RESEARCH STUDY REPORT

DEVELOPMENT OF A TOOL FOR THE ASSESSMENT OF COMPLEMENTARY FEEDING PRACTICES OF CHILDREN (9 – 12 MONTHS)

Rama Narayanan

Subhangi Sahoo

RashmitaBehera

Contents

Preface

The need to develop a tool for assessing complementary feeding practices of caregivers arose while engaging in participatory research withtribalcommunities in Odisha, to reduce undernutrition in young children. While growth monitoring of children could be undertaken using the growth chart by the World Health Organization (WHO), field workers expressed the need for a tool tomonitor and assess the adequacy and quality of the diets given to individual children, to be able to intervene and provide dietary counseling to caregivers during household visits.The present research was undertaken as a first step in that direction.

The feeding of young children between 7 – 36 months is a step-by-step process undergoing several transitions by way of food, feeding device and from feeding by a caregiver to atleast partial self-feeding by children. Added to these complexities is the child's response to the feeding process. The search for a tool revealed that there were very few tools combining all these aspects and most had not been validated. Since theperiod encompasses several variations within a narrow range, it was decided to delimit the exercise to the age group of 9 – 12 months, the period which is most critical for the onset of stunting. An attempt was made to combine dietary aspects, process of feeding and child behavior to develop a holistic tool covering various aspects of feeding.

The exercise highlighted the need to combine various methods to assess complementary feeding practices and the complexities in assessing

quantitative food intake of young children. Needless to say, this exercise is only a beginning in the development of an assessment tool andfurther exploration will be needed before afull fledged tool can be developed.

Given the widespread nature of undernutrition among young children in India and the urgent need to address the same at the ground level, it is hoped that more endeavours of a similar nature will be taken up by all those interested in the welfare of the young child.

August 2014

Rama Narayanan

Ford Foundation Chair for Women and Food Security

Acknowledgements

The authors are deeply indebted to the village community in Odishafor participating in the research study whole heartedly and providing a wonderful learning opportunity for the researchers.This research study was undertaken with financial support from the International Development Research Centre, Canada.Sincere thanks are due to Dr. V. ArivudaiNambi, Principal Scientist, M S Swaminathan Research Centre (MSSRF), Chennai for facilitating the field work. The guidance provided by our Expert Committee members Dr. T.S.Saraswathi, Senior Consultant in Child Development, Dr. Subhadra Seshadri, Senior Nutrition Consultant, Ms. Mina Swaminathan, Expert in Early Childhood Development and Dr.L.S.Saraswathi, Development Consultant has been invaluable in conducting the research and in preparing this report. We are especially grateful to Dr T.S. Saraswathi and Ms. Mina Swaminathan for viewing the videographed feeding episodes of children and giving their feedback.

This effort would not have been possible but for the support of our colleagues in Odisha, Mr.TusarRanjanNayak, Mr. Ramachandra Tosh and Mr. Sanjay Swain in identifying the field investigators and in supervising the data collection. The meticulous data collection by the field investigators and anthropometric assessment by Ms. Maneka Choudhury is deeply appreciated. Dr K.U.K. Nampoothiri, Director, Biju Patnaik Medicinal Garden and Research Centre (BPMGRC), Jeypore deserves special mention for the guidance extended to the field staff on a day-to-day basis. The authors place on record the administrative support extended by Dr.Rukmani, Director,Programme Area of Food Security and Dr. Ajay Parida, Executive Director, MSSRF for conducting the research.We thank Mr A. Sakthivelan for providing secretarial assistance in preparing the report andall our other colleagues at Chennai, for their contributions.

Introduction

Despite progress in the agricultural and economic fronts, India still lags behind with regard to improving nutritional indicators, especially for the young child. In 2006 about 40% of children in the 0-3 year age group were reported as underweight (NFHS III, 2006). Though a rapid nutrition survey of children by the Government of India in 2013 - 2014 (IFPRI, 2014) has recorded a 10% and 5% decline in stunting and wasting levels respectively for children under 5 years of age, undernutrition nevertheless remains high with 38.8% and 15% of children below five years still remaining stunted and wasted. The first thousand days of life of an individual are very critical since 80% of brain development takes place during this time and any nutritional setback causes irreversible damage leading to health complications throughout the life of the individual. Among many factors that affect nutritional status of children, Infant and Young Child Feeding practices is a major one. Hence intervention programmes for improving nutritional status of children invest a good deal of resources on promotion of appropriate Infant and Young Child Feeding Practices (IYCF) (Ramji, 2009).

Feeding of young children is a skilled activity, involving considerable time and knowledge on the part of the caregiver, in preparing palatable and nutritious food, patience while feeding and maintenance of hygiene and safety, both personal and environmental. It is also made complex by the fact that the child has to be given only breastmilk till six months, following which complementary feeding has to begin (i.e.) family foods have to be introduced gradually one after the other and in adequate amounts needed by the child along with breastmilk for continued growth and development. From suckling at the breast, the child has to learn to partake of food from an external device such as a spoon, bottle or a glass. The child is expected to be eating all family foods by the age of one. The period between 9 – 12 months is very critical in

the prevention of undernutrition, since stunting which peaks during the second year of life hasits origin within the first twelve months of birth. While other foods are introduced to the child during the seventh and eighth months, by the time the child is nine months old, definite meal times with a diversity of food groups have to be included. Assessing the adequacy of the diet during this period, with regard to both quantity and quality and making necessary changes to improve the same will go a long way in preventing undernutriton.

Feeding practices influencing food intake and nutritional status:

Trends in food intake in India, have shown that while the food and nutrient gap between the recommended and actual intakes have been closing for all age groups, it has remained more or less the same for young children (NIN, 2006), indicating that feeding practices rather than food being the major cause undernutrition in young children. Breastfeeding practices, calorie density of food, the number of times a child is fed and the diversity of food are reported in literature as key predictor variables for undernutrition (USAID, 2011). Arimond and Ruel (2002) also identified the type, quality, texture, andnutrient density of complementary food as being determinants of nutritional outcomes. Several studies (Brown et al, 1998; WHO, 2001 and Chirmulay and Bhagwat, 1997) highlight, poor feeding and hygienic practices, as causal factors of undernutrition.

A child in the 0 - 2 years age group is solely dependent on the caregiver for the satisfaction of its basic needs through 'care'. 'Care', in this context, refers to the behaviors and practices of caregivers (mothers,siblings, fathers and childcare providers) to provide food, health care, stimulation and emotional support necessary for children's healthy survival, growth, and development (Engle, 1999). The infant's transition from a diet of breastmilk to one that includes most food groups, the timing of transition, the feeding pattern of infants, the caretaker-child interaction during feeding episodes and the quality of their diet have important implications for early onset of stunting in children (Sara et al, 2008). Engle (2002) suggested that care behaviour of the caregiver is one of the critical elements in influencing food intake by children.It is for

the caregiver to feed the child with adequate nutritious food.According to Myers (1990) it is not only the food but feeding which also determines the nutritional status of children. Feeding is not only a nutritional activity but also a social activity with psycho-social development purposes. The quality of this interaction will determine the amount of food the child is able to demand and ingest. Interactions during breastfeeding and bottle-feeding as well as during meal times can encourage or discourage proper feeding while helping to satisfy important developmental needs.

Dettwyler (1989) observes that most of the studies on child feeding in anthropometric literature are concerned with determinants of infant feeding patterns and the effect of these patterns on nutritional outcomes. The focus of these studies was towards influencing policies on how to improve the nutritional status of children. Howeverthere is very little ethnographic descriptions in these literature of how young children eat solid foods, whether special foods are prepared, the devices/utensils used in feeding children and the presence and role of caregivers. Dettwyler (ibid) argues that the degree and type of caregiver control on child's food consumption, may be as important as food availability, household food economic status or maternal work load in determining nutritional status of children.She rues the fact that while recommended dietary allowances suggest the amount of nutrients that a child has to eat, they do not discuss how one gets a child to eat these recommended allowances or with whom the children should be eating. According to Thomas et al (1970) the interactive process accompanying feeding of children has significance in the mother-child relationship starting from the birth of the baby and persists throughout the maternal care of the child.The mother's competence, patient attitude and knowledge, influence the feeding sessions since the child has to be fed with the use of varied prompts till he / she achieves satiety (Ghosh, 1999).

Child-feeding behaviours, also known as 'parental feeding styles', is a collective term for the behaviours that parents demonstrate as they feed their children, either intentionally (as a strategy) or without consideration (Clark et al, 2007).Three major feeding styles are reported in literature namely, authoritarian feeding, authoritative feeding and permissive or laissez - faire feeding (Patrick et al., 2002). The first refers to a situation when caregivers exert control over child's eating, forcing it to eat irrespective ofchild's choices or preferences. Permissive feeding refers to a situation when the child is allowed to eat whatever it wants and in any quantity it wants.

Authoritative feeding represents a balance between authoritarian and permissive such that while adults offer the food, children may determine what to eat and how much to eat. Dettwyler (1989) highlights that evidence from folklore describes a variety of strategies adopted by caregivers that are missed out in conventional research in nutrition and pediatrics.Reported techniques for controlling what and how much children eat, especially convincingthem to eat more food, or disliked foods,range from positive comments about thefood's appearance, taste, or nutritionalvalue, to threats of exaggerated violence. Mothers or caretakers may pretendto eat themselves, reward the child withsmiles or praise for eating, or play age-appropriatefood games. Based on anthropological data, she offers an account of how a mother in Rajasthan in India, fed solids to her child. The feeding session begins with the mother sitting with the child on the lap and putting food into the mouth of the child by hand. After sometime when the child became restless, she got up and started walking around. As explained by the mother this was a common practice in her culture to help the child finish the portion taken by the mother. According to Dettwyler, thisstrategy is suggestive of parental control in regulating food intake through distracting the child, though force feeding is not attempted.

There is a wide cross-cultural variation on two aspects of infant feeding namely the degree and kind of control exhibited by caregivers to feed children. The study of infant nutrition or malnutrition is incomplete without getting data on how children actually get the food and who makes the decision about what, when and how much food that a child should get. Data is needed to answer the question on how the different feeding styles contribute to food intake and nutritional outcomes in children under varying circumstances such as adequacy of food availability, moderate availability and excess availability.

Need for a tool to assess complementary feeding practices

Assessing complementary feeding practices and identifying aspects needing improvement requires the use of reliable tools and skills of assessment. However, there is a lack of simple, valid, and reliable tools to measure child feeding in the context of program development, for designing and targeting interventions, and for monitoring and evaluating progress(Virginia Chaidez and Lucia L. Kaiser, 2011).Unlike exclusive breastfeeding, which can be summarized

into a set of variables, measuring the quality of complementary feeding implies measurement of a variety of practices simultaneously. The problem of measurement of complementary feeding practices arises primarily because children's feeding encompasses a series of interrelated behaviors that are difficult to summarize into one or more variables. In addition the following lacunae exist

- Child feeding practices are age-specific within narrow ranges, which add to the complexity of measurement.
- Day-to-day variationsare also a main cause of unreliability
- The selection criteria of cutoff points to define optimal feeding are not clearly enunciated
- There is a lack of appropriate methodologies for assessment

Most studies till date have used structured observations to describe complex interactions during feeding. Scales have been developed but most have not been validated (Engle and Zeitlin 1996; Guldan et al. 1993). Experience with survey approaches is also scarce and it is probable that many aspects of psychosocial care will never be amenable to survey approaches (Arimond and Ruel 2001). Kannani et al (2005) opine that semi structured interview is an important method which would help to elicit information on complementary feeding practices. The questions posed will give information on the beliefs and practices of the people regarding infant feeding practices. However the authors believe that direct observation would fare better than the interview method.

Srivastav and Sandhu (2006) have developed an Infant and Child Feeding Index (ICFI) from a set of complementary feeding practices and have determined its association with the growth of children in an urban set up. The study, the first of its kind in India quantifies the various dimensions of IYCF practices using recommended indicators and summarizes the information into a composite age specific Infant and Child Feeding Index. The study found a positive co

relation between the index score and an enhanced nutritional status. However no relationship could be established between the various components of complementary feeding behaviour to the nutritional outcome. The study does not provide any information on the actual food intake of children, the feeding styles, and the caregiver child interaction, since the recommended indicators do not include these. According to the authors, more research has to be directed in identifying the relative contribution of each child feeding practice on the nutritional outcome, the optimal combination of key child feeding practices determining 'universally acceptable' cut-off points for each component, which would in turn provide basis for assigning weightage to each component of the index.

On tool currently available in the public domain is "An Infant and Young Child Feeding Practices Monitoring Tool and Guide'' prepared by USAID's Infant and Young Child Nutrition Project (IYCN) and used by PATH in collaboration with CARE, (2011)*(Annexure 1).*The major components as well as the sub components of the tool is provided below.. This pictorial tool is also accompanied by a series of questions pertaining to each component tso that it would be easy for investigators to administer this to the subject in question.

(i) **Breastfeeding Indicators** (illnesses of the child at the time of the survey, number of times fed, bottle feeding).

(ii) **Caloric density of the food**(meal frequency, consistency, quantity of the meal and snacks included)

(iii) Nutrient Density / Diversity indicators.

(iv) Food Safety and Feeding Styles.

The pictorial representation of each component of the tool provides a good methodological perspective of conducting the research. However the tool does not include aspects of caregiver child interaction during feeding. This tool was taken as a starting point for

the present exploratory research on developing a tool for assessing complementary feeding practices of children between the ages of 9 – 12 months.

Objectives

1. To identify components of feeding practices that influence food and nutrient intake in children between 9 – 12 months of age.

2. To undertake an exploratory study to understand the influence of these practices in determiningfood intake and nutritional status of children between 9 – 12 months.

3. To consider their use for building a tool for assessing feeding practices of caregivers.

Methodology

Formulation of research design

A four member expert committee, interdisciplinary in nature, was constituted. The committee comprised of two experts from the field of Child Development, a specialist in nutrition and a developmental professional. The research was proposed as a cross sectional one with data collection at a single point of time. The variables under study were

1) Feeding practices of mothers /caregivers (identified as the predictor variables).
2) Child's food intake and nutritional status (identified as the dependent variables).
3) Certain household characteristics or typologies considered to be affecting or influencing feeding practiceswere

- Caste and tribe
- Landedness and landlessness of households
- Access to forest resources / families with or without access.
- Gender (Number of men and women in the households, their position and role in child feeding).
- Presence of multiple caregivers. They could provide a supportive mechanism for feeding, while the mothers carry out other household chores or are away from home.
- Utilization of ICDS entitlements

In addition, recent history of episodes of illnesses during the past one month was considered as a predictor variable to child nutritional status. While the current feeding practices were considered to influence food intake at the given point of time, the entire feeding history since birth and episodes of illnesses were considered to influence the nutritional outcomesin children. The following feeding practiceswere identified through literature as well as personal observation as influencing food intake and thereby nutritional status of young children

1) Initiation of breastfeeding at birth (survival of infants)
2) Prelacteal feeds
3) Exclusive breastfeeding for six months
4) Initiation of complementary feeding upon completion of six months
5) Minimum of 3 – 4 feeds per day
6) Total quantity of food intake
7) Energy density of the food, defined as 1 calorie per gram of food
8) Presence of atleast four food groups in the daily diet
9) Protein rich food atleast twice a week
10) Iron rich food atleast twice a week (ICDS supplement and Green leafy vegetables were considered as iron rich foods)
11) Minimum acceptable diet defined as 3 or 4 feeds a day and presence of atleast four food groups in the daily diet.
12) Caregiver's feeding style
13) Child response
14) Consistency of food
15) Hygiene practices

To collect information on all aspects related to feeding and nutritional outcomes data collection was proposed at several levels using a mix of methodologies, described in the next section.

***b. Tools* / methods of data collection**

i. *Questionnaire* –

Data on the predictor variables and households typologies were studied using a questionnaire. The questionnaire consisted of five sections. The first section gathered general information about the village and the respondent. The household details were covered in the second section. The third and fourth sections gave information about the mothers, their daily activity pattern and child care roles. The last section dealt with the feeding practices of mothers / caregivers since the birth of the child, the usual meal pattern and food frequency of the child's current food intake (*Annexure* 2).

ii. *Observation schedule* –

While food intake and household characteristics could be studied through survey schedules, other aspects of feeding such as hygiene practices, consistency of food, caregiver – child interaction and child's responses can be understood only through personal observation.An observation schedule consisting of eight items was developed. These were, consistency of the food, two items on personal hygiene practices of the caregiver namely handwashing prior to feeding and cleanliness of the feeding utensil.Since assessing feeding styles of caregivers requires skill and experience in observation, it was decided to give some descriptions of possible behavior by caregivers for reliable documentation by the investigators. Fifteen such descriptions were given (Annexure 3) and these were categorized under three heads namely at the start of the feeding, during feeding and methods / strategies used.

Similar descriptions about child's behaviour were given and these were categorized into two groups namely child's response during feeding and at the end of the meal.Itwas decided to observe one feeding session for each child using the schedule. Since data collection through observation requires skill which can only be built up over a period of time, it was anticipated that despite training, there could be inconsistencies among investigators. To mitigate this, in addition to observation, each feeding session was also videographedto enable the experts to review the feeding sessions and validate the observations of the investigators. This also enabled one to understand the feeding styles of the caregivers in their natural setting. Of the 40 feeding sessions observed, video documentation could be done for 37 cases.

iii. ***24 hourrecallfor diet survey***–

The food intake of the child was assessed through 24 hour recall method. As a first step, through personal observation and interaction with the community, the usual meal pattern of the households, the food given to children and the utensils used in child feeding were identified. A set of utensils closely resembling those used in the households in these areas for feeding children were obtained from the market. These consisted of two tumblers of differing sizes, three differently sized bowls and three ladles (*Annexure*4). Three households were requested to cook rice, *ragi* gruel, pulses(*dals* namely red Gram, green Gram, horse Gram, lentils and pigeon pea)and fish, as is done in any normal day.The raw quantities were weighed prior to cooking and the cooked quantities were weighed and transferred to the tumblers, bowls and ladles respectively. The bowls and the tumblers were calibrated to measure the levels of serving. The volume of rice and dhal at each level of calibration was weighed to arrive at the conversion of the volumetric quantity into weight.

Rice was measured in the bowls, while *dal* was measured in both the bowls and ladles, since they were served either way. *Ragi* gruel was measured in the tumblers. With regard to vegetables, the amount used for cooking was usually reported in sizes such as big, small or

medium. Photographs of the various sizes and weights of vegetables were taken and a pictorial booklet was prepared. This was used in the diet survey to help the respondents to quantify the amount of raw vegetables cooked for the household (*Annexure* 5). The number of servings of the entire quantity of cooked vegetable was ascertained. The total quantity of raw vegetables divided by the total number of servings gave the portion estimate and the approximate quantity of raw vegetable in each serving. The number of servings given to children was then assessed.

iv. *Nutritional Status Assessment:*

Anthropometry was used to assess the nutritional status of children. Heights of children were assessed with an infantometer. For the weight, the*SECA Robusta 813* digital weighing scale was used. The two indicators of nutritional status were stunting and wasting. Stunting is defined as inappropriate height for age, measured as a score of less than -2 SD from the median WHO score. It is a long term indicator of nutritional status. Wasting, a short term indicator of nutritional status is defined as inappropriate weight for height measured as a score of less than -2 SD from the median WHO score (WHO, 2009).

c. Thestudy area and sample size:

The study was carried out in 16 settlements which included 6 revenue villages and 10 hamlets of the Kundra and Boipariguda Blocks of Jeyporesub division, Koraput district, Odisha, where MSSRF has a presence.Situated in the Eastern Ghats, Koraput has a rich treasure of flora and fauna. Nevertheless it is one of the most backward districts in India with nearly 50% of the population being tribal. It has an average literacy rate of 49.21 (Census, 2011). Agriculture is the major livelihood activity with most of the households being small and marginal farmers engaged in subsistence agriculture. According to an NSSO Survey of six most insecure districts from six states in India (IHD and WFP, 2008) of which Koraput was one, it was found that Koraput was

the most food insecure with the lowest per-capita calorie intake of 1559 Kcal/day, and the lowest per-capita protein intake of 36gms/day as against more than 52 gm/day for the five districts. The HUNGaMa Survey by Naandi Foundation (2012) in Koraputdistrictfound that nearly 55% of children below five years of age were underweight, while 70% were stunted, indicating prolonged periods of inadequate food intake.

All households with children between 9 – 12 months were included. The preliminary informationofhouseholds with children 9 – 12 months of age was gathered from the Anganwadi worker. In addition enquiries were made to identify such households which could be missing in the list provided by the worker. These households were visited and the purpose of the study explained. The ages of children were verified. Written consentto participate in the study as well as to allowfor recording a feeding sessionof the child was obtained from parents. A total of 40 children between 9 and 12 months of age were studied. Video recording of feeding sessions was done for 27 of the total 40 children.

d. Steps in data collection:

1. Preliminary field testing by study team: All the schedules and 24 hour recall survey were first tested by the investigators. After suitable modifications, these were translated into *Odia*.

2. Training of investigators for data collection: Six male investigators were recruited and three day training was conducted to accustom them to the three schedules designed for the study. The first one gave general information about the household; the second was the feeding observation schedule and the third, the 24 hour recall schedule designed for the survey. The survey schedules were translated into Odia for the convenience of the investigators. After a preliminary orientation to the schedules, the investigators were taken to the field for hands on experience in data

collection. One demonstration was done by the principal investigator, following which the investigators carried out the interviews under supervision.A similar procedure was followed for the observation schedule and the 24 hour recall method. The method of measuring the quantity of food served to the child was also demonstrated using standardized equipment. Investigators were sent in pairs for data collection, since one could interview and the other could document.

3. Video documentation:An orientation on video documentation of the feeding sessions involving the study children was conducted to enable as natural a recording as possible. One feeding session was shot by each of the field investigators using a Samsung cell phone video or a dslr camera. The observation and video documentation of a feeding session were done together, with one investigator scoring the observation schedule and the other documenting the episode.

4. Time period of the study: The study was designed for a one year period from June 2013 – July 2014. Review of literature, setting up of the research committee and its first meeting was completed by August 2013. Recruitment of research assistant, development of research design and tools of assessment were completed by November 2013. Between December 2013 to February 2014, no activity could be taken up due to lack of accessibility to Odisha due to political unrest. Recruitment and orientation of investigators and field testing of the schedules were carried out during March 2014. The actual study took off in April 2014 and was completed in June 2014.

e. Data entry and analysis

All the responses, obtained through interviews as well as observations were coded and the data entered and analyzed using excel application. Percentages were used to find the proportion of children and caregivers for each of the components under feeding practices. Energy density of the food was calculated by dividing thetotal calories consumed by the child during one day divided by the total quantity of food consumed. Comparison of data on number of times of

feeding, dietary diversity and minimum acceptable diet, was made between food frequency data and 24 hour recall. Bivariate tables were used to see the relationship between time of initiation of complementary feeding to food intake, number of feeding sessions and food intake, child behavior during feeding and food intake. Similarly bivariate tables were also prepared for studying association with nutritional status.

Findings:

Profile of study sites:

The five revenue villages and eleven hamlets belonged tofour panchayats namely Banuaguda, Chandrapada, Digapur and Lima, of Kundra and Boipariguda blocks of Koraput district of Odisha.Table1gives the details about the population, the numbers of households and number of children from each of the study sites.

Table No1: Population details of study villages/hamlets

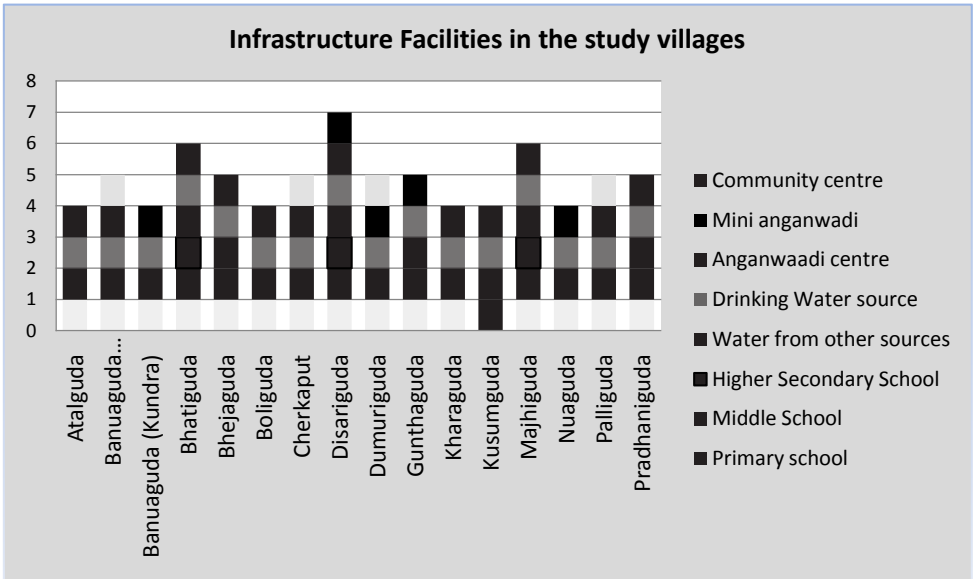
Study Village	Revenue village	Panchayat	Population Size	Total No. of Households	No. of children (9-12 months)
Atalguda#		Chandrapada	246	91	2
Banuaguda# (Boipariguda)		Banuaguda	473	98	5
Banuaguda (Kundra)	Bhejaguda	Chandrapada	425	136	6
Bhatiguda	Taraput	Banuaguda	439	110	1
Bhejaguda#		Chandrapada	382	78	1
Boliguda#		Chandrapada	364	86	1
Cherkaput	Pujariput	Digapur	442	105	2
Disariguda	Gorahandi	Banuaguda	1025	272	3
Dumuriguda	Bhejaguda	Chandrapada	162	49	1
Gunthaguda	Phukiaguda	Lima	299	80	4
Kharaguda	Chandrapada	Chandrapada	495	65	2
Kusumguda	Banuaguda	Banuaguda	434	108	2
Majhiguda#		Banuaguda	379	78	3
Nuaguda	Lima	Lima	157	39	2

Palliguda	Palliguda	Chandrapada	660	128	4
Pradhaniguda	Gundal	Lima	199	47	1
Total			6581	1570	40

***Note:** # - These are revenue villages, the rest being hamlets*

Figure 1 gives details about the infrastructure in the study villages. All villages had a drinking water source in the form of tubewells (hand pumps). No village had piped water supply at the time of the study. Water for other purposes such as washing and bathing was found in practically all study sites. While fifteen siteshad ponds, 14 had dug wells. None of the households had toilets at the time of the studyand open defecation was the norm. The roads leading to the villages were mud roads and most of the houses were *kutcha*with mud walls.

Figure 1: Infrastructure facilities available in the study villages (N = 16)



Fourteen of the sixteen sites had a primary school. While 12siteshad full-fledged anganwadis, 4 had mini anganwadis.A mini anganwadi serves an area with less than forty children under the age of six. Except for preschool activities, all other services of the Integrated

Child Development Scheme (ICDS) such as supplementary feeding, immunization, healthcare, growth monitoring and antenatal services are provided by a mini centre. Disariguda, being a large hamlet, had two Anganwadi centres, one a full-fledgedanganwadi and the other a mini anganwadi.Theanganwadicentresprovidednutritious mix to the children below three years and the pregnant and lactating mothers as well as two eggs a week for children from the age of one. There are three mini Anganwadi centres in Banuaguda (Kundra block), Boliguda and Gunthagudasince they have less than 40 children below six years of age.There are no separate ration shops and households draw their monthly ration fromthe Panchayat office which include rice, kerosene and sugar for Below Poverty Line (BPL) and *Antyodaya* card holders and rice, wheat and sugar for Above Poverty Line (APL) cardholders. The Panchayat office is in Banuaguda(Kundra block) which is centrally located. Two villages Banuaguda (Boipariguda block) and Cherkaput have community centresbuilt with the support of the *VanaSamrakshanaSamiti* (VSS) which is used for convening village meetings.

Socio economic details of households:

There were 1570 households with 40children between 9 – 12 months. Forty eight percent belonged to the ST community, 20% were Scheduled Caste and 32% belonged to Other Backward Communities (OBCs).Among the ST households, 52% were Parojaswhile 48% wereBhumias. The Parojasare considered to be the lowest while the Bhumiasare the highest in the social hierarchy of the tribal communities. The Scheduled Caste is the bottom-most, lower than the Parojas. Of the OBCs who are the dominant caste, the sub castes were Rana (54%), the Kamar (15%) and Kumbhar (23%) and Mali(8%). Considering the ST and SC households together, sixty eight percent of the study children were from the most marginalized sections of society. Majority (60%) of the households were nuclear while 40% were of the extended type. The average household size was five.

With regard to land holdings, 37(93%) of the study households owned land and 3 (7%) were landless. Sixty percent of all households had <2 acres of land while another 20% had marginal land holdings between 2 – 5 acres. Households with over five acres constituted 13% of the entire sample. One household had land from two sources - one given by the government and the other being own land.Twohouseholds had leased land along with their own land.

Besides cultivating their own field, the other economic activities performed by the study households included wage labour – either agricultural wage labour or others like construction of roads, bridges and dug wells under MGNREGS. These were taken up by both men and women. Adolescent boys and girls also engaged themselves to earn additional income for the family. Of the landed households, 8 (21%) were engaged in agricultural wage labour, 10 (27%) households took up both agricultural as well as non-agricultural wage labour and 3 (9%) households did only non agricultural wage labour. Sixteen households (43%) did not engage themselves in paid labour and cultivated only their own land. Focus group discussions revealed that within the village, households gave mutual labour support, to each other for cultivating their land (for eg) members of one household besides cultivating their own land also helped another household to cultivate their land by givinglabour free. This was reciprocated by the other household.Of the 3 landless households, one household carried out agricultural wage labour, another did non agricultural wage labour while in the third the male breadwinner was an auto driver.

Sources of food and fuel:

Land was the major food source along with the public distribution system. The staple diet of the population was rice and ragi. The types of crops grown depend on the type and extent of land. Koraput, a hilly terrain has three major land types namely the upland, middle land and low land. Upland supports maximum diversity of crops. The short duration traditional varieties of

paddy, millets, blackgram and horsegram are especially grown in this land type. The middle land supports the long duration traditional varieties, finger millets and greengram. Lowland poses a problem due to water logging. However, long duration traditional rice varieties and green gram are cultivated in this land after the rain water drains off. Seventy percent of landed households grew staple crops (i.e.) paddy and finger millets (Table 2.)

Table No. 2: Comparison of the household's land holdings and the crops grown (n = 40)

Land holding	Crops grown	No of householdss
<2 acres(n= 24)	Only Paddy	12
	Only Ragi	3
	Cash crops (*eucalyptus, cashewnuts, mango and groundnuts*)	5
	Only vegetables	2
	Combination of crops (*paddy, ragi or groundnut*)	2
2 – 5 acres (n = 8)	Only Paddy	1
	Only Vegetables	1
	Combination of crops (paddy, ragi, vegetables, blackgram, horsegram, pigeon pea)	6
>5 acres (n = 5)	Only paddy	1
	Combination of crops (paddy, ragi, vegetables, blackgram, horsegram, little millet)	4

Note: *Three households were landless*

Of the 24 marginal farmer householdswith less than 2 acres of land, only 2 had grownmixed crops, with two cereals and one oilseed variety. Seventeen had grown only one variety, with 12 opting for rice, three for ragi and two for vegetables. Five had opted for cash crops such as eucalyptus, cashewnuts and mango. Among the eight small farmer households,6 practiced mixed cultivation. The crops included a combination of cereals, pulses and vegetables.

One household grew only vegetables like cabbage, tomato, cauliflower, bittergourd and brinjal. One hadcultivatedonly paddy. .Among the five households with more than five acres of land, four followed mixed cropping with a diversity of crops such as cereals, pulses and vegetables andone grew paddy as a single crop. In the focus group discussion it was found that priority was given to staple food such as rice and millets, since the people preferred traditional varieties of rice while the ration shops provided only hybrid varieties. Millets were not supplied in the ration shops and if not grown had to be purchased from the open market. When the land holding was small, all the available space was used for cultivating only one type of crop, usually the staple crop (ie) rice or ragi since households tried to meet their basic food requirements.With an increase in land holding, beside the staple crops other crops could be grown.

Vegetables were grown either in small patches of land outside their households (home gardens) or as border crops in their fields by 17 (42%) of the study households. The vegetables grown includedamaranthus, broad beans, pointed gourd, spine gourd,brinjal, ivy gourd and radish. Fruits like mango, tomato and banana were also reported from home gardens. Nine of the nuclear households and 8 of the extended households reported having a home garden. In the current season, of the seventeen households, 2% of the households had not cultivated anything and another 2% had finished cultivating whatever vegetables had been sown.

Sowing is done during the rainy season, between July and August. Harvesting is between November and January during winter. Produce from the fields last for about three months after the harvest (ie) between November and March depending upon the month of harvesting. Summer is a lean period when the food stock gets finished and no agricultural operation due to scarcity of water. Livelihood activities centrearound collection of minor produce from the forest such as *Kendu* leaves or non-agricultural wage labour.However the rainy season is the period of acute

food scarcity, since all food stocks are over, livelihood opportunities are less due to heavy rains, coupled with the need to take up sowing and investing resources for the next agricultural cycle.

Of the 40 households, 18 (45%) households collected wild food. They gathered whatever was available in the forest. Sometimes two to three different items were also collected. The foods collected were *karadi*(wild tubers) (46%), mushroom (11%), bamboo shoot (13%), wild varieties of sweet potato,*amla* and *kendu* (10% each). Collecting tubers involved digging deep, done by the men and usually combined with collection of firewood. Items such as mushroom were available during the rainy season, and were even collected near streams and river bunds.

Firewood is used for cooking and is collected from the nearby areas as well as the forests. During summer, firewood is collected for daily cooking and is also stored for the subsequent rainy season. Most of the households, whether nuclear or extended follow a similar pattern of collection of firewood. The family members usually venture out together to the forests. Of the 24 nuclear households, 10 stay close to the forest and another 14 stay far off. However, the forests are accessed by a majority of the households, irrespective of the distance, since firewood is a very importantsource of fuel and comes free from nature. All the 10 households residing near the forest collect firewood. Ten of the 14 households staying far away also go for the collection. Of the 16 extended families, 9 resided near the forests and 7 at a greater distance. While all households residing close accessed the forest, 5 of the 7households located far away also visited the forest.

The family members jointly collectedfuel.The fathers of the study children alongwith their own parents, siblings and older children in the households went for firewood collection. In nuclear households the fathers alongwith their relatives who live nearby went together for collection. In eleven households the mothers also went to the forest for collecting firewood.

Profile of the mothers:

Age of mothers ranged from 18 to 39 years. Thirty two percent fell in the age group of 18 – 22 years.Of the 40 mothers, 50% had not completed primary education. Thirty percent had completed primary schooling while 20% had gone beyond primary education. None hadstudiedupto class 10. Fifty percent of thefathers of the study children had studied less than class 5. Twenty six percent of them had completed primary educationbut not class 10. Literacy levels of men and women as well as between social groups were more or less the same.

Fourteen motherswere primis. Six had two children while 11 had three children. Another 6 mothers had four children while three had five children.Of the 14 primis, eight were in the age group between 18 – 22 years.Parity increased with increase in age, but with longer gaps after the first two children. Focus group discussion revealed that families preferred to have two to three children very quickly since they feel that it is important to have children when you are young, to be able to raise them. Furtherby the time the parents reached middle age,the children would have grown up and would take care of them. After two or three children, women generally usedplant based preparations obtained from *dais* or local healers to avoid pregnancy. Even if it was not 100% foolproof , mothers claimed that it helped in postponing pregnancies .

Table No.3:Ageof mothers and parity (n= 40)

Age group	1st child	2nd child	3rd child	4th child	5th child
18-22 (n=13)	8	5	-	-	-
23-27 (n= 10)	4	1	5	-	-

28-32 (n= 8)	1	-	5	1	1
33-37(n= 8)	1	-	1	4	2
38-42(n= 1)	-	-	-	1	-
Total	**14**	**6**	**11**	**6**	**3**

The mothers start working within a few days of their delivery. At the time of the survey all the mothers were carrying out household chores. Their day starts between 5 and 6 am in the morning. Since electrification of villages has started only recently in Koraput district, with all households being given one bulb, outdoor work gets done before dark and women are at home before 6 pm and retire to bed by 9.30 pm. Women's work could be classified as unpaid work and paid work. The unpaid work consisted of daily household chores such as sweeping, washing clothes, cooking, attending to cattle, cleaning of grains and working in their own agricultural field. Three mothers were doing paid work. One was a school teacher and two undertook agricultural wage labour. From the point of view of breastfeeding and complementary feeding the period of separation of the mother and child determines who feeds and what food is given. For breastfeeding, mother's need to stay closely with their children or work within a short distance such that they can come back in time for the next feed. Of the 40mothers,16(40%) always remained either within or very close to the house and were never really separated from their children. Seventeen mothers (43%) who went upto short distances for fetching water or washing clothes in the streamwere separated for less than twohours.Six mothers (15%) were separated for three hours and they were engaged in activities both within and outside the village namely, wage labour, collection of firewood and kitchen garden. Only the one who worked as a school teacher was separated for the whole day from 10 am to 4 pm. The nature of activity and the place where it had to be done had a bearing on the hours of separation.

Table No.4 :Mother's separation from child and work location.

Time of separation	Type of activities	Location
Not separated (n=16)	Cooking, cleaning of house and cow shed, childcare,	In and around the house
Less than 2 hours (n= 21)	Fetching water, cleaning of grains, washing clothes & utensils and kitchen garden	In the village
Three hours (n=6)	Agricultural wage labour, kitchen garden and some times firewood collection	Outside and within the village
Six hours (n=1) 10 am to 4 pm	Primary school Teacher	Outside the village

Strategies for childcare while at work consisted of strapping the infants to their bodies, carrying the child to the work place, making arrangements for the child being brought to the mother's workplace if the mother is not able to return home and the support of family members as caregivers during mothers' absence. Strapping the child to the body is a common strategy of women in the study sites to combine work with childcare, even while working within the home. Deliberately undertaking only those tasks that allowed one to remain within or close to home such that they were not really separated from their children, was also a strategy adopted by 16 mothers.Irrespective of whether they belonged to nuclear or extended families, all mothers had support for childcare. While the concept of nuclear or extended family is based on whether there is a separate kitchen or not, when it comes to childcare it does not really matter that people do not live under the same roof. The natal and marital relatives of the mothers of nuclear families lived closeby and offered childcare support.(Table 4).

Table No. 4: Type of family and role of caregivers in childcare (n = 40)

Family members	Nuclear Family (n = 24)		Extended Family (n = 16)	
	Childcare	**Child**	**Childcare**	**Child**

		feeding		feeding
Father	4 (17%)	3 (13%)	4 (25%)	4 (25%)
Father –in-law	7 (29%)	1 (4%)	4 (25%)	2 (13%)
Mother-in-law	9 (38%)	2 (8%)	4 (25%)	4 (25%)
Sister-in-law/brother-in-law	2 (8%)	2 (8%)	0	9 (56%)
Siblings	3 (13%)	1 (4%)	7 (44%)	0
Neighbours	5 (21%)	1 (4%)	2 (13%)	1 (6%)

Note: *Multiple members involving in childcare and feeding is commonly resorted to by all households.*

In nuclear families 38% of mothers had the support of their mother-in-laws for childcare, while 29% and 21% respectively also reported the support of father-in-laws or neighbours. However, very few of them were involved in feeding of children. In extended families, more mothers had the assistance of sister-in-laws and brother-in-laws, in child feeding. Older children in the households were also involved in childcare.Except for one nuclear household, siblings were not involved in child feeding. A few fathers in both types of households were also involved in feeding children though not on a daily basis, but only when other arrangements had failed.

I Household Food Habits

Three meals are eaten in a day and the diets are predominantly cereal based. Food is cooked twice during the morning and evening. Ragi gruel prepared once in a day is taken throughout the day by adults and children alike. Since ragi flour lends viscosity to the gruel, a small quantity is enough to prepare gruel of the needed consistency for drinking. It was found that the energy density of one gram of ragi gruel provided 0.3 calories. Vegetables are either cooked alone or used in combination with pulses like lentils.Lentil is commonly consumed since it is the cheapest of all pulses. Predominantly, rice mixed with *dal* or vegetables in wet gravy is consumed.

Animal foods like country fowl, sheep and goat are reserved for festivities and consumption is limited to availability. In general animals have an economic rather than a food value, though the households were non vegetarian. Milk consumption is negligible. Tribals in the study areas do not drink milk or consume milk products, probably because they are not accustomed to it having lived in the forests before settling down as agriculturists. The nontribal population also does not drink milk everyday, except for the men, who drink tea from local shops. Several households in three of the study villages reported consumption of small games, maggots and pigs during interviews and focusgroup discussionsin an earlier study (Narayanan and Sahoo, 2015). Likewise households reported that they brought back these items when they went to the forest to collect firewood, if they had the time and chance to catch them. Snacks like biscuits, mixture, *nadi*and*nala* are bought from local shops or weekly shandies, once a week.

IIInfant and Young Child Feeding Practices

Of the 40 children boys and girls were equal in number. The number of children for each month of age varied with the maximum number in the 12th month.

Table No.5: Details of ages and sex of the children studied (n = 40)

Age group	Female	Male	Total
9 months (n = 7)	3	4	7
10 months (n = 7)	2	5	7
11 months (n = 12)	6	6	12
12 months (n = 14)	8	6	14
Total	**20**	**20**	**40**

A. Breastfeeding

Sixty two percent of the mothers had initiated breastfeeding within 1 hour after birth while 23% had started within two hours. The remaining 15% started breastfeeding after a day. While 95% of the mothers had not given anything before initiating breastfeeding, 5% had given honey

and water as pre lacteal feeds. At the time of the survey all the 40 mothers were breastfeeding their children. The data suggests that by and large the initiation of breastfeeding and its continuation by all mothers at the time of the study is on par with the recommendations. Breastfeeding is carried out by all, regardless of their work commitments.

B. Complementary Feeding

All 40 children of the study households had started taking complementary food at the time of the study along with breastmilk. However, the time of initiation has varied with onemotherstarting complementary feeding as early as 3 months and four delaying it till 10 months also. Forty five percent had initiated at the beginning of 6 months and another 25% had done so between eight and ten months. Twenty eight percent of the mothers had initiated complementary feeding at the recommended age of 7 months.The one mother who had started complementary feeding at 3 months, cited inadequacy ofbreastmilk. This was her fifth child and she said that right from the beginning there was inadequacy of milk. As for the rest, there was no delayed initiation of complementary feeding for 75% of the children.

Mothers reported that the usual practice in their communities was to give only breastmilk till 6 or 7 months of age and start complementary feeding thereafter. They perceived that breastmilk was sufficient till then after which the child needed other foods also. However they were also sensitive to cues from the child (crying incessantly or clinging to the breast which according to them was an indiator) and would even start a little earlier or laterbased on the same.

Table No.7: Initiation of complementary feeding (n = 40)

Age	At 6 months	At 7 months	At 8 months	At 9 months	At 10 months	Total

9 months (n=7)	1	5	1	-	-	7
10 months (n=7)	5	1	1	-	-	7
11 months (n=12)#	6	3	1	-	1	11
12 months (n=14)	6	2	1	2	3	14
Total	**18 (45%)**	**11 (28%)**	**4 (10%)**	**2 (5%)**	**4 (10%)**	**39**

***Note:** # for 1 child in the 11 months category food was introduced at 3 months of age.*

Since breastfeeding cannot be delegated to others, mothers were found to adopt four strategies to combine work with breastfeeding. Sixteen mothers undertook only those chores in and around the house, such that they were not separated from their children. Seventeen mothers returned home in time to breastfeed their children. In one case the child was carried to the work spot by the mother. Five otherchildren were taken to where the mothers were by the caregivers and brought back after being breastfed. One mother who worked as a school teacherwas separated for six hours breastfed before going for work and after returning. In general mothers reported that they mostly breastfed in the mornings and evenings and at night.

Table s8. Strategies for combining work with breastfeeding and complementary feeding (n=40)

Time of separation	**Type of work done**	**Breastfeeding strategy**	**Complementary feeding**
Not separated (n=16)	Cooking, cleaning of house and cow shed, childcare, cooking.	Mother is present in and around and also keeps an eye on the child with other caregivers	Child fed only by mothers – 13 Mothers and caregivers - 3
Separated for less than 2 hours (n= 17)	Washing clothes/utensils, fetching water, cleaning of grains, kitchen garden	Returns home before the next feed.	Child fed only by mothers –5 Mothers and caregivers - 12
3 hours (n = 6)	Agricultural wage labour, kitchen garden and sometimes fire wood	Mother carries the child to the workplace – 2 Caregivers carry the	Only mothers – 6 .

		children to the workplace and bring back - 4	
4-6 hours (n = 1)	School teacher	Mother feeds the child in the morning and upon her return from work	Only caregiver

Unlike breastfeeding complementary feeding could be delegated and it depended on whether mothers had the support of caregivers who had the ability and willingness to feed the children while mothers were engaged in work. Even while mothers were available at home, some of them were found to entrust feeding to other caregivers while being busy with household chores. Except for one case when the child was fed by an older sibling, all the other children who were fed by other caregivers were done so by adults, in most cases the sister-in-laws or mother-in-law and sometimes also by the fathers-in-law. While thirteen of the sixteen mothers, who were not separated from their children themselves fed their children, three were released for household work by other caregivers who took over the feeding, while she was at work. Twelve of the seventeen children whose mothers were away for less than two hours had other caregivers besides their mother feeding them. On the other hand, the six mothers who had to be separated for nearly three hours did not entrust complementary feeding to anyone else and had the babies brought to them for feeding. The school teacher who was separated from the child for nearly six hours during the day, said that she could do so only because she had childcare support. During her absence the child was fed by her mother.Thus the decision on who feeds the child is likely to be based on mothers' faith in the ability of the caregiver to feed and their availability which then influences the work and feeding arrangements.

The first complementary food given to children is either rice or ragi. Rice is broken into small granules and made into a porridge and given. Rice and ragi are introduced one after the

other. Usually, within a month of introducing complementary feeding, cooked rice alongwith ragi gruel gets introduced as a standard meal and gradually the number of feeds are increased.Dhal is introduced next followed by vegetables Snacks (mostly biscuits) and ICDS mix are started after that. Animal food is started at about one year of age and egg is the first to be given. Wild foods are given only after the age of three years.

Current feeding practices: All the children were being given home based foods except for one child who was also given reconstituted powdered milk by the caregiver while the mother was separated from the child for nearly six hours during the daytime.They were also being given biscuits The frequency of feedingalong with aspects of dietary diversity were elicited through two methods, through the food frequency questionnaire and 24 hour recall. In the former, mothers reported about how often they fed the child with different food groups in a week, while in the latter, the actual food intake of the children during the previous day was collected. A

comparison of the food intake using both methods is provided inTable 8.

Table No.8: Child's food consumption according to food frequency and 24 hour recall (n = 40)

Components		
	According to food frequency	**According to 24 hour recall**
No of food groups eaten per day	3 groups– 33 children 2 groups – 7 children	3 groups-12 children 2 group- 20 children 1group-8 children
Dhal	Everyday 15 Once a week 8 Twice a week 11 Thrice 5 Not at all 1	Previous day's diet 23
Animal Foods (Egg)	Everyday 1 Once a week - 9 Twice a week - 11 Thrice - 1 Once in 15 days 7	Egg – 4 children

	Once in a month - 3 Not at all – 8	
Chicken	Once a week - 1 Twice a week Five times a week - 1 Once in a month - 4 Not at all-31	Chicken – 4 children
Fish	Everyday – 1 Once a week - 2 Thrice a week - 1 Once / 15 days - 1 Once in a month - 3 Not at all- 32	Dry fish – 5 children Fresh fish – 2 children
Green leafy veg	Everyday – 3 Once a week – 6 Twice a week – 7 Thrice a week – 3 Four times /week – 1 Once in 15 days – 2 Once in a month – 1	0
ICDS	Everyday – 5 Once a week – 3 Twice a week – 5 Thrice a week – 3 Once a month – 1	0
Snacks	Biscuit - 38 Nadi/nala (murukku)– 15 Mixture – 10	Biscuit – 20 Pakudi – 4 Uppama – 3 Bread – 3
Feeding 3 – 4 times a day	4 times - 16 3 times - 19 2 times - 2 1 time - 3	4 times - 21 3 times - 8 2 times - 7 1 time - 4

With regard to dietary diversity, according to the food frequency data, 33 children were being fed with three food groups on a daily basis while 7 reportedly received two food groups. Based on 24 hour recall diet survey, 12 children had been given three food groups, while 20 had consumed two groups and eight had eaten only one food group. None of the children were consuming four food groups considered ideal from the perspective of diversity as observed

through either of the methods.The variations in the number of children for each of the feeding practices observed between the two methods could be due to the fact that 24 hour recall is based on one day's surveyand food frequency is about usual food pattern over a period of time.This suggests that there is likely to be day to day variations in the child's diet. The predominant combination of food groups were either rice, dhal or vegetable gravy. Except for one child, all had been started off on dhal and about 26 (65%) of mothers reported giving dhal either everyday or twice a week, according to the food frequency method. This more or less corresponded to the fact that about 23 (58%) had reportedly been given dhal the previous dayas per the 24 hour recall diet survey.

While pulses are a source of protein, the bio availability of protein is much higher from animal sources. Since milk does not form part of the regular diet, the community has to rely on other animal sources for a diet of high protein quality. Fifteen children were found to have consumed animal food the previous day, with 4 each having been given eggs and chicken respectively and 7 had been given fish. Of these, 5 had been given reconstituted dry fish that are salted and stored in the households and used during lean periods. Twelve of these 15 children were either 11 or 12 months old which corroborates mothers' statement in the focus group discussion that animal foods are usually started around one year of age. As per the food frequency data, about 32 children had not yet been started on chicken or fish and eight children were yet to be given eggs. From these observationsit may be inferred that the diet generally lacks in high quality proteins.

The same is true for consumption of iron rich food. The two likelysourceshigh in iron content are green leafy vegetables and the supplementary food provided through ICDS that is enriched with vitamins and minerals. At the time of survey supply of the ICDS mix had been suspended in several villages for reasons that were not clear. Further only about 10 mothers reported giving it everyday or twice a week and almost all reported sharing it with other household members.

According to the food frequency data, only 7 mothers reported giving green leafy vegetables atleast twice a week while no one had reported giving green leafy vegetables the previous day of the survey. Twenty five mothers had reported giving either potatoes, brinjals, tomatoes or star fruit (*kunduri*). The diets of children appeared to lack in both protein and iron rich foods.

Snacks are commonly given to children. These are either purchased from local shops in the village or from weekly shandies. Biscuits are commonly given to children and this is corroborated in both the food frequency and 24 hour recall survey. Practically all children are being given biscuits and 20 mothers reported that their children had eaten biscuits twice, the previous day, in the morning and in the evening. *Upma, pakodi* (savoury made from Bengal gram dhal) and bread had also been given. Unlike biscuits which are bought in a packet and stored the other snack foods are purchased on a day to day basis. Further while biscuits and nada or murukku are finger foods, the rest are fed by mothers. Usually snacks are given as a mid morningmeal. Except for bread, which had been given at dinner time all other snacks had been given after the first meal in the morning.

A majority of mothers (88%) reported usually feeding their children three to four times a day and twenty nine caregivers had been observed to havedone so the previous day. This includes the bread and upma that were given to children (except the biscuits). It is likely that most children are fed with two or three home cooked meals with one item bought from the local shop and given a biscuit twice a day since they are very popular with children.

C. Quantity of Food intake based on 24 hour recall

The average amount of food consumed by children for each month of age did not show any linear increase, probably because the time of initiation of complementary feeding is not uniform and varies across months of age. Bivariate analysis of food intake with time of initiation

of complementary feeding and the number of times a child is fed, was undertaken and the results are presented in Table 9.

Table 9: Time of initiation of complementary feeding and quantity of food eaten (n=38)

Age of initiation (months)	No of children	Average food intake (gms)	Minimum (gms)	Maximum (gms)	Range (gms)
6	18	344	109	580	471
7	11	345	230	524	294
Above 7	9	210	156	409	243

**for one child age of initiation had been three months and for another the actual quantity eaten could not be estimated and they have not been considered for analysis*

For a majority of children initiation to foods other than breastmilk had begun either at the 6th or 7th month. While the average quantity of food eaten did not vary for children between these two groups, it was much less for those for whom it had begun later than 7 months. While by and large mothers and caregivers held that complementary feeding should begin after 6 months, they nevertheless waited for cues from the child to begin. There is a period of adjustment between introduction of the semi solid 'bridge food' to consuming an actual meal which could very well take a month. The later the introduction, the longer it could take for the child to consume a full fledged meal sincethe change in consistency and increase in quantity will have to be gradual.

According tomothers adaptation by children to dietary changes varies from one child to another and as one mother put it 'no two children of the same mother are alike in their feeding patterns'. This suggests that late starters though older in age may actually be consuming less than the younger age group for sometimeatleast. Though the number of children in each category is less,

the wide variation in range of food intake within each category suggests biological variation between children. Further food intake is also regulated by children themselves. It is likely that the relative contribution from breastmilk, which could not be gauged, influences the quantity of complementary food consumed by children.

Table 10. Number of meals consumed and food intake (n= 39)

No of meals eaten	Age group of children	Average intake (gms)	Minimum	Maximum	Range
< 3 times	9 months – 2 nos.				
(n = 11)	10 months – 2 nos.				
(Average has been taken for 10 children.)	11 months – 2 nos 12 months – 5 nos.	242	109	409	300
3 times	9 months – 2 nos.				
(n = 8)	10 months – 2 nos. 11 months – 3 nos. 12 months – 1 no.	327	204	501	297
4 times	9 months – 3 nos.				
(n = 21)	10 months – 3 nos. 11 months – 7 nos. 12 months – 8 nos.	341	112	587	475

*food intake of one child could not be gauged.

Twenty-three children were being fed three to four times a day and a majority of childrenin any one category were in the group fed 4 times. It is likely that most mothers and caregivers consider feeding atleast four times a day to be the appropriate practice to cater to the dietary needs of

Formatted: Font color: Auto
Formatted: Font color: Auto
Formatted: Font color: Auto
Formatted: Font color: Auto

children. There was not much difference in the average food intake of children who were three or four times and those who were fed 5 times showed an increase of about 30 grams. It is also likely that mothers have an idea of how much quantity is adequate for their children and try to help children eat that quantity through adjusting the number of times of feeding. Children fed less than three times clearly ate less with the mean intake being 242 grams. The within group variations in food intake showed a wide range showing as much as 300 to 475 grams.

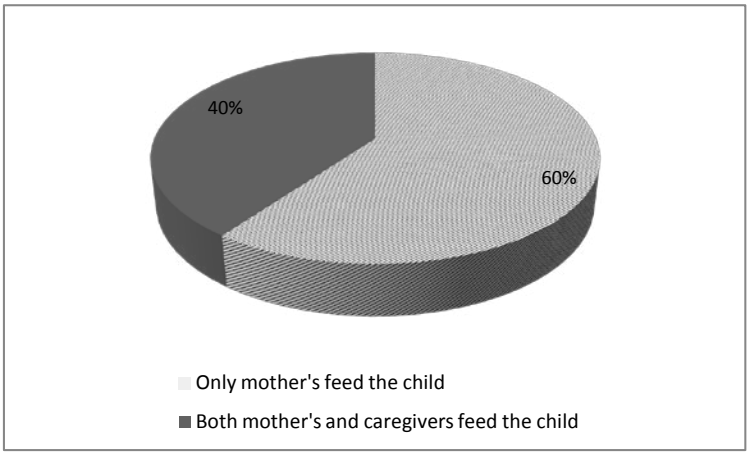
Notwithstanding the biological differences among children with regard to food intake, portion estimates are harder to assess since it is not clear if caregivers considered plate wastage before giving information about child food intake. The observation data for one feeding session as well as the video recordings show that children did not finish their portions completely and that they were fed the liquid gruel more than the solid. Hence, 24 hour recall may not be suitable for estimating quantitative consumption. Observations of food intake for the entire day, over atleast three days and taking the average may help come closer to estimates of actual intake.

There is likely to be an underestimation of the total food intake since the quantum of food intake was assessed only for home based foods and did not include the ready to eat food purchased from the local shops. The inclusion of snacks (biscuits, mixture, *nala*and*nadi)* in the diets of 80% of children increases with increasing age. Forty two percent of children also took the ICDS supplement the quantity of which could not be assessed.

With regard to energy density of the food, defined as 1 calorie from 1 gram of food, only 20% of the children were found to consume an energy dense meal. Sixty percent of children were fed only by their mothers, while another 40% were fed by both mothers and caregivers (Figure 1). The first morning meal, evening and night meals are fed by the mothers in all the

instances. Caregivers provide themid-morning and or noon meal, when the mothers are out on different errands or may be at home attending toother household chores.

Figure 1. Feeding by caregivers derived from 24 hour recall



Observation of food intake

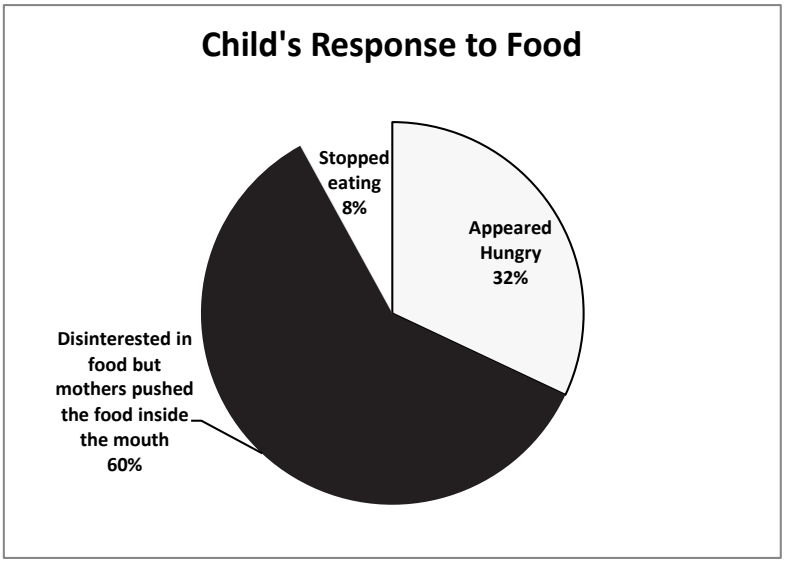
Observation of a feeding session was done for all 40 children, while 27 video sessions had been recorded. The observation and videography was done for the first mealof the day which in a majority of cases is handled by the mothers. Hence there was not much opportunity to observe feeding by caregivers. The choice of the first meal for observation and recording by the investigators was due to the fact that this was the meal which more or less adhered to the timing given by the mothers as the meal time. Even then, in several cases investigators had to make two or three trips, since sometimes mothers had already finished feeding the children because the children had got up early. While all mothers and caregivers did have a rough time table for feeding children there were variations based on children's wake up and activity schedule of the day.

Videographic recording as well as spot observation showed that children were fed with solids and liquids. The solid portion comprised of only rice or rice mixed with vegetable gravy or dal water. Ragi gruel was the liquid. The practice of serving ragi *kanji*alongwith solids is common toall households. Children are fed a mouthful of rice and then allowed to sip on the gruel.All the children were fed by hand except for one child who was fed by the mother using a spoon.Hand washing practices before feeding the child was observed for only 33% mothers. This data could not be documented for 67% mothers since all the preparatory process before child feeding took place within the hut and the investigators did not have access most probably because they were males and could not go inside. Lack of familiarity with the subjects could also be a reason for this.One of the caregivers reported feeding the child with the bottle during the day which was not observed. Since the cleanliness and hygiene practices may vary with different caregivers and even for the same caregiver over different meals, observation with just one meal may not be correct in arriving at a decision about hygiene practices. With regard to consistency, the food varied from being adequately mashed (18%) to partially mashed(32%)and not being mashed at all (50%).

Only fifteen percent of the children finished the full portion served. Of the remaining, 32% consumed only half a portion while another 39% and 29% of children ate less than half the portion served or had only a few mouthfuls respectively. Mothers were found to persist to try and get the children to finish the portions taken.All the caregivers were patient and the spot observations as well as the video recordings indicated that there were no apparent variations in the feeding style. The caregivers demonstrated persistence even when the children resisted. However children showed an inclination to complete the liquid portion over the solid portion and the caregivers found it easy to help the child finish the liquid portion over the rice.

Child feeding is a two way process. While caregivers adopt various strategies to help children to eat their portions, food intake also appears to be regulated by child behavior.Amajority (60%)of children showed disinterest in the food but mothers were patient and persistently kept on pushing the food into their mouths. They gave breaks inbetween to enable the child to complete the portions. However this strategy seemed to have worked more with younger children, than with the 11 and 12 month old children, because only about one third of the mothers in the latter category succeeded in pushing the food into the child's mouth. Four percent distracted the children and fed them while two mothers got up and walked around with their children.On an average a feeding episode took about twenty minutes. With breaks it could stretch to forty minutes or so. Only thirty two percent of the children appeared hungry and showed an interest in eating.Another 8% of the children stopped eating altogether after a few mouthfuls.

Table No. 13: Children's response to food (n = 40)



Tableno 14:Children's response to food, age group and nutritional status

Child Response	No of children	Age group	Nutritional status
Appeared hungry	13	9 months – 3 10 months – 1 11 months – 2 12 months-7	Normal – 3 nos. Wasted – 4 nos. Underweight – 1 no. Stunted & Underweight – 3 Stunted & Wasted - 2
Disinterested in food	24	9 months – 4 nos. 10 months – 5 11 months – 9 nos. 12 months - 6	Normal – 12nos. Stunted – 3 nos. Wasted – 3nos. Underweight – 1 no. Stunted & Underweight – 3 Stunted &Wasted – 2
Stopped eating	3	10 months – 1no. 11 months – 1no. 12 months – 1 no.	Normal – 1 no. Wasted – 2 nos.

Formatted: Font: Bold, Complex Script Font: Bold

Formatted: Font: Bold, Complex Script Font: Bold

Formatted: Left, Space After: 0 pt, Line spacing: single

It is not likely that mothers would take impossibly huge portions that their children are unable to complete them. Most probably have an idea of how much their children can eat

through experience. It is likely that the diets are monotonous and not very appetizing to the children. The solid portion consisted of only rice with a little dal water or vegetable gravy and this was the meal given at all times. This corresponds with the earlier observation of lack of diversity in the diets of children. On the other hand mothers reported that children relished snacks and were eager to eat the same,especiallybiscuits. It is likely that children find the snacks tastier and novel and hence showmore enthusiasm to eat them. Further it may be difficult for children to eat the partially mashed rice and hence may prefer to swallow the liquid gruel to eating rice. This reduces the caloric density of the consumed food. One gram of rice would provide four calories when compared to one gram of ragi gruel which provided only 0.3 calories.

E. Nutritional status of the children:

The nutritional status of children is presented in Table 15.

Table No.15: Nutritional status of children in different age groups (n = 40)

Age of children(in months)	Normal	Underweight	Stunted	Wasted	Stunted & Underweight	Stunted &Wasted	Underweight &Wasted
9 months (n = 7)	**4**	**1**	**1**	**0**	**0**	**0**	**1**
10 months (n = 7)	**2**	**0**	**1**	**2**	**2**	**0**	**0**
11 months (n = 12)	**4**	**1**	**0**	**5**	**1**	**1**	**0**
12 months (n = 14)	**6**	**0**	**1**	**1**	**3**	**3**	**0**
Total	**16**	**2**	**3**	**9**	**6**	**4**	**1**

***Underwt defined as weight for age less than -2 SD* ***Stunting defined as height for age less than – 2 SD* ****Wasting defined as inappropriate wt for ht.*

In the overall sample only 16 children (40%) were normal. Two were underweight and an equal number were severely under nourished by being both stunted and wasted. Three children were stunted. With increasing age, more number of children are undernourished. At nine months, four of the seven children were normal. Two children were underweight and one child was

Formatted: Indent: First line: 0 cm

stuntedwho was just 0.1 gm below the cut off for normal.The undernutrition levels gradually increased with increasing age and the gap between the standard and actual weights widened. At twelve months of age only about one third of the children had adequate nutritional status. Stunting makes its appearance in 9 months, in one child, which increases to 6 children by twelve months. Though the numbers are small the pattern of undernutrition corresponds to what is reported in literature. Age of initiation of complementary feeding and the nutritional status of children were compared.

Table No. 16: Comparison of nutritional status of child with age of initiation of complementary food (n = 40)

Age of initiation	Nutritional Status						
	Normal	Underweight	Stunted	Wasted	Stunted & Underweight	Stunted &Wasted	Underweight &Wasted
3 months (n = 1)	1	0	0	0	0	0	0
6 months (n = 18)	5	1	0	4	6	2	0
7 months (n = 11)	6	1	1	2	0	1	0
Above 7 months (n = 10)	4	0	2	2	0	1	1
Total	16	2	3	8	6	4	1

Formatted Table

For the child for whom comp feeding started at 3 months, the mother reported insufficiency of breastmilk. The child was the fifth one for the mother, and it is likely that she was under nourished and could not exclusively breastfeed beyond 3 months. The mother initiated complementary feeding with thinragi gruel and went on to feed the child with rice kheer as it was the cultural practice to introduce e rice in the 7 month of birth. However the child was adequately nourished. Children for whom complementary feeding was started at 6 months the chances of

being underweight and stunted was more. This is evident from the table 15. Eight children are stunted while 5 children fall in the underweight category.

Six children whose complementary feeding was started at 7 months are normal while only a few 3 children and 1 child are stunted and stunted & underweight respectively. The late starters only fair slightly better as per the available data. Of 10 children 4 are normal and 3 are underweight. The severe signs of malnourishment like stunting and stunting & underweight are seen in 1 and 2 children respectively. This suggests that late initiation rather than early initiation is more a cause for under nutrition. This might be because of the beneficial effects of exclusive breastfeeding which in some way is also a preventive against childhood illnesses.

Table No.17: Comparison of children consuming a at least three food groups and those not doing so based on the Food frequency (n = 40)

Categories	Nutritional Status						
	Normal	Underweight	Stunted	Wasted	Stunted & Underweight	Stunted & wasted	Underweight &Wasted
Children consuming three food groups (n = 33)	15	2	2	5	6	3	0
Children not consuming three food groups (n = 7)	1	0	1	3	0	1	1
Total	16	2	3	8	6	4	1

Table No.18: Comparison of children consuming at least 3 – 4 meals a day and those not doing so based on the Food frequency (n = 40)

Categories	Nutritional Status						
	Normal	Underweight	Stunted	Wasted	Stunted & Underweight	Stunted & wasted	Underweight &Wasted

Children taking 3 – 4 meals / day (n = 35)	14	2	2	7	5	4	1
Children not taking 3 – 4 meals / day (n = 5)	2	0	1	1	1	0	0
Total	16	2	3	8	6	4	1

Of the 40 children, 30 are consuming aminimum acceptable diet while another 10 are devoid of it. The children (50%) consuming 3 – 4 meals of a diversified diet in a day are normal. Even the instances of underweight and stunted & underweight are less (23% each) for these children. In comparison their counterparts lacking a mimimum acceptable diet, show increased instances of underweight (36%) and stunted & underweight (36%). The number of normal children is less (21%) only. There are 2 stunted children in each of the categories.

Household typologies also did not have any bearing on child food intake or nutritional status. Of the several household typologies studied such as caste, landholding, access to forest, family type, presence or absence of the mother (resulting in feeding by multiple caregivers) the last one seemed to have an influence on the nutritional status.

Table No. 18: Mother's separation and child's nutritional status (n = 40

Period of separation	**Nutritional Status**						
	Normal	**Underweight**	**Stunted**	**Wasted**	**Stunted & underweight**	**Stunted & wasted**	**Underweight &Wasted**
Not separated (n = 16)	6	1	1	3	3	1	1
Separated for 2 hours (n = 17)	8	1	1	2	3	2	0
Separated for 3 hours	2	0	0	3	0	1	0

(n = 6)								
Separated for >5 hours (n = 1)	0	0	1	0	0	0	0	
Total	16	2	3	9	6	4	1	

Table No. 19: Comparison of nutritional status of children fed by mothers only and those fed by both mother and caregiver (n = 40)

Category	Nutritional Status							
	Normal	**Underweight**	**Stunted**	**Wasted**	**Stunted & Underweight**	**Stunted & wasted**	**Underweigh t &Wasted**	
Children fed only by mothers (n = 24)	**7**	**2**	**2**	**6**	**4**	**2**	**1**	
Children fed by mothers and caregivers (n = 16)	**9**	**0**	**1**	**2**	**2**	**2**	**0**	
Total	**16**	**2**	**3**	**9**	**6**	**4**	**1**	

Table 18 shows that of the 40 mothers, 16 mothers were available at all times in and around the children and fed the children themselves. Six of these children are normal while 7 and 3 children are underweight and stunted & underweight respectively. The nutritional status of children whose mothers were separated for 2 hours shows that nearly 50% of the children were normal and 6 were stunted & underweight. One child was stunted in this category. There was not much difference between the nutritional status of children separated from their mothers for 2 and 3 hours. Only 1 mother, a school teacher, was separated for six hours from her child but got support from her family. However, the child was stunted.

Table No.19: Episodes of illnesses and nutritional status (n = 40)

Categories	Number of children	Normal children	Under nourished*

Episodes of illnesses	24	11	13
No episodes of illness	16	7	9

*includes stunted, wasted and both categories

As per the table only 24 of the 40 children were reportedly suffering from illnesses during the past one week of the survey. Of the 24 children, 13 children suffered from respiratory tract infection. The incidence of diarrhoea and scabies was prevalent in 5 and 2 children respectively. Diarrhoeal attacks were few at the time of the study. This might be due to absence of bottle feeding in the community and hence, less chances of contamination. The rest 4children suffered from multiple complications such as cold and cough along with scabies or diarrhoea.

Discussion:

The study to develop a checklist for assessing food adequacy, diversity and feeding practices of caregivers for children between 9 – 12 months of age, was carried out in a predominantly tribal area of Koraput district of Odisha which has a history of chronic hunger and undernutrition.The HUNGAMA Survey by Naandi Foundation (2012) found that nearly 55% of children below five years of age were underweight, while 70% were stunted, indicating prolonged periods of inadequate food intake. There were no differences in the food habits of tribal and non-tribal households except in case of consumption of wild food by some tribal households that had access to forest. However this did not make a difference to child feeding since wild foods are not introduced in the diets of 9-12 month old children, but much later.

It was assumed that the feeding practices and food intake of adequately nourished children will be the reference point for preparation for such a checklist. This assumption was

based on the fact that in literature, examples of positive and negative deviants among children with regard to nutritional status is reported, with discriminative treatment of the girl child (Shekar et al, 1991) and sub optimal deployment of existing resources and feeding choices of the caregivers (Merchant and Udipi, 1997) being attributed as the reasons for the poor nutritional status of the negative deviants. On the other hand mothers of positive deviants are reported to have made more intelligent choices by spending their available income on nutritious foods such as green leafy veg and fruits or by seeking timely medical help.

The present study did not find such overt differences in feeding practices between the two groups of children. The breastfeeding practices of a majority of households at the time of birth and afterwards were along the recommended lines and all mothers were breastfeeding at the time of the study. Even after resumption of work following delivery, mothers adopted several strategies to combine work with breastfeeding, such as strapping the child to their bodies, deliberately arranging to work in and near the house, carrying the child to the work place and having family members to bring the child to the workplace to breastfeed.

However complementary feeding practices were far from satisfactory. Of the seven aspects of complementary feeding practices that were studied, three were uniformly poor for majority of the children. These were the presence of iron rich food, protein rich food in daily diet and energy density of the food in providing 1 calorie for every gram of food. Twenty eight percent had introduced complementary feeding at the beginning of 7^{th} month, as per the recommended guideline, with the rest having introduced it either earlier or later. This suggests the discretion of mothers or caregivers in judging the time they think is appropriate for initiating complementary feeding. Sixty five percent of children were consuming a minimum acceptable diet.

There were no differences in feeding practices based on gender. Observation of a feeding session showed poor consistency of diet for majority of children and in general showed the apathy of most children to eating. However it showed that children and mothers preferred to finish the liquid gruel portion, which has a much lower energy density over the solid portion.Motherstook time to feed and showed patience while feeding children.

Only 16 out of the forty children were well nourished, the rest being undernourished with 11 children being both stunted and wasted. Proportion of undernourished children, increased steadily with increasing age. Given the lack of observable variation in feeding practices and food intake, between well-nourished and under nourished children, and between the different age groups it was difficult to explain the differences between well-nourished and under nourished children, based on diet alone. It also highlights the fact that feeding practices are not likely to vary widely among mothers in a given cultural milieu. There was no difference in episodes of illnesses among well-nourished and under nourished children. Respiratory infection was the predominant affliction. Incidence of diarrhea and scabies were few. The former could be because there was no bottle feeding and the latter is suggestive of good personal hygiene practices.

Granted that nutritional status is the result of a host of other factors besides food intake, it was nevertheless felt that the 24 hour recall method was not a satisfactory method for assessing child food intake for several reasons. A one day history of food intake is not sufficient to capture the day to day variations in food intake of children. It does not account for left overs, Direct weighment method over a period of three days and taking the average would probably help offset the variations and bring estimations closer to actual intake. The other lacunae in estimating food intake was the amount of calories derived from breastfeeding and from snack foods purchased from shops.Some household typologies thought to have a bearing on feeding practices also did not have any bearing on food intake. However, 15 of the 19 children whose mothers were

separated for longer periods due to work and who were fed by other caregivers were undernourished in comparison with only 9 children of the 21mothers who were not separated from their children.

This suggests that there could be a difference in food intake of children who are fed by other caregivers besides the mothers and who do not have access to breastmilk so much as those children who are not separated from the mothers. Hence further studies with equal number of well-nourished and under nourished children for each month of age, estimating food intake over a period of time and using direct weighment methods, calculating energy intake through all possible sources and observing the differences between mothers and other caregivers could help in arriving at a tool or checklist that could help in assessing the quantitative and qualitative aspects of feeding.

The challenges identified in the present study towards identifying the differences in the food intake and nutritional status of children were:

a. Variability in the child's food intake suggesting that rather than a one day diet survey to arrive at the quantity of food eaten by the child, average intake over a three day or one week observation might provide some useful information over the quantity of food eaten.

b. Wide intra and inter group variations suggesting that a large sample for each month of age will be needed to iron out the extreme observations before arriving at an average consumption for the particular group.

c. Other complexities associated with capturing the actual intake such as estimate of food consumed after left over, estimate of ICDS supplement consumed, nutrient value of snack items, energy from breastmilk and activity pattern of children, suggest the need for adopting more

nuanced and sensitive methods of data collection such as assessment by direct weighment method rather than by recall.

c. There is not much variation in the feeding practices of mothers. The mean food intake of children did not increase substantially with increasing month of age, which in part explains the increasing levels of undernutrition with increase in age. A majority of children were disinterested in eating and did not finish their portions, leading to inadequacy of food intake, or were fed less dense liquid portion over solid portion. It also underscores the need to observe adult child interaction and child behavior to understand if the child is eating adequately or not. These findings reiterate the inclusion of observation technique as an important method of assessing adequacy of feeding practices.

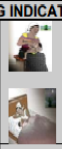
d.The numbers of normal children in the study were few to be able to draw any decisive conclusions regarding the quantity of food considered adequate for the appropriate month of age A comparison of the feeding practices and food intake of an equal number of healthy and under nourished children for each month of age would give a better picture of the desired quantum and adequacy of food and nutrient intake.

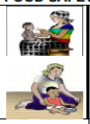
e. Yet another possible reason for the better nourished state of some children could be advantage due to higher birth weight rather than differences over actual feeding practices. The HUNGaMa survey of child under nutrition in 16 most backward districts in India of which Koraput was one, found that birth weight was an important predictor of nutritional status for children under three years of age. It is likely that some children who may have the advantage of an optimal or comparatively higher birth weight over the rest may be better off due to this reason rather than to any actual difference in feeding practices.

The checklist of items that have emerged as variables for an in depth analysis are presence or absence of mother and the differences in the conditions including feeding that influences nutritional status of children, estimating food and nutrient intake from various sources and direct weighment method for a whole day for atleast three consecutive days . It is suggested that further studies along these lines be undertaken to arrive at a tool for assessing feeding practices.

Annexure – 1

PATH Tool

			BREASTFEEDING INDICATORS					CALORIC DENSITY INDICATORS							
Date	Age (mo.)	Sick?					Sub-total	Meal frequency 1, 2 , 3, or more 	Consistency 		Quantity/Meal 1/2 3/4 1 			Snack 	Sub-total
	6														
	7														
	8														
	9														
	10														
	11														
	12														
	13														

NUTRIENT DENSITY/DIVERSITY INDICATORS					FOOD SAFETY AND FEEDING STYLE INDICATORS					TOTAL	
				Sub-total					Sub-total	Actual	Target
											18
											18
											19
											22
											22
											22
											22
											22
											22
											22

These are screen shots of the actual tool to give the readers an idea of the original tool. The original tool is available in the following link

(http://www.manoffgroup.com/IYCN_complementary_feeding_monitoring_tool_083111.pdf.pdf)

Source:*USAID (2011).*

<u>Annexure – 1 (Continuing)</u>

Appendix B: Questions and Criteria for Marking Practices—

Sick?	
	*Questions*: Is your child sick now? [If yes, ask] Has your child been eating relatively normally? [If not currently sick, ask] Has your child been sick recently? [If yes, ask] Was your child eating relatively normally, even though sick? ***Check the box if the mother believes the young child is currently sick. Do not complete the feeding assessment for the month if the sick child has poor appetite or was sick and still has a poor appetite.***
Breastfeeding	
	*Question*: Are you still breastfeeding your young child? ***Check the box if the response is yes.***
	*Question*: Each time you breastfeed, do you feed from one breast or both? ***Check the box if the mother empties one breast and offers the other each time she breastfeeds.***
	*Questions*: How many times do you breastfeed during the day? How many times do you breastfeed during the night? ***Check the box if the mother breastfeeds at least once at night AND if she feeds 4 or more times in a day.***
	*Question*: Do you ever give your child anything to drink in a baby bottle? Additionally, look to see if there is a bottle present with the child. ***Check the box if the mother says no.***
Meal frequency	
	*Question*: Do you give your baby any feedings besides breastfeeding? [If yes] How many times do you feed your baby each day? For example, how many times did you feed your baby yesterday?

	***Check the boxes for each meal that the child receives soft, but thick or solid food.***
Quantity/each meal	
½ cup  ¾ cup  Full cup 	*Questions [for each meal that the child eats every day]*: How much food does the child eat at the meal? **Show a 250ml cup.** How much of this cup would the food fill up? Think about what your child ate yesterday. ***For a 6–8-month old child, check the box if the child eats at least ½ cup at each meal.*** ***For a 9–11-month old child, check the box if the child eats at least ¾ cup at each meal.*** ***For a 12–17-month old child, check the box if the child eats at least ¾ cup at each meal.*** ***For an 18–23-month old child, check the box if the child eats one cup at each meal.***
Snacks	
	*Questions*: Do you give your young child any foods/snacks between meals? [If yes] How many snacks do you give your child each day? ***Check the box if the mother gives one or more healthy snacks.***
Quality/Diversity	
   	*Question*: Thinking about yesterday, can you please tell me what foods your young child ate? Anything else? Was this typical? ***Check the first box if the child eats fruit and vegetables every day.*** ***Check the second box if the child eats food from an animal source every day, e.g., meat, fish, milk, cultured milk, cheese, yogurt, insects.*** ***Check the third box if the child eats a pulse each day, e.g., beans, legumes, nuts.*** ***Check the fourth box if the child eats a good source of fat each day, e.g., oil, vegetable shortening, animal lard, butter (ghee), coconut milk, avocado, peanut butter.***
Feeding style	
	*Questions*: Who feeds your young child? [If the child feeds him or herself] Do you watch your child eat? Do you encourage your child to finish all the food?

ANNEXURE - 2

Schedule I (Data Collection)

Complementary feeding practices of children (9 – 12 months of age)

Questionnaire for field testing

Parent Information / Consent Form

Dear Parent

The M S Swaminathan Research Foundation is engaged in improving the food and nutrition security of rural and tribal households through the application of science and technology. Of special concern is the health of women and children. In this context, we are developing a pictorial material which will help caregivers/mothers /child care workers to assess food intake by young children which will be useful for improving child feeding. To develop the material we have to interview the primary caregivers on food intake by young children, feeding pattern and household food availability. We would also need to videograph a feeding episode to understand child behavior. This would be done as unobtrusively as possible, without disturbing the mother and child.

We seek your consent in participating in the study and sharing information with us on the above issues and for the video Recording. The information provided by individual participants will have anonymity and not lend itself for identification.

Thanking you

Parent consent: (signature or thumb impression)

I am willing for both interview and video recording.
I am willing only for interview.

SCHEDULE 1:

Formatted: Left

I. General Information

1. Questionnaire code : - - -
   (3 digit code, first number referring to the village and next two numbers serial order)

2. Name of the investigator :

3. Date of survey :

4. Village : Revenue / hamlet

5. Panchayat :

6. Block :

7. Name of the respondent :

8. Relationship of the respondent to the index child:

Signature of Investigator :

II Household Details:

1. Name of Head of Household :
2. Caste : ST : Bhumia (1) Paroja (2) Gadaba (3) Batra (4) Soura (5) others
   SC : Harijan (7)
   OBC : Rana (8) Mali(9) Bisoi (10) Komar(11) Kumbhar (12) Gowda (13) others (14)
   Other Category : Brahmin (1)

3. Details of family members:

Sl No	Name (start with Head of Household)	Relationship to mother of study child*	Age (yrs)	Sex	Literacy**	Schooling***	Daily work / activities****
1							
2							
3							
4							
5							

*Husband(1) daughter (2) son (3) mother-in—law(4) father-in-law(5) husband's sister(6) husband's brother(7) husband's nephew (8) husband's niece (9) mother (10)

**Can read and write (1) non literate (2) Can put signature only (3)

*** less than class five (1) upto class five (2) less than class ten but above class five (3) upto class ten (4) Less than 12^{th} (5) upto 12^{th} (6) above 12^{th} (7)

****Cooking (1)
Cleaning of house/ courtyard (2)
Washing clothes (3)
Fetching water (4)
Collecting firewood (5)
Cleaning of grains (6)
Agriculture work (own field) (7)
Agriculture work (wage labour) (8)
Other wage labour (mention what) (9)
Kitchen garden (10)
Childcare work (11)
Any other, mention what (12)

4. Is there anyone not living in the house but sharing the family meal? Yes (1) No (2)

5. If 'yes', what is their relationship to the mother of the index child?

6. Type of Family : Nuclear (1) Extended (2)

7. Household size : (exclude those not having a meal)

8. Land ownership : Landed (1) landless (2)

8a. Only for landed □ *(Skip if the household is landless)*

1. How much land do you own?
   NA (0) < 2 acres (1) 2 – 5 acres (2) More than 5 acres (3)

2. Do you cultivate in government land? NA (0) Yes (1) / No (2)

3. Do you lease in (take) land for cultivation ? Yes (1) No (2) NA (0)

4. Do you cultivate in your own land? NA (0) Yes (1) / No (2)

5. List all the foodstuffs grown?

Type of land	**Crops grown**	**Sowing period**	**Harvesting period**
Upland			
Middle Land			
Low Land			

6. If 'no', why? □ NA (0)

7. Do you lease out (give) land for cultivation? NA (0) Yes (1) No (2)

8. Do you have a kitchen garden in your house: NA (0) Yes (1)□/ No (2)
□

9. If 'yes', what do you cultivate in the kitchen garden? NA (0)

10. Do you have vegetables **now** in the kitchen garden? NA (0) Yes (1) No (2)

11. If 'yes', what are the vegetables grown? NA (0)

12. If 'no', why? NA (0)

13. Is your house close to the forest? NA (0) Yes (1)□ / No (2)□

14. Do you collect firewood from the forest ? NA (0) Yes (1) / No (2)

15. If 'No', where do you get firewood from? NA = 0

16. If 'yes', who collects firewood? NA (0)

17. What foodstuffs do you collect from the forests?

8b. For Landless Household: *(Skip in case the household has land)*

1. Do you have leased land? NA (0) Yes (1) / No (2)
2. Do you cultivate in government land? NA (0) Yes (1) / No (2)
3. List all the foodstuffs grown?

Type of land	Crops grown	Sowing period	Harvesting period
Upland			
Middle Land			
Low Land			

4. Do you have a kitchen garden in your house: NA (0) Yes (1) / No (2)
5. If 'yes', what do you cultivate in the kitchen garden? *(NA =0 : where households do not have a kitchen garden in their home)*
6. Do you have vegetables now? NA (0) Yes (1) No (2)
7. If 'yes', what are they? (NA = O)
8. If 'no', why? NA = O
9. Is your house close to the forest? NA (0) Yes (1) / No (2)
10. Do you collect firewood from the forest? NA (O) Yes (1) No (2)
11. If 'yes', who collects firewood? NA (0)
12. If 'no', where do you get firewood from? NA (0)
13. What sort of foodstuffs do you collect from the forests? NA (0)

III Mother's Details

1. Age of the mother:
2. Parity: (total number of living children):
3. No of pregnancies: (include abortions, medical termination of pregnancy, still born)
4. Name of the index Child:
5. Date of birth of the child:
6. Age of the child (in completed months) :
7. Place of delivery: Home (1) / hospital (2)

8. Sex of the child: Male (1) Female (2)

9. Birth order *(Including the number of children who have died in the mother's womb or after birth)*:

10. Gap between the study child and immediate older child in months *(mark '0' in case it is the mother's first child)*

11. Is the mother pregnant now? Yes (1) No (2)

IV: Mother's Activity pattern and child care

1. Has the mother resumed all her activities after child birth? Yes (1) No (2)

2. If 'no', which are the ones that she is not doing now? Give specific reasons.

3. List all activities the mother did yesterday from morning till you went to bed and how did she manage child care during this time

No	Time	Task	Place *	Who took care of the child**

*Within the house or very close (1) *Short distance (can be contacted and reach home within 15 or 20 minutes (2) *Far away (cannot be contacted and will take an hour or more to come (3)

** Self - strapping the child to one's own self (1)
Self- Keep an eye on the child while doing work (2)
Both (3)
Mother –in-law (4)
Father –in-law (5)
Other in laws (6)
Husband (7)
Child's sibling (8)
Neighbor (9)
Any other (mention who) (10)
The child is left alone without a caretaker (11)

4. Who feeds the child when you are at work?
Mother herself feeds the child during or after the tasks (1)
Mother –in-law (2)
Father –in-law (3)
Other in laws (4)
Husband (5)
Child's sibling (6)
Neighbor (7)
Any other caregiver (mention who) (8)

5. How many times is the child fed? Once (1) Twice (2) > 2 (3)

6. Is the mother breastfeeding the child? Yes (1) No (2)

For those who work away from home

7. Does the mother work away from home? Yes – 1 / No – 2

8. When you are away from home for work who cares for the child?

Mother –in-law (1)
Father –in-law (2)
Other in laws (3)
Husband (4)

Child's brother & sister (5) Neighbor (6)
Other caregiver (mention who) (7) Child is left alone without a caregiver (8)

9. How is the child fed when you are at work?
Child is brought from home to work place by the caregiver and the mother feeds the child (1)
Mother carries child to her workplace and feeds the child herself (2)
Child is at home and fed by Mother –in-law (3)
Child is at home and fed by father –in-law (4)
Child is at home and fed by other in laws (5)
Child is at home and fed by spouse (6)
Child is at home and fed by child's sibling (7)
Child is fed by the neighbor (8)
Any other caregivers who feed the child (mention) (9)
Self feeding (10)

10. How many times is the child fed by the above mentioned caregiver?
Once (1) Twice (2) More than 2 times (3)

11. When you are away from home how do you manage to breastfeed?
Returns home before the next feed (1)
Mother takes the child along with her (2)
Child is brought by the caregiver to the work place (3)
Am not breastfeeding now (4)

V. **Feeding Practices**

1. Breastfeeding

a. Soon after birth when did you start breastfeeding?

Within 1 hour (1) Within 2 hours (2) Within a day (3) After one day (4) □

b. Did you give anything before giving breast milk? Na (0) Yes (1) No (2) □

c. If yes, what? *(Kindly mention)*

d. Do you give water now to your child? Yes (1) / No (2) □

e. At what age did you introduce water to your child?

2. Complementary Feeding:

a. What food are you giving the child now?
Only breastmilk (1)
Only other food (2)
Breastmilk and other food (3)

b. At what age did you introduce other foods to the child? NA (0)

c. What was the first food that you introduced for your child? *(Mention the food)* NA (0)

d. Is there any specific reason for you to introduce this as the first food? NA (0)

e. What was the next item that you introduced? NA (0)

f. Did you have any difficulty in making the child eat other food? NA (0) Yes (1) No (2)

g. How many times are you feeding the child now?

h. How do you feed the child?
By Hand (1)
With a Spoon (2)
With a Bottle (3)
All together (4)

3. Current food pattern andFood Frequency: How often do you give the following foods to your child? *(Put a (√) in the appropriate column)*

Food Items	**Daily (1)**	**Once/ week (2)**	**Twice/wee k (3)**	**Thrice/ week (4)**	**Four times a week (5)**	**Five or six times a week (6)**	**Once/ 15 Days (7)**	**Once/ a month (8)**	**Not yet started (9)**
Cereals: Rice Rice / Maize gruel									
Ragi gruel									
Pulses: *Dal*									
Vegetables Root vegetable									
Other vegetable									
Green leafy vegetable									
Fruits									
Flesh foods a)Fish									
b)Chicken									
c)Mutton									
Egg									
Animal Milk: Baby milk (specify)									
Snacks Biscuit, Mixture, *Nadi,* *Nala* Any others *(Specify)*									
ICDS Mix									

4. Do you think your child is eating adequately? Yes (1) / No (2) □

4a. If 'yes', give specific reasons for this? NA (0)

4b. If 'No', specify the reason? NA (0)

5. Does the study child have food preferences? Yes (1) No (2)

6. If yes mention the foods liked and disliked by the child?

Foods liked -

Foods disliked –

ANNEXURE - 3

Observation Schedule

SCHEDULE 2: OBSERVATION SESSION

Observations on food and feeding practices:

1. **F**ood was adequately mashed and given (1)

   Food was partially mashed (2)

Food was not mashed adequately (3)

2. Utensils were cleaned before putting food inside
   Yes (1) No (2) Could not find out (3)

3. Did the caregiver wash her hand before feeding the child
   Yes (1) No (2) Could not find out (3)

4. **Start of feeding** *(if fed by the caregiver)****Tick the appropriate choice (one or more than one choices can be made)***
   a. Caregiver drew attention of the child to food
   b. Slowly distracted the child from its activity to feed
   c. Started feeding with child engaged in activity

5. **During feeding** ***Tick the appropriate choice (one or more than one choices can be made)***
6. Child was left to eat on its own
   Caregiver fed the child throughout
   Child was fed initially but later left on its own to eat
   The caregiver intervened in between while the child was feeding on its own

7. **Methods used** by the caregiver to help the child eat ***Tick the appropriate choice (one or more than onechoices can be made)***
   A. Show the child around (divert attention and then feed)
   B. Motivate/ encourage the child (telling stories etc)
   C. Make the child eat along with other members
   E. Allow some break and then feed
   F. Run after the child
   G. Distract the child and stuff the food inside
   H. Prompting the child to eat in between feeds while the child was self feeding
   I. Beat the child
   I. Others (describe)

8. **Child response** ***Tick the appropriate choice (one or more than onechoices can be made)***

A. Child appeared hungry and was ready to eat

B. Child was playing and not interested in the food but kept swallowing

C. Child was not interested in eating after a few mouthfuls

D. (if eating on its own) Child played with the food but did not eat

E. Child kept its mouth tight and refused to eat

9. **At the end of meal**

A. Child had completed the portion served

B. Child completed only half of the portion served

C. Child completed less than half of the portion served

D. Child had had only a few mouthfuls

ANNEXURE - 4

Standardization Process of recipes

1. Collection of bowls, tumblers and plates as used by the index households

Standardized Utensils Standardized Ladle

2. **Collection and weighing of all the required raw ingredients and preparation of the recipe:**

Weighed Raw Ingredients

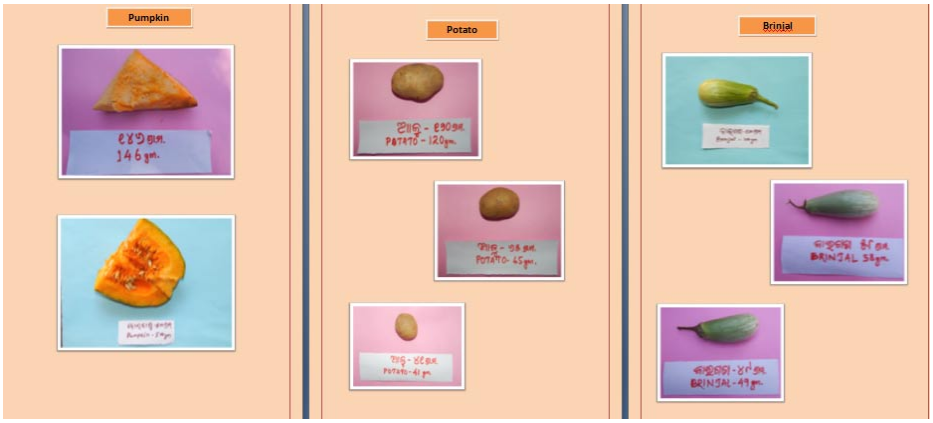
Preparation as per local method

3. **Measurement of the cooked volume in the standardized utensils:**

Measurement of cooked food

ANNEXURE - 5

PictureCards



(These cards were made of at the time of standardization of recipe. These were prepared keeping in mind the need for some visual document which would help the households give a rough estimate about the size of the vegetables used in food preparation)

References:

- Arimond M, Ruel MT (2001). "Assessing Care: Progress towards the Measurement of Selected Childcare and Feeding Practices, and Implications for Programs". Washington, DC. Food and Nutrition Technical Assistance Project, Academy for Educational Development.
- Bentley M, Stallings R, Fukumoto M, Elder J (1991). Maternal feeding behavior and child acceptance of food during diarrhea episodes, convalescence, and health in the Central Northern Sierra of Peru. American Journal of Public Health. Vol. 83. pp- 1–15.
- Engle PL, Zeitlin M (1996). Active feeding behaviour compensates for low child demand among Nicaraguan one-year-olds. Journal of Nutrition. Vol. 126. pp- 1808 – 1816.
- Government of India (2005 – 2006). Ministry of Health and Family Welfare. National Family Health Survey (I & II). International Institute of Population Studies. http://www.nfhsindia.org
- Government of Odisha (2013 – 2014). 'Odisha Economic Survey'. Planning and Coordination Department. Directorate of Economics and Statistics. June.
- Guldan, G. S., Zeitlin, M. F; Beiser, A. S, Super, C. M; Gershoff, S. N and S. Datta, S (1993.). "Maternal Education and Child Feeding Practices in Rural Bangladesh". Social Science andMedicine. Vol. 36, No.7. pp- 925-935.
- Institute for Human Development and World Food Programme 'Food Insecurity Atlas of Rural Orissa'. WFP, New Delhi, 2008.
- Kanani S, Srivastava N, Daxini M, Sharma M, Sharma K, Mehan M (2005). "Are Recommended Infant and Young Child Feeding (IYCF) Practices Being followed In Our Region? Assessment Methods and Research Evidence". Scientific Report Series No.1, Vadodara; Sandhya Press.
- Naandi Foundation 'HUNGaMa: Fighting Hunger and Malnutrition' TheHUNGaMa Survey Report, Hyderabad, 2011.
- Rama N and Sahoo S (2015). "Food Availability in households of young children (upto 3 years) in three tribal villages of Odisha". Vol. 52, Issue. 1. January – March.
- Ramji, S (2009). "Impact of infant and young child feeding and caring practices on nutritional status and health". Indian Journal of Medical Research. Vol. 130. pp- 624 – 626.12. Srivastava, N and Sandhu, A (2007). "Index for measuring child feeding practices". Indian Journal of Pediatrics. Vol. 74. pp- 363 – 368.
- USAID (2011). Infant and Young Child Nutrition Project's "Infant and Young Child Feeding Practices Monitoring Tool and Guide". Project implemented by PATH in collaboration with CARE.(http://www.manoffgroup.com/IYCN_complementary_feeding_monitoring_tool_083111.pdf.pdf)
- Virginia Chaidez and Kaiser, L.L (2011). "Validation of an instrument to access toddler feeding practices of Latino mothers". Appetite. Vol. 57. pp- 229- 236.

- World Health Organisation (2009). “WHO child growth standards and the identification of severe acute malnutrition in infants and children”. A joint statement by WHO and the United Nation’s Childrens’ Fund.