarely made explicit in the discussion of results.

Growth monitoring and counselling and food supplementation programmes are analysed in 27 papers and 35 papers, respectively. These papers also look at similar indicators that are more specific to the programme, such as the percentage of AWCs reporting interruption in the supply of supplementary nutrition (Chudasama et al. 2014) or AWWs who have experienced delayed payment for food supplements in the past six months (Kosec et al. 2015).

Similarly, papers on growth monitoring and counselling often look at the availability of infrastructure at AWCs or health centres, but more specifically measure for availability of growth charts (Haider et al. 2014) or weighing scales (Tripathy et al. 2017).

The surprising finding has been the number of papers that look at programme cost. Of the 261 times that programme-level outcomes were coded, a little under 30 per cent were for 'programme cost'. However, caution must be exercised in interpreting this, given that the underlying quality of data is not very encouraging. The study team coded for all mentions of programme cost in the literature, not only papers that looked at cost effectiveness or cost benefit. The latter is more informative only if we included an assessment of how accurate the computations are, which was beyond the purview of this exercise.

To give a sense of the underlying data, the study team coded for cost where papers: discussed budget allocations to programmes (Menon et al. 2009; Anderson et al. 2006); estimated cost to participants for using services (Bhandari et al. 2005); mentioned norms for expenditure on services like supplementary nutrition (Jain 2015); estimated social costs of iron deficiency of anaemia (Plessow et al. 2016); and so on.

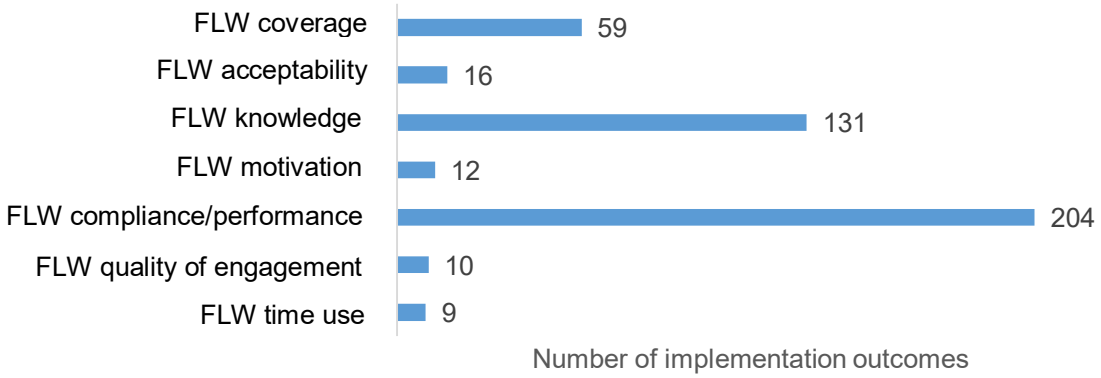
[6] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total number of 368 included papers.

Programme targeting is almost always discussed in relation to severe and acute malnutrition, whereas programme access is measured, in all but one case, with respect to bundled interventions.

4.2.2 FLW and health worker level

Against 261 programme-level outcomes, FLW- and health worker-level outcomes were coded 441 times. Figure 18 presents the distribution of evidence across the seven outcomes for which we coded included papers:

Figure 18: FLW- and health worker-level implementation outcomes[7]



A large proportion of papers (N=118 times) measure FLW and health worker 'compliance'; together with 'knowledge', these account for close to 76 per cent of all outcomes coded under this category. 'Acceptability', 'quality of engagement', 'motivation' and 'time use' together account for only 10 per cent of total FLW outcomes coded.

FLW and health worker 'knowledge' and 'compliance' are mostly measured to assess their delivery performance with regard to 'counselling' and 'bundled' interventions. However, knowledge and compliance are but two levers that affect FLW performance. FLW workload, both in terms of expected participant outreach as well as record-keeping and other administrative tasks, has been the subject of much debate and discussion and can potentially undermine service delivery.

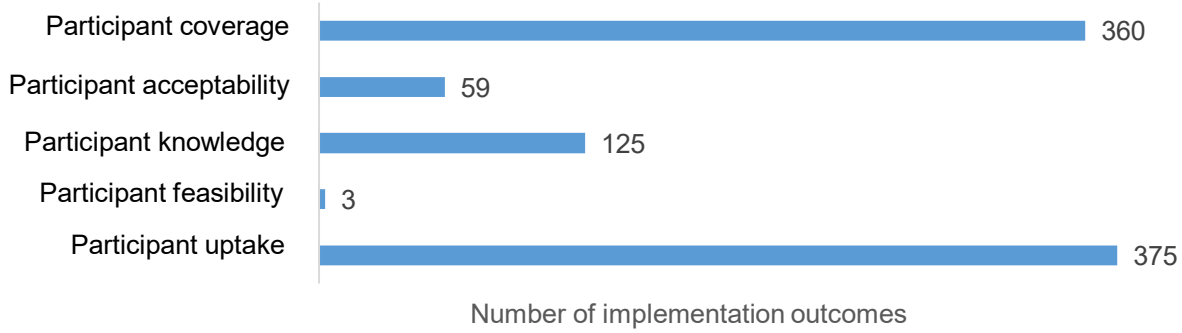
Unfortunately, there is very limited literature that tries to assess these more difficult-to-measure outcomes. While there are papers that try to measure the average time spent on various tasks by AWWs (Singh et al. 2013) and ICDS supervisors and Child Development Project Officers (Sankar 2013), there are no clear measures for quality of interaction. There are, however, papers that measure the duration of home visits (Borkum et al. 2015), frequency of interaction (Sankar 2013) and intensity of interaction (Lyngdoh et al. 2018) in order to assess interaction quality.

[7] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total number of 368 included papers.

4.2.3 Participant level

Participant-level outcomes were coded across five implementation outcomes of 'acceptability', 'coverage', 'feasibility', 'knowledge' and 'uptake'. The distribution of evidence across these various outcomes is presented in the figure below.[8]

Figure 19: Participant-level implementation outcomes



Like that of FLWs and health workers, 'knowledge' of participants is well studied and documented. Many papers measure participant knowledge to assess the performance of FLWs and health workers in relaying nutrition-related messages accurately.

Not surprisingly, 'coverage' is the most studied outcome. 'Receiving a service' was the primary indicator of coverage across interventions. It included factors such as: receiving advice or counselling with regard to, for example, breastfeeding; being enrolled in an AWC for supplementary food or registered as a pregnant/lactating mother; receiving micronutrient supplementation like iron and folic acid, calcium and other vitamins and minerals; or being weighed during pregnancy.

'Coverage' is different from 'take-up', where the latter included papers that measured the actual consumption of supplements provided, and changes in nutritional and feeding practices based on advice received from FLWs. A few indicators used by included papers to measure take-up are: utilisation of services by pregnant and lactating women registered with AWCs (Chudasama et al. 2014); attendance at village health and nutrition days (Barua and Baruah 2014); and attendance of enrolled children at AWCs (Pati et al. 2016).

Even though 'take-up' of an intervention is mostly contingent upon its 'acceptance' among the participants, we find few instances of papers measuring 'acceptance' relative to the other outcomes discussed above. We find that 'acceptance' is mostly measured in the case of 'food supplementation'. Acceptance of supplementary nutrition is mostly assessed based on the participants' perceptions of the quality of food received; its taste, smell, texture and sufficiency are important factors in determining participants' inclination to consume what is provided.

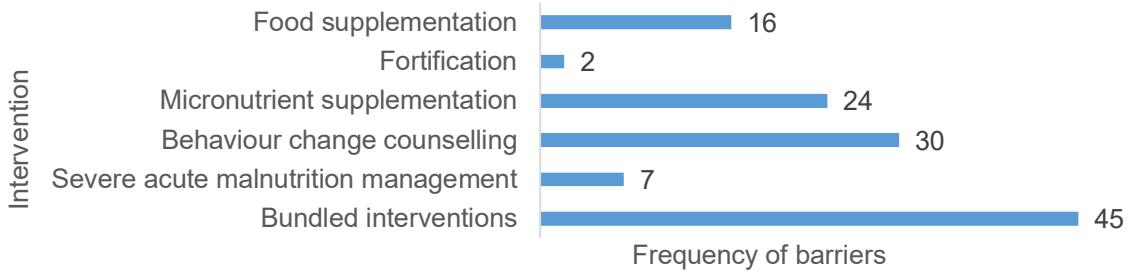
[8] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total 368 included papers.

4.3 Cross-cutting: barriers and facilitators

Lastly, we code for barriers and facilitators, which are critical in explaining the failure or success of programme implementation, including if it reached its intended participants; if they received the services or products in the prescribed dosage and in prescribed frequency; and if these services and products were in fact utilised by participants. All these factors must be in place for the programme's theory of change to work and for the programme to thereby have its intended impact. Implementation failures are common in preventing programmes from realising their intended impact. Identifying barriers and facilitators is therefore crucial to help a programme deliver to its full potential through reconceptualisation or redesign.

The included literature can be considered lacking in this respect. As mentioned earlier, the summation of implementation outcomes coded across all interventions shows that these have been measured 1,624 times. However, barriers and facilitators are coded a mere 151 times, or in 9 per cent of cases. Barriers and facilitators are identified both on the demand side and the supply side. Figure 20 below provides us with numbers on implementation barriers discussed by intervention category. None of the included papers measured barriers for delayed cord clamping and weighed during pregnancy.

Figure 20: Implementation barriers

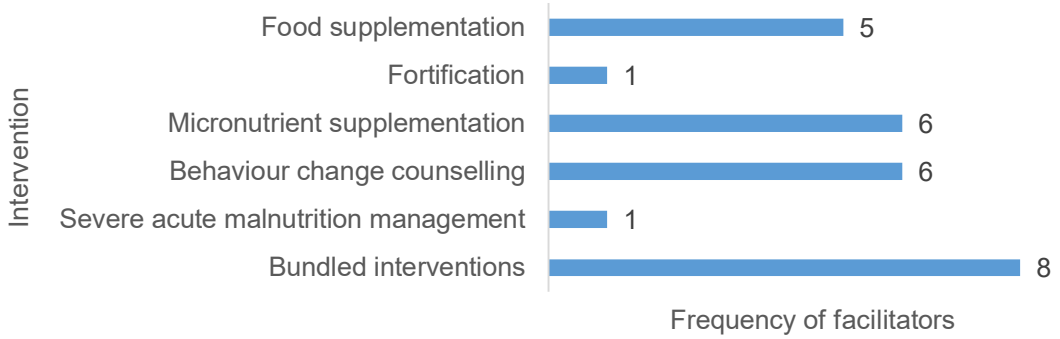


Demand-side barriers discussed in the literature range from participants being influenced in their choices by sources of information other than the health workers (Adhisivam et al. 2017) to pre-existing beliefs and norms (such as iron and folic acid tablets being seen as unfit for consumption by pregnant women [Agarwal 2004] or colostrum being considered 'bad or stale milk').

A few papers also mention poor economic status and low female literacy as potential barriers to receiving (Raghunathan et al. 2017) or using services (Gunjan et al. 2012). Migration (Mahajan et al. 2016), inaccessibility of the AWC (Ahmad et al. 2005), and no one to accompany the child (Desai et al. 2014) were some of the other reasons cited for poor use of services.

An even smaller number of papers (N=25 papers) consider facilitators. This is not surprising given that even good research tends to refrain from discussing enablers and facilitators when the programme is seen to work. Traditionally, there is little emphasis on learning lessons from successful programmes beyond concluding that the theory of change worked. While this might be true, there may be other external (unforeseen) factors that could have contributed to the programme and which might be worth documenting. None of the included papers measured facilitators for delayed cord clamping and weighed during pregnancy.

Figure 21: Implementation facilitators



Among the facilitators discussed in the literature, leadership is recognised as an important enabler by the evaluators of the Dular programme (Dubowitz et al. 2007). Programme implementation was found to have been assisted in some cases by: family encouragement for the adoption of new practices (Raajashri et al. 2018); better education of FLWs (Datta et al. 2010); dovetailing initiatives with other ongoing programmes, as in the case of vitamin A supplementation (Singh et al. 2013); and good communication strategies (Shivalli et al. 2015).

4.4 Gaps in literature

The table below summarises information from the earlier discussion. Significant gaps in the literature are highlighted in red. There is almost no evidence available on delayed cord clamping or management of severe acute malnutrition, and fortification remains understudied. In a country where malnourishment is rampant, and which bears over 30 per cent of the global burden of severe acute malnutrition (Kapil et al. 2015), these figures are startling.

Table 3: Distribution of papers by intervention and outcome[9]

Interventions	Implementation outcomes		
	Programme	FLW	Participant
Food supplementation	40	33	138
Fortification	5	4	27
Micronutrient supplementation	55	66	243
Behaviour change counselling	40	161	348
Severe acute malnutrition management	14	12	21
Delayed cord clamping	0	1	0
Weighed during pregnancy	8	7	19
Bundled interventions	99	157	126

However, for implementation research to contribute to the design of efficient programmes and facilitate evidence-informed decision-making, it needs to focus on more than just filling the evidence gaps outlined in the earlier sections.

[9] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total number of 368 included papers.

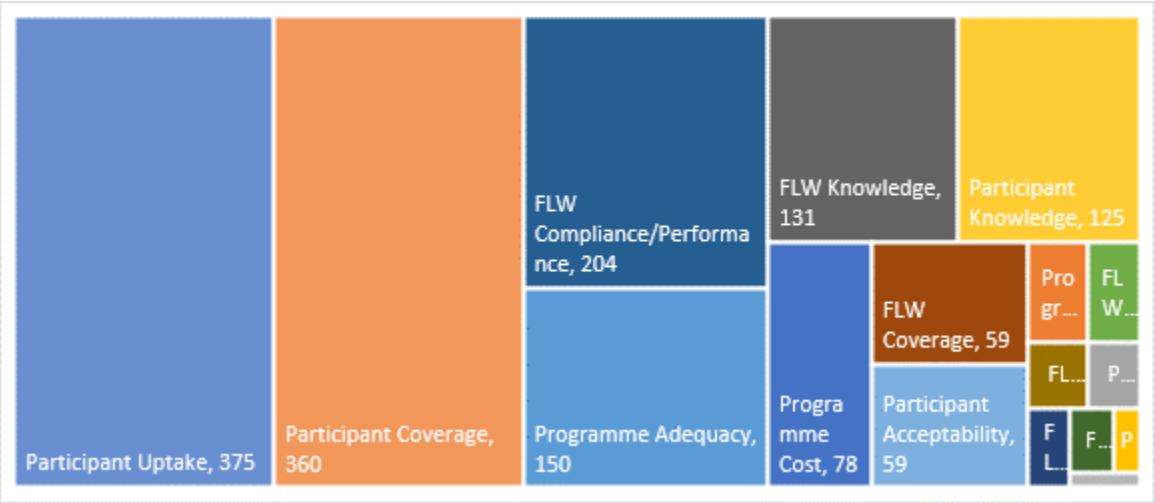
First, there is a paucity of literature that studies implementation with the approach and granularity outlined by Peters and colleagues (2013). For a large body of literature included in the study, the primary objective was not to study programme implementation. This is important to note, given that a study's motivation has a bearing on its design, methodology, sources and types of data collected, and conclusions drawn from the analysis.

Hence, for the included papers there is little to glean beyond measures of programme performance on a set of implementation outcomes. The studies do not systematically capture relevant programmatic information through the causal chain, and provide limited insights on factors affecting programme implementation – as borne out by the scant information provided on barriers and enablers.

Second, assessing implementation fidelity is important because it documents implementation departures from what was mandated by design. Most of the studies, however, rely on primary data alone to make this assessment, aside from evaluations of bundled interventions that use ICDS guidelines to measure, for example, adequacy of programme resources. Papers that look at FLW and health worker training programmes say nothing about reviewing training manuals, and do not comment on adherence to guidelines in the delivery of training programmes.

Third, as we consolidate the available evidence, we also find a preference to study those implementation outcomes that are easy to measure and are often tracked as part of regular monitoring and evaluation of project progress. Figure 22 shows that among the 17 outcomes for which the papers were coded, participant uptake, participant coverage, FLW and health worker compliance, FLW and health worker knowledge, and adequacy of programme resources are the five most-studied outcomes.

Figure 22: Frequency of implementation outcomes[10]



[10] A paper often reports on more than one implementation outcome for a particular intervention or a set of interventions. The sum of this figure is therefore greater than the total number of 368 included papers.

Finally, few papers investigate whether implementation outcomes differed for women and children drawn from different segments of society, or with varied literacy levels. Out of our total pool of papers, 78 report implementation outcomes according to demographics and conduct some form of subgroup analysis. Though there is ample literature examining how demographics may be correlated with women's willingness to adopt healthy behaviours, it is not discussed in relation to interventions, and was therefore excluded.

A gnawing gap in implementation research remains about how one draws links between programme implementation and the achievement of nutritional outcomes. While the included papers do tell us about the implementation outcomes they measure, we do not necessarily know if a well-implemented programme translates into better outcomes for the target population.

In the absence of this crucial link, the current approach may be suboptimal when viewed from the perspective of making programmatic and policy decisions. Future research would benefit from better-designed studies that carefully integrate the following key elements:

- Systematic exploration of the full programme theory of change, rather than just aspects of it; and
- The development of robust research standards for assessing programme implementation through a mix of quantitative and qualitative methods.

We did not systematically assess the quality of the literature included in the map, for reasons discussed in section 3.4. However, it is worth reiterating that addressing gaps in implementation research is not only about identifying areas with thin or no evidence, but also strengthening the field of implementation research so that it can contribute substantively to evidence-informed decision-making for better-designed policies and programmes.

5. Conclusion

Implementation research can help unpack the reasons why well-intentioned programmes fail to create their desired impact by systematically evaluating programme implementation for fidelity and identifying barriers and enablers. We examined implementation research on nutrition-specific interventions in India, which are of significant relevance in light of the country's flagship programmes such as ICDS and the NHM, which aim to tackle issues of maternal and child nutrition.

Despite the value that implementation research can potentially bring to policy and programming, especially in combination with effectiveness studies, its application by researchers and use by decision makers has been somewhat limited. Academic research has focused on estimating the effectiveness of nutrition-specific interventions in improving maternal and child health; however, a similar focus on the mechanisms of impact was thought to be missing.

Our search results, however, tell a different story; the literature is not as scant as originally imagined. Our systematic search of 13 databases and hand search of 32 organisational websites yielded 24,133 records, which filtered down to 368 papers that met our inclusion criteria (after various rounds of screening based on population, interventions, comparators, outcomes and study design). Compared to EGMs of

effectiveness studies carried out by 3ie, this is a significant number of included papers. Despite this encouraging news, significant gaps and biases were revealed when mapping papers on an intervention-outcome matrix.

The IRGM looked at a range of interventions that are broadly classified as food supplementation, fortification, micronutrient supplementation, behaviour change counselling and management of severe and acute malnutrition. These interventions are mostly targeted at pregnant and lactating women and children below the age of two, since the first 1,000 days between conception and a child's second birthday is a critical period that can have a profound impact on the child's ability to grow and thrive.

Given that the map focused on India-based interventions, it is not surprising that 66 per cent of the included papers look at the ICDS programme, a flagship national-level programme that seeks to address the issue of undernutrition among young children and nursing mothers. With an outreach of close to 20 million pregnant and lactating women and 82 million children, ICDS is the world's largest programme of its kind; therefore, it is important to understand how well it is delivered.

We looked at implementation outcomes at the programme level, FLW and health worker level, and participant level, and found that most studies evaluate programmes for participant-level coverage and uptake, followed by programme resources and FLW compliance/performance and knowledge. The data also revealed many important insights about distribution of evidence across geographies, interventions and target populations.

However, the central question of 'how well a programme is delivered' remains essentially unanswered in the absence of thresholds to calibrate effective programme implementation. Barriers and facilitators are discussed and measured only in a small fraction of papers, and mostly in cases of 'bundled interventions'. One third of the papers do not even include a description of the intervention evaluated.

We therefore conclude that implementation research evidence needs to be strengthened on two counts: generating more evidence in areas where studies are either missing or scant; and strengthening protocols for design and implementation of rigorous evaluations, which provide conclusive evidence on critical implementation factors that have a bearing on nutrition outcomes.

Appendix A: Detailed methodology

The first step in developing an IRGM was to build the scope. The scope was developed by doing an extensive literature review and by defining key areas of interest in close collaboration with IFPRI. The scope was defined by an inclusion-exclusion criterion based on population, interventions, comparators, outcomes and study design (PICOS). The intervention categories were designed to avoid significant overlap and to allow for papers with multiple interventions to be coded discretely. This was done keeping in mind large interventions like ICDS, which implement multiple sub-interventions of interest. The outcome categories were designed to reflect implementation outcomes at programme level, health worker level and participant level with the view of identifying literature that study barriers and facilitators at all these levels.

After the framework was built, it was internally reviewed by specialists on nutrition and EGMs. A stakeholder exercise was conducted to obtain feedback from relevant partners.

The second step in developing the IRGM was to run the search strategy. We developed a search word list (see Appendix B) with a search specialist who ran the search strategy in November 2018 for 13 academic databases (see Table A3), which generated 23,861 results. We limited our search to papers published from 2000 onwards. We conducted targeted searches of organisations' databases, online repositories of nutrition related research. A total of 272 records were identified through manual search of websites and repositories. Table A4 provides a list of the websites that we visited for hand searches.

All these papers were uploaded in EppiReviewer and screened for duplicates. A total of 2908 records were excluded as duplicates at title screening phase. The remaining records were screened at title and abstract using the machine learning function in EppiReviewer. A total of 1324 records were then screened at full text which yielded 368 papers (see Appendix D) which were finally coded with all the nutritional and implementation outcomes. At the full text screening stage double coding was carried out for 15 percent of the records, while 65 percent of the records were double coded at the full text coding stage. The data for these 368 records were then populated into the 3ie online platform. The following flowchart displays the number of records that were screened and coded in this IRGM at various stages.

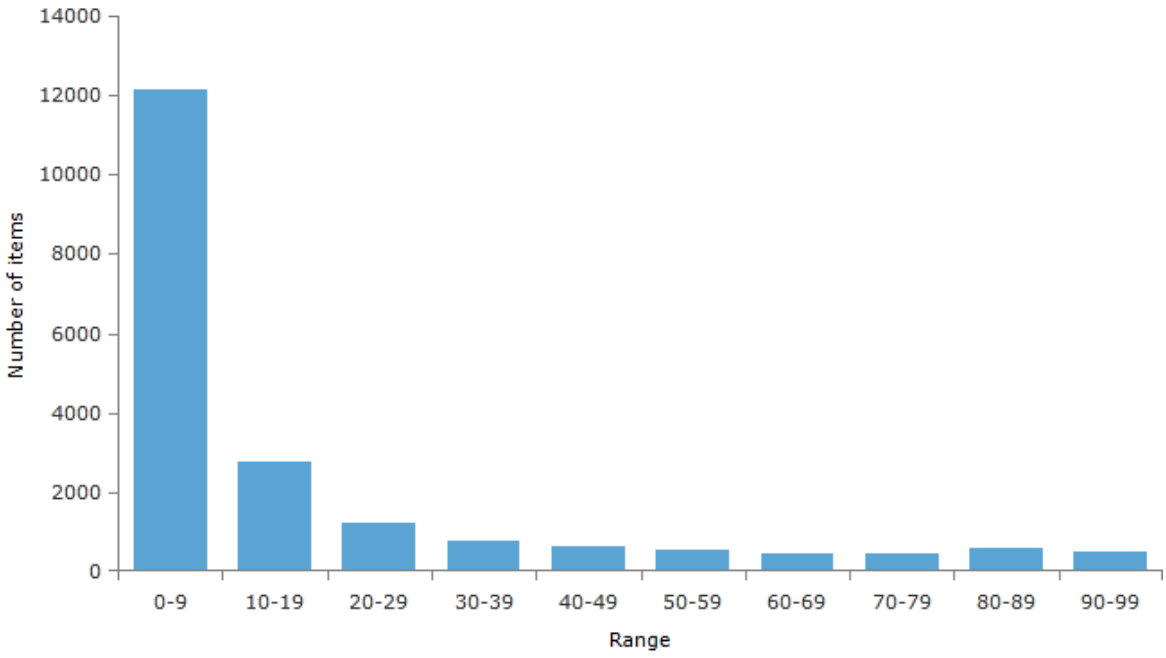
Details of screening

Table A1: Phase I title and abstract screening code set

Include	
Exclude if published before 2000	Exclude all abstracts where year of publication was before 2000.
Exclude if NOT India	Exclude all abstracts if the target country and population did not include India.
Exclude if book/manual/editorial	Exclude all abstracts of books, book chapters, editorials or manuals.
Exclude if NOT relevant to study	Exclude by this category if abstract can be excluded by outcomes, intervention and target population
Exclude if biomedical (efficacy) trial	Following 3ie IER screening instructions
Exclude by study outcomes	If abstract did not include any implementation level outcomes
Exclude by intervention	If abstract did not include any of the interventions
Exclude by target population	If abstract did not include the target population

- The code-set above was used for screening abstracts during the first Phase. However, the inclusion criteria were more relaxed during this phase. The focus was **on not excluding** articles which had major PICOS related keywords (e.g., breastfeeding, nutritional outcomes, BMI, etc) that might be used by the Machine Learning Classifiers for identifying probabilities of inclusion.
- A total of 20102 references were identified for the first phase of Title and Abstract screening, (after removal of duplicates and without including manual search results and titles without abstracts).
- Manual coding was carried out for a random subset of 1000 items out of the 20102 abstracts.
- Normal screening was carried out by 2 coders. In case of abstracts where coder was not sure about the categories of exclusion/ inclusion to be used, other coder was consulted for resolution of doubts.
- Using the 1000 items as a training set for EPPI-Reviewer's Machine Learning Classifiers (MLC), it was possible to categorize each item in 10 classes of probabilities of inclusion.

Figure A1: References arranged into categories indicating probability of inclusion from machine learning classifiers



- Following standard EPPI Reviewer protocol, out of the 20102 items identified for screening during this phase, 12159 items (60.5%) which fell in the category of <10 percent probability of inclusion were excluded from further screening.
- 5 percent of the 12159 excluded items were randomly screened to check for includes. Only one item was included.
- The first set of manual search items were added to the remaining 7943 titles and a second round of duplicate removal was carried out. Ten items were removed as duplicates.
- The final set for the second phase of title and abstract screening was 8135 items (7933 titles from phase I and 187 manual search items).

Table A2: Phase II title and abstract screening code set

Include	
Exclude if published before 2000	Exclude if year of publication is before 2000.
Exclude if NOT India	Exclude all abstracts if the target country and population did not include India.
Exclude if book/manual/editorial	Exclude all abstracts belonging to books, book chapters, editorials or manuals.
Exclude if biomedical (efficacy) trial	Following 3ie IER screening instructions
Exclude by study outcomes	If abstract did not include any implementation level outcomes
Exclude by intervention	If abstract did not include any of the interventions
Exclude by target population	If abstract did not include the target population

- In this phase, the screening criteria was tightened.
- Two coders individually screened 870 items out of 8135 (10 percent). This became the training set to use the screening tab.
- We screened 3675 more records before got about 500 continuous excludes.
- A total 4545 records were screened.
- We had a total of 1489 includes from Title and Abstract Screening
- Then we checked for duplicates and books manually and the total number of includes became 1472.
- We also conducted a final round of manual hand searches and have added another 86 records.
- To this we also added 25 records for which we didn't have abstracts initially and had to manually search for the abstracts online.
- The total tally of records for full text screening was 1579 after deleting 4 duplicates
- Out of 1579 records, there were 255 items for which full papers could not be retrieved, so a total of 1324 items were screened at full text.
- At the full text screening stage 368 items were included for full text coding.

Table A3: List of databases

Database	**Date the database was searched**
MEDLINE	13th November 2018
Cochrane Library (Cochrane Central Trials)	30th November 2018
CAB Abstracts	15th November 2018
Cap Global Health	14th November 2018
CINAHL (Plus)	19th November 2018
Popline	5th December 2018
PsycINFO	20th November 2018
Applied social science index and abstracts (ASSIA)	28th November 2018
Repec, Econlit & World Bank e-Library via Ebsco Discovery	30th November 2018
WHO Global Health Library	5th December 2018
EBSCO Discovery	30th November 2018
Ideas REPEC	30th November 2018
Epistemonikos	11th December 2018

Table A4: List of websites hand-searched

Website	Link to URL
Alive and Thrive (A&T)	https://www.aliveandthrive.org/
Brookings Blogs	https://www.brookings.edu/blogs/
CARE	https://www.careindia.org/
CARE Evaluation	http://careevaluations.org/
CHAI	https://clintonhealthaccess.org/
Dasra	https://www.dasra.org/
FHI 360 Alive and Thrive	https://www.fhi360.org/projects/alive-thrive
FSSAI FFRC	https://ffrc.fssai.gov.in/
GAIN	https://www.gainhealth.org/
Give Well	https://www.givewell.org/
ICMR	https://www.icmr.nic.in/
Ideas for India	https://www.ideasforindia.in/
IDInsight	https://www.idinsight.org
IFPRI (POSHAN)	https://www.ifpri.org/project/poshan
Intrahealth International	https://www.intrahealth.org/
IPE Global	http://www.ipeglobal.com/
Mathematica Policy Research	https://www.mathematica-mpr.com/
National Institute of Health and Family Welfare	http://www.nihfw.org/
NHM	https://nhm.gov.in/
NIPI	https://nhm.assam.gov.in
Nutrition International	https://www.nutritionintl.org/
Oxford Policy Management	https://www.opml.co.uk/
PATH INDIA	https://www.path.org/where-we-work/india/
Pharos Global Health Advisors	https://pharosglobalhealth.com/
Population Council	https://www.popcouncil.org/
Public Health Foundation of India (PHFI)	https://phfi.org/
Save the children	https://www.savethechildren.in/
Transform Nutrition	http://www.transformnutrition.org/
UNICEF	https://help.unicef.org
USAID	https://www.usaid.gov/
World Bank	https://www.worldbank.org/en/country/india
World Food Programme	https://www.wfp.org/

Table A5: Population, Intervention, Comparison, Outcomes and Study type for IRGM

	Include	Exclude
Population	Study which include participants who are: • Pregnant women in India • Women with a child below two years of age in India • Children below two years of age in India • Front Line Workers/ health workers	• Men • Adolescents (aged 10-19 years) • Women having children more than 2 years of age, but no child under 2 years of age • Children more than 2 years of age
Intervention	Nutrition-specific interventions provided in the first 1000-day window are the focus • Supplementary feeding • Food fortification • Micronutrients supplementation • Severe Acute Malnourishment category • Behavioural change counselling • Additional interventions under POSHAN Abhiyan	• Interventions targeting populations exclusively beyond the 1000 day window like school feeding programmes • Conditional Cash Transfers for institutional delivery and ANC services (when discussed and measured as a package). • Nutrition sensitive interventions
Comparison	• **For impact evaluations**, comparison group has to be a valid control group, which is a business-as-usual group. • **For process evaluations**, the concept of comparison group may not necessarily apply.	
Outcomes	**Implementation outcomes:** • Programme level • FLW/HW level • Participant level • Barriers and facilitators	
Study design and methods	**Impact Evaluations:** Completed papers with any evaluative component on nutritional outcomes and/or implementation outcomes **Experimental** • Randomisation **Quasi- experimental** • Propensity Score Matching • Regression Discontinuity Design • Difference-in-Difference with matching • Instrumental Variables • Multivariable panel regression with fixed effects • Interrupted times series **Completed Process Evaluations (qualitative and/or quantitative).**	• Evaluation Plan • Impact evaluation papers reporting only on nutritional outcomes without **any** mention of implementation outcomes of interest in the study. • Descriptive papers which do not include any measurement of implementation outcomes.
Date Restriction: Papers from year 2000 till 2018		
Language – Papers in English language only		

Appendix B: Detailed search strategy

Sample Search Strategy

1. Ovid MEDLINE(R) and In-Process & Other Non-Indexed Citations and Daily <1946 to November 12, 2018> Searched 13th November 2018

1 infant food/ or infant formula/ (13330)

2 ((infant or child* or maternal or mother* or pregnan*) adj3 (feed* or food* or formula* or nutrition* or diet*)).ti,ab,kw. (51130)

3 infant nutritional physiological phenomena/ or bottle feeding/ or breast feeding/ or weaning/ or kangaroo-mother care method/ or growth/ or growth charts/ (80255)

4 (((bottle or breast) adj3 (Feed* or fed or milk)) or (growth adj3 (monitor* or screen* or refer*)) or (kangaroo adj2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*).ti,ab,kw. (81598)

5 maternal nutritional physiological phenomena/ or prenatal nutritional physiological phenomena/ (5100)

6 exp Nutrition Disorders/co, dh, ep, lj, mo, pc, px, rh, th and (maternal health/ or maternal health services/ or maternal-child health services/ or perinatal care/ or postnatal care/ or preconception care/ or prenatal care/ or pregnant women/ or mothers/ or child health services/ or "early intervention (education)"/) (2925)

7 exp Micronutrients/ (619151)

8 ferric compounds/ or ferrous compounds/ or iron, dietary/ (28750)

9 (micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt").ti,ab,kw. (1174625)

10 exp dietary supplements/ or food, fortified/ or food,specialized/ or feeding behavior/ or tablets/ or syrup/ or capsules/ or powders/ or (supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*").ti,ab,kw. (738947)

11 ((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) adj5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)).ti,ab,kw. (74966)

12 (("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" adj3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) adj3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*) or ((behavio* adj2 (chang* or communicat*)) or counsel* or educat* or promot*))).ti,ab,kw. (1217)

13 ("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Front Line Workers" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" adj3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF).ti,ab,kw. and (health communication/ or persuasive communication/ or counseling/ or health education/ or health promotion/) (107)

14 or/1-13 (2268350)

Annotation: Nutrition interventions

15 Infant Nutrition Disorders/ or exp malnutrition/ or growth disorders/ or wasting syndrome/ or anemia/ or anemia, hypochromic/ or anemia, iron-deficiency/ or anemia, neonatal/ or obesity/ or pediatric obesity/ or body mass index/ or skinfold thickness/ (433022)

16 (malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*)).ti,ab,kw. (1859236)

17 or/15-16 (2007779)

Annotation: Nutrition outcomes

18 india/ or sikkim/ (94100)

19 (india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram adj2 india) or panchayat* or "swachh bharat" or "nirmal bharat").ti,ab,kw. (97587)

20 (kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or

trivandrum or thiruvananthapuram or kanpur or nagpur).ti,ab,kw. (12445)

21 or/18-20 (139692)

Annotation: India terms

22 14 and 21 (13647)

23 limit 22 to (english language and yr="2000 -Current") (10045)

Annotation: Nutrition interventions + India

24 17 and 21 (13971)

25 limit 24 to (english language and yr="2000 -Current") (10437)

Annotation: Nutrition outcomes + India

26 25 not 23 (7617)

Annotation: (Nutrition outcomes + India) but excluding overlaps with (Nutrition interventions + India)

2. CAB Global Health (Ovid) <1910 to 2018 Week 44> Searched 14th November 2018

1 ((infant or child* or maternal or mother* or pregnan*) adj3 (feed* or food* or formula* or nutrition* or diet*)).ti,ab,hw. (65857)

2 (((bottle or breast) adj3 (Feed* or fed or milk)) or (growth adj3 (chart* or monitor* or screen* or refer*)) or (kangaroo adj2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*).ti,ab,hw. (64961)

3 exp nutritional disorders/ and (community health services/ or maternity services/ or public health services/ or health services/ or child health/) (1201)

4 (micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e).ti,ab,hw. (363194)

5 exp trace elements/ or iron deficiency anaemia/ or iron/ or iron deficiency/ (62441)

6 (("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state

convergence" or "centrali?ed kitchens" or ("self help group" adj3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) adj3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*) or ((behavio* adj2 (chang* or communicat*)) or counsel* or educat* or promot*))).ti,ab,hw. (447)

7 (supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*").ti,ab,hw. (244330)

8 ((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) adj5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)).ti,ab,hw. (83028)

9 food supplements/ or supplementary feeding/ or food enrichment/ (30970)

10 or/1-9 (618189)

11 nutritional anaemia/ or exp nutritional disorders/ or growth charts/ or growth disorders/ or body measurements/ or arm circumference/ or exp body mass index/ or obesity/ or growth retardation/ or undernutrition/ or deficiency diseases/ or nutrient deficiencies/ or protein deficiencies/ or vitamin deficiencies/ (207339)

12 (malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*)).ti,ab,hw. (497131)

13 or/11-12 (526673)

14 (india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram adj2 india) or panchayat* or "swachh bharat" or "nirmal bharat").ti,ab,hw,gl. (121728)

15 (kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur).ti,ab,gl. (11909)

16 14 or 15 (122341)

17 man/ (2114893)

18 10 and 16 and 17 (11697)

19 limit 18 to yr="2000 -Current" (**7296**) – **Nutrition Interventions + India**

20 13 and 16 and 17 (12391)

21 limit 20 to yr="2000 -Current" (8468)

22 21 not 19 (**5536**) – **Nutrition Outcomes + India (excluding overlapping results from Set 19)**

3. CAB Abstracts (Ovid) <1990 to 2018 Week 44> Searched 15th November 2018

1 ((infant or child* or maternal or mother* or pregnan*) adj3 (feed* or food* or formula* or nutrition* or diet*)).ti,ab,hw. (49595)

2 (((bottle or breast) adj3 (Feed* or fed or milk)) or (growth adj3 (chart* or monitor* or screen* or refer*)) or (kangaroo adj2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*).ti,ab,hw. (74735)

3 exp nutritional disorders/ and (community health services/ or maternity services/ or public health services/ or health services/ or child health/) (720)

4 (micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e).ti,ab,hw. (589005)

5 exp trace elements/ or iron deficiency anaemia/ or iron/ or iron deficiency/ (116034)

6 (("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" adj3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) adj3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*) or ((behavio* adj2 (chang* or communicat*)) or counsel* or educat* or promot*))).ti,ab,hw. (468)

7 (supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*").ti,ab,hw. (394112)

8 ((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) adj5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)).ti,ab,hw. (109876)

9 food supplements/ or supplementary feeding/ or food enrichment/ (33981)

10 or/1-9 (990770)

11 nutritional anaemia/ or exp nutritional disorders/ or growth charts/ or growth disorders/ or body measurements/ or arm circumference/ or exp body mass index/ or obesity/ or growth retardation/ or undernutrition/ or deficiency diseases/ or nutrient deficiencies/ or protein deficiencies/ or vitamin deficiencies/ (169351)

12 (malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*)).ti,ab,hw. (1132514)

13 or/11-12 (1158996)

14 (india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram adj2 india) or panchayat* or "swachh bharat" or "nirmal bharat").ti,ab,hw,gl. (345413)

15 (kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur).ti,ab,gl. (22871)

16 or/14-15 (346814)

17 man/ (939704)

18 10 and 16 and 17 (7143)

19 limit 18 to yr="2000 -Current" (**6176**)

20 13 and 16 and 17 (7658)

21 limit 20 to yr="2000 -Current" (6818)

23 21 not 19 (**4129**)

4. Social Sciences Citation Index (Web of Science) – Searched 28th November 2018

#15 #11 AND #8

Refined by: COUNTRIES/REGIONS: (INDIA)

#14 #11 AND #7 **[Interventions – 1186 hits]**

Refined by: COUNTRIES/REGIONS: (INDIA)

#13 #11 AND #8

#12 #11 AND #7

#11 #10 OR #9

#10 TS=(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) OR CU=(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) OR PS=(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur)

#9 TS=(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram NEAR/2 india) or panchayat* or "swachh bharat" or "nirmal bharat") OR CU=(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram NEAR/2 india) or panchayat* or "swachh bharat" or "nirmal bharat") OR PS=(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram NEAR/2 india) or panchayat* or "swachh bharat" or "nirmal bharat")

#8 TS=(malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* NEAR/2 deficien*))

#7 #6 OR #5 OR #4 OR #3 OR #2 OR #1

#6 TS=((("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" NEAR/3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) NEAR/3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* NEAR/2 deficien*) or (behavio* NEAR/2 (chang* or communicat*)) or counsel* or educat* or promot*)))

#5 TS=((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) NEAR/5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday))

#4 TS=(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*")

#3 TS=(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt")

#2 TS=(((bottle or breast) NEAR/3 (Feed* or fed or milk)) or (growth NEAR/3 (monitor* or screen* or refer*)) or (kangaroo NEAR/2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*)

#1 TS=((infant or child* or maternal or mother* or pregnan*) NEAR/3 (feed* or food* or formula* or nutrition* or diet*))

5. CINAHL (Ebsco) – Searched 19th November 2018

S11 S7 AND S10 - **914 [Final Result]**

Limiters - Published Date: 20000101-20191231; English Language; Exclude MEDLINE records

S10 S8 OR S9

13,944

S9 TI(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) OR AB(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) OR SU(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur)

1,136

S8 TI(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar

haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram N2 india) or panchayat* or "swachh bharat" or "nirmal bharat") OR AB(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram N2 india) or panchayat* or "swachh bharat" or "nirmal bharat") OR SU(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram N2 india) or panchayat* or "swachh bharat" or "nirmal bharat")

13,797

S7 S1 OR S2 OR S3 OR S4 OR S5 OR S6

93,138

S6 TI(("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" N3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) N3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*) or ((behavio* N2 (chang* or communicat*)) or counsel* or educat* or promot*))) OR AB(("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" N3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) N3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*) or ((behavio* N2 (chang* or communicat*)) or counsel* or educat* or promot*))) OR SU(("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" N3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) N3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short

stature" or weight-for-age or (diet* N2 deficien*) or ((behavio* N2 (chang* or communicat*)) or counsel* or educat* or promot*)))

83

S5 TI((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) N5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)) OR AB((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) N5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)) OR SU((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) N5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday))

20,541

S4 TI(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*") OR AB(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*") OR SU(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*")

44,192

S3 TI(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt") OR AB(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-

vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt") OR SU(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt")

38,876

S2 TI(((bottle or breast) N3 (Feed* or fed or milk)) or (growth N3 (monitor* or screen* or refer*)) or (kangaroo N2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*) OR AB(((bottle or breast) N3 (Feed* or fed or milk)) or (growth N3 (monitor* or screen* or refer*)) or (kangaroo N2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*) OR SU(((bottle or breast) N3 (Feed* or fed or milk)) or (growth N3 (monitor* or screen* or refer*)) or (kangaroo N2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*)

11,312

S1 TI((infant or child* or maternal or mother* or pregnan*) N3 (feed* or food* or formula* or nutrition* or diet*)) OR AB((infant or child* or maternal or mother* or pregnan*) N3 (feed* or food* or formula* or nutrition* or diet*)) OR SU((infant or child* or maternal or mother* or pregnan*) N3 (feed* or food* or formula* or nutrition* or diet*))

12,503

6. PsycINFO (Ovid) <1806 to November Week 2 2018> Searched 20th November 2018

1 ((infant or child* or maternal or mother* or pregnan*) adj3 (feed* or food* or formula* or nutrition* or diet*)).ti,ab,sh. (10383)

2 (((bottle or breast) adj3 (Feed* or fed or milk)) or (growth adj3 (monitor* or screen* or refer*)) or (kangaroo adj2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*).ti,ab,sh. (7649)

3 (micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd

or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt").ti,ab,sh. (44185)

4 nutritional deficiencies/ or exp protein deficiency disorders/ or exp vitamin deficiency disorders/ or failure to thrive/ or exp underweight/ (14534)

5 (supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*").ti,ab,sh. (73637)

6 ((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) adj5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)).ti,ab,sh. (3461)

7 dietary supplements/ or exp vitamins/ (5989)

8 (("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" adj3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) adj3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*) or ((behavio* adj2 (chang* or communicat*)) or counsel* or educat* or promot*))).ti,ab,sh. (98)

9 or/1-8 (144357)

10 (malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* adj2 deficien*)).ti,ab,sh. (149697)

11 nutritional deficiencies/ or exp protein deficiency disorders/ or exp vitamin deficiency disorders/ or failure to thrive/ or exp underweight/ (14534)

12 or/10-11 (160277)

13 (india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram adj2 india) or panchayat* or "swachh bharat" or "nirmal bharat").ti,ab,lo. (24514)

14 (kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur).ti,ab,lo. (1781)

15 (india or sikkim).lo. (19512)

16 or/13-15 (24661)

17 19 and 16 (766)

18 limit 17 to (english language and yr="2000 -Current") (**638**) - **Interventions**

19 12 and 16 (1181)

20 limit 19 to (english language and yr="2000 -Current") (997)

21 20 not 18 **(862) – Outcomes**

7.Repec, Econlit & World Bank e-Library via Ebsco Discovery – Searched 30th November 2018

Results limited to Repec, Econlit & World Bank e-Library: **Interventions: 1391 hits**

Results limited to Repec, Econlit & World Bank e-Library: **Outcomes without Interventions: 13033**

S14 S13 not S11 - 91,131 [**Outcomes not Interventions**]

S13 S10 AND S12 - 103,511 [**Outcomes**]

S12 TI(malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*)) OR AB(malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*)) OR SU(malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*)) 6,403,013

S11 S7 AND S10 - 62,127 [**Interventions**]

S10 S8 OR S9 1,134,599

S9 TI(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) OR AB(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) OR SU(kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur) 152,295

S8 TI(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or

odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram N2 india) or panchayat* or "swachh bharat" or "nirmal bharat") OR AB(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram N2 india) or panchayat* or "swachh bharat" or "nirmal bharat") OR SU(india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram N2 india) or panchayat* or "swachh bharat" or "nirmal bharat") 1,077,948

S7 S1 OR S2 OR S3 OR S4 OR S5 OR S6 6,531,711

S6 TI(("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" N3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) N3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*) or ((behavio* N2 (chang* or communicat*)) or counsel* or educat* or promot*))) OR AB(("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" N3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) N3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*) or ((behavio* N2 (chang* or communicat*)) or counsel* or educat* or promot*))) OR SU(("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" N3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) N3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* N2 deficien*) or ((behavio* N2 (chang* or communicat*)) or counsel* or educat* or promot*))) 6,790

S5 TI((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) N5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)) OR AB((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) N5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)) OR SU((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) N5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)) 281,268

S4 TI(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*") OR AB(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*") OR SU(supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*") 2,941,948

S3 TI(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt") OR AB(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt") OR SU(micronutrient* or multinutrient* or multi-nutrient* or "multi*nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-

mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or 25ohd or "25-oh-vitamin d" or 25-ohd or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt") 3,559,573

S2 TI(((bottle or breast) N3 (Feed* or fed or milk)) or (growth N3 (monitor* or screen* or refer*)) or (kangaroo N2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*) OR AB(((bottle or breast) N3 (Feed* or fed or milk)) or (growth N3 (monitor* or screen* or refer*)) or (kangaroo N2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*) OR SU(((bottle or breast) N3 (Feed* or fed or milk)) or (growth N3 (monitor* or screen* or refer*)) or (kangaroo N2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*) 180,381

S1 TI((infant or child* or maternal or mother* or pregnan*) N3 (feed* or food* or formula* or nutrition* or diet*)) OR AB((infant or child* or maternal or mother* or pregnan*) N3 (feed* or food* or formula* or nutrition* or diet*)) OR SU((infant or child* or maternal or mother* or pregnan*) N3 (feed* or food* or formula* or nutrition* or diet*)) 176,070

8. Cochrane Library – Searched 30th November 2018

#1 MeSH descriptor: [Infant Food] explode all trees

#2 ((infant or child* or maternal or mother* or pregnan*) near/3 (feed* or food* or formula* or nutrition* or diet*)):ti,ab

#3 [mh ^"infant nutritional physiological phenomena"] or [mh ^"bottle feeding"] or [mh ^"breast feeding"] or [MH ^weaning] or [mh ^"kangaroo-mother care method"] or [mh ^growth] or [mh ^"growth charts"]

#4 (((bottle or breast) near/3 (Feed* or fed or milk)) or (growth near/3 (monitor* or screen* or refer*)) or (kangaroo near/2 (care or method or mother*)) or skin-to-skin or "skin to skin" or wean*):ti,ab

#5 [mh ^"maternal nutritional physiological phenomena"] or [mh ^"prenatal nutritional physiological phenomena"]

#6 MeSH descriptor: [Nutrition Disorders] explode all trees and with qualifier(s): [complications - CO, diet therapy - DH, mortality - MO, epidemiology - EP, prevention & control - PC, psychology - PX, rehabilitation - RH, therapy - TH]

#7 [mh ^"maternal health"] or [mh ^"maternal health services"] or [mh ^"maternal-child health services"] or [mh ^"perinatal care"] or [mh ^"postnatal care"] or [mh ^"preconception care"] or [mh ^"prenatal care"] or [mh ^"pregnant women"] or [mh ^mothers] or [mh ^"child health services"] or [mh ^"early intervention (education)"]

#8 #6 and #7

#9 MeSH descriptor: [Micronutrients] explode all trees

#10 [mh ^"ferric compounds"] or [mh ^"ferrous compounds"] or [mh ^"iron, dietary"]

#11 (micronutrient* or multinutrient* or multi-nutrient* or "multi* nutrient" or "multimicro-nutrient*" or "multimicronutrient*" or multivitamin* or "multi-vitamin*" or multimineral* or "multi-mineral*" or "multiple micro nutrient*" or "multiple micronutrient" or micro-nutrient* or MMN or "essential vitamins*" or mineral* or "m.v.i. pediatric" or "trace element*" or "trace mineral*" or "trace metal" or vitamin* or "vitamin d" or "hydroxyvitamin d" or vitamin-d or "25 hydroxyvitamin d" or "25 hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25-hydroxy-vitamin d" or "25-hydroxyvitamin d" or "25ohd" or "25-oh-vitamin d" or "25-ohd" or "vitamin d2" or vitamin-d2 or "25-hydroxyvitamin d2" or "25-hydroxy-vitamin d2" or "vitamin d3" or vitamin-d3 or "25 hydroxyvitamin d3" or "25 hydroxyvitamin d3" or "25-hydroxy-vitamin d3" or calcidiol or calcifediol or calcium or retinol* or retinal* or Retinaldehyde or retinoid or Retinoids or retinoic or beta-carotene or "beta carotene" or iron or "Fe(III)" or "Fe3+" or "iron(III) " or "Ferrous ion" or "Fe(II)" or "iron(II)" or "Fe2+" or "ferr* compounds" or zinc or "zn" or "zn acetate" or "zn sulfate" or "zn oxide" or iodine or "iod* compounds" or "folic acid" or "ergocalciferol derivative" or "ergocalciferol-D2" or cholecalciferol-D3 or "colecalciferol derivative" or iodiz* or "beta carotene" or "b-tene" or "beta carotin" or betacarotene or "vitamin e" or vitamin-e or "fortified salt"):ti,ab

#12 [mh "dietary supplements"] or [mh ^"food, fortified"] or [mh ^"food,specialized"] or [mh ^"feeding behavior"] or [mh ^tablets] or [mh ^syrup] or [mh ^capsules] or [mh ^powders]

#13 (supplement* or nutraceutical* or nutriceutical* or neutraceutical* or capsule* or tablet* or syrup* or drop* or Sprinkles or powder* or foodlet* or "foodlet-based" or "crushable nutritabs" or "micronutrient powder*" or "multiple-micronutrient powder" or mnp or "complementary feed*" or "complementary food*" or "take home ration*" or "take-home ration*"):ti,ab

#14 ((food* or meal* or drink* or beverage* or diet* or snack* or breakfast* or break-fast* or lunch* or dinner* or rice or flour or oil or pulses or salt) near/5 (fortif* or enrich* or supplement* or cooked or hot or prepared or midday)):ti,ab

#15 (("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Front Line Workers" or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" near/3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF) near/3 (nutrition* or malnutrition or malnourish* or undernutrition* or undernourish* or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* near/2 deficien*) or ((behavio* near/2 (chang* or communicat*)) or counsel* or educat* or promot*))):ti,ab

#16 ("Integrated Child Development Services Scheme" or "Integrated Child Development Scheme" or "National Health Mission" or "National Nutrition Mission" or NNM or "National Rural Health Mission" or "Supplementary Nutrition Program" or SNP or Anganwadi or "Auxiliary Nurse Midwi*" or ANM or "ASHA worker*" or "Front Line Workers" or "Open Market Sales" or "state convergence" or "centrali?ed kitchens" or ("self help group" near/3 kitchens) or "National Nutrition Scheme" or "National Nutrition Strategy" or "POSHAN Abhiyaan" or "Infant Young Child Feeding" or IYCF):ti,ab and ([mh ^"health communication"] or [mh ^"persuasive communication"] or [mh ^counseling] or [mh ^"health education"] or [mh ^"health promotion"])

#17 #1 or #2 or #3 or #4 or #5 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16

#18 [mh ^"Infant Nutrition Disorders"] or [mh malnutrition] or [mh ^"growth disorders"] or [mh ^"wasting syndrome"] or [mh ^anemia] or [mh ^"anemia, hypochromic"] or [mh ^"anemia, iron-deficiency"] or [mh ^"anemia, neonatal"] or [mh ^obesity] or [mh ^"pediatric obesity"] or [mh ^"body mass index"] or [mh ^"skinfold thickness"]

#19 (malnourish* or malnutrition or kwashiorkor or growth or BMI or "body mass index" or anemi* or anaemi* or wasting or stunting or stunted or obes* or overweight or underweight or skinfold or height-for-age or weight-for-height or "short stature" or weight-for-age or (diet* near/2 deficien*)):ti,ab

#20 #18 or #19

#21 [mh india] or [mh sikkim]

#22 (india or "andhra pradesh" or "arunachal pradesh" or assam or bihar or Chhattisgarh or goa or gujarat or haryana or "himachal pradesh" or jammu or kashmir or Jharkhand or karnataka or kerala or "madhya pradesh" or maharashtra or manipur or meghalaya or mizoram or nagaland or odisha or orissa or punjab or rajasthan or sikkim or "tamil nadu" or telangana or tripura or "uttar pradesh" or uttarakhand or "west bengal" or andaman or nicobar or chandigarh or dadra or "nagar haveli" or daman or diu or lakshadweep or delhi or "national capital territory" or puducherry or pondicherry or (gram near/2 india) or panchayat* or "swachh bharat" or "nirmal bharat"):ti,ab

#23 (kolkata or hyderabad or chennai or bhopal or ahmedabad or pune or mumbai or jaipur or bengaluru or bangalore or lucknow or surat or patna or agra or chandigarh or amritsar or trivandrum or thiruvananthapuram or kanpur or nagpur):ti,ab

#24 #21 or #22 or #23

#25 #17 and #24 with Cochrane Library publication date Between Jan 2000 and Dec 2018, in Cochrane Reviews, Cochrane Protocols, Trials [**1406 hits – Interventions**]

#26 #20 and #24 with Cochrane Library publication date Between Jan 2000 and Dec 2018, in Cochrane Reviews, Cochrane Protocols, Trials [**828 hits – Outcomes**]

9. Popline – Searched 5th December 2018

[All Fields] ((infant OR child* OR maternal OR mother* OR pregnan*) AND (feed* OR food* OR formula* OR nutrition* OR diet* OR supplement* OR micronutrient* OR fortified OR complementary))

AND

[All Fields] india OR "andhra pradesh" OR "arunachal pradesh" OR assam OR bihar OR Chhattisgarh OR goa OR gujarat OR haryana OR "himachal pradesh" OR jammu OR kashmir OR Jharkhand OR karnataka OR kerala OR "madhya pradesh" OR maharashtra OR manipur OR meghalaya OR mizoram OR nagaland OR odisha OR orissa OR punjab OR rajasthan OR sikkim OR "tamil nadu" OR telangana OR tripura OR "uttar pradesh" OR uttarakhand OR "west bengal" OR andaman OR nicobar OR chandigarh OR dadra OR "nagar haveli" OR daman OR diu OR lakshadweep OR delhi OR "national capital territory" OR puducherry OR pondicherry OR (gram AND india) OR panchayat* OR "swachh bharat" OR "nirmal bharat" OR kolkata OR hyderabad OR chennai OR bhopal OR ahmedabad OR pune OR mumbai OR jaipur OR bengaluru OR bangalore OR lucknow OR surat OR patna OR agra OR chandigarh OR amritsar OR trivandrum OR thiruvananthapuram OR kanpur OR Nagpur

Results – 2057

10. WHO ICTRP Trials Database – Searched 5th December 2018

(feed* OR food* OR formula* OR nutrition* OR diet* OR supplement* OR micronutrient* OR fortified OR complementary) AND India – **232 trials**

11. WHO Global Health Library – Searched 5th December 2018

tw:((feed* OR food* OR formula* OR nutrition* OR diet* OR supplement* OR micronutrient* OR fortified OR complementary OR "maternal health" OR "child health") AND (india OR "andhra pradesh" OR "arunachal pradesh" OR assam OR bihar OR chhattisgarh OR goa OR gujarat OR haryana OR "himachal pradesh" OR jammu OR kashmir OR jharkhand OR karnataka OR kerala OR "madhya pradesh" OR maharashtra OR manipur OR meghalaya OR mizoram OR nagaland OR odisha OR orissa OR punjab OR rajasthan OR sikkim OR "tamil nadu" OR telangana OR tripura OR "uttar pradesh" OR uttarakhand OR "west bengal" OR andaman OR nicobar OR chandigarh OR dadra OR "nagar haveli" OR daman OR diu OR lakshadweep OR delhi OR "national capital territory" OR puducherry OR pondicherry OR (gram AND india) OR panchayat* OR "swachh bharat" OR "nirmal bharat" OR kolkata OR hyderabad OR chennai OR bhopal OR ahmedabad OR pune OR mumbai OR jaipur OR bengaluru OR bangalore OR lucknow OR surat OR patna OR agra OR chandigarh OR amritsar OR trivandrum OR thiruvananthapuram OR kanpur OR nagpur)) AND (instance:"ghl") AND (db:("IMSEAR") AND mj:("India" OR "Female" OR "Child" OR "Infant" OR "Child, Preschool" OR "Adolescent" OR "Infant, Newborn") AND pais_assunto:("asia") AND year_cluster:("2008" OR "2000" OR "2007" OR "2005" OR "2003" OR "2006" OR "2004" OR "2009" OR "2002" OR "2001" OR "2010"))

Results – 1115 hits

12. Epistemonikos – Searched 11th December 2018

(advanced_title_en:(feed* OR food* OR formula* OR nutrition* OR diet* OR supplement* OR micronutrient* OR fortified OR complementary OR "maternal health" OR "child health") OR advanced_abstract_en:(feed* OR food* OR formula* OR nutrition* OR diet* OR supplement* OR micronutrient* OR fortified OR complementary OR "maternal health" OR "child health")) AND (advanced_title_en:(india OR "andhra pradesh" OR "arunachal pradesh" OR assam OR bihar OR chhattisgarh OR goa OR gujarat OR haryana OR "himachal pradesh" OR jammu OR kashmir OR jharkhand OR karnataka OR kerala OR "madhya pradesh" OR maharashtra OR manipur OR meghalaya OR mizoram OR nagaland OR odisha OR orissa OR punjab OR rajasthan OR sikkim OR "tamil nadu" OR telangana OR tripura OR "uttar pradesh" OR uttarakhand OR "west bengal" OR andaman OR nicobar OR chandigarh OR dadra OR "nagar haveli" OR daman OR diu OR lakshadweep OR delhi OR "national capital territory" OR puducherry OR pondicherry OR (gram AND india) OR panchayat* OR "swachh bharat" OR "nirmal bharat" OR kolkata OR hyderabad OR chennai OR bhopal OR ahmedabad OR pune OR mumbai OR jaipur OR bengaluru OR bangalore OR lucknow OR surat OR patna OR agra OR chandigarh OR amritsar OR trivandrum OR thiruvananthapuram OR kanpur OR nagpur) OR advanced_abstract_en:(india OR "andhra pradesh" OR "arunachal pradesh" OR assam OR bihar OR chhattisgarh OR goa OR gujarat OR haryana OR "himachal pradesh" OR jammu OR kashmir OR jharkhand OR karnataka OR kerala OR "madhya pradesh" OR maharashtra OR manipur OR meghalaya OR mizoram OR nagaland OR odisha OR orissa OR punjab OR rajasthan OR sikkim OR "tamil nadu" OR telangana OR tripura OR "uttar pradesh" OR uttarakhand OR "west bengal" OR andaman OR nicobar OR chandigarh OR dadra OR "nagar haveli" OR daman OR diu OR lakshadweep OR delhi OR "national capital territory" OR puducherry OR pondicherry OR (gram AND india) OR panchayat* OR "swachh bharat" OR "nirmal bharat" OR kolkata OR hyderabad OR chennai OR bhopal OR ahmedabad OR pune OR mumbai OR jaipur OR bengaluru OR bangalore OR lucknow OR surat OR patna OR agra OR chandigarh OR amritsar OR trivandrum OR thiruvananthapuram OR kanpur OR nagpur)) [Filters: protocol=no, min_year=2000, max_year=2019] – **405 hits**

Appendix C: Coding sheet

Coding categories	Answer options
Unique ID for publication	Unique ID number generated
Publication year	Year
Short title of document	Short title
Title of document	Title
Type of document	Journal article Working paper Evaluation report National survey reports Thesis report/dissertation Others
Study Status: Whether ongoing, completed or information unavailable	Ongoing Completed *[This also includes baseline and midline reports of IEs (that have been marked as PEs based on 3ie guidelines) if these compare programmes outcomes/processes with pre-programme outcomes/processes.]* Information unavailable
Type of study	Impact Evaluation Process Evaluation *[Marked only when paper calls itself a process evaluation or a formative evaluation.]* IE and PE Systematic Review Other Evaluations
Design method used in the study	Impact Evaluation: Randomised controlled trials or Cluster-RCT Impact Evaluation: Propensity score matching (PSM) or other matching methods (as well as synthetic controls) Impact Evaluation: Difference-in-differences (DID) & Fixed Effects Estimation Impact Evaluation: Regression Discontinuity Design (RDD) Impact Evaluation: Instrumental variable estimation Impact Evaluation: Interrupted Time Series Systematic Reviews Process Evaluations Others
State where the programme was implemented	Andhra Pradesh Arunachal Pradesh Assam Bihar Chhattisgarh Goa Gujarat Haryana Himachal Pradesh Jammu and Kashmir Jharkhand Karnataka Kerala

Coding categories	Answer options
	Madhya Pradesh Maharashtra Manipur Meghalaya Mizoram Nagaland Odisha Punjab Rajasthan Sikkim Tamil Nadu Telangana Tripura Delhi Uttarakhand Uttar Pradesh West Bengal Andaman and Nicobar Islands Chandigarh Dadar and Nagar Haveli Daman and Diu Lakshadweep Pondicherry India *[Marked for papers which do not specify a state and give information about the entire country]* Region (South/North/East/West) [Marked for papers which do not specify a state and give information about the regions]
Whether intervention details are clearly described in the document	Intervention details clear Intervention details absent/unclear
Whether the programme was implemented in an urban area or rural area, or both	Rural Urban Rural and Urban Information unavailable
Nature of organisations which implemented the program	Govt. only NGO only For-profit only NGO & govt. partnership NGO & for-profit partnership For-profit & govt. partnership For-profit & NGO & govt. partnership Information unavailable
Whether the programme has any linkages to ICDS	It is an ICDS intervention Collaboration with ICDS NOT ICDS related Information unavailable

Coding categories	Answer options
Target population that was recipient of the programme	Pregnant women in India Women with a child below two years of age in India Children below two years of age in India FLW/ health workers/implementers implementing the interventions *[Also marked when FLW implementation outcomes are marked even for interventions for which FLW is not the target population]* Women with a child (age group other) Children (age group other)
Channel used to deliver the programme	Home visits Facility visit Others Not applicable Information unavailable
Platform used to deliver the programme	ICDS ASHA/NHM SHGs Health care system Others Information unavailable
Food supplementation: If the intervention is a demand side intervention, supply side or both	Demand Supply Both
Fortification: : If the intervention is a demand side intervention, supply side or both	
Micronutrients supplementation: : If the intervention is a demand side intervention, supply side or both	
Behaviour change counselling (BCC): : If the intervention is a demand side intervention, supply side or both	
Severe acute malnutrition (SAM) management: : If the intervention is a demand side intervention, supply side or both	
Other interventions: : If the intervention is a demand side intervention, supply side or both	
Bundled intervention: : If the intervention is a demand side intervention, supply side or both	

Coding categories	Answer options
Intervention subcategory: description and classification	Food supplementation Fortification: Micronutrient powder Fortification: Fortification of commonly consumed goods (salt, wheat flour, edible oil, rice, milk, water) Micronutrients supplementation: Iron & folic acid supplementation Micronutrients supplementation: Vitamin A supplementation Micronutrients supplementation: Calcium supplementation Micronutrients supplementation: Zinc supplementation Micronutrients supplementation: Other BCC: Breastfeeding counselling BCC: Counselling on kangaroo mother care BCC: Counselling on complementary feeding BCC: Growth monitoring and counselling Severe acute malnutrition management Delayed cord clamping Weighed during pregnancy Bundled interventions
Broad outcome levels	Programme Level Frontline worker/Health worker level Participant Level Cross-cutting
Specific outcome description and classification	Programme level: Programme access Programme level: Programme targeting Programme level: Programme adequacy Programme level: Programme monitoring Programme level: Programme cost FLW/Health worker level: FLW coverage FLW/Health worker level: FLW acceptability FLW/Health worker level: FLW knowledge FLW/Health worker level: FLW motivation FLW/Health worker level: FLW compliance/performance FLW/Health worker level: FLW quality of engagement FLW/Health worker level: FLW time-use Participant level: Participant coverage Participant level: Participant acceptability Participant level: Participant knowledge Participant level: Participant feasibility Participant level: Participant uptake/compliance Cross-cutting level: Barriers Cross-cutting level: Facilitators
Stunting: Direction of impact on nutritional outcome measured Wasting: Direction of impact on nutritional	Positive Impact Negative Impact Null Impact

Coding categories	Answer options
outcome measured	
Anaemia: Direction of impact on nutritional outcome measured	
Underweight: Direction of impact on nutritional outcome measured	
Overweight/Obesity: Direction of impact on nutritional outcome measured	
Others: Direction of impact on nutritional outcome measured	

Online appendix D: Included papers

https://www.3ieimpact.org/sites/default/files/2020-08/WP38-IRGM-Online-appendix-D-Included-papers.pdf

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Other publications in the 3ie working paper series

The following papers are available from http://3ieimpact.org/evidence-hub/publications/working-papers

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The current and potential role of self-help group federations in India, 3ie Working paper 36. Barooah, B, Narayanan, R and Balakrishnan, S, 2020.

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3ie@3ieimpact.org
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