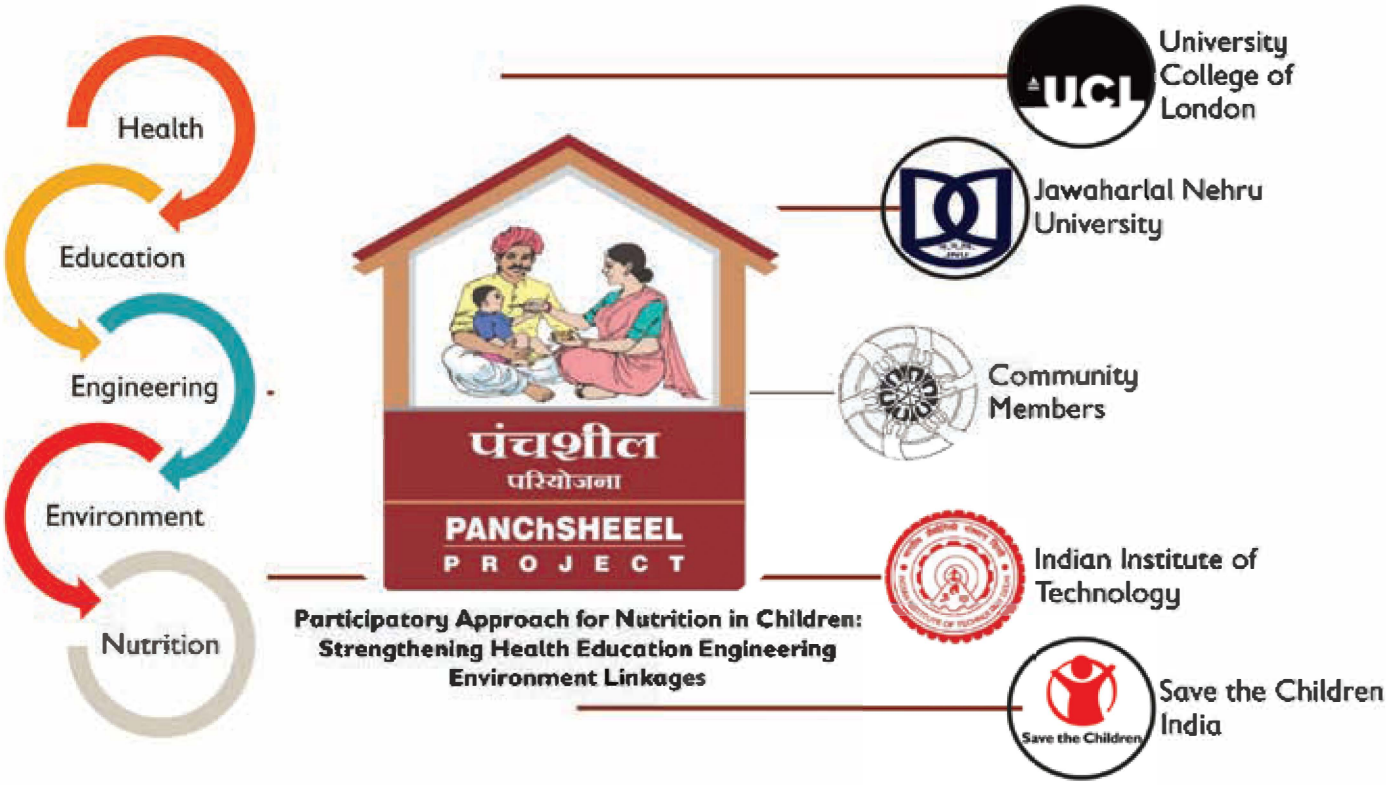

Participatory Approach For Nutrition In Children Strengthening Health Education Engineering And Environment Linkages

INTERVENTION REPORT

1st January 2020

Meet Our Team Members

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ABBREVIATIONS

ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
AWW	Anganwadi Worker
CC	Community Champions
CF	Complementary Feeding
CLMCs	Comprehensive Lactation Management Centres
CM	Community Members
CR	Community Researcher
EBF	Exclusive Breast Feeding
eLENA	e-Library of Evidence for Nutrition Actions
FGD	Focus Group Discussion
FHW	Frontline Health Worker
GDP	Gross Domestic Product
IDI	In-Depth Interview
IEC	Information Education Communication
IP	Intervention Package
IYCF	Infant and Young Child Feeding
JNU	Jawahar Lal Nehru University
KII	Key Informant Interview
LPG	Liquid Petroleum Gas
MAA	Mother's Absolute Affection
MARKS	Motivation Attitude Resource Knowledge Skill
MDG	Millennium Development Goals
MRC	Medical Research Council
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NFHS	National Family Health Survey
NGO	Non-Governmental Organization
PDS	Public Distribution System
PLCA	Participatory Learning Cycle Approach
PRI	Panchayati Raj Institutions
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SCI	Save The Children India
TAB	Technical Advisory Board
THR	Take Home Ration
UCL	University College London
VHSNC	Village Health Sanitation & Nutrition Committee
UNICEF	The United Nations Children's Fund
WHO	The World Health Organization

GLOSSARY

Accredited Social Health Activist (ASHA)	A trained female community health activist selected from the village itself and trained to work as an interface between the community and the public health system. She is the first port of call for any health related demands of deprived sections of the population, especially women and children, who find it difficult to access health services.
Anganwadi Centres (AWC)	A village level institution under Integrated Child Development Services (ICDS) Programme, that provides a wide range of health, nutrition and education related services to target the needs of age groups that represent a significant window of opportunity for nutrition investments (i.e. children under three years of age, pregnant and lactating mothers)
Anganwadi Worker (AWW)	The incharge (usually a female from the community) of the Anganwadi Centre established under the government programme of Integrated Child Development Services (ICDS). Conducts all the activities at the Anganwadi Centre.
Auxiliary Nurse Midwife (ANM)	A village level female health worker who is the backbone of primary healthcare in rural areas. They form an important link between the rural Primary Health Centers and the community, ensuring no one is left without access to basic primary health services.
Clean India Mission	Swachh Bharat Abhiyan "The Clean India Mission", is a national campaign by the Government of India, covering 4041 towns. It aims to eliminate open defecation and improve solid waste management (SWM) in urban and rural areas in India
Colostrum or Khidi	The sticky, yellowish substance produced by the mother soon after birth is ideal for the newborn - in composition, in quantity and rich in antibodies. Colostrum not only nourishes, it also protects. It is just what the baby needs during its first few days. Colostrum needs to start in the first hour. In the tribal language of Banswara region, Rajasthan, India, it is called Khidi.
Community Health Centre	The Community Health Centre (CHC) is the third tier of the network of rural health care institutions, which acts primarily as a referral centre (for the neighbouring PHCs, usually 4 in number) for the patients requiring specialised health care services.
Complementary Food	Foods that are introduced to the infant after the completion of 6 months, to complement breast milk, because the infant's need for energy and nutrients starts to exceed what is provided by breast milk. Ensuring that infants nutritional needs are met requires that complementary foods be timely, adequate, safe and properly fed.
Convenience Food	Convenience food, or processed food, is commercially prepared food created as an easy way to get and consume. Most convenience foods provide little to no nutritional value and have excessive amounts of sodium, sugar, and saturated fats.
Early childhood development (ECD)	Early childhood development (ECD) encompasses physical, socio emotional, cognitive and motor development between 0-8 years of age.

GLOSSARY

Focus Group Discussion (FGD)	It is a form of qualitative research consisting of interviews in which a group of people are asked about their perceptions, opinions, beliefs, and attitudes towards a product, service, concept, advertisement, idea, or packaging. Questions are asked in an interactive group setting where participants are free to talk with other group members.
Growth Monitoring	Growth monitoring (GM) in India is a strategy to detect early growth retardation, promote optimum growth, create awareness about growth among mothers, enhance delivery of primary health care, and identify those at risk of malnutrition. Anthropometric measures include weight, height, mid-upper arm circumference, chest circumferences, and the ratio of chest to head circumference.
HEEE	Health-Education-Engineering-Environment interdisciplinary research team.
HEEE Nutrition package	An interdisciplinary HEEE intervention package, based on this formative research, to facilitate the introduction of nutritionally-adequate and safe complementary foods at 6 months together with continued breastfeeding up to 2 years of age or beyond.
Infant and Young Child Feeding (IYCF) practices	A set of global public health recommendations for appropriate feeding of new-born and children under two years of age. Recommendations for optimal infant and young child feeding state that infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional needs, infants should receive safe and nutritionally adequate complementary foods while breastfeeding continues for up to two years of age or beyond.
Key Informant Interview (KII)	In-depth interview with important members of the village like elected representatives, AWW, and government staff working in the village, such as ANM and Teachers.
Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA)	MNREGA is an Indian labour law and social security measure that aims to guarantee the 'right to work' in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work.
Mid Upper Arm Circumference (MUAC)	The circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow (olecranon process and the acromium). MUAC is used as an anthropometric indicator for the assessment of nutritional status.
Minimum Acceptable Diet (MAD)	The Minimum Acceptable Diet (MAD) for children 6-23 months old, is one of eight core indicators for assessing infant and young child feeding (IYCF) practices developed by the WHO. MAD is a composite indicator composed of the Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF).

GLOSSARY

Minimum Dietary Diversity (MDD)	Proportion of children 6–23 months of age who receive foods from 4 or more food groups.
Minimum Meal Frequency (MMF)	Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.
Mother and Child Protection Card	A maternal and child care entitlement card, a counselling and family empowerment tool which would ensure tracking of mother and child cohort for health, nutrition and development purposes.
Mother's Absolute Affection (MAA)	"Mother's Absolute Affection" is a nationwide programme of the Ministry of Health and Family Welfare in an attempt to bring undiluted focus on promotion of breastfeeding and provision of counselling services for supporting breastfeeding through health systems.
National Family Health Survey (NFHS)	The National Family Health Survey (NFHS) is a large-scale, multi-round survey conducted in a representative sample of households throughout India. Four rounds of the survey have been conducted since the first survey in 1992-93.
Nutrition Pyramid	A nutrition pyramid is a representation of the optimal number of servings to be eaten each day from each of the basic food groups.
Ottawa Charter	The Ottawa Charter is a global health milestone, and remains a vital reference for health promotion. The Charter identifies five components of health promotion action and prerequisites for health, including peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity.
Panchayat villages	A gram panchayat (village council) is the grassroots-level of panchayat raj formalised local self-governance system in India at the village or small-town level, and has a sarpanch as its elected head.
Panchayati Raj Initiatives (PRI)	Panchayati Raj Institution (PRI) is a system of rural local self-government in India. Local Self Government is the management of local affairs by such local bodies who have been elected by the local people.
Partial Breastfeeding	When the infant is given some breastfeeds, and some artificial feeds, either milk or cereal, or other food.
Participatory Learning Cycle Approach (PLA)	Participatory Learning Cycle Approach is a family of approaches, methods, attitudes, behaviours and relationships, which enable and empower people to share, analyse and enhance their knowledge of their life and conditions, and to plan, act, monitor, evaluate and reflect.
Pradhan Mantri Ujjwala Yojana/ Ujjwala Scheme	This scheme aims to safeguard the health of women & children by providing them with a clean cooking fuel – Liquefied Petroleum Gas, so that they don't have to compromise their health in smoky kitchens or wander in unsafe areas collecting firewood.

GLOSSARY

Prime Minister's Overarching Scheme for Holistic Nutrition (POSHAN)	POSHAN Mission is Government of India's flagship programme to improve nutritional outcomes for children, pregnant women and lactating mothers. It directs the attention of the country towards the problem of malnutrition and address it in a mission-mode.
Public Distribution System (PDS)	Public distribution system is a government-sponsored chain of fair price shops entrusted with the work of distributing basic food and non-food commodities to the needy sections of the society at subsidised prices. Wheat, rice, kerosene, sugar, etc. are a few major commodities distributed by the public distribution system.
Revenue villages	A Revenue Village is a small administrative region in India, a village with defined borders. One revenue village may contain many hamlets.
School Management Committee (SMC)	A school level committee consisting of elected representative of local authority, parents or guardian of children admitted in such schools and teachers. It provides a platform for communities to take an active role in the planning, implementation and monitoring of school functioning and provide mechanisms for more effective management at school level.
Setting	The place or social context in which people engage in daily activities in which environmental, organizational, and personal factors interact to affect health and wellbeing.
Snowballing	A sampling method where existing participants inform the recruitment of future participants from among their acquaintances and relevant to the study.
Stunting	Stunting refers to the failure to reach one's full potential for growth due to poor nutrition, repeated infection, and inadequate psychosocial stimulation.
Take Home Ration (THR)	Supplementary nutrition in the form of micronutrient fortified blended food and/or energy dense food packets that are distributed at Anganwadi Centre to children between 6-36 months of age and to pregnant/lactating women for consumption at home to fill in the nutrition gap.
Transect Walk	A transect walk is a systematic walk along a defined path (transect) across the community/project area together with the local people to explore the water and sanitation conditions by observing, asking, listening, looking and producing a transect diagram.
Village Health and Nutrition Day (VHND)	It is a fixed day of the month, which is organized to provide a unique platform at village level to bring about the convergence of health, nutrition and sanitation services at primary care level.
Wagdi	Wagdi is one of the Bhil languages of India spoken mainly in Dungarpur and Banswara districts of Southern Rajasthan.

GLOSSARY

Ward Panch (WP)	Elected representative of Panchyati Raj Institutions. One village has one or two Ward Panchs depending on the size of the village.
Water Sanitation and Hygiene (WASH)	WASH is the collective term for Water, Sanitation and Hygiene. Due to their interdependent nature, these three core issues are grouped together to represent a growing sector. While each a separate field of work, each is dependent on the presence of the other.

MEET OUR TEAM MEMBERS

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EXECUTIVE SUMMARY

India has the highest burden of undernutrition in the world, hosting 30% of the world's stunted children and nearly 50% of severely wasted children under the age of five. In order to achieve the global SDG targets, India and its high burden states must improve their picture of childhood nutrition. The profound impact of undernutrition on health, education and economic productivity are well known. Undernutrition contributes to almost half of the country's under-five mortality, through direct and indirect means. The World Bank has called the current landscape of childhood malnutrition "India's silent emergency." According to the National Family Health Survey-4 data, only 9.6% of children aged 6 to 23 months in India receive a nutritionally adequate diet. The rate of children receiving an adequate diet drops to 3.4% in Rajasthan and as low as 0.8% in one of its tribal districts, Banswara. Additional indicators of child health in Banswara further highlight the issue of undernutrition in children below 24 months of age, with low rates of exclusive breastfeeding up to 6 months (56%) and only 34% of newborns being breastfed within the first hour of life.

Funded by the Global Challenges Research Fund (GCRF) and Medical Research Council (MRC), AHRC, BBSRC, ESRC and NERC [grant number: MR/P024114/1], the Participatory Approach for Nutrition in Children: Strengthening Health Education Engineering and Environment Linkages (PANChSHEEEL) project was an interdisciplinary study, designed to explore HEEE (Health, Education, Engineering and Environment) factors that influence Infant and Young Child Feeding (IYCF) practices and nutrition in India. The study aimed to develop a socio-culturally appropriate, tailored, innovative and integrated cross sector HEEE intervention package to address malnutrition by supporting optimal Infant and Young Child feeding (IYCF) practices for children in rural India focussing primarily on the period of 6-24 months. The study also recognised the importance of mobilising and engaging all members of the village community and developed linkages between the Angawadi centres and schools so that common messages and behaviour changes activities could be delivered at household, village and policy level by considering MARKS (Lakhanpaul et al) – Motivation, Awareness, Resources, Knowledge and Skills.

PANChSHEEEL was a 5-phase formative study; Phase 1 focused on identifying and documenting the local practices with regard to feeding practices, sanitation, access to local resources (such as energy and water) and educational practices in relation to infants and young children aged 6-24 months. The existing Government of India (GOI) initiatives in the study sites were also mapped during Phase 1. Phase 2 involved extensive field work to identify the local challenges, drivers, resources, opportunities and needs for children in the first 6-24 months of life at individual, household, community and environmental level. Phases 3, 4 and 5 focused on the analysis and mapping of HEEE linkages, intervention design and implementation, as well as review and dissemination phases of this study. The study was conducted in the Banswara district of Rajasthan, India, where access to water naturally divides the district into two distinct zones, with impacts on agrarian processes. One block was chosen from each of the two zones – Ghatol from the canal-irrigated zone, and Kushalgarh from the rain-fed zone – for inclusion in the study. Nine villages from each of the blocks, with a total population of 2626 individuals, were included in the study.

The Core Team comprised of members from multiple disciplines, a hallmark of this study. The CT included members from University College London (UCL), across the Institute of Child Health, Institute of Education and Faculty of Engineering Sciences; and expertise from Save the Children India (SCI), Indian Institute of Technology, New Delhi (IIT-Delhi) and Jawaharlal Nehru University, New Delhi (JNU). A mixed-methods approach structured by a socio-ecological framework was used for the data collection at individual, household and community levels and co-design of the Intervention Package was developed through an iterative participatory process. The process involved selecting local district members as Community Researchers (CR), Community Champions (CC) and Community members (CM). These local district members formed the 'Community Wing' of the research team. Community Researchers acted as an extension of the Community Wing and worked in tandem with the SCI Field Team, who made up an extension of the Core Team.

In order to design the intervention package, inputs were sought from stakeholders at various levels, with an approach to undertake horizontal integration of the insights obtained from each of the target groups. Five major sources of information were used in the process:

1. Community perspectives;
2. Review of policy and program environment;
3. Expert advice; and
4. Good practice models of Non-Governmental Organizations.

CO-DE: Co-Design

F: Flexible, Feasible

A: Acceptable, Adaptable, Accessible

S: Sustainable, Scalable

T: Tailoring and Targeting (0 to 2 years)

E: Effective

R: Resource Efficient

The guiding principles enshrined by the CO-DE FASTER approach (Lakhanpaul et al) were used to undertake an iterative, multi-cyclic, formative exercise to develop the intervention package. Prior to undertaking these steps, formative data from field work, and review of existing literature was completed to form a full picture of the community's IYCF challenges. This then fed into the process of preparing community members to participate in the intervention development.

Development of the Intervention Package was not a linear process, but a multi-cyclic model. PANChSHEEEL adopted a cascaded iterative process to arrive at a syncretic intervention package to improve IYCF practices.

The stakeholder analysis process identified the following barriers and facilitators for the adherence to recommended practices for IYCF:

1. Provision of colostrum and exclusion of pre-lacteal feeds
2. Disruption of exclusive breast feeding, and inappropriate weaning practices
3. Low dairy intake between 6-24 months age despite early introduction of animal milk in feed
4. Intake of inappropriate and low-quality complementary food materials like biscuits
5. Inadequate growth monitoring at Anganwadi, with counselling sessions being few and far between

Step 1: Analysis of Formative Research
Step 2: Creating a Joint Understanding about the Settings Approach to Health Promotion
Step 3: Sharing the Framework with the Community Champions
Step 4: Selection of one village from each block
Step 5: Mapping the Responses
Step 6: Discussions Related to IP1 with Block and District Officials
Step 7: Refinement (Acceptability) Workshop
Step 8: Finalisation of Intervention Package III

6. Patchy use of water filtering and purification techniques for drinking water
7. Incomplete coverage of built facilities for sanitation, with patchy use by men
8. Indoor cooking using firewood as fuel
9. Inconsistent handwashing practices, using inappropriate agents

The intervention framework examined the following themes according to the integrated HEEE approach:

1. Sanitation
2. Water
3. Cooking fuel
4. Vaccination
5. Early and delayed initiation
6. Adequacy and diversity of diet

Using the co-designing approach, the study identified the content of intervention packages, point of intervention, and mode of delivery engaging the community level stakeholders, to address the barriers identified above. This content was generated in the context of the following themes, targeting mothers, families, communities, Frontline Health Workers, and District and State Level Officials.

Theme 1: Improve breastfeeding practices from first hour of childbirth to six months of life

Theme 2: Increase Minimum Acceptable Diet for children aged 6-24 months

Theme 3: Enhanced child care practices associated with growth and development of the children below 24 months

Further, inputs were sought from experts, and a detailed review of the existing, published evidence was undertaken, to finalize the components of the intervention package. The intervention package was then shared with the community members, through Community Intervention Refinement Workshops, to assess the acceptability of the package. Responsive social network and support systems were identified as a key necessity to enable the mothers to be able to provide their newborn with the necessary nursing and care needed during the first six months of life. Chronic poverty, family-based agrarian systems and the need for all able-bodied men and women to participate in the agrarian economy emerged as major challenges which needed deeper socioeconomic transformations for meaningful and effective change to occur.

Two dissemination workshops were held to present the findings of the formative research and the intervention package's phases of development. This dissemination was vital to build trust with the community, obtain final comments and feedback on the intervention and address the ethics of dissemination of findings as good research practice. The first dissemination workshop included senior health systems level, public health research and governance level functionaries and the second workshop included community members.

Many of the health-related Sustainable Development Goals (SDGs) are likely to be achieved only through protection of child health, access to safe food and water, and sanitation, all of which emerged as major barriers in the current enquiry. The report outlines the details of the intervention packages which may be developed to ensure a swift and responsive action to these challenges, which, when met, are likely to enhance the progress towards the achievement of the SDGs.

Chapter 1

Introduction to the Initiative

BACKGROUND

The Participatory Approach for Nutrition in Children: Strengthening Health Education Engineering and Environment Linkages (PANChSHEEEL) project was an interdisciplinary study, designed to explore Health, Education, Engineering and Environment (HEEE) factors that influence Infant and Young Child Feeding (IYCF) practices and nutrition in India. The study aimed to develop a socio-culturally appropriate, tailored, innovative and integrated cross sector HEEE Nutrition package to support optimal IYCF practices for children in rural India aged 6 to 24 months. This exploratory study was designed in five iterative phases over a span of two years, with the intention to secure further funding for the implementation of the interventions designed during the first stage, and assess their feasibility and effectiveness.

PANChSHEEEL was a five-phase formative study; Phase 1 focused on identifying and documenting the local practices with regard to feeding practices, sanitation, access to local resources (such as energy and water) and educational practices in relation to infants and young children aged 6 to 24 months. The existing Government of India (GOI) initiatives in the study sites were also mapped during Phase 1. Phase 2 involved extensive field work to identify the local challenges, drivers, resources, opportunities and needs for children in the first 6 to 24 months of life at individual, household, community and environmental level. Phases 3, 4 and 5 focused on the analysis and mapping of HEEE linkages, intervention design and implementation, as well as the review and dissemination phases of this study.

Study setting: Banswara District

The study was conducted in Banswara District of Rajasthan state, India. The Banswara District lies on the Mahi River basin with the river flowing from north to south. Access to water creates a natural division of the district into two distinct zones and impacts agricultural processes. These zones are canal (or command area) and non-canal (or non-command area). During the first international team meeting of the PANChSHEEEL project, the study team decided to confine the study area to one block from each zone. This natural division also reflected the different agricultural patterns of these two zones; one being canal fed and the other being rain fed. The rationale was that the canal area may have better access to water for productive use, better agricultural output and, hence, less migration for work.

FIG 1: BLOCK WISE MAP OF BANSWARA DISTRICT

'Ghatol', a canal block, was purposively selected for two reasons: its proximity to the district headquarters and prior Save the Children India (SCI) engagement in this block. 'Kushalgarh', a non-canal block, was selected as the second study block. Kushalgarh was chosen because it was the most economically poor block in the district with employment limited to rain-fed agriculture, and

this was possible for three to four months in an year only. (Fig. 1). These limitations lead to persistent migration for work. The need for a nutrition treatment centre at the Community Health Centre in Kushalgarh served as an additional indicator that nutrition of children in this block was poor. Therefore, these two divergent blocks provided an opportunity to capture the varying needs of the residents of rural Banswara.

As per the study protocol, nine rural villages from Ghatol (n=5) and Kushalgarh (n=4) formed the study setting. Two villages from each block were Panchayat villages[1] and the remaining two to three villages from each block were revenue villages[2]. Panchayat villages were purposively selected because the Panchayat (e.g. local self-government) is the necessary platform to design community level interventions and engage diverse sectors across the HEEE domains, with all sectors collaborating with and accountable to the Panchayat. Village selection criteria were then developed by the HEEE Medical Research Council (MRC) Nutrition study team. Detailed, stepwise information from the epidemiological methods followed the selection of the villages. More information on the village selection criteria, qualitative study, household survey and their respective results can be referred to in the Formative Phase Report (Annexure I).

The Team

Our collaborative approach included an interdisciplinary team from University College London (UCL), across the Institute of Child Health, Institute of Education and Faculty of Engineering Sciences, and expertise from Save the Children India (SCI), Indian Institute of Technology, New Delhi (IIT-Delhi) and Jawaharlal Nehru University, New Delhi (JNU). Team members from the above institutions formed the Core Team (CT). The participatory approach actively involved community members from nine villages within Ghatol and Kushalgarh Blocks of Banswara district of Rajasthan. A mixed-methods approach structured by a socio-ecological framework was used for the data collection at individual, household and community levels and co-design of the Intervention Package was developed through an iterative participatory process. The process involved selecting local district members as Community Researchers (CR), Community Champions (CC) and Community members (CM). These local district members formed the 'Community Wing' of the research team (Figure 1). Community Researchers acted as an extension of the Community Wing and worked in tandem with the SCI Field Team, who made up an extension of the Core Team (*Fig.* 2).

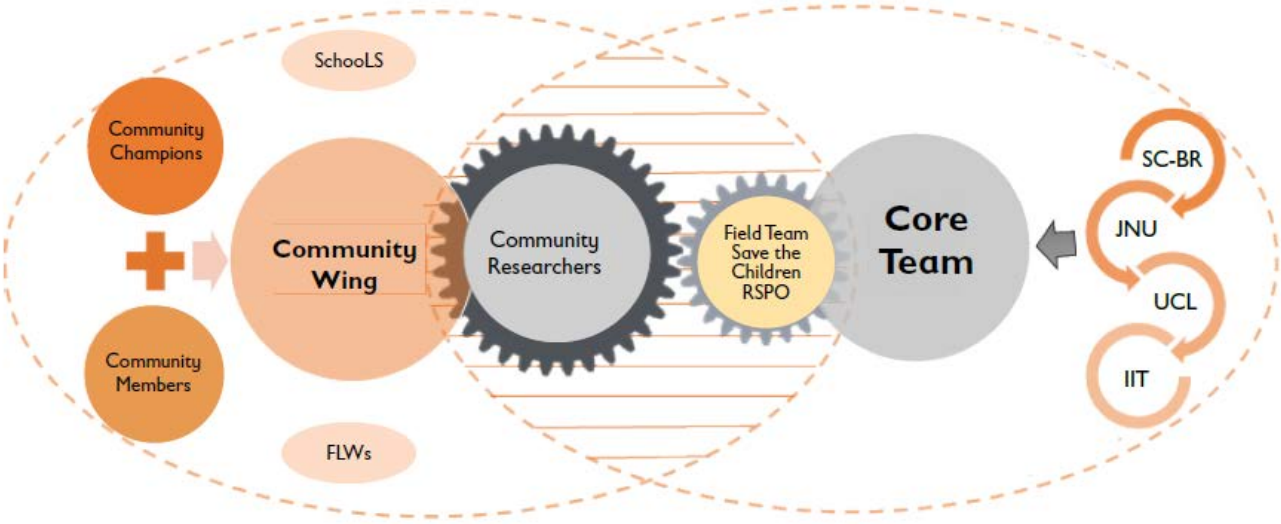

Fig 2: Team Structure of the PANChSHEEEL Study

1. A Panchayat village is a larger village catering to one or more revenue villages.
2. A Revenue Village is a small administrative region in India, a village with fixed (defined) borders. One revenue village may contain many small settlements called hamlets.

Conceptual framework

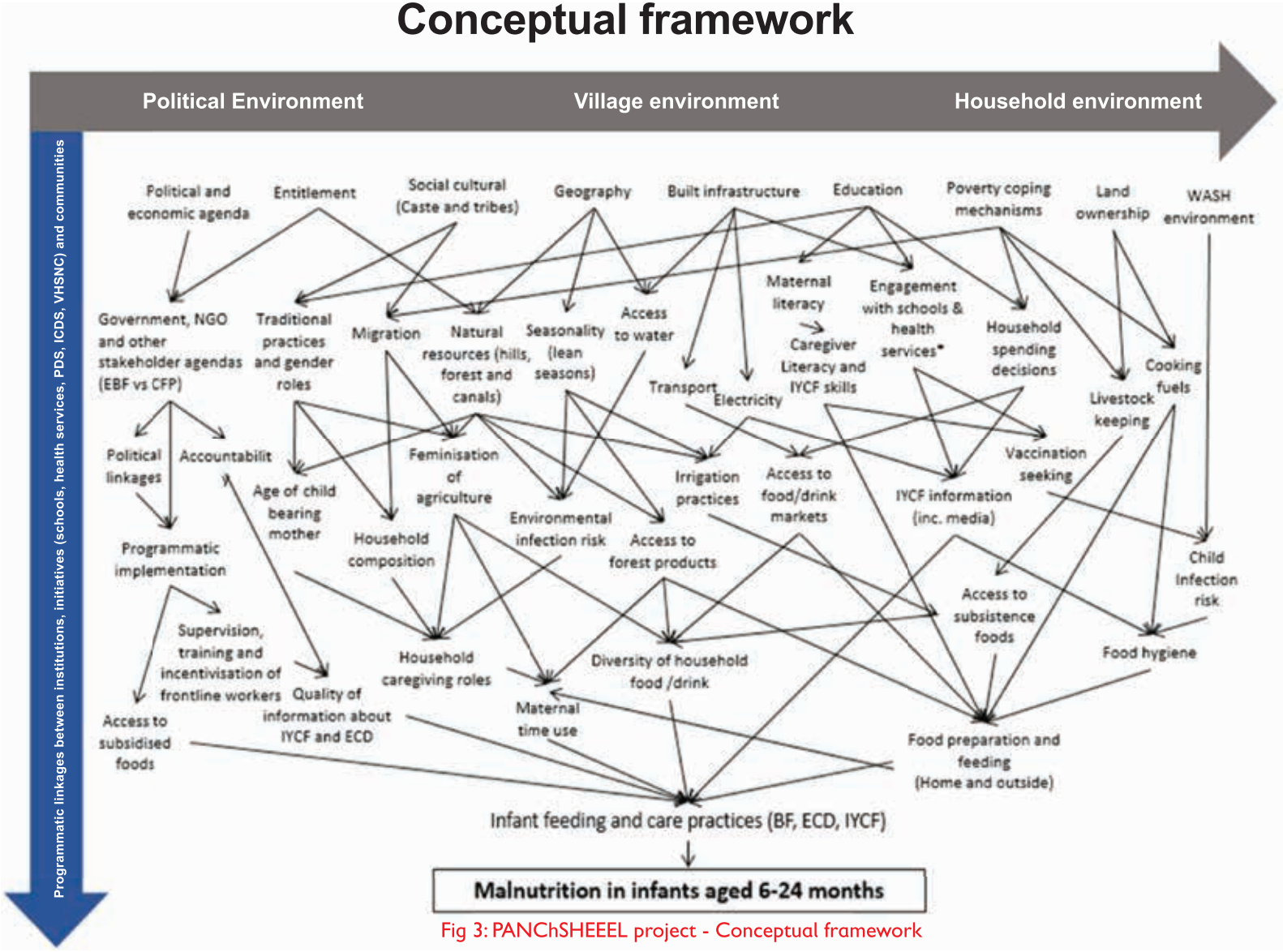

Fig 3: PANChSHEEEL project - Conceptual framework

Chapter 2

The Methodological Approach

Public health interventions are rarely simple, singular, replicable actions. To a large extent, 'upstream' interventions 'require less individual effort from recipients and have the greatest population impact', whereas interventions requiring voluntary uptake are more likely to exacerbate health inequalities(1,2). Drawing on the strengths of this bottom up approach, we developed a socio-culturally appropriate, tailored, innovative and integrated cross-sector intervention package, through collaborations between affected community, interdisciplinary team of researchers, and non-government organization (NGO) partner expertise as well as existing and emergent evidence (*Figure 4*).

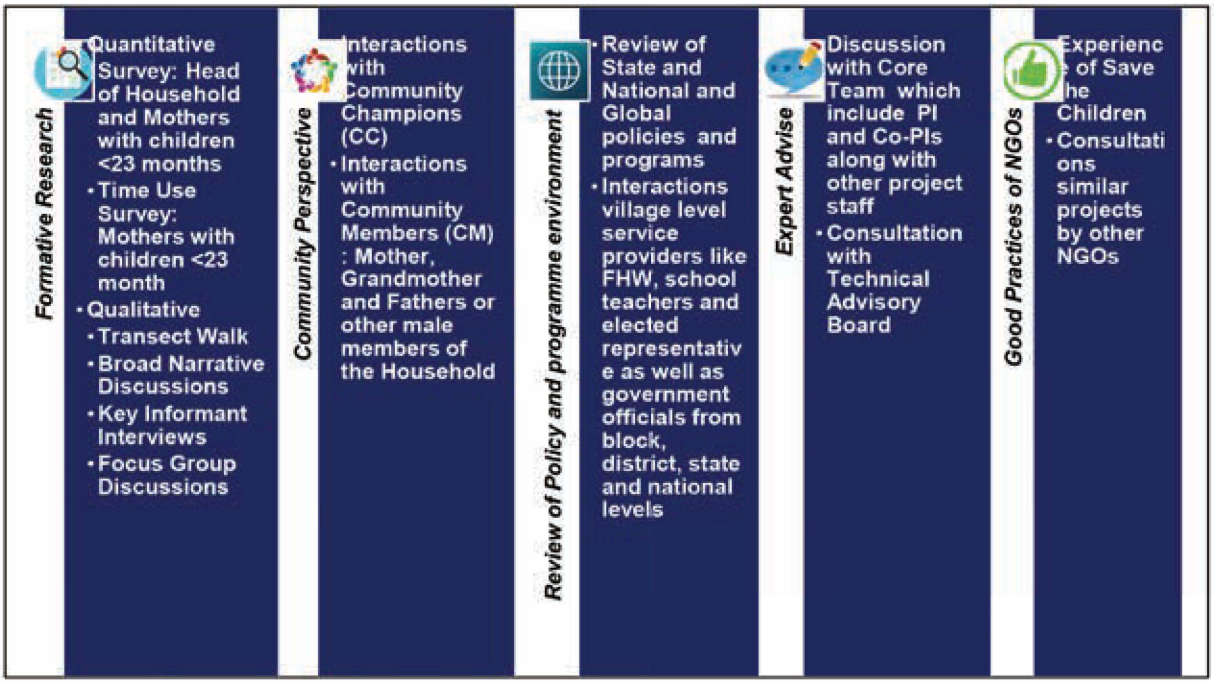

Figure 4: Five Arms of Co-Designing Intervention

In order to design the intervention package, inputs were sought from stakeholders at various levels, with an approach to undertake horizontal integration of the insights obtained from each of the target groups. Five major sources of information were used in the process:

1. Formative research
2. Community perspectives;
3. Review of policy and program environment;
4. Expert advice; and
5. Good practice models of Non-Governmental Organizations.

Interactions with identified Community Champions and lay community members (e.g. mothers, fathers, grandmothers and other key male members of the household) were vital to the participatory approach. Under the review of the policy and programme environment, State and National policy documents and programme details were studied. Interactions at the village level were conducted with various levels of public health service providers, such as Female Health Workers (AWWs, ANMs), local opinion leaders (e.g. school teachers), policymakers at various levels (block, district, state, nation) and elected local representatives. Consultations with the Technical Advisory Board (TAB) and the group of investigators generated the expert advice which the streamlined process is based on. The process was further tailored through cross-pollination of ideas from other successful models, best practice guidelines, and success stories of NGOs working with similar problems in similar settings.

This collaboration between community members and experts paved the way for gaining both emic as well as etic perspectives, both of which seem essential for a complete research perspective. The emic perspective provided the community's view of reality, focusing on their unique, individual 'insider' viewpoints. The etic perspective in the form of expert advice helped organize the emic viewpoints into analytical-descriptive categories, thus informing the overall intervention package design.

CONCEPTUAL THINKING: THE SETTINGS APPROACH

The Ottawa Charter presented a framework for health promotion with an explicit focus on settings, appreciating that the places in which people live their lives are crucially important in determining health outcomes (3). The World Health Organisation (WHO) Health Promotion Glossary defined settings as the place or social context in which people engage in daily activities. These settings are where environmental, organisational and personal factors interact to affect health and wellbeing, as people actively use and shape the environment and thus create or solve problems relating to health (4). Settings can normally be identified as having physical boundaries, a range of people with defined roles, and an organizational structure.

However, the settings approach is not limited to a mechanistic view of delivering interventions in a particular setting, but is based on an appreciation that health is determined by wider social, economic, environmental, organizational and cultural circumstances. Therefore, the approach has the potential to increase effectiveness by focusing on settings not only as channels for delivering interventions, but also as contexts which in themselves influence wellbeing directly and indirectly through social rules, norms, values and interrelationships (5).

Settings are complex dynamic systems with inputs, throughputs and outputs. They take inputs (e.g. people, resources, information), change them in some way (e.g. throughputs), and then return the processed inputs to the environment as an output. Using this systems perspective, PANChSHEEEL aimed to develop an Intervention Package equipped to modify the context within which individuals exist, rather than attempting to change the individuals themselves. This approach of introducing and managing change within the setting in its totality is an application of 'whole system thinking'.

PARTICIPATORY APPROACH: CO-DE FASTER

The guiding principles enshrined by the CO-DE FASTER approach (Lakhanpaul et al) were used to undertake an iterative, multi-cyclic, formative exercise to develop the intervention package. As identified in Figure 1 above, the four sources of information primed the process of intervention development. However, prior to undertaking these steps, formative data from field work, and review of existing literature was completed to form a full picture of the community's IYCF challenges. This then fed into the process of preparing community members to participate in the intervention development. The principles enshrined in the CO-DE FASTER principle are as below:

CO-DE: Co-Design

F: Flexible, Feasible

A: Acceptable, Adaptable, Accessible

S: Sustainable, Scalable

T: Tailoring and Targeting (0 to 2 years)

E: Effective

R: Resource Efficient

Operationalization of the concept: Eight-Step cascade process

Development of the Intervention Package was not a linear process, but a multi-cyclic model. This cyclical approach allowed the package to be developed with emphasis on the processes of change and flexible development of activities in response to stakeholder involvement, evidence gathered through programme/policy reviews and good practices of NGOs. PANChSHEEEL adopted a cascaded iterative process to arrive at a syncretic intervention package to improve IYCF practices (summarized in Figure 5). The approach was based on principles of intervention mapping, underpinned by approaches from different social sciences, and followed by practical translation into an intervention package based on the Motivation, Awareness, Resources, Knowledge and Skills (MARKS) approach (Lakhanpaul et al).

Step 1: Analysis of Formative Research

The first step of the formative research process captured the current feeding practices, as well as the facilitators and barriers towards optimal feeding practices. (More information on the Phase 1 survey, household survey, and respective results can be referred to in the Formative Phase Report (Annexure I). These factors were summarized at three levels in Step 1, including:

1. Household
2. Village
3. Governance

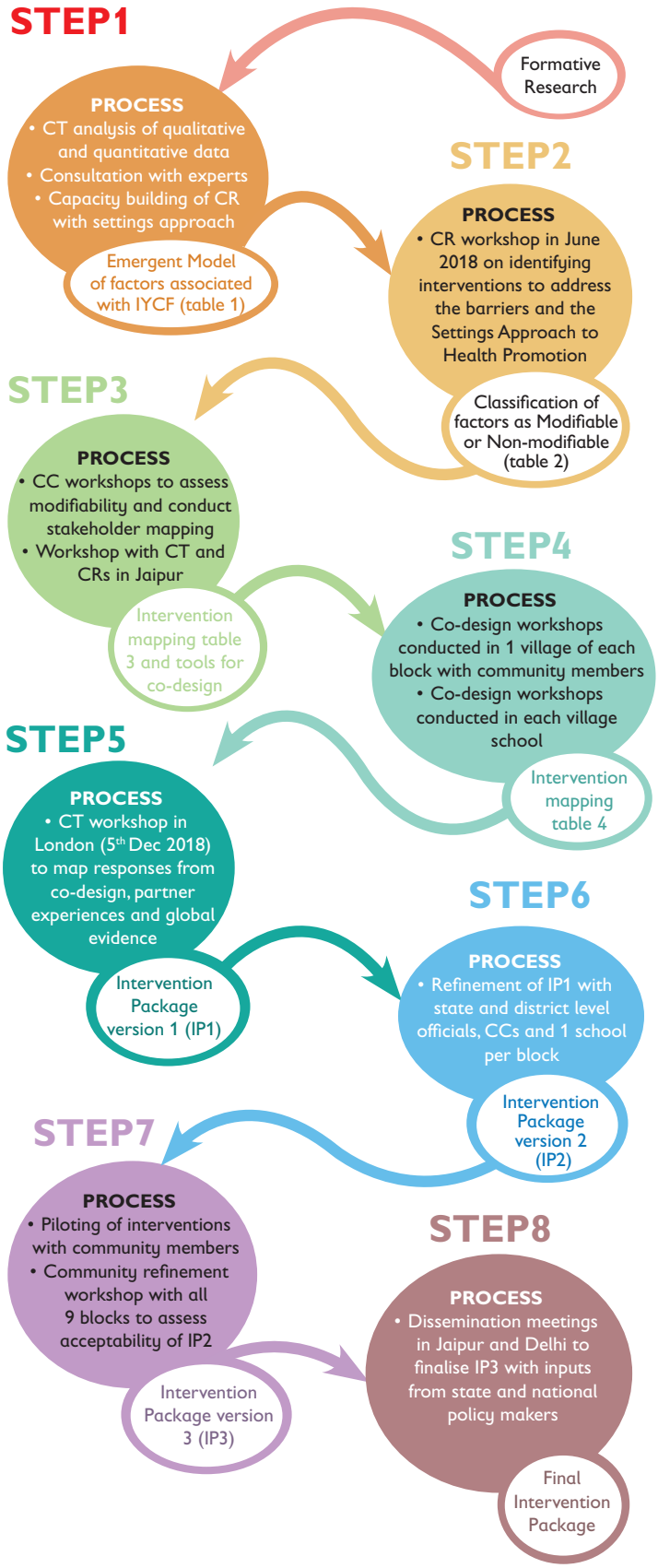

FIGURE 5: STEPS OF INTERVENTION DESIGN

The project aimed to identify the determinants of IYCF practices in the four domains - health, education, engineering and environment. The data gathered during the formative research was then classified accordingly. In addition to the mapping of these factors at the appropriate level, data was classified across four themes according to the HEEE domains, including:

1. Health and nutrition
2. Education
3. Water, Sanitation and Hygiene (WASH)
4. Energy

The Community Researchers and the Core Team conducted the data collection for the formative phase collaboratively, and the Core Team led the data analysis for the formative findings. The output from Step 1 consisted of the emergent model, comprised of various factors that are associated with or influence the IYCF and care practices in the communities.

Step 2: Creating a Joint Understanding about the Settings Approach to Health Promotion

After the capacity building of the Community Researchers was completed, including training on the theory and practice of health promotion, the factors identified under the modifiability framework were classified into modifiable and non-modifiable across four levels of intervention:

1. Household
2. Community
3. Organizations (e.g. NGOs)
4. Government

All the factors affecting the IYCF practice were further classified based on the dimension of modifiability. A working definition for the term was derived after discussing with the core team comprising of PI, Co-Is and other team members. This was also validated by the community researcher based on their field experience in that region. Those factors which were possible to be modified with short and medium term intervention at the community as well as service provider level were considered to be modifiable, while the structural variables that required long term interventions were considered to be non-modifiable.

Step 3: Sharing the Framework with the Community Champions

The intervention framework was shared with the Community Champions to identify their views about the modifiability of these factors, share and validate the findings from the ongoing steps, conduct a stakeholder mapping exercise to identify the key individuals and organizations for instilling change across the emergent model's domains and to map the community stakeholders who would be appropriate for engagement in co-designing the framework.

Step 4: Selection of one village from each block

One village was selected from each block to be involved in an intensive for the community setting. Furthermore, the teachers and school management committee members (e.g. individuals with a better understanding of the factors at play in the study area and who belonged to the nine villages) were also included in the co-designing exercise based on the stakeholder mapping exercise, as they are largely considered to be opinion leaders in their communities.

Step 5: Mapping the Responses

The responses of the community, experiences of study partners, review of the existing national and state level policies around IYCF and evidence from the national, and global programs in IYCF were mapped to arrive at the consolidated intervention package (IP1) of potential interventions. This IP1 was then discussed through an iterative exercise involving the key members of the Core Team.

Step 6: Discussions Related to IP1 with Block and District Officials

Following the discussions on IP1 between the key members of the Core Team, the results of the discussion and the designed IP1 framework were presented to the Block and District public health officers of the relevant departments, which were previously identified through the stakeholder mapping exercise with the Community Champions in Step 3. The inputs from the local policymakers and other stakeholders, along with the inputs from the key members of the Core Team were factored in to develop the second iteration of the Intervention Package (IP2).

Step 7: Refinement (Acceptability) Workshop

The refinement (acceptability) workshop was conducted with the key members from all the nine study villages across the two blocks. The IP2 was shared with these members at this meeting and its components reviewed in depth. The comments received at these workshops were collated and then used to develop the third iteration of the Intervention Package (IP3). Further refinement of the IP3 was undertaken through pilot events which were organized to assess the promotion of schools as a community hub.

Step 8: Finalisation of Intervention Package III

The eighth and final step in the multi-cyclic process of the co-creation exercise aimed to finalize IP3 with inputs from state-level and national-level policy makers, through dissemination meetings organized in Jaipur and Delhi, respectively.

Chapter 3

Intervention Mapping

INTRODUCTION

Infant and Young Child Feeding (IYCF) is a global priority, jointly recognised by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in 2002 in order to combat the challenging trends in infant and young child feeding practices (6). However, in India, like many other developing and resource constrained settings, there has been consistent reporting of non-compliance with the recommended practices on the ground (7). Even with India's economic growth and general development, the persistence of childhood under-nutrition is a complex public health issue that continues to challenge experts, program managers and implementers at all levels. In 2017, the National Family Health Survey 4 (NFHS-4) reported a moderate decline in under-nutrition figures compared to the last two rounds. However, India continues to perform poorly in achieving the Sustainable Development Goals (SDGs) targets, specifically, Goal 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture and Goal 3 – Ensure healthy lives and promote wellbeing for all at all ages (8,9). Surveys reported that the prevalence of malnourished children increased in eight states (Assam, Arunachal Pradesh, Bihar, Haryana, Jharkhand, Madhya Pradesh and Mizoram) between the last two rounds of the NFHS and remained unchanged in another seven states. The national level prevalence of underweight and stunting was 42 and 48%, respectively (10). The concern over India's poor performance against indicators of under-nutrition is rooted in the fact that while gross domestic production (GDP) in India grew at an average of 3.95% per capita per year between 1980 and 2005, almost half of the under-five population in India continued to be undernourished (11).

When it comes to addressing undernutrition, the current prescribed or 'evidence based' practices under the globalised solutions are not tailor-made and may be difficult to implement in diverse settings, considering that globalised solutions are tested under controlled settings for a particular context (12). Attempts to implement these solutions around the world reported disconnect between the resources requested and resources available in the new environment. In this chapter, we are dealing with the intervention mapping, a procedure for developing theory and evidence-based health promotion programs (12). This multifaceted approach not only identifies the potential intervention points when dealing with a complex issue but also involves exploring how community resources and opportunities can be harmonized and leveraged to optimize implementation of potentially feasible interventions. The PANChSHEEEL project is targeted at developing locally feasible solutions for successful implementation of the prescribed IYCF practices at individual, household, community and environment levels through a community participatory approach across four themes: (i) Health and nutrition, (ii) Education, (iii) WASH and (iv) Energy. Stakeholders are central to any participatory approach and play a critical role in addressing the local issues. Correct mapping of stakeholders, their interests, influence and the level they are operating at is immensely important for success of any health promotion initiative. Using the Eight Step cascade model approach (Please refer to Chapter 2; page 10 for details), this chapter deals with Steps 2 and 3 to address following three objectives:

1. To understand the potential barriers and facilitators in practising the IYCF;
2. To understand the modifiability and interventions at various levels for each variable under IYCF;
3. To identify the potential stakeholders from the community to engage in participatory approaches.

METHODOLOGY

In the current initiative, mapping of interventions for successful implementation of IYCF practices was completed using a two-step approach. Firstly, a formative inductive phase was undertaken to assess the potential barriers and facilitators in practising the various components of IYCF. Following this, interactive workshops were conducted with CCs and CRs with the aim of identifying interventions to address the barriers and facilitators by assessing modifiability of variables at various points of intervention.

Formative Phase and conceptualising an emergent model

To understand the multitude of factors that influence IYCF practices, a parallel mixed methods approach with both a quantitative and qualitative survey component was adopted. Quantitative data was collected through a household survey and survey on maternal time use in households with children under two years of age. Qualitative data was collected using the traditional methods of one-to-one Key Informant Interviews (KII) and Focus Group Discussions (FGD). KIIs were conducted with the Anganwadi Workers (AWWs), Accredited Social Health Activists (ASHAs), Auxiliary Nurse Midwives (ANM), Elected Panchayat Representatives (PRI members) and School teachers. FGDs were conducted with mothers and grandmothers of children under two years of age. Thematic guides were designed through literature review and expert consultation, evolving further through pilot testing with different sub-sets of population of interest. Social mapping and transect walk exercises were also conducted in each of the nine study villages to map resources related to WASH and energy, as they are some environmental influencers of feeding practices and play directly into the risk of infection due to poor sanitation and malnutrition. A detailed report is attached as Annexure I.

In the intervention mapping phase, the workshop was organised to discuss and triangulate the findings obtained from the qualitative and quantitative arms of the formative research. The exercise led to the development of the PANChSHEEEL emergent model. The model emerged based on a deductive approach, in line with WHO IYCF guidelines which recommend capturing different aspects of the challenge.

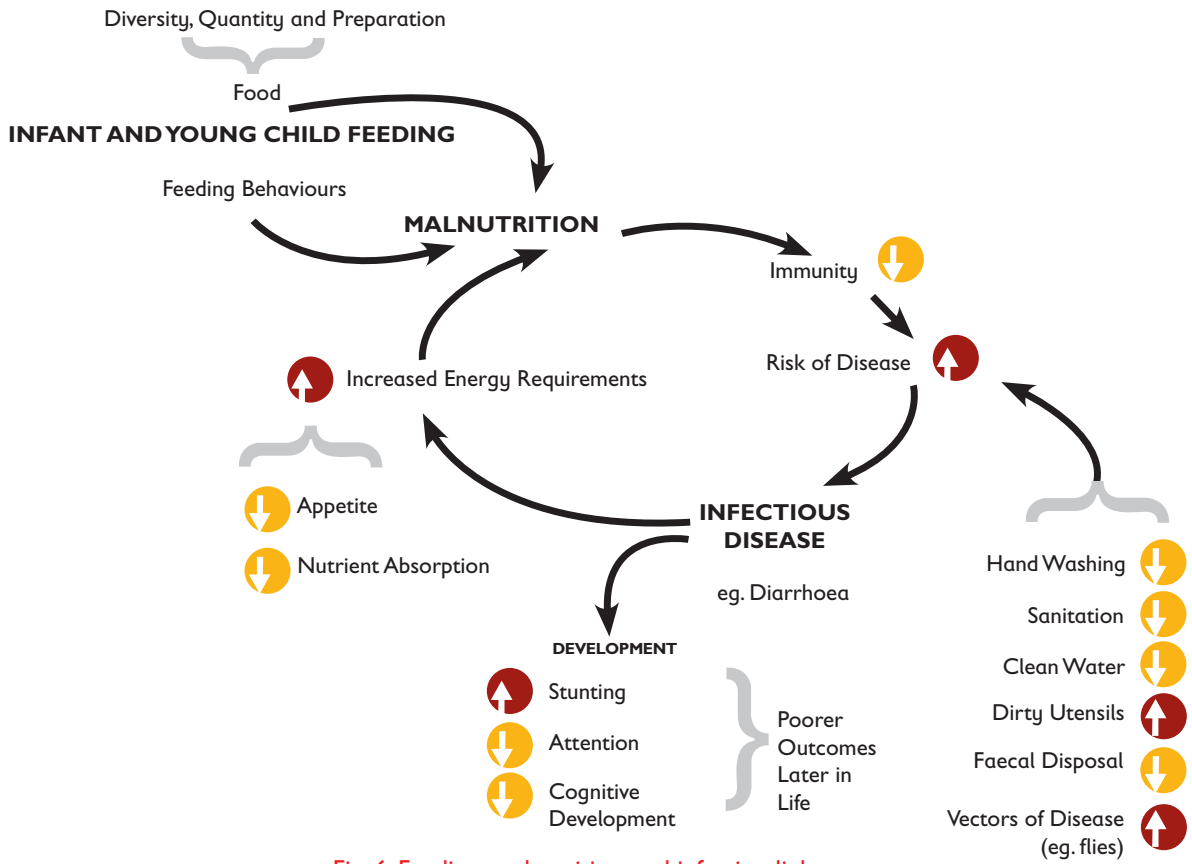

Fig. 6: Feeding, malnutrition and infection linkages

Table 1: Emergent Model

Themes	Household level	Village Level	Governance Level
A. Health and Nutrition:	A1.1 Breast feeding	A2.1 Livelihood	A3.1 Components of Government Programmes
	A1.2 Complementary feeding	A2.2 Livestock	A3.2 Quality of services
	A1.3 Feeding during illness	A2.3 Local wage labour	
	A1.4 Convenience food	A2.4 Migration and "Left Behind Population"	
	A1.5 Factors affecting infant and young child feeding	A2.5 Market for purchase and sale of food items	
	A1.6 Role of play in Early Childhood Development (ECD)	A2.6 Subsidized Government Fair Price Shops: Public Distribution System	
B. Education	B1.1 Enrollment	B2.1 Mid-day meals	B3.1 Services
	B1.2 Absenteeism and dropout	B2.2 Games	B3.2 School and AWC
	B1.3 Parental participation in school	B2.3 Health and WASH	
	B1.4 Parental participation in homework		
C. Water, Sanitation and Hygiene	C1.1 Water	C2.1 Water	
	C1.2 Sanitation	C2.2 Sanitation	
	C1.3 Hand Washing		
D. Cooking Fuels	D1.1 Firewood	D2.1 LPG Connection	
	D1.2 LPG Connection		

Community Workshops to assess modifiability of identified factors and inform intervention development

Prior to engaging the target population directly, CRs and CCs were identified as key informants to address the barriers in successful implementation of the IYCF intervention in the community. An intervention framework was developed as a tool to capture the responses of the stakeholders (Annexure III). The tool comprised the different themes under IYCF, including but not limited to sanitation, water, cooking fuel, early initiation, adequacy of food available and diversity of diet. Each theme was further categorised into variables to be aggregated into the Intervention Package. The CCs and CRs were then asked to share their opinions on the modifiability of each variable included to ensure the Intervention Package is locally relevant and feasible. Additionally, CCs and CRs provided their response on the potential interventions to address the variable at different levels (e.g. Individual, Village, Organisational and Policy). All the themes and relevant variables under each theme were discussed with the community members in detail. Considering the long-standing experience with the community engagement processes and technical expertise in field research methods, CCs and CRs were asked to map each variable to the stakeholder they believed would be able to effect change or share information for that specific barrier or facilitator. A simple stakeholder analysis process was conducted with a strategic system thinking approach view of identifying informants at Individual, Community, Institutional and Policy level. CCs and CRs were asked to list the stakeholders directly or indirectly contributing to various variables across the study themes.

RESULTS

Two CRs and 28 CCs participated in the exercise, respectively. They reported the modifiability of the variables across the themes identified and potential points for intervention across the four levels. A summary of the key findings is listed below. Detailed information on the barriers and facilitators related to IYCF and the intervention framework can be found at Annexures I and II, respectively.

Barriers and facilitators for adherence to recommended practices for IYCF

Always give colostrum

It is generally recommended to provide colostrum[3] to the new born as a foundation stone of appropriate IYCF practices. The study revealed that despite many mothers providing colostrum, it is also common to provide sweet foods as an infant's first meal whilst discarding the thick, antibody-rich colostrum. Caregivers (especially elderly women or grandmothers) sometimes perceive colostrum to be dirty milk and this belief contributes to preferentially feeding sweet foods over colostrum.

Introducing complementary feeding at 6 months

Exclusive Breast Feeding (EBF) should continue for six months and be followed by a weaning diet to support complementary feeding in the first year of life. The study gathered data on complementary feeding from two levels of practices: practices contributing to the disruption of EBF prior to six months, and practices related to the introduction of complementary feeding (CF) at six months. The most commonly cited reason for the disruption of EBF before the child reached six months of age, was the need for women to work in agriculture. This perceived lack of time to nurse the new born, coupled with the physical demands of working in agriculture, creates an environment which promotes the introduction of animal milk (especially goats' milk) early on in the EBF period. Furthermore, perceptions related to the superior nutritive value of animal milk (e.g. goat) over breast milk also promotes the disruption of EBF prior to the age of six months.

3. "first milk" produced immediately after delivery

Higher dairy intake between 6 to 24 months

Despite the practice of introducing animal source milk in the EBF period, less than 7% children aged between 6 to 24 months receive animal milk. The observation is in agreement with the finding that milch cattle[4] holding is minimal and most livestock owned are buffaloes. The barriers to proportionate allocation of dairy-based food products in this age group are mainly driven by a 'milk crisis' rooted in issues accessing milk. Most households do not own livestock and even households which do own livestock have cattle with low milk yields. Goats are the most commonly held animal and are often used as a source of revenue as goat milk can be used to manufacture ghee for sale at the local markets.

Appropriate dietary intake in quantity and quality

Several practices that may contribute to dietary inadequacy were reported in the household survey, including: low intake of Vitamin A rich foods, vegetarian food preferences, use of biscuits as a complementary food material (especially during intercurrent illnesses), absence of a set routine for age-appropriate meal frequencies, lack of apportionment of appropriate proportion sizes resulting in dispensing food based on perceived needs and not following optimal dietary diversity in food routines. A number of these domains are explored and presented in the table in Annexure II.

AWW monitors growth according to guidelines

The Anganwadi Workers (AWW) do not undertake regular growth monitoring on a monthly schedule, however they do not use the MUAC measurement tapes, weighing scales or machines. Availability of calibrated, working instruments at the Anganwadi levels is also a barrier in undertaking timely nutritional surveillance. Furthermore, counselling sessions are few and far between, and AWWs only recognize severely malnourished children. The language barriers and the knowledge gaps in the AWWs were identified as major barriers. Furthermore, although the Auxiliary Nurse Midwives (ANMs) were better informed, the lesser informed AWWs were responsible for nutritional monitoring activities. Furthermore, there was limited skill building since the AWWs functioned under minimal supervision and guidance.

Optimal filtering of water

Use of filtering techniques for potable water was limited to the use of home-based cloth. Water purification efforts were more common in Ghatol block, where there were also more hand pumps. The Kushalgarh area suffered from seasonal water scarcity. In all areas there were no known data on the fluoride content of water. Notably, some villages in Kushalgarh were using solar-panel based reverse osmosis systems for water purification.

Building toilets

Although some toilets have been built in the villages, others have remained unfinished. There are more toilets in the Ghatol area. In addition to being unusable, the unbuilt or incomplete toilets pose a major public health threat, since the waterlogged toilets act as vector-breeding grounds, and thus risk spreading mosquito-borne illnesses. Many households admit to using the toilets as storage rooms for keeping wood and other household items.

In addition to the prevalent cultural practice of open defecation, there is a perception that the process of building the toilets has not been finished because of delayed payments from the government. Suspicions of corruption, inadequate transmission of money, or even inadequate sanctioning of budget have been raised as reasons responsible for the delays in the building of toilets in the area.

4. milch cattle are those that are reared for their milk

Using toilets

Men and the elderly members of the family were more likely to indulge in open defecation, whereas women were more likely to use the toilets. However, there was evidence of open defecation adjacent to the canals, small streams and open fields near the house. The incomplete construction of toilets, the culture of open defecation and the inadequate support from government towards construction of household toilets were cited as barriers for universal uptake of toilet use.

Cooking with firewood inside the home (risk of respiratory infection)

The local preference to cook with firewood in indoor cooking areas with poor ventilation was observed throughout the study. The cost of using safer alternatives (such as cooking gas), presence of adequate gas line connections and the alternative that the firewood is free, were all noted to have contributed to the increased use of firewood for indoor cooking.

Hand washing with soap

Although our research suggests that knowledge and awareness regarding the importance of hand washing was present in the community, practices are inconsistent and often do not adhere to the recommended guidelines. Handwashing is often done with ash, soil and detergent, rather than soap. The cost and availability of soap is a major limiting factor to hand washing with soap.

Intervention framework – Modifiability of variables and potential interventions

The intervention framework examined the following themes according to the integrated HEEE approach:

1. Sanitation
2. Water
3. Cooking fuel
4. Vaccination
5. Early and delayed initiation of Complementary feeding
6. Adequacy and diversity of diet

Sanitation

The construction of sanitary latrines could be strengthened by appropriate allocation of funds to combat the reports of funding for construction being cut off and leaving toilets partially constructed and unusable. The construction of community latrines, in combination with the legislative outlays to ensure reduced open defecation, could encourage improved usage of built latrines. Awareness programmes would be required to reduce socio-cultural barriers to uptake and use of toilet facilities. Intensive Information Education Communication (IEC) activities should target the mothers and other caregivers of children to ensure appropriate disposal of child faeces. Activities should also include interaction and co-ordination with Clean India Mission officials to reduce the current disconnect between policy and intervention on the ground.

Water

Improvement in existing facilities for hand pumps, wells and surface water is essential to ensure continued access to safe water. Access to water, especially in view of the issue of collection and transport, also needs to be addressed through either building of water storage facilities or improved access to wells and surface water sources. The use of home-based water purification practices also need to be supported, especially with respect to proper storage of purified water. Enhanced access to chlorinated or boiled water, water filtration, and local cooperation to ensure sustainable and safe access to water are key components of safe water practice which need strengthening.

Cooking Fuel

Use of firewood, especially in the indoor cooking facilities, could predispose the beneficiaries to suffer from respiratory illnesses such as chronic obstructive pulmonary diseases or respiratory tract illnesses. Leveraging the Ujjwala Yojana program[5] could provide a potential pathway to provide the communities with access to safer indoor fuels for cooking. The replacement of firewood with gas must be explored to ensure sustainable deployment over time.

Early and Delayed Initiation of Complementary feeding

The core message of continued EBF needs to be reiterated at every possible interaction. This needs to be topped up with education and awareness, not only of mothers but also of the elderly caregivers of children in the families – the grandmothers. As is indicated by the results, there are glaring gaps in the understanding of what constitutes a healthy food plan for children under 6 months and up to one year of age. A core intervention would be to address the key gaps in nutritional knowledge and awareness in the caregivers of children in this sensitive age range. Furthermore, the importance of using appropriate meal plans, and not just reverting to convenience foods for CF or child feeding (e.g. biscuits or other packed and processed snacks) needs to be stressed. The potential health impacts of over dependence on processed, convenience foods leads to children forgoing a proper meal plan and knowledge of the risks associated with this behaviour must be delivered to mothers, grandmothers and other caregivers. Building a support system within the family as well as in the community, particularly with the participation of pregnant and lactating women, is of paramount importance. This is particularly important for mothers who need to partake in farm labour and care for livestock. Utilizing regular employment programs, like the MNREGA, could be leveraged to explore potential solutions for alternate employment plans for pregnant women.

A comprehensive intervention package must also address the issue of chronic poverty, especially for landless families, and families with access to poor agrarian reserves which forces them to undertake seasonal, itinerant labour for sustenance.

Dietary Adequacy and Diversity

There are several potential interventions to be explored in relation to dietary adequacy and diversity, including: building community resilience to ensure that there is appropriate agricultural and animal husbandry practices (especially for the development of a line of cash crops); rearing milch cattle; using community-based season barter practices to crowdsource dairy products for feeding infants and children; and focusing on access programs and supply chain management improvement to reduce access and cost barriers to purchase fruits, vegetables and other necessary elements of a balanced diet. Utilising regional and local resources and markets is likely to improve sustainability of production, access, and continued usage of these products, resulting in positive impacts for beneficiaries from across the spectrum of the agrarian supply chain – from producers (farmers) to sellers (markets, transporters) and consumers (end user communities).

5. Pradhan Mantri Ujjwala Yojana (PMUY) is a scheme launched by **Prime Minister of India** on 1 May 2016 to distribute 50 million LPG connections to women of BPL families.

Developing a CC program to foster and develop the local support system could also be envisioned. Using individuals from the community and the existing mechanisms of AWW or ANM based advocacy, meetings of the Village Health Sanitation and Nutrition Committee (VHSNC), and the activities of Panchayat Raj Institutes, could be explored as potential pathways to deploy targeted interventions to improve the gaps in appropriate healthcare seeking behaviors and nutritional knowledge, surveillance and monitoring. Building trust in the Public Distribution System (PDS) is also a vital strategy that needs to be explored. This can be done by ensuring that the mechanisms for its activity are in place and that the services are reaching their intended beneficiaries where they are used optimally.

DISCUSSION

A large number of the IYCF practices which deviate from the recommended norms are moored in cultural and traditional practices, which have not been attenuated despite the instillation of knowledge and awareness of the negative impacts of the practices concerned. Colostrum avoidance, for example, is commonly practiced by several mothers despite their knowledge that colostrum needs to be fed to the child for its wellbeing (13). Ritualistic understandings of cleanliness by elder women, and the necessity to keep mothers confined and secluded after childbirth has contributed to the practice of colostrum avoidance and led to delays in onset of EBF, provision of top feeds and provision of home-based sweet fluids (e.g. honey), as the initial interim feeds before the mother is considered cleansed and able to breastfeed (14). However, our results show an encouraging trend as more and more mothers are not only knowledgeable about the needs of EBF, but also are encouraging the feeding of colostrum to their children. With respect to the practices for introduction of CF at six months, aside from the early introduction of animal milk, two critical practices have been mapped: late introduction of solid and semi-solid foods (7 to 12 months), and early introduction of animal milk and biscuits.

The major barriers in the implementation of targeted or recommended behaviours include the following patterns: the physical and time demands placed on mothers due to their involvement in agrarian work (15); understanding of nutrition for 0 to 24 month old children (which is often driven by traditional customs, particularly with respect to animal milk sources); and usage of biscuits and other convenience foods which are often used by elderly caregivers in the family (e.g. grandmothers) as an appropriate feeding strategy instead of using meals-based feeding. Most commonly, the physical and time demands placed on the puerperal mother due to her commitment to provide manual labour in the agricultural fields is the major barrier which causes the disruption of EBF prior to completion of six months (15). This inability to provide nursing care to the new born creates an environment which promotes the introduction of animal milk (especially goats' milk) early on in the EBF period. Additionally, perceptions related to the greater nutritive value of animal milk also promotes the disruption of EBF prior to the age of six months.

Despite the introduction of animal milk as a breastmilk substitute early on in the child's life, adequate quantity and quality of dairy feeding is present in a very small proportion of the studied households. The issue is further complicated by the lower frequency of trading in inter-household settings. However, this opportunity for improved trading provides a facilitator which could be leveraged. A family with access to milch cattle that exists harmoniously with the neighbours, and are willing to engage in seasonal barter, could be influenced to increase the transactions in milk for families which require greater milk access to feed their infants and young children (> 6 months).

The lack of adequate dietary intake of dairy products is not the only indicator of an unbalanced diet, as found by the study evaluation. It is apparent that the other principles of a balanced and adequate diet, including both macro and micronutrients, are lacking. One of the major barriers to dietary adequacy was the lack of awareness of the specific food principles required for a healthy, balanced, diverse diet. Additional barriers in implementation of an appropriate food plan included the high cost of fruits and vegetables, distance of local food markets, cultural food practices (which were often shaped by theological persuasions) and difficulties in preparing specialized meals to meet the children's needs.

Community-based infection, prevention and control efforts, particularly through the establishment of the corpus of sanitary toilets, has also been inadequate in the study areas. Cultural preferences for outdoor or open defecation, especially next to surface water bodies, not only amplifies the problem of open defecation, but also increases the risk of surface water contamination(16,17). When viewed in combination with existing water supplies of uncertain quality, absence of appropriate home-based water filtration methods and practices related to improper storage of potable water, clean water practices join into a vicious cycle which renders the water as a vector for infection and ill health.

The initiative to build toilets has also remained incomplete, with lack of funds cited as the main complication hindering their construction. These unfinished toilets perpetuate two problems: the potential to act as vector breeding sites and the possible occurrence of bottlenecks in the appropriation and distribution of adequate funds to build the toilets. The narrative already identifies this as a modifiable problem and suggests critical interventions in this regard.

There is definite room to create more cross-silo or cross-regional collaborations, particularly within the overlapping activities of multiple departments which are functioning in this region. One particular area for synergism lies in the work being done by Department of Public Health Engineering in the Kushalgarh region. The department is using solar-panel driven water purification systems at the community level and their work opens up the potential to collaborate and cooperate on resolving larger problems with multiple determinants, which would have otherwise been difficult to address by one particular project undertaken by one specific NGO with a definitive mandate. However, with more horizontal integration of activities, such large-spectrum problems could potentially be reduced to bite-sized pieces, and then dealt with.

A lingering challenge is to identify and engage the different stakeholders at the various study levels. The Intervention Framework (Annexur V), outlines the various roles that need to be undertaken at the individual level, the village level, the organization or institutional level, and the policy level. The core target group, end-user, or the primary beneficiary is the household and the community, which are expected to be the users of the modified interventions addressing the IYCF challenges outlined and discussed in this document. The Panchayat Raj Institutions need to take the leadership, with supportive supervision, in implementing the key recommendations as outlined in the framework. This would also mean providing the relevant stakeholders within the system with supportive supervision, especially ones which help in breaching the cultural barriers, such as colostrum avoidance, improper food habits and proper sanitary latrine use.

Finally, the presence of chronic poverty is a concern. As evidenced by the need for puerperal mothers to commit time and physical labour to agricultural activities, this is a need which has to be addressed in a sustainable manner. This is part of the larger canvas, where appropriate trickling down of the planned social benefits programs needs to be administered with efficiency and through transparent governance. For example, the provisions of the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA)[6], which provides guaranteed employment to every family in financial need, should be leveraged to address the issue of chronic poverty. Another program that could go a long way to improve the quality of life, especially with respect to respiratory infections, is the Ujjwal Bharat program, which ensures sustainable access to cooking gas at the domestic level. Strengthening the Public Distribution System (PDS) is also likely to improve the access of the population to materials of critical importance for their survival. The current analysis reveals that there are significant socio-cultural-economic divides which hamper appropriate IYCF practices from taking root in communities. Simply deploying one-size-fits-all IEC and behaviour change communication programs are unlikely to result in practice changes, as has been seen in the case of colostrum avoidance.

6. National Rural Employment Guarantee Act 2005 is an Indian labour law and social security measure that aims to guarantee the 'right to work'.

Chapter 4

Co-Designing Interventions

INTRODUCTION

In the previous chapter we mapped the potential interventions which emerged from the study data across various themes of IYCF. Although using the classical participatory approach, the core team conducted the formative research to establish the knowledge base before involving the community. In this process, barriers and facilitators were mapped as potential levers of successful IYCF in the targeted community, followed by the identification of probable modifiable and unmodifiable factors and intervention points in consultation with the community researchers and community champions. Due to this systematic process, the evidence generated are backed by a comprehensive and rigorous scientific protocol collected from the community itself (formative research) and stakeholders (CCs and CRs) who are well versed with the community processes.

Despite the depth of information collected in the formative research phase, there is limited knowledge on the most appropriate communication strategies that meet the specific needs of the community in the context of successful implementation of IYCF practices. Interventions to improve compliance should be developed in accordance with the future users' needs and preferences to increase their usefulness. During the last few decades, methods in which patients, family members and health care professionals are involved in the design of health care services have become more common. Examples of such methods are experienced-based design, co-design and experienced-based co-design, in which staff and patients (or other service users) co-design services and/or care pathways, together in partnership with researchers (18). A core methodological approach in these methods is involving the experiences of future users in the design process, focusing on both understanding and improving a person's experiences of a product/service as well as the product/service itself (19,20).

Key benefits of co-design methods in development studies include the possibility to engage and empower the ultimate beneficiaries, their family members and health care professionals to become active participants in the development of services that they will use in the future. In this context, the community is the end recipient but the intervention must also be suitable for the implementers who are responsible for delivering it and have active knowledge of key local challenges, such as resource availability. The intervention's mode of delivery is equally important if the potential lever contributing to intervention uptake deals with knowledge, awareness or advocacy. Evidence-based information and local suitability are important components of the co-design process, including decision making on the modes of delivery of the relevant information. Targeted modes of delivery would enhance the proper understanding of behaviour and adherence to interventions. For example, the communication channel (e.g. written, electronic, phone, in-person), the source of information, (e.g. community leader, front line workers, physician) and the ideal setting (health centres, home, school) (21). The mode of delivery is closely linked to an intervention's cost and therefore to its long-term feasibility and sustainability. As the complex issue was approached through a system-thinking approach all potential stakeholders who were mapped in the previous step were engaged in this step. The aim of this chapter is to list the content, point of intervention and mode of delivery engaging the community level stakeholders.

METHODOLGY

Study settings and participants

Relevant stakeholders identified during the formative phase and stakeholder mapping workshop, were recruited. Considering the possibility of snowballing[7], the research team was open to any new stakeholder(s) identified during the data collection. Key participants were community members including mothers, paternal grandmothers, fathers/male members of the household, elected representatives from the village (e.g. FHWs viz. ANM, AWW and ASHA) and teachers of schools that were located in the village.

Data collection and instrument

Data collection was done by the CRs, with assistance from CCs for scheduling the meetings with the stakeholders. The CRs were also trained intensively on techniques and tools of conducting FGDs, KIIs and Broad Narrative Group Discussions. PowerPoint Presentations and handouts were used for training.

The data collection was completed using thematic guides prepared by the CT and other experts (Annexure IV). Themes were developed around the core components of IYCF and were informed by the findings of the formative research and the potential intervention points to be targeted for developing a comprehensive intervention package. In addition to acceptance or non-acceptance of the interventions, stakeholders were asked to suggest the best mode of delivery of the intervention package (e.g. through tv, radio, posters, using mobile phones, through schools and teachers at parent education days, school or community fairs and through artwork).

The exercise was completed with a novel in-house tool developed by the CT (e.g. MARKS (Lakhanpaul et al) framework). The tool was used to categorize the variables or interventions into five categories – **Motivation, Awareness, Resources, Knowledge and Skills**. According to its case definition, Motivation is the driving force by which a community under study would achieve their goals of successful implementation of an intervention package (22). Awareness refers to basic information about a particular theme, without getting into the details (e.g. in case of breastfeeding, the family members need to have awareness of the importance so that they can support the mother in breastfeeding). Third is the resource, a stock or supply of money, materials, staff and other assets that can be drawn on by a person or organization in order to fully implement and sustain an intervention. Fourth is knowledge, which refers to facts, information and skills acquired through experience or education; representing the theoretical or practical understanding of a subject. Fifth is Skill - the ability to use one's knowledge effectively and readily in execution or performance.

Data management and analyses

Audio recorded data was translated and transcribed. A detailed summary of the field notes was also prepared. Data from the open-ended questions in the questionnaires were evaluated, discussed and summarised across the various themes of IYCF and particularly for each variable as an intervention point. As the aim was to identify improvement ideas expressed by the participants and evaluate the intervention, the data were summarised without an in-depth qualitative analysis. Frequencies and proportions were used to describe the outcomes in the questionnaires.

7. A sampling method where existing participants inform the recruitment of future participants from among their acquaintances and relevant to the study

RESULTS

Table 2: Theme one - Improve breastfeeding practices from first hour of childbirth to six months of life

Level of Intervention	
	Mothers
	Household (Father, Grandfather)
	Community (VHSNC, Elected Representatives, School Management Committee)
	Frontline Health Workers
	District and State level officials

Themes /functions	Content	Mode of delivery
Building knowledge	1. Importance of colostrum 2. Benefits of EBF for adequate nutrition in first 6 months 3. Correct Breastfeeding practices starting from 1st hour of childbirth till 6 months of the child. 4. Care practices include hand-washing during breastfeeding 5. Expression of breast-milk – skills/techniques for expression, storage of expressed milk 6. Sterilization of utensils (for feeding and storing of expressed milk) Water treatment for feeding water (in instances where EBF is not practiced)	Organize mothers' meetings in community Video shows at school on sterilization of feeding utensils, water treatment Picture cards Group and one-on-one sessions by FHW
Demonstration and practice	1. Breastfeeding techniques 2. Addressing complications and difficulties faced by mothers in latching	ASHA, ANM at the community as well as at the facility of childbirth using picture cards and audio-visual medium in hospitals Household visits by FHW Group demonstration by FHW
Routine planning	1. Supporting a routine or timetable that facilitates and prioritizes EBF under time pressures due to other household responsibilities 2. Developing a timetable for feeding and expression of milk where appropriate	ASHA and ANM during household visits

Themes /functions	Content	Mode of delivery
Role modelling/ Positive Deviance	1. All mothers to demonstrate good breastfeeding practices to identify and establish herself as the role model for other mothers- EBF champions 2. Hand-holding (support) for mothers to keep exclusively breastfeeding	Mother peer educators supporting other new mothers (group) household visits for new mother by identified EBF champions along with FHW organise small group meetings Pairing up mothers to support each other
Task shifting (from the mother	1. Importance of breastmilk in child's brain development and protection against infection 2. Planning with extended family and husbands to task shift agriculture duties as well as household related chores like fetching water and cooking during EBF phase	ASHA, AWW during household visit Teachers and elected panchayat representatives (communicating to fathers)
Creating enabling environment	1. Information about importance of breastfeeding 2. Encouragement to set up support networks that help share agriculture duties during times of EBF 3. Building semi-formal structures (mobile creche) near the agricultural fields where the mothers can keep their babies while they are working.	Through Mass Media created under the Mothers Absolute Affection (MAA)[8] Programme Self-help or women's groups Mothers with older children, Elected Panchayat representatives
Generate demand for Maternity Benefit Scheme and Programmes	1. Information about provisions of schemes and programmes that support exclusive breastfeeding till 6 months of the child - (to be discussed if any such schemes exist with the district and state officials)	FHW at the school meetings as well as Gram Sabha platforms using audio visual methods.
Demonstration of behaviour	1. Training on how to demonstrate breastfeeding after delivery	'Training of the trainer' at district level Video Supportive supervision and monitoring of delivery by female Health Visitors
Counselling skills to support breastfeeding mothers	1. Good Breastfeeding practices - introduction of colostrum, feeding on cue, personal hygiene, expressing and storage of mothers' milk, sterilization of utensils used to feed expressed breast milk, using boiling water	Training of the trainer Training sessions at district level or similar Picture cards Monitoring of delivery Supportive supervision by ANM

8. **MAA - "Mother's Absolute Affection"** is a nationwide **programme** of the Ministry of Health and Family Welfare in an attempt to bring undiluted focus on **promotion of breastfeeding** and provision of counselling services for supporting **breastfeeding** through health systems.

Themes /functions	Content	Mode of delivery
	2. Common difficulties in breastfeeding - latching, dealing with mastitis 3. Correcting the myths and misconceptions - giving water, animal milk and biscuits	
Supply side strengthening	1. Improving the implementation of the schemes and programmes 2. Addressing issues concerning frontline health workers role; existing bottleneck; scope for new role 3. Operationalising Comprehensive Lactation Management Centres (CLMC) at the facilities where institutional delivery is conducted. Mechanism for service guarantee and redressal.	Advocacy by NGOs

Interventions at the maternal level included: building knowledge; demonstration and practice of breastfeeding techniques; routine planning to support breastfeeding and prioritizing EBF; and identifying role models, in the form of a mother with appropriate EBF practices. Focus remained on reiteration of the recommended behavioural patterns, especially through household visits conducted by the ASHA/ANM/AWW or other community-based health worker. Information regarding targeted IYCF patterns were conveyed using picture cards, audio-visual cues and group activities. Peer support mechanisms, particularly the deployment of EBF champions, were used to foster an environment for assisting mothers through the steps of breastfeeding their children appropriately. This remains, by far, one of the most important interventions, since it has been observed in many cases that the empowerment and education of the mothers could exponentially improve the quality of breastfeeding behaviours in the community setting. Addressing the questions and confusions of mothers during breastfeeding, particularly issues related to the child latching on, is needed to ensure that appropriate breastfeeding behaviours are encouraged.

Within the family, task shifting from the mother to the other family members, especially during the seasonal work done for agricultural activities, was identified to be an important component to support appropriate IYCF. Since one of the major reasons for the disruption of breastfeeding was seen to be the involvement of mothers in agricultural activities, planning to shift tasks related to these activities to extended family members was identified as an important intervention.

Within-community involvement was seen to be an important step in empowering women to promote appropriate breastfeeding behaviour. This was particularly evident with respect to the creation of an enabling environment to support breastfeeding activities and generate demand for access to maternity benefit schemes and programs. It was considered important to share information regarding the existing facilities and programs that could be accessed by the mothers. This could be achieved using the available media resources and community-based health workers,

The role of Frontline Health Workers (FHW) was of paramount importance in ensuring appropriate uptake of breastfeeding behaviours. In this regard, demonstration of appropriate breastfeeding

behaviours and provision of counselling and support to breastfeeding mothers were identified as their primary activities delivered by FHWs. The need to train FHWs using audio-visual systems, was recognised as an important step in promoting positive breastfeeding behaviours. Since the AWWs had gaps in their own knowledge of appropriate IYCF practices, providing training and supportive supervision through ANMs has potential to improve the quality of information or training shared by AAWs, as they are the point of contact for families seeking care.

The roles of district and state level policymakers and program managers in supporting appropriate IYCF practices at the community level were vital. Ensuring that there was supply-side strengthening, in the form of provision of access to ongoing maternal and child benefit schemes, was a key aspect of enabling and empowering mothers to undertake appropriate IYCF activities through policy and program management. Furthermore, the creation and operationalization of CLMCs was another aspect which could be considered to promote proper breastfeeding behaviours by mothers.

Table 3: Theme two - Increase Minimum Acceptable Diet for children aged 6-24 months

Level of Intervention	
	Mothers
	Household (Father, Grandfather)
	Community (VHSNC, Elected Representatives, School Management Committee)
	Frontline Health Workers

Themes /functions	Content	Channel of delivery
Building knowledge	1. The importance of timely introduction of solid and semi-solid foods at 6 months for adequate nutrition 2. The risks of late introduction at 7-12 months; Information on adequacy 3. Age appropriate minimum meal frequency; age appropriate portion sizes 4. Information of minimum dietary diversity; dairy intake between 6-24 months 5. Vitamin A and Iron rich foods - nutritional benefits and local sources 6. continued breastfeeding till 24 months 7. Calorie density; Information about suboptimal feeding practices 8. High consumption of packaged food like biscuits and wafers; Introduction of powder milk 9. Choice of cooking fuels; Harmful effects of indoor air-pollution due to cooking with wood and cow patty	Organize meetings in all the hamlets by Frontline Health workers Video shows in the schools Wall paintings of different food groups for children Women's groups / self-help groups Posters Picture cards Home visits by FHWs

Themes /functions	Content	Channel of delivery
	10. Alternative for different kind of cook stove; Benefits of LPG as cooking fuel 11. Importance of Take-Home Ration and including it in the regular feeding routine 12. Recognizing feeding cues; Role of other fathers and family members in optimal feeding practices 13. Personal hygiene and food hygiene (washing of ingredients prior to cooking, washing of utensils, if drying using clean cloth) and water hygiene (purification of water before giving to the child)	
Demonstration and Practice	1. Modelling optimal portion sizes and preparation of age-appropriate meals 2. Different ways of preparing Take Home Ration, 3. Different ways of preparing Take Home Ration, 4. Different ways of preparing Take Home Ration, 5. Healthy and easily prepared snacks as an alternative to packaged foods 6. Healthy and easily prepared snacks as an alternative to packaged foods	Develop a pictorial community recipe book Organize cooking classes in the school by the FHWs with oversight of the school teachers
Routine planning	1. Age appropriate diet chart with type of foods, frequency of feeding, portion sizes and breastfeeding	Mothers meetings in different hamlets by FHWs Home visit by FHWs to follow up
Role modelling/ Positive Deviance	1. Demonstrating good child feeding practices to identify and establish herself as the role model for other mothers- Mother Champions 2. Demonstrating good child feeding practices to identify and establish herself as the role model for other mothers- Mother Champions	Mother peer educators supporting other new mothers (group) household visits for new mother by identified Champions Mothers along with FHW organise small group meetings Pairing up mothers to support each other (Mother to Mother communication)
Awareness generation	1. Appropriate feeding for children above 6 months 2. Appropriate feeding for children above 6 months 3. Hygiene issues before feeding the child 4. Harmful effects of packaged food	Meetings of the Gram Sabha and Grandmothers by FHWs

Themes /functions	Content	Channel of delivery
Role modelling/ Positive Deviance	1. Encouraging fathers and grandmothers to see themselves as role models to support mothers in adopting good complementary feeding practices	Father/ grandmother peer educators supporting other fathers (group) through organise small group meetings
Restructuring physical environment	1. Water treatment and storage 2. Cook with fuels other than firewood or cow dung cakes 3. Use of reduced smoke cook stoves 4. Kitchen garden projects	Posters and mass media campaign Through other NGOs Through schools
Role modelling for milk sharing	1. Designing approaches for selling or exchanging milk locally 2. Valuing milk in the community 3. Promoting consumption of animal milk amongst children above 6 months	Self Help Group members Gram Panchayat representative
Health awareness campaigns	1. On various IYCF topics	In school premises by FHWs and other Champions
Training and supportive supervision for quality and frequent IYCF counselling	1. Promoting optimal IYCF practices 2. New ways to measure growth where equipment is lacking 3. Monitoring routine and age appropriate IYCF 4. Demonstrating effective growth monitoring and development with limited resources 5. On the job training on effective counselling for IYCF topics (MMF, MDD)	Food chart for child's food, Age appropriate recipes including THR recipes Picture cards and audio-videos aids; IYCF training manual Portion size bowls By FHW supervisors, e.g. Lady Health Visitor for ANM and ASHA and Lady Supervisors for AWW

Chapter 2 highlighted the gap in appropriate feeding behaviours for children aged 6 to 24 months. It was also highlighted that local misconceptions and cultural traditions were only a single element contributing to the promotion of inappropriate feeding patterns in children belonging to this age group. To that end, it was seen that the key messages for mothers regarding the feeding of their children included:

- The importance of timely introduction of solid and semi-solid foods at six months for adequate nutrition;
- The risks of late introduction at 7 to 12 months;
- Information on adequacy of dietary intake;
- Age appropriate minimum meal frequency;
- Age appropriate portion sizes; information of minimum dietary diversity;
- Improving the quantity of dairy intake between 6 to 24 months;

- Increasing the consumption of vitamin A and Iron rich foods, focused messaging on the nutritional benefits and local sources for such food materials;
- Continued breastfeeding till 24 months;
- Sharing the concept of calorie density;
- Information about suboptimal feeding practices;
- Controlling the high consumption of packaged food (biscuits, wafers and other convenience foods) as complementary feeding materials;
- Clarifying the role of personal hygiene and food hygiene (washing of ingredients prior to cooking, washing of utensils, if drying using clean cloth);
- And water hygiene (purification of water before giving to the child).

This information formed the core of the intervention strategy, since it was previously identified that the systematic lack of information regarding appropriate feeding habits was hampering the process of providing feeding support to children aged 6 to 24 months.

The role of the extended family is critical in ensuring appropriate feeding of children since a large proportion of the children aged 6 to 24 months are tended to by secondary caregivers within their family, such as grandmothers and grandfathers. This, in particular, opens up an avenue where the extended family (grandmothers in particular) need training and information regarding appropriate feeding practices. In addition to improving the knowledge and awareness of IYCF for extended family members, it was vital to ensure that fathers and grandfathers saw themselves as role models in supporting mothers and other caregivers to provide adequate and appropriate complementary feeding to children. Furthermore, restructuring of the physical or built environment, especially with respect to the handling of water, cooking fuel, and kitchen garden projects, was seen as the purview of the extended family.

The community can also be targeted with broad scope interventions to support mothers in providing appropriate diets for children. The role of the community remained especially important to address the issue of access to milk, which has been highlighted in the previous chapter. Although a large proportion of the children were starting off on animal milk within the first six months of their lives, thus breaching the tenets of EBF, many children in the 6 to 24 month age bracket were actually not receiving enough milk. The role of the community was thus identified in designing approaches for selling or exchanging milk locally, valuing milk in the community and providing access to milk. Overall, community involvement can promote consumption of animal milk amongst children above six months. The role of the FHWs remains of significant importance in designing and deploying these interventions, to ensure that the children have access to appropriate and adequate diets. The basic responsibilities of the ASHA/ANM/AWW would be to promote optimal IYCF practices using multi-cyclic approaches; finding new ways to measure growth where equipment is lacking; monitoring routine and age appropriate IYCF practices in target families, and providing information and support for those who are unable to undertake appropriate or recommended practices; and demonstrating effective growth monitoring and development with limited resources, particularly through the use of community champions. One of the major gaps that needs to be addressed is the capacity of the FHWs themselves in providing appropriate advice and counselling support to the families caring for young children. Provision of on the job training on effective counselling for IYCF topics, supportive supervision and a sense of personal growth with professional fulfilment, would be a vital impetus to ensure that the FHW continues to work with motivation.

Table 4: Theme three - Enhanced child care practices associated with growth and development of the children below 24 months

Level of Intervention	
	Mothers
	Household (Father, Grandfather)
	Community (VHSNC, Elected Representatives, School Management Committee)
	Frontline Health Workers
	District and State level officials

Function	Content	Channel
Awareness generation	1. The benefits of play for motor and cognitive development and knowledge of types of activities 2. Indicators for good growth and development of the child	Schools as a venue for community mobilisation
	3. Importance of hygiene, safe water and sanitation 4. Benefits of rainwater harvesting maybe through a pilot demonstration	Thorough school – School going children Schools as a venue for community mobilisation
	5. Common risk factors for various illnesses from un-treated water, open defecation and disposal of child faeces, open drains, mosquito breeding, 6. Benefits of health services available in public health institutions	Through Women's groups for peer education
	7. Through vegetable gardens in schools	Schools as a venue for community mobilisation
	8. Alternative Cooking fuel and indoor air pollution	Through Women's groups for peer education
Demonstration and practice	1. Hand-washing with soap 2. Safe drinking water at household - treatment at source, storage and during use 3. Cooking with alternative stoves and cooking fuels 4. Rainwater harvesting 5. Enabling interpretation of growth monitoring charts 6. Age appropriate play activities 7. Use of Solar power in schools	Through Women's groups for peer education Schools as a venue for community mobilisation FHWs to reinforce caregiver's capability to make these changes Involve NGOs who are designing gas stoves Advocacy with officials

Routine planning	1. Plan ways to build playtime into their day	FHW counselling
Role modelling/ Positive Deviance	Demonstrating good practices related to: 1. Play and development of child 2. Personal Hygiene 3. Water treatment at household level 4. Rainwater harvesting in schools 5. Cooking with alternative stoves or fuels 6. Toilet usage 7. Support for above mentioned services	FHWS to reinforce caregiver's capability to make these changes
Education and literacy classes	1. Literacy classes for mothers 2. Motivating for change	Through Peer educators in schools after school hours
Encourage health-seeking behaviours amongst caregivers	1. Providing information and treatment about parasitic infection 2. Public health services for deworming, iron supplementation and other services	FHW household visits Picture cards Small group meetings
Awareness generation	Reinforcing messages on: 1. Handwashing 2. Toilet Use 3. Kitchen garden	School Teachers Props such as soap, picture cards Games Community score cards Demonstration pilot in schools
Demonstration and Practice	1. Kitchen gardens in the community 2. Model for low cost toilets 3. Supporting teacher to mentor AWCs 4. Channelizing open water 5. Treatment of drinking water 6. Reduce water logging 7. Use of solar panels 8. Milk Banks – human and animal	School as training centre for community Training package around how to take care of kitchen garden / how to compost Cooking for AWW children in schools
Awareness	1. Recognising signs and symptoms on the need for deworming	FHW household visits Small group meetings
Demonstration and practice	1. Demonstrating on how to deworm 2. Prevention of mosquito breeding and practices to reduce risk of malaria 3. Regular growth monitoring	FHW counselling Small group meetings
Availability	1. Access to deworming tablets 2. Model for low cost toilets and demonstration of water treatment plants in schools 3. Equipment for growth monitoring 4. Regularise payment for toilet construction	Advocacy and engagement with policy makers in the District

Given the constraints mentioned in the previous chapter, the role of enhanced child care practices, associated with the growth and development of children, younger than 24 months, remains a potent target for improvement. The prime intervention target for this remains the mothers. Generating awareness in mothers with young children is important at four levels:

- The benefits of play for motor and cognitive development and knowledge of types of activities;
- Importance of hygiene, safe water and sanitation;
- Dealing with the common risk factors for various illnesses from un-treated water, open defecation and disposal of child faeces, open drains, mosquito breeding, etc.;
- And use of alternate cooking fuels to prevent indoor air pollution.

For these interventions, the role of schools as a venue for community mobilization remains of utmost importance. Developing and supporting the women's support groups, peer education, and peer to peer care, were also considered to be of significant importance in achieving these ends. Overall, the targeted interventions would need to provide focused training, support and role modelling on the following aspects:

- Play and development of child;
- Personal hygiene;
- Water treatment at household level;
- Rainwater harvesting in schools;
- Cooking with alternative stoves or fuels;
- And toilet usage.

The role of the mother's education was also identified as an important factor motivating change in these activities.

Schools are likely to act as a central theme in the deployment of these interventions, owing to the fact that they form a central part of the child's daily routine. In addition, the schools are also a centre of activity, which could be developed and aided by the teachers. The number of activities that could be tied in with ongoing benefits, through either leveraging of the mid-day meal program or other such child development schemes, also provide an opportunity to improve the determinants of healthy living in children as well as their parents. This would, include targeting an older group of children who are linked to the school systems.

Since childcare was likely to occur exclusively in domiciliary or school settings, recognition for the role of the community is essential. Developing a supportive environment, particularly around the schools, geared towards reinforcing messages around healthy sanitary practices, toilet use and kitchen gardening could support improvements in the local physical or built environments.

The FHWs also have a significant role to play in this aspect. Their role in undertaking activities which prevent the occurrence of diseases in children, particularly with respect to recognising signs and symptoms on the need for deworming, was identified to be an important predictor for ensuring the health and wellbeing of young children. The role of the community health workers included:

- Demonstration on how to deworm;
- Prevention of mosquito breeding and practices to reduce risk of malaria;
- And regular growth monitoring.

As far as the district and state level policy makers and program managers were concerned, their roles include:

- Supporting access to deworming tablets;
- Development and deployment of models for low cost toilets;
- Demonstration of water treatment plants in schools;
- Provision of calibrated, working equipment for growth monitoring (which has been identified to be a major gap in the previous chapter);
- And to regularise payment for toilet construction.

The regulation of toilet construction is also linked to the perceived trust around government run benefit schemes. The issue of incompletely built toilets, especially in cases where construction was halted by a lack of money, was perceived to be linked with corruption. Therefore, addressing these supply chain and appropriation issues would positively impact the health aspects of all stakeholders and residents in the particular area, while also promoting trust and transparency in government schemes, particularly those which work based on the principles of shared benefits or cash transfer schemes.

DISCUSSION

The above discourse summarizes the multiple levels through which activities may be undertaken at the community level, targeting various stakeholders involved in improving the feeding patterns and behaviours of mothers, children and extended family members. The role of the NGO in this setting becomes a critical catalyst for change, particularly in those areas where the conventional system has been unsuccessful. One of the roles that can be fulfilled by the NGOs or Community Based Organizations (CBOs) is in horizontal integration of the vertically running programs, all addressing various elements of the multifaceted issues around IYCF. In particular, the provision of supportive supervision to ANMs and AWWs is an area that could be augmented by the involvement of the NGOs and CBOs. Through the multi-cyclic approaches to identify the intervention packages, it was seen that one of the major limitations was the relatively low awareness and knowledge regarding the tenets of exclusive breast feeding or appropriate child feeding. These gaps were present across the board, affecting not only the mothers and extended families but also several classes of the FHWs, such as the AWWs and ANMs. The role of the NGOs could be critical in ameliorating this situation.

The training of trainers at the district level through audio-visual training cues, particularly with training videos and picture cards is a key intervention aspect that has been identified in the current framework to improve the prevalent IYCF practices. Furthermore, provision of supportive supervision and monitoring of pre-, intra- and post-partum status in the beneficiaries, undertaken by the female healthcare workers, like ASHA, ANM or AWW is another key activity which can help in the early identification and redressal of complications. However, in addition to these monitoring activities, it is essential to continue reiteration of training messages with a stronger focus on improvement of service delivery. The essential role of the FHWs in ensuring that the IYCF practices are improved cannot be overstated. They form the bridge that connects the individual beneficiaries with the community as well as with government schemes through which they can access the relevant services. In addition, they are the key players who can assemble and sustain the peer-support groups. They can act as reservoirs for the practiced, learnt, experiential knowledge which was acquired by previous cohorts of mothers and pass them on to other mothers, thereby ensuring the continued transmission of embodied knowledge.

Finally, the role of the individual in comparison to the role of the family, the community and the policy makers and program managers has been highlighted in the current discourse. Given the interconnected nature of the issues related to maternal and child nutrition, particularly with reference to the appropriate and adequate IYCF practices, it remains of critical importance to note that all the components must be targeted through well-designed, customised intervention packages so that changes can occur across the spectrum. Potential intervention points were appraised based on MARKS (Lakhanpaul et al) framework.

Chapter 5

Designing of Intervention Package

INTRODUCTION

Evidence-based practice has gained momentum in nutrition and child health related research, and definitions vary widely. Three major components are considered as evidence when developing practice guidelines, including:

- Research findings,
- Knowledge from the experiments,
- And expert opinion.

An intervention package is a comprehensive set of intervention points developed to successfully achieve a desired outcome. Intervention packages are often developed with consideration of local evidence. Therefore, evidence-based intervention packages are often considered relatively appropriate in local settings. Out of the three major components of evidence-based interventions, the 'research findings' component was discussed in Chapters 3 and 4. This includes:

- Findings from the formative research,
- Identification of the potential intervention points across the four themes,
- Identification of stakeholders,
- And co-designing the intervention package in consultation with the community.

An expert, particularly in our context, is a senior researcher who has extensive knowledge in their respective field. This expertise is a result of wide-ranging research, experience and observation in a particular area of study or in a specific phenomenon. The opinions of experts provide knowledge-based information which is necessary to fill the data gaps between evidence provided by long-term medical statistics and systematic empirical evidence (23). There are certain areas in public health, specifically in community research, where empirical evidence is not always available. Knowledge from the past and long-standing experiences of senior researchers can be considered as evidence in these cases. As an important step in collecting knowledge-based evidence, researchers assemble to discuss and suggest as many spontaneous ideas from their field knowledge and findings from the baseline of their current initiative. Considering the existing literature, all potentially effective ideas are compiled and summarised for a brainstorming session, after which the ideas are evaluated for final consideration in the intervention context.

As mentioned above, empirical evidence is important to synthesize evidence for developing an intervention. This can be achieved through a systematic review or umbrella review, where all existing published data on a particular area of focus is rigorously searched, screened and compiled to form a complete picture of the existing evidence. This process allows for convincing demonstrations of the efficacy or effectiveness of an intervention, based on existing evidence. Interventions related to many

aspects of IYCF have been implemented in the past and tested for efficacy and efficiency, so there is a wealth of information to draw on in this manner. The umbrella review conducted to support PANChSHEEEL was not limited to only empirical evidence, but also synthesized the global policies and programmes around IYCF with the aim of documenting the existing initiatives which could be adapted to the PANChSHEEEL context.

The current chapter deals with Step 5 of the PANChSHEEEL 8 step cascade, collating the research findings from the formative research with the global evidence from the umbrella review, the past experiences of similar research projects from collaborators, expert opinion and knowledge of partners. The specific objectives of the chapter are to:

1. Document the existing interventions and past experiences of the Collaborators (Save The Children and knowledge partners);
2. Review literature/systematic reviews of interventions in context to IYCF themes.

METHODOLOGY

The intervention design was completed by following two processes, including a review of empirical research and existing initiatives and data collection from co-design processes with vital stakeholders and community members. An umbrella review of existing policies and programmes and relevant empirical studies of IYCF related interventions was completed alongside the formative research phase. This data collection was followed by intervention mapping and co-designing with the community. Methodologies for each process are described below.

Umbrella Review

The present review includes a systematic search of peer-reviewed and grey literature (mainly policy and programme related), in accordance with the Preferred Reported Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement (24). The search was constructed using the following PICO format:

- Population: caregivers of children aged 0–24 months
- Intervention: behaviour change interventions
- Comparator: usual care or no-intervention
- Outcome: IYCF practices and/or related psychosocial factors and Global Context

Searches were conducted within PubMed and websites hosting information for the relevant government IYCF stakeholders were manually searched for relevant policy and programme related documents (see full methodology in the review report here (Annexure IV). Searches completed using the following terms:

> ('infant and young child feeding' or 'infant nutrition' or 'child nutrition') AND ('nutrition education' or 'health education' or 'behaviour change' or 'behaviour change communication') AND ('knowledge' or 'attitudes' or 'beliefs' or 'practices' or 'behaviours').

Rigorous quality assessment was not completed, as the objective of the review was to list the evidence related to interventions for IYCF practices, current global initiatives and current programmes and policies in Rajasthan, India. Relevant results are presented in brief in the result section, more detailed results can be found here (Annexure IV).

Core Group Meeting

The PANChSHEEEL initiative was a multi-country collaboration to develop locally feasible interventions for the community in the context of IYCF practices. A roundtable meeting was held with the PANChSHEEEL project principal investigator, Dr Monica Lakhanpaul, and all co-investigators in attendance. Experts from the field contributed decades of experience in varied areas of implementation research across the themes of the initiative (Health, Education, Environment and Engineering). The group included experts from the fields of community paediatrics, politics and education in India, gender, community medicine, ethnographic research, co-designing interventions, rural technologies and community processes. The PANChSHEEEL team represented highly reputable institutions across the world, including UCL, JNU, IIT Delhi and SCI. The team from SCI presented the findings from the baseline survey or 'formative research' component, 'Intervention mapping' phase and 'Co-Design' exercises to the PANChSHEEEL team. Barriers and facilitators to appropriate IYCF practices were presented to the team, followed by co-designing through workshops with CCs and CRs and intervention mapping.

Intervention Mapping Workshop

The intervention mapping workshop was held in London at UCL on December 5th, 2018. The meeting united the CT members from UCL, JNU, IIT Delhi and SCI for discussion of the findings from the research conducted to date. The PANChSHEEEL framework, findings from CC co-design and insights from the policy and umbrella review were assessed with expert insights to determine which areas held the greatest potential for improving IYCF according to overlaps in findings from community and empirical global evidence. Careful mapping of these findings allowed the CT to determine which potential interventions were supported by evidence from global research and research in setting, ensuring the proposed intervention package was both evidence-based and tailored to the community.

This workshop focused on refining actions to support the intervention aims which encompass the priority areas of intervention highlighted by quantitative and qualitative research with the community. These wider arms formed the "arms" of the intervention, and within each arm the intervention recipients, intervention content and channel of delivery explored through co-design were assessed. The mapping process included incorporating these aims with a strategy for engaging with key intervention recipients identified from stakeholder mapping with the community. The channels for interacting with each intervention recipient and the content for the intervention were heavily informed by co-design with the MARKS approach (Lakhanpaul et al) and based in evidence of what works from the wider global evidence review.

FINDINGS

The results from the above exercises are presented below alongside a brief summary of the final intervention package. The detailed description can be referred in Annexure V at the end of the document.

Published evidences

In summary, evidence is available to inform decisions across policy sectors and infant and child feeding in low- and middle-income countries at all levels of the social determinants of health. The following sections offer some examples of this evidence.

Evidence support from nutrition support interventions

Conditional cash transfer programmes were noted to improve care-seeking behaviour, with improved nutritional status observed in children aged less than 24 months of age and a reported increase in the weight of newborns in urban areas of residence (25). However, these findings were not replicated in those

aged over 24 months, or for new-borns who resided in rural areas. Similarly, a study conducted in Colombia in 2005 showed mixed results around the impact of monetary transfers on the nutritional status in children, where an increase in dietary diversity and attendance at growth-monitoring clinics was observed, but no effect was seen on the outcome of participation in existing nutritional programmes (25). Community-based intervention packages are another nutrition-sensitive intervention: they have been demonstrated to reduce maternal and neonatal mortality and improve neonatal outcomes in developing countries. Packages included community support groups or women's groups, community mobilisation and home visitation by traditional birth attendants or community health workers where interventions are coupled with the local health system in efforts to strengthen it (26). In addition, interventions showed an increased uptake of tetanus immunisation, increased rates of early breastfeeding and more healthcare-seeking for neonatal morbidities(26).

The women's group interventions in which a participatory learning cycle approach (PLA) was implemented proved to have a worldwide benefit. The PLA involves participants identifying and prioritising a problem, developing and implementing solutions and analysing results. A Lancet systematic review and meta-analysis of the impact of PLA interventions in Bangladesh, India, Malawi and Nepal, revealed a significant reduction in maternal and neonatal mortality. Awarding Certificates of Completion for Training programmes can be beneficial in improving nutritional status, however more research and evidence is required before conclusive recommendations can be made.

Evidence support from Water, Sanitation and Hygiene (WASH)

A systematic review examining the effects of water, sanitation, and hygiene interventions in reducing diarrhoea among children suggests that sanitation 'hardware' interventions are highly effective in reducing diarrhoea morbidity and may be more sustainable than water treatment at point-of-use and hygiene interventions that tend to show smaller effectiveness and reducing compliance rates over time (27). Because the location of toilets and time taken to reach them influences their use, particularly by women and children, access to sanitation has been more successful when installation was planned alongside communities (27,28). Sustained adoption of safe water, hygiene and sanitation is influenced by psychosocial, contextual and technological factors, and by programme characteristics (29). Cost may be more in any case of intervention development. The durability, rate of water flow and system maintenance are essential aspects for withstanding frequent use (29). Personal communication, group meetings and mass media may encourage sustained adoption (30).

Evidence support from Investment in electricity (Energy)

Investment in electricity was reviewed systematically for its effects on access to electricity (31), for agricultural productivity (32); and for the major barriers to increased use of modern energy services and interventions to overcome them (33). A review of access to electricity found only two studies that investigated the effects on health. These studies found a reduction in the incidence of cough, respiratory problems, eye irritation, and headache (34).

Evidence support from interventions in Health education

The implementation of health education interventions is particularly well-recognised in supporting and improving complementary feeding practices. A study monitoring the effect of counselling sessions on appropriate complementary feeding practices of 5 to 11 months old children in three South West Indian villages, was found to improve infant growth (as measured by weight), infant feeding practices (as measured by completion of a monthly questionnaire), and care-giver knowledge(34). A nutritional education intervention in the form of nutritional counselling was targeted to mothers in two Pakistani villages, with the aim of reducing the severity of wasting and changing feeding practices. Results displayed a significant increase in the number of meals consumed daily, as well as establishing that 36% and 32% of children progressed to obtain "normal nutritional status[9]" in

9. The international definition of 'normal' (two SD from the WHO standards median) defines the first threshold, which includes 2.3% of the area under the normalized distribution. Multipliers of this "very low" level (rounded to 2.5%) set the basis to establish subsequent thresholds

the villages of Tando Jam and Quetta, respectively. A further example of a successful multi-sectoral educational intervention is the Mexican education-health-nutrition combined approach of provision of fortified weaning, food supplementation, nutritional counselling and conditional cash transfers (35). Infants of lower socioeconomic status and higher stunting grew an average of 1 centimetre in the first two years of life and anaemia rates reduced by 20% (36).

Evidence support from Interventions in agriculture

Agricultural systems play a key role in the provision of immediate food needs, but also in supporting livelihoods and income. Therefore, interventions and policies are best tailored as nutrition-sensitive approaches which impact factors influencing nutrition, but may not alter food intake directly. A systematic review addressing the effects of agricultural interventions that aim to improve children's nutrition found that Interventions improve the production of the agricultural goods promoted, but not households' total income. In other words, the interventions promote the consumption of food rich in protein and micronutrients, but the effect on the overall diet of poor people remains unclear (37). No evidence was found of an effect on the absorption of iron, but some evidence exists of a positive effect on absorption of vitamin A. However, very little evidence was found to have a positive effect on the prevalence of stunting, wasting, and underweight among children aged under five years of age (37).

Biofortification on the whole has been of greater agricultural value compared to home gardening and homestead food production interventions. For example, HarvestPlus is a global movement across 17 countries in Asia, The Americas and Africa, with the aim to develop and scale up the delivery of biofortified nutritious crops for universal access (38). Effectiveness trials for biofortification of sweet potato demonstrated readiness of farmers to adopt the scheme, alongside an improvement in vitamin A status in Ugandan children aged three to five years (39).

Cross-sector interventions have informed WHO nutrition guidelines identified from the e-Library of Evidence for Nutrition Actions (eLENA) alongside their multi-sectoral nature, primarily with respect to health, education, engineering and environmental approaches. According to the PANChSHEEEL umbrella review, breastfeeding interventions represent the majority of multi-sectoral nutrition interventions (n = 4/9), with collaboration between health and education interventions the most common (n = 5/9). There was no evidence of interventions with collaboration across health, education, engineering and environment sectors (40).

Expert consultation

The intervention package was finalised with components from across all themes. These were discussed under the following domains:

- Improves to Improving access and availability of WASH services,
- Management of severe acute malnutrition,
- And improving leadership and coordination for nutrition action.

Interventions are further categorised at the household, community or village and governance level. Existing global evidences, past experiences by the collaborators (e.g. experts and existing policies and programmes around the theme of IYCF) were discussed. All the potential interventions were listed along with the beneficiaries. Again, taking in to account the findings of the formative, co-design and expert consultation, the expert group further informed the list of potential intervention points with their respective content, mode of delivery and target beneficiary for the best possible effectiveness. A detailed overview of the outcome of the meeting and the intervention package is detailed under Annexure V.

Chapter 6

Refining of Intervention Package

INTRODUCTION

The PANChSHEEEL project has followed a validated and scientifically rigorous approach to develop its community health promotion intervention package for IYCF. However in order to get to this point, the intervention package has undergone a long journey of mapping and co-designing using existing evidence and expert consultation as well as feasibility and pilot testing to fine tune the final package. The term 'pilot testing' refers to testing a large-scale research study on a small scale to assess any challenges in its implementation (41). In the context of PANChSHEEEL, this is related to engaging with the community the intervention is tailored for to discuss acceptability and the pre-testing of specific components of the intervention package including its content and mode of delivery for feasibility at the community level. Pilot studies are a crucial element of a good study design. Conducting a feasibility study does not guarantee success in a larger initiative, but it does help to identify any challenges which may be mitigated before final implementation. Pilot studies fulfil a range of important functions and can provide valuable insights for other researchers (42).

The end users (e.g. community members or the stakeholders) of the PANChSHEEEL project intervention package were always at the centre of the social marketing process. When developing an intervention package, designing and pre-testing its content and mode of delivery with the target audience as thoroughly as possible is immensely important, irrespective of the operational rigour being followed in its evidence-based development. There are a number of components that should be pre-tested in addition to any materials produced, such as:

- New or improved materials on IYCF awareness;
- Communication and advocacy plan or process targeted programme and policies;
- Concepts;
- Key messages;
- And settings and communication modes or channels.

Assessment of acceptability and pilot testing allows the intervention to be refined or changed if required. Considering this an iterative process, it may take several rounds of review for an intervention to be ready for implementation. Within PANChSHEEEL, this process is termed 'refinement' and hence pre-testing has been coined as 'refinement of the intervention package'.

This process not only includes testing the intervention with the end recipients but also testing with other key stakeholders, such as FHWs, implementing agencies and other distal stakeholders for the service delivery component associated with IYCF. In this chapter, we are describing the process of refinement, which the intervention package has undergone to ensure acceptability and feasibility within the community and other stakeholders. The current chapter aims to:

1. Refine the intervention package via feedback from the community and system level stakeholders for its acceptability;
2. Refine the intervention package via feedback from the community through pilot testing of the intervention package for its feasibility.

METHODOLOGY

In the previous chapter we discussed the core team workshop in London to map responses from co-design, partners' experiences' and global evidence. A consolidated Intervention package was designed (IP1) as the outcome of the workshop. To refine the IP1 intervention package, a two-step approach was followed as mentioned in the Step 8 of the PANChSHEEEL methodology cascade. To this end, a refinement workshop was conducted with state and district officials, CCs and schools, followed by piloting on the field.

Community refinement workshop with all 9 blocks to assess acceptability of IP2 (IP2 to IP3)

The PANChSHEEEL intervention refinement took place while the intervention was still in its development phase and relied on a heavily qualitative approach that engaged key stakeholders in decision making. This refinement included acceptability testing through semi-structured focus groups hosted in workshops with the community. These focus groups were designed to guide open discussion about the intervention's aims, content, channels and targets.

In order to assess the acceptability of the PANChSHEEEL intervention package, the Theoretical Framework of Acceptability (TFA) (Sekhon et al. 2017) was applied in creating two unique guides to prospectively collect feedback from the intervention's target audience and essential facilitators (42). The TFA assesses an intervention's acceptability across seven essential areas, including: ethicality, affective attitude, burden, opportunity costs, perceived effectiveness, self-efficacy and intervention coherence (see table below for definitions of each key area).

Table 5: Theoretical Framework of Acceptability

Elements	Definition
Ethicality	The extent to which the intervention has good fit with an individual's value system.
Affective Attitude	Anticipated Affective Attitude: How an individual feels about the intervention, prior to taking part Experienced Affective Attitude: How an individual feels about the intervention, after taking part
Burden	Anticipated burden: The perceived amount of effort that is required to participate in the intervention Experienced burden: the amount of effort that was required to participate in the intervention
Opportunity Costs	Anticipated opportunity cost: The extent to which benefits, profits, or values must be given up to engage in the intervention. Experienced opportunity cost: the benefits, profits or values that were given up to engage in the intervention.
Perceived effectiveness	Anticipated effectiveness: the extent to which the intervention is perceived to be likely to achieve its purpose. Experienced effectiveness: the extent to which the intervention is perceived to have achieved its intended purpose.
Self-efficacy	The participant's confidence that they can perform the behaviour(s) required to participate in the intervention.
Intervention Coherence	The extent to which the participant understands the intervention and how it works.

The two day refinement workshop began with a summary presentation of the PANChSHEEEL research findings to date to showcase how the intervention was developed through its evidence-based, co-designed methodology. The five arms of the intervention were then presented to the two groups so they could prospectively assess the intervention against the TFA in light of their unique insights on the practicalities of the intervention. The first group of participants consisted of the intervention's target audience (e.g. CCs and community members), and the other of the individuals who will facilitate the intervention (e.g. teachers, ASHAs and ANWs).

After presentation of each arm of the intervention, the refinement tools were utilised by the CR team to collect feedback specific to that intervention arm, allowing for the collection of tailored feedback on each intervention aim. The tools provided guidance and prompts against the key areas of the TFA and served as a template to log participant responses. Participant responses were captured and recorded in a transcript which was carefully assessed to highlight any areas for improvement in the intervention. Results from this assessment are detailed below in "Findings".

Piloting of interventions with community members, Community refinement workshop with all 9 blocks to assess acceptability of IP2 (IP2 to IP3)

The PANChSHEEEL team hosted intervention pilot events in government schools in Garnawat (Ghatol Block) and Devdasath (Kushalgarh Block) on Republic day[10]. The team utilised this public holiday as an opportunity to host a large gathering, which included community celebrations in schools, to promote schools as education and innovation hubs in line with the PANChSHEEEL study objectives. The team piloted five activities in Devdasath UPS, Ghatol Block and two activities in UPS Devdasath, Kushalgarh Block. The IYCF intervention activities were co-designed with the community and these piloting events presented an opportunity to test the modes of delivery, as the events included several different activities. The activities piloted included a skit on hand washing and nutrition, a short film on nutrition, health and hygiene, a quiz and an educational session on the nutrition pyramid.

A consultant with experience in writing scripts to engage children was hired by SCI to assist in preparing a scripted skit as well as training the children. Fifty school children were trained for the skit, with a primary goal of sharing the theme of handwashing practices and nutrition. After the children presented their play, Dungarpur facilitators hosted the nutrition pyramid session, where 12 community members participated in activities aimed at informing parents and caregivers about nutrition and locally available nutritious foods, in order to improve their children's nutrition status, identify the types of foods available around them and understand the importance of feeding practices.

Some short films on nutrition, health and hygiene were also shown to children and community members to spread awareness. The event was attended by 150 children and 50 community members. The quiz activity took place after the film showing, with the objective of ensuring attentive community participation in activities. Informative activities were delivered and a quiz facilitator then asked questions to the community members regarding the activity to assess whether they were listening and watching attentively. The events concluded with all community members and leaders taking a pledge together. The activities had the active participation of the community members and leaders, exemplified by the pledge taken by all participants to promote healthy practices for children.

10. Republic Day honours the date on which the Constitution of India came into effect on 26 January 1950. The day is celebrated across schools, government offices etc in India on this date.

FINDINGS

Findings from the IP1 refinement (Cascade Step 6)

The refinement workshop took place over the 5th and 6th of February 2019 in Banswara district and was attended by 60 participants (35 female, 25 male), including CCs from all nine study blocks, ward panchs, AWWs, ASHAs, ANMs, teachers and other community members.

In the course of the refinement of the IP1, the following facets were observed and led to subsequent modifications. According to the local stakeholders, cultural aspects and variation, differences in skill sets and other requisite logistics (e.g. appropriate storage, safe feeding, and undertaking appropriate infection prevention and control measures) would lead to a major gradient in the effective delivery of the intervention package. The time and effort required to bringing about these changes would make the process difficult and not pragmatic.

One of the major barriers in mothers achieving the full recommended duration of EBF was their involvement in agricultural activities, particularly with respect to seasonal agrarian activities. Given the chronic poverty, family-based agrarian systems and the need for all able-bodied men and women to participate in the agrarian economy, the stakeholders felt that that the social networks and peer support groups could be utilised to reduce the burden on mothers. This would lead to the formation of a support system which could support the IYCF practices of mothers both during harvesting or sowing periods, irrespective of the extent of involvement of the mothers in agrarian activities.

The concept of crèches and day cares for children was not a familiar concept in the rural communities where the study was conducted. The crèche model offers mothers a safe childcare option while they are engaged in income generating activities. Crèche models have been deployed in four Indian states and provide care for children younger than three years of age. These crèches are managed within the community, often in the same settings where the AWWs operate. Despite these examples of success, community members within the PANChSHEEEL study had concerns about the use of crèche in their villages. In addition to feelings of distrust from mothers towards leaving her children in the care of strangers, customs pertaining to familial ties and socio-cultural customs would also hamper the deployment of crèche or day cares for children. Instead, the children were more likely to be put under the care of the elderly members of the extended family, like grandmothers and grandfathers.

One of the major issues noted in prior chapters is not only the quantity of foods used for complementary feeding, but also their quality. Provision of convenience foods, like biscuits, or other processed, packed food materials, was commonly observed. This not only failed to fulfil the nutritional needs of the 6 to 24 month old children, but also interfered with the development of a planned and meal-based feeding system. It was seen that awareness regarding the nature and quantum of food elements that are required in a balanced diet was low, not just in the primary caretakers (e.g. mothers) but also in the extended family members who were responsible for the nurturing of the children when the parents were away on income generating activities. To address this critical gap in knowledge, the stakeholders suggested utilising the available social milieu, particularly through strategies like putting nutrition training on the agenda of events where the villagers showed up in masses (e.g. like the Gram Sabha meetings, or during Bhajan evenings).

The milk access crisis remained a sore point with no easy solutions in sight. The provision of powdered milk was considered, but keeping in mind the cost and sustainability of the material, as well as its likely impact on the local animal husbandry systems, alternate strategies were also discussed. For example, there was a suggestion that in lieu of the introduction of the powdered milk products, which would also perpetuate the use of processed foods, focus should be put on increasing the milk production through collaboration with the animal husbandry department. While this approach would require a significant investment in terms of time and effort needed to make a difference, it remains a solution which has multiple benefits in the long term.

Although developing cooperative-based models in the rural community settings appears to be an attractive option for increasing access to milk, it remains challenging in fiscal terms since the purchasing power of the community is limited, especially with respect to dairy products. The community's willingness to purchase or spend additional revenues on a product not in their daily priorities is not likely to catch on.

Findings from the IP2 pilot testing (Cascade Step 7)

The IP2 pilot testing also revealed interesting trends, which are summarized here. Taking advantage of the Republic Day program in government schools on 26th January 2019, the PANChSHEEEL team took the opportunity to promote the school as a local nutrition hub. The activities undertaken at the hub were mainly geared towards the following objectives:

- To enhance child care practices in order to improve complementary feeding practices;
- To increase Minimum Acceptable Diet for children;
- And to enhance hygiene practices.

The program focused on building the awareness, knowledge and skills of the target population. The program was attended by mothers, grandmothers, fathers, grandfathers, household members and extended family members, teachers, and the wider community (VHSNC, Elected Representatives, and School Management Committee).

A skit, demonstrating the steps of handwashing, was done to improve the infection prevention and control practices, and enhance hygiene related behavioural patterns. The community members in attendance tried to learn by copying as they were also asked to follow along with the demonstration. A film showing, focusing on the nutritional and hygiene related issues was also conducted, targeting the younger people in the community. The Nutrition Pyramid was explained to the core, small focus groups. The activities, their contents, and the mode of delivery was designed based on suggestions from the community members and teachers, which were collected during the co-designing phase of the intervention package development. The material and content was created in a manner which would engage the community members and be culturally appropriate, acceptable and accessible for the audience.

Although the high levels of participation in the programs was encouraging, wider participation could be ensured if more streamlined efforts were undertaken, particularly with respect to using loudspeakers to spread the news of the event, using door-to-door visits to create a buzz about the event and using the FHWs (e.g. ASHA, ANM and AWW) to spread the information about the event in their target community of beneficiaries.

Chapter 7

Dissemination

PURPOSE

Dissemination of study findings is one of the core strategies for developing trust between researchers and the community in any tailored intervention development initiative (42). This includes engaging community and governance level members at every step, reserving ample time for discussion during presentations, building rapport by sharing personal experiences, being receptive to and learning from criticism and implementing input from varied stakeholders involved from the beginning to the end of the initiative (43). This process led to a deeper understanding of the research findings and ensured that results reached the community members who were most invested in them. This can be achieved through creating a flexible dissemination plan, adapting presentations to each community group (e.g. tailoring language and content), establishing a point person to serve as a community liaison and continuing dialogue with community members after the presentations (42). The community, health systems and governance level stakeholders were involved at various levels for formative research, mapping of the interventions across themes, co-designing of the intervention package and refining of the final intervention. Two dissemination workshops were held to present the findings of the formative research and the intervention package's phases of development. This dissemination was vital to build trust with the community, obtain final comments and feedback on the intervention and address the ethics of dissemination of findings as good research practice. The first dissemination workshop included senior health systems level, public health research and governance level functionaries and the second included community members.

Dissemination workshops

Dissemination - National and state-level stakeholders

The dissemination workshop targeting the policy makers and program directors was organized in the form of a panel discussion on the theme of "Intersectoral collaboration under POSHAN Mission: Opportunities and challenges". The objective of the dissemination meeting was to; 1. Share the PANChSHEEL project findings and learn from the reflections of the invited panellists and participants to inform the refinement of the intervention package being developed, and 2. Engage with key stakeholders tasked with translating the POSHAN mission into action 'on the ground', with special reference to opportunities and gaps for inter-sectoral convergence. The panel was chaired by Prof. Vinod K. Paul. and the panel members included Dr. Gayatri Singh, Dr. Indira Chakravarty, Mr. Haldhar Mahato, Dr. Narendra Gupta. The panel was moderated by Dr. Rajesh Khanna. The panel discussion focused on operationalising local solutions and partnerships, drawing on the policy and technical expertise of the panel to explore several themes, including an IYCF crisis, how the Swachh Bharat Mission can help break the cycle of infection, strengthening household food security and being inclusive of tribal and other vulnerable populations.

The focus remains on understanding the current practices and the barriers to adopt the recommended practices, based on an age-stratified manner by looking at children aged 6 to 8 months and 9 to 12 months as independent groups due to their diverse needs. The age group from 9 to 12 months is

the age when children are learning to eat and are building up their dietary practices for the rest of their lives. Furthermore, this is the age when up to 75% of dietary intake contributes directly to the nourishment of the brain, making it a period of critical focus for child development. Discussions on the NFHS-4 data reveals that even though children are reaching the minimum meal frequency, there remains much to be desired in terms of achieving dietary diversity in their meals. Given that caregivers usually prepare food only twice a day, there needs to be a focus on devising diverse dietary structures using locally available foods, many of which are not adequately represented on the menu. Given that the primary objective of the caregivers is to appease the child's hunger and prevent them from crying, readily available processed and pre-packaged foods have become common items for complementary feeding. This practice is detrimental to the long term health of the children but, given the current milieu of knowledge, awareness and practices, the ideal way to combat this would be to develop healthy snacks which remain practical, affordable, accessible and acceptable to the families concerned. In order to take the issue forward, it is vital to address the IYCF practices as an aspirational matter, looking into models of success, and stressing on positive deviance. The discussions around improvement of the IYCF status in the country needs to be linked to policies in addressing local food systems, otherwise sustainable solutions are unlikely to be forthcoming in the near future.

Many of the SDGs are likely to be influenced through the improved deployment of sanitation measures. In recent years, the linkage of evidence between WASH, and nutrition and health has been demonstrated in India and globally. The introduction of safe water and universal sanitary latrines in areas of India has led to dramatic reductions in the occurrence of soil transmitted helminthiases. These improvements in sanitation have also had major implications on the prevalence of undernutrition, due to the relationship between sanitation, infection and malnutrition. Additionally, improving access to safe and potable water in the community results in several time-saving benefits with positive impacts. For example, fetching water and cooking fuels may account for 30 to 50% of the caloric intake of the women in the family, with variation depending on the difficulty of the terrain. This time commitment to collecting safe water is a barrier to optimal hygiene and perpetuates the intergenerational cycle of undernutrition, especially in settings where locally sustainable food systems to address caloric deficits are not optimal. To fully realise the potential benefits of access to safe water, linkages between existing government programs needs to be improved, particularly in difficult terrains where the time commitments for collecting water are the greatest. In existing programs to develop sanitary latrines, the window of opportunity to improve access to safe potable water remains and better utilisation of resources could be guided by the existing body of evidence. Water quality monitoring, a critical component infection prevention, remains a central tenet which has to be closely monitored using high fidelity measures.

The potential of using a crèche system was promising, with expected improvements in growth monitoring, weight and height measurements – all of which were identified as inadequate in the current study during the co-designing steps. Another positive impact of the crèche system is that it allows women to partake in employment opportunities (resulting in added earnings of 5000 to 6000 rupees every month), opens up enough time for women to care for their children at home, and also liberates the older children from childcare activities, enabling them to undertake age-appropriate activities themselves. The crèche system appears to be an interesting model based on the experience thus far and could be a potential pivot away from the cash-transfer based approach, which has been the go to solution for maternal and child health related challenges. This could further fuel the need to look into locally sustainable solutions and encourage the adoption of traditional practices, especially with respect to agriculture, food systems and dietary practices which are being overturned by the market economics. However, it must be considered that whilst the crèche based systems appeared to have worked well in the settings where they have been trialled, their acceptability remained questionable in the areas under the study. During the development of the intervention packages and the multi-cyclic rounds of deliberations going into the devising of the strategy, it was noted that the faith in the crèche system was limited.

IYCF has remained a challenge across all communities and practice variance remained quite high, even across the wealthiest centiles. The real issue in vulnerable communities was that large scale, systematic changes are required before adequate positive momentum can be observed in the IYCF domains. Community-based centres to care for children aged 3 to 6 years were opted for their potential to result in improved outcomes for child nutrition and health. In light of the well documented shortcomings of the Take Home Rations (THR) initiative, other innovative food preparation mechanisms needed to be explored. Developing community kitchens using a cooperative oriented approach could be a cost-efficient innovation that could be explored using existing framework and resources, without needing additional funding. Co-locating AWW centres with schools, and using these centres to provide pregnant and lactating women with hot, cooked meals, at a time convenient for the beneficiaries, was also explored. In addition, these centres could also deliver the additional cooked meal needed for children aged 6 to 24 months. The role of the elected officials and the Panchayat Raj Institutions remains of central importance in taking these innovative plans to fruition. These efforts need to be accompanied by structural changes, which require political will and support to be translated into action. The intervention packages within the PANChSHEEEL framework are likely to be beneficial in addressing these issues and they remain potent approaches which can provide a buffer against the threat of chronic poverty and its impact on malnutrition in mothers and children across the nation.

The focus of the POSHAN Mission remains on the first 1001 days of life, during the course of which the trajectory for muscle mass and brain development is determined. The growth and nutrition lost in the first 1001 days of life cannot be compensated for later on. The POSHAN Mission addresses this issue using technological solutions in a multidisciplinary framework, leveraging participatory principles whereby solutions are leveraged from the beneficiary communities themselves, making this a sustainable mission.

Dissemination – Community level stakeholder

The community dissemination was conducted in the nine study villages, and the venues for the dissemination meetings were either at the AWCs or the schools, based on the suggestions received from the community dwellers themselves. The stakeholders in the dissemination program included a wide variety of people, including: community champions, School teachers, PRIs, ASHA, ANM, AWWs, self-help groups and community dwellers, especially those who were engaged in the project activities like social mapping, transect walks and focus group discussion with mothers' and fathers' groups. Overall, 328 members attended the nine discussions held across the nine study villages.

The field investigators, in the company of the community champions, took the lead on the mobilisation of the community. The stakeholders were asked to assemble at the preselected venue of their choice to participate in the dissemination meeting. The mobilisation strategy targeted community leaders, service providers, PRIs, teachers and the other community dwellers who wanted to participate in the community dissemination discussions.

The dissemination program was modelled on an interactive, participatory discussion model. First, the investigators shared the findings from the study, with the relevant details, with the stakeholders present at the meeting. This was then followed up by the discussions on the development of the intervention packages. After the presentation, a question and answer session was also kept for clarification of the queries in the minds of the attendees. All communications were carried out in the language that the stakeholders who were present could comfortably understand. For the community dissemination, a majority of the stakeholders preferred the use of the Wagadi language, which was used in the discussions throughout.

Following the discussions, two major issues were raised at almost all the events. First, was the fact that the women, especially the ones with children younger than three years of age, were overburdened with work on the domestic front as well as in the income generation activities. This was particularly of concern as the community dwellers felt that the mothers were unable to provide enough time to care for the children themselves. To that end, developing a government program to support such mothers was a desire that was largely echoed across all the meetings. The second fact was that although the study findings show that the study villages consumed very small amounts of vegetables, in reality, this was due to extremely limited access to vegetables. The vegetables needed for consumption were purchased from the nearby markets, and in addition to the cost barrier, there was also the perception that these vegetables were unhealthy, as they were ridd d with chemicals and hence, there was no real motivation in spending money to purchase them.

Hand washing promotion programme and evaluation

Apropos to the finalization of the intervention package through co-design process, pilot testing and feedback through disseminations at various levels, the WASH component of the PANChSHEEEL intervention, schools were identified as a potential platform by both teachers and community members. Enrolment in school was high across the nine villages and schools were also functioning regularly as well as efficiently to deliver initiatives such as the mid-day meal to children, highlighting their potential reliability as an intervention delivery platform. In order to field test the practical feasibility of activities suggested under interventions package, testing of hand washing intervention is proposed in all the 17 schools in 9 villages of study area.

The handwashing practices intervention has rolled out at two different levels:- 1.Awareness generation and Infrastructure support 2. Awareness Generation only. Under level-1, 2 out of 17 schools have supported via construction of age appropriate handwashing platforms in school along with training session on handwashing for children and teachers. These hand washing stations are simple, scalable and sustainable, and rely on usage of minimum water, while the facilities are developed using local materials. Under Level-2, Save the Children field team conducted handwashing session with all children in all 17 schools to make them aware about the good hand washing practices using the skit/ play method as discussed in detail in the intervention package.

Impact assessment of the WASH intervention was also undertaken. The study was to understand the status of wash practices among children at school level before and after intervention. The target of sample size was 30 children from each school, 8 UPS school were selected for the survey 4 school from Kushalgarh and 4 from Ghatol block of Banswara district 240 was the total sample size. Questionnaire was used as tool to record the data from the children as well as an observation check list was also used.

During the baseline it was observed that out of 240 children only 19 (8%) children were using soap in the school. After the intervention on wash activities at school level, it was noticed that 198 children (83%) children started using soap in the school indicating a 75% improvement. Similarly, only 27 (11%) children were using soap in the school during baseline, whereas 201 children (84%) children started using soap in the school after the intervention on wash activities at school level indicating a 73% improvement. Also, baseline data shows only 5% children were using all 6 steps of handwashing. Following the intervention, this percentage increased to 61%, the percentage of improvement was 56% among children. Only 3 (4%) children out of 240 reported being trained on handwashing practices during baseline. After the intervention on wash activities under the PANChSHEEEL Project, 237 (98%) children were reported to be trained on wash practices at school level.

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