SUMMARY AND CONCLUSIONS

Chapter V

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Childhood malnutrition is a significant health problem in developing countries; more than one-quarter (27%) of all under fives in the developing world are underweight. Malnutrition is implicated in more than half of all child deaths worldwide and also contributes significantly to infant and child morbidity. India has the lion's share of malnourished children in the world. One in every three of the world's malnourished children lives here. According to NFHS-3 (2005-06), 46% children below age of 3 years are underweight and 38% are stunted. In India, the state of Gujarat has markedly high prevalence of child undernutrition, similar to rest of India, despite being among the better developed states on the economic front.

Data available in India suggests that majority of the children become malnourished within a fairly narrow "age window" between 6-24 months; the prevalence remaining high at 3 years. The growth curve of many infants living in a poor environment begins to falter around 6 months of life when they begin to receive foods other than breast milk. After a child reaches 2 years of age, this undernutrition is very difficult to reverse.

As stated by UNICEF (1990), the nutrition, growth and development of infants and young children depend not only on sufficient food, but also on adequate health services and appropriate Care behaviours. These Care behaviours include breast feeding and feeding of young children, hygiene practices, home health practices, psychosocial behaviours and care for women.

But in order for Caregivers to perform these practices, they must have resources for Care, which allow them to put knowledge into practice. The resources that a Caregiver draws on in giving Care include

- Education, knowledge and beliefs

- Caregiver's own physical health and nutritional status
- Mental health and self confidence
- Autonomy and control of resources
- Reasonable workload and availability of time, and
- Family and community support.

Thus, a Caregiver who has resources available is more likely to give effective Care and therefore helps maintain good child nutrition.

It is being recognized that providing support to empower the Caregiver is an important vehicle for behaviour change. Nutrition education communication (NEC) interventions involving community based workers have shown to help mothers in initiating and sustaining appropriate feeding practices and thus have been successful in improving Caregiving behaviours and child's nutritional status. Women's groups including microenterprise programmes can become useful partners for such NEC interventions on a volunteer basis with minimal resources. However, their potential has rarely been researched especially in India and Gujarat.

In view of the above, the main objectives of the present study were:

- To study Infant and Young Child Feeding (IYCF) and Care practices and resources available for Care, in relation to breastfeeding and complementary feeding practices in children 3-24 months, in rural Vadodara.
- To improve IYCF and Care practices for children 6-36 months through capacity building of local community groups i.e. *Bachat Mandals* or savings groups which are run by a local Non Governmental Organization (NGO).

This research consists of two research studies in accordance with the two broad objectives given above. 'Study I' formed the basis of the intervention and process-impact evaluation described in 'Study II'.

METHODOLOGY

The study was carried out with the support of a local Non Government Organization (NGO), which offers health care and other services in 27 villages in and around Nandesari area of Vadodara district. As a part of its many community development programs, the NGO promotes women's economic and social development through microcredit groups or *Bachat Mandals*.

Study I: Breastfeeding, Complementary Feeding and Care Practices in Rural Vadodara

Site and sample of the study

- In Study I five villages were randomly selected from the 27 villages under the NGO. Among these selected villages, all those families with children upto 3 years, who were available and willing to participate were enrolled. In order to remain focused and adhere to the timeline of this research, the age group of 3-24 months was considered which is also the most vulnerable age group as regards prevalence of malnutrition. Hence data was collected on 106 children of consenting families
- For assessing the Grandmother's support in Child Care and Feeding, *all* households which had presence of grandmother (GMP) (n= 31) were taken. Out of the remaining families where grandmother was absent (GMA), 39 families had children in a similar age range of 3-24 months and therefore formed the comparison group. Both groups were similar as regards key socio-economic variables.
- For assessing food and nutrient intake data of the children through twenty-four hour dietary recall method (focusing on complementary feeding), half of the children (from the total sample of 106) were randomly included (n=53).
- Direct observations were used for breastfeeding and complementary feeding. During field visits all through data collection, the researcher was able to observe 40 children for breastfeeding and 13 children for complementary feeding episodes.

In this study data was obtained on:

1. The IYCF and Caregiving knowledge and practices of the mothers in relation to:
   1.1. Newborn feeding and breastfeeding (initiation of breastfeeding, colostrum feeding, prelacteal feeding, water feeding, exclusive breast feeding-EBF and top milk feeding)
   1.2. Complementary feeding-CF
   1.3. Health related knowledge and practices
   1.4. Feeding during and after illness (BF, CF)
   1.5. Hygiene care (personal hygiene of mother and child, surrounding and food safety)
2. Resources available to the mother or child caregiver for Care in terms of
   2.1. Economic resources: the socio-economic status of the family
   2.2. Nutritional status and well being of mother
   2.3. The role of mother in family decision making
   2.4. Family support for child care: role of grandmothers
3. The morbidity history of the children.
4. Dietary intake of the children from complementary foods
5. The nutritional status of the children.

Both quantitative and qualitative indicators and methods were used for data collection which have been summarized in **Table 5.1**

Table 5.1 Indicators and Tools for Data Collection: Study I

Indicator	Sample	Method and Tool
Anthropometry ▪ Weight for age, Height for age and weight for height (children 3-24 months) ▪ Weight, height and Body Mass Index (mother of the index child)	102 106	Standard methods
Awareness and practices of mother related to breastfeeding, complementary feeding and Care	106	Semi-structured interview schedule
Health care seeking practices		
Morbidity		
Socio-economic status		
Role of mother in family decision making		
Influences on mothers: IYCF decisions		

Table continued...

Indicator	Sample	Method and Tool
Family support received by the mother ▪ Perceptions of family members (particularly grandmother) regarding support given by them to the mother for breastfeeding, complementary feeding and health care practices	31	Semi-structured interview schedule
Feeding episodes: ▪ Breast feeding ▪ Complementary feeding	 40 13	 Direct observation (using checklist)
Hygiene of the mother, child and environment	106	Direct observation
Dietary intake	53	24-hour dietary recall (one day)

Study II: Community Based Intervention Through Capacity Building of Bachat Mandal Members

Out of the five villages included in the Study I, the intervention in Study II was carried out in two purposively selected villages and one randomly selected village served as the control. All the three villages were comparable as regards key socio-economic indicators. The description of the NEC strategy is given below.

Village 1: Nutrition Education and Communication (NEC) intervention through capacity building of *bachat mandal* members (BM members) i.e. *NEC-BMM* was carried out in one village (where the BM was actively working). Here 9 volunteer women BM members from various *bachat mandals* (within the village) were trained in a capacity building workshop as regards communicating simple and focused IYCF messages and were given flash cards to use as visual aids during home visit counseling. This training was spread out in 3 sessions of 2 hours each, carried out on separate days. Each BM member was expected to contact around 3-4 mothers of children (6-36 months) in their neighbourhood once a week for 3 months by means of home visits and this was recorded in a simple checklist. A total of 32 families were covered by the BM members. Refresher training was carried out for the BM members after 1 month of the intervention.

Village 2: In order to compare the performance of *bachat mandal* in facilitating behaviour change among their neighbourhood women, the NEC intervention through direct home visit i.e. *NEC-DIR* was carried out in another village by the researcher. The same NEC messages using the same flash cards were imparted by the researcher by means of home visits once a week for 3 months to all the mothers (n= 30) with children 6-36months.

Village 3: The third village served as the control where no NEC intervention was carried out.

The implementation of the capacity building training workshop

The sessions of the three-day interactive capacity building training were about 2-3 hours each. In addition to the knowledge oriented sessions, role-plays and hands-on-practice component in the form of group discussions and demonstration were also included. Further, on the last day of the training, role-plays by the BM members to the whole group were conducted for further reinforcing the messages. Feedback was given after role-play to improve their counseling skills.

The last session of the capacity building training also focused on how the home visit could be **documented** in a simple checklist.

Feedback of the workshop session was obtained after each capacity building session by means of written feedback from trainees with respect to how well the messages were understood and change in knowledge of the BM members (breastfeeding, complementary feeding and hygiene care).

Process evaluation of the intervention

During the home visit intervention, process evaluation data was obtained on:

- The strengths and weakness of Nutrition Education Communication (NEC) carried out by BM members through home visits.

- Number and quality of home visits made by BM members and the accuracy of filling checklist given (monitoring).
- Reasons for frequent\infrequent home visits by BM members and support of NGO, which was running the *bachat mandal.*

The indicator and tool for process evaluation of the intervention is given in **Table 5.2.**

Table 5.2 Indicators and Tools for Process Evaluation of the Intervention

Indicators	Method and Tool	Sample
Strengths and weakness of BM members in carrying out home-visits with respect to: ▪ Communication skills ▪ Use of flash cards ▪ Accuracy of filling monitoring check lists	▪ On site observation in the field and giving feedback for each BM member especially in initial home visits. ▪ Follow up weekly meetings with BM members ▪ Feedback from mothers using structured checklist	9 BM members 9 BM members 19 mothers
Number of home visits carried out	Follow up weekly meetings with BM members	9 BM members

Impact evaluation of the intervention

The pre and post intervention data was collected in the two intervention villages NEC-BMM (n=32) and NEC-DIR (n=30) for all the households with children aged 6-36 months who were willing to participate and continued to be present during and after completion of the intervention period (3 months). For comparison, similar assessment was also made on 30 households with children in the same age group in the control village. The time gap between pre and post data collection was about 5-6 months.

In impact evaluation data was obtained on:

- Mother's recall of NEC messages imparted.
- Change in IYCF and Care practices of mothers.
- Reasons underlying the specific behaviour changes (or lack of change).
- Change in morbidity profile of the children.
- Change in food intake of the children through complementary foods.
- Change in nutritional status of the children (Weight-for-age, height-for-age and weight-for-height).

Table 5.3 outlines the quantitative and qualitative indicators of data collection employed for pre, post NEC data collection.

Table 5.3 Indicators and Tools for Data Collection Pre-Post Intervention

Indicators	Method and Tool	Sample
Change in IYCF and Care practices of mothers during the intervention period	▪ Structured check list ▪ Unstructured observation in the field (NEC-DIR)	62 45
Mother's recall of NEC messages, improvement in IYCF and Care practices of mothers (pre to post intervention)	Semi-structured interview	62
Change in food intake of the children through complementary foods	24-hour dietary recall (one day)	62
Change in Anthropometric indicators of the children ▪ Weight for age, Height for age and Weight for height (children 3-24 months)	Standard procedures	62
Change in morbidity profile of the children	Semi-structured interview	62

RESULTS

The main highlights of the results of the research are given below.

Study I: Breastfeeding, Complementary Feeding and Care Practices in Rural Vadodara

IYCF and Caregiving awareness and practices of mothers

These are summarized in the form of a matrix in **Tables 5.4** and **5.5**.

Table 5.4 indicates that most IYCF awareness and practices of the mothers were found to be undesirable. Feeding prelacteals was a common practice in the rural area (41%) as mothers perceived that initially there was no breastmilk and child felt hungry. Feeding colostrum was reported by only 50% of mothers and initiation of breastfeeding was delayed (beyond 10 hours) by almost two third mothers. Exclusive breastfeeding (not even water) for 6 months was rarely practiced mainly due to initiation of water feeding. Most of the women reported feeding little milk from both the breasts and not emptying one breast before offering the other. From about half of the children who were receiving top milk, one third had been initiated top milk before six months, as the mothers perceived their breast milk to be inadequate for the child.

However, majority of the mothers thought breast milk to be more nutritious and safe for the child than top milk. Most of the mothers (62%) initiated complementary feeding after 6 months of age. Almost three fourth of the mothers believed that their child has a normal appetite and very few fed the child actively that is: feeding the child frequently, being alert to hunger cues of child, feeding and encouraging child to eat and feeding the child from separate plate.

Table 5.4 Major Responses Regarding Breastfeeding and Complementary Feeding

Item	Percent Responses		
	<50%	50-70%	>70%
Feeding prelacteals	√		
Feeding colostrum		√	
Initiation of breast feeding • Within 2-5 hours • Beyond 10 hours	√	√	
Breast feeding : a little from both breasts			√
Exclusive breast feeding • ≤3 months • 4-6 months	√		√
Initiation of water feeding • ≤1 month • 2-3 months	√	√	
Top milk feeding (before 6 months)	√		
Initiation of complementary feeding • Before 6 months • After 6 months	√	√	
Mother thinks child has normal appetite			√
Special foods prepared for the child	√		
Foods avoided to the child (some vegetables & fruits)	√		
Mother practices active feeding	√		

Table 5.5 highlights the major responses regarding health related beliefs and practices. Evil eye was attributed to be the most common cause for childhood illness as reported by mothers. More than one third of the mothers (38%) attributed food deficiency and illness and infection (36%) to be the cause of malnutrition. More than half of the children experienced illnesses like fever, cold / cough and diarrhoea and most of the children were given doctor's medicine during illness.

Unfortunately, more than one third of the mothers, when ill, decreased the number of breastfeeds. Most of the mothers breastfed as well as fed complementary foods to the child on demand when the child was ill. When the child was recovering from illness, a majority of the mothers unfortunately fed the child same as before and did not actively ensure increased intake.

Table 5.5 Major Responses Regarding Health Related Beliefs and Practices

Item	Percent Responses		
	<50%	50-70%	>70%
Mother thinks evil eye as a cause of child's illness			√
Mother associates child's diet with his / her health			√
Mother thinks cause of malnutrition to be: • Food deficiency • Illness and infection	 √ √		
Morbidity experienced (cold/cough, diarrhoea and fever)		√	
Treatment during illness (doctor's medicine)			√
Decreased breast feeding during mother;s illness	√		
Frequency of breast feeding during child's illness: amount child demands		√	
Frequency of complementary feeding during child's illness: amount child demands		√	

In some of the practices gender difference was seen. For example, more boys than girls were reported to be given colostrum. More boys than girls were delayed initiation of complementary foods beyond 6 months. More boys as compared to girls were fed special foods, at the same time they were not given certain foods. Significantly more boys were assisted in eating as compared to girls and overall active feeding was reported more frequently for boys. These gender differences emerged at the time of analysis, and reasons for these differences need to be probed in further research.

Resources available to the mother for Caregiving

- The socio-economic resources available to the mothers were inadequate: majority of the mothers were illiterate or had only primary school education, had poor mean per capita income (Rs 201-500) and unsatisfactory living conditions (semi-pucca and poorly ventilated houses without toilet facility).

- As regards nutritional status, most of the mothers were undernourished (BMI< 18: 57%). Nearly half of the mothers were married at 16 years of age or even less and more than two third had their first child at 20 years of age or less.
- As regards decision making in the family, most of the mothers had a major say in decision related to family meals (if the grandmother was not present) and allocation of food to family members. Decisions related to schooling of the children, family purchases and treatment for ill child were taken either by the father alone or in consultation with mother. Mothers of boy children had greater say in certain decisions than those having girl child.
- Grandmother's support to mother for child Care was assessed with regard to the IYCF knowledge and practices of the mothers as well as grandmothers. Nutritional status and diet intake of the children with presence of grandmother (GMP) were compared with those where grandmother was absent (GMA).
  - ✓ The present study revealed that unfortunately irrespective of grandmother's presence, the child feeding knowledge and practices of rural mothers was largely undesirable.
  - ✓ Some desirable practices seemed to be significantly encouraged by the presence of the grandmothers: active feeding of complementary foods (52% GMP vs. 19% GMA children) and utilization of anganwadi services (88% GMP vs. 32% GMA children).
  - ✓ Most of the grandmothers helped the mother more in childcare activities and less in household work. A trend was seen was that as the number of tasks in which the grandmother helped the mother increased, more were the child caring behaviours practiced by the mothers.
  - ✓ The undesirable IYCF practices which appeared to be favoured in grandmother's presence were feeding prelacteals, delaying the initiation of complementary foods and decreasing breastfeeding during mother's illness.
  - ✓ The grandmothers themselves had inappropriate knowledge regarding child feeding and Care. For example, according to them child should be fed prelacteal feeds, not fed colostrum, delayed initiation of breastfeeding after child birth,

giving water (not exclusively breastfed), delayed initiation of complementary feeding and less of active feeding.

- ✓ Overall, diet intake and the nutritional status and of the children was not influenced by the grandmother's presence as both GMP and GMA children were:
  - Under fed (median calorie intake as % RDA): 36% GMP, 35% GMA and
  - Undernourished: WAZ < –2SD: 64% GMP, 56% GMA

    HAZ <-2SD: 61% GMP, 44% GMA

- Almost all fathers supported the mother in child care activities like playing with the child and seeking treatment for the ill child; the help was significantly more (number of tasks) if the child was boy as compared to girl.

Food and nutrient intake of the children

The intake of foods from various food groups was poor (less than ≤50% RDA); consumption of fruits and vegetables being very low.

Table 5.6 Mean Nutrient Intake of the Children (% RDA)

Nutrient	Total	Age		t value	Sex	
		6-11 months	12-24 months		Boys	Girls
	(N=53)	(N=14)	(N=39)		(N=31)	(N=22)
	Mean ± SE	Mean ± SE	Mean ± SE		Mean ± SE	Mean ± SE
Energy	57.6 ± 5.1	55.3 ± 2.6	58.4 ± 5.5	0.26 NS	56.0 ± 7.1	59.9 ± 7.4
Protein	70.3 ± 7.0	51.0 ±13.6	78.0 ± 7.9	1.76 NS	66.2 ± 8.9	75.7 ± 11.5
Calcium	25.1 ± 3.4	16.7 ± 7.4	28.1 ± 3.7	1.50 NS	24.3 ± 4.1	26.0 ± 5.7
Iron	33.9 ± 3.7	16.0 ±2.5	40.7 ± 4.6	3.21*	32.7 ± 4.7	35.6 ± 6.1
Vitamin A	11.1 ± 2.1	12.1 ± 4.7	10.8 ± 2.4	0.22 NS	12.5 ± 3.2	8.5 ± 1.7
Vitamin C	17.6 ± 3.7	9.2 ± 3.4	19.2 ± 4.4	0.99 NS	21.8 ± 5.9	11.9 ± 3.4

*p<0.05, NS: non significant

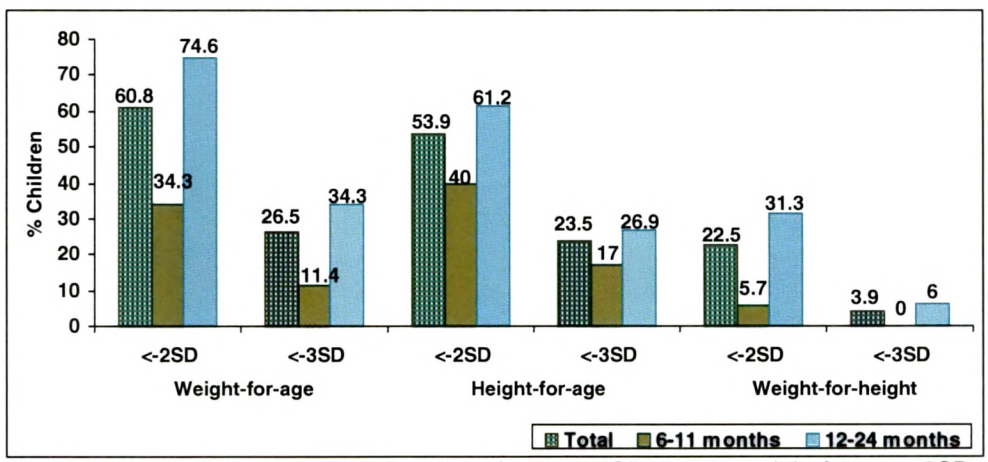
The children consumed inadequate amount of calories (<60% of RDA), calcium (25% of RDA), iron (34% RDA) and especially vitamin A and vitamin C (11% and 17.6%

of RDA). For the older children the intake of all nutrients as percent RDA (12-24 months) except vitamin A was higher than younger children (6-11 months). Boys had higher intake of vitamin A and vitamin C (% RDA) as compared to girls but the gender differences regarding nutrient intake were not significant (**Table 5.6**).

Nutritional status of the children

As **Figure 5.1** indicates the nutritional status of the children was poor with more than half of the children being underweight (weight-for-age <-2 SD) and stunted (height-for-age <-2 SD) and about one fourth being wasted (weight-for-height <-2 SD). Prevalence of malnutrition increased significantly with increasing age from 3-11 months to 12-24 months. As regards gender differences, boys had significantly better mean weights than girls. Severe malnutrition was more in girls than boys.

Figure 5.1 Nutritional Status of the Children by Z score Values



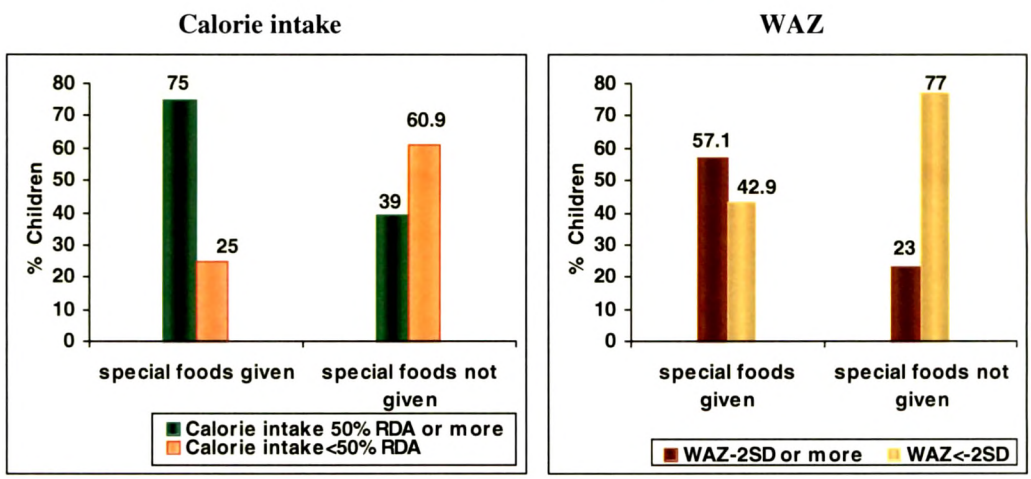
6-11 months vs. 12-24 months: p<0.01 weight-for-age<-2SD, p<0.05 weight-for-age<-3SD, p<0.05 height-for-age<-2SD, p<0.01 weight-for-height<-2SD

As regards influence of food intake on child's nutritional status, when the calorie intake was higher (> 50% of RDA) the prevalence of underweight (mean weight-for-age Z scores) was significantly lower as compared to when the calorie intake was less (≤ 50% of RDA).

Association of Caregiving behaviours with child's nutrient intake and nutritional status

Many Caregiving behaviours were positively associated with child's nutrient intake and weight-for-age, some behaviours like giving special foods to the child significantly influenced intake of calories as well as adequate nutritional status of the children (**Figure 5.2**).

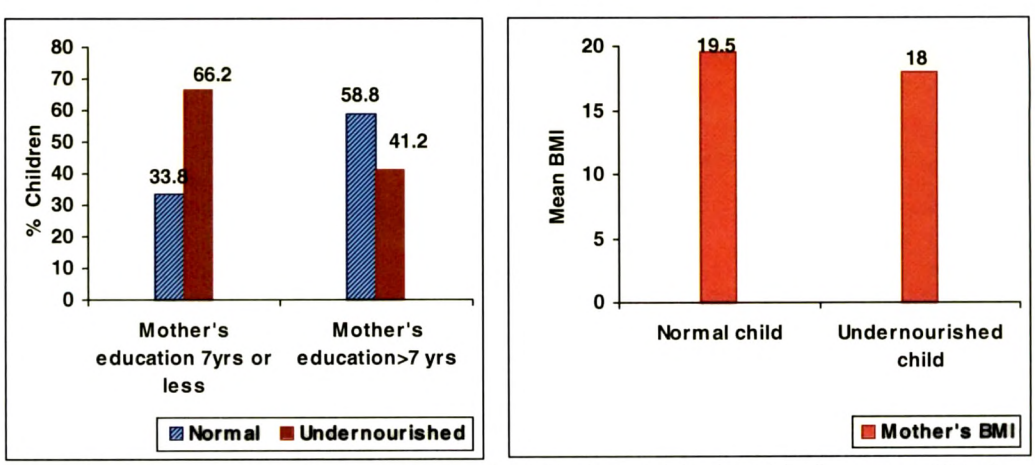
Figure 5.2 Association of Giving Special Foods with Child's Calorie Intake and Weight-for-age (WAZ) Z Scores



p<0.01: special foods vs. calorie intake

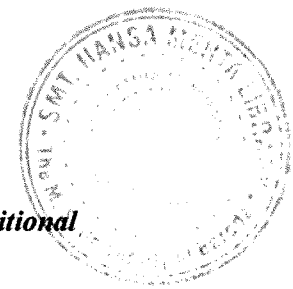
p<0.01: special foods vs. WAZ Z score

Figure 5.3 Relationship Between Mother's Education and BMI with Child's Weight-for-Age



Normal: weight-for-age >80% of NCHS standard, Undernourished: weight-for-age ≤ 80% of NCHS standard

p<0.05: mother's education vs. weight-for-age, p<0.01: mother's BMI vs. weight-for-age



Association of resources of Caregiving with Caregiving and child's nutritional status

Two important resources of Caregiving i.e. mother's years of education and BMI were found to be significantly associated with child's weight-for-age (**Figure 5.3**). As regards relation with Care behaviours, a trend was seen that with presence of nuclear families, greater role of mother in decision making; higher education of fathers and help given by father in household and child Care, the number of desirable Caregiving behaviours increased.

Study II: Community Based Intervention Through Capacity Building of Bachat Mandal Members

Process evaluation of the intervention

- The capacity building training and subsequent refresher traing were successful in improving the knowledge of the BM members regarding IYCF and Care with the messages being well retained even four months after the itervention.
- After the training of the BM members, initial observations on accompanying them during their home visits revealed some plus points in a few of them: use of flash cards as recommended; filling the checklist completely and accurately and communicating the messages clearly; willingness to improve performance on being corrected; trying out innovations such as using household measures to explain quantities of complementary foods for the child, and using local examples to convince the mothers. However, many lacunae were also seen in these early home visits in 6-8 of the members: not filling checklist correctly at times; asking leading questions (suggesting answers) while recording the current IYCF and Care practices; not being familiar with the flash cards\messages and reading out the messages directly from the flash card; not holding the flash card properly; not explaining benefits or not adequately convincing mother for behaviour change.
- These shortcomings were addressed through guided practice and refresher training (after one month of intervention) wherein again the correct communication methods and checklist recording process were demonstrated to them. Subsequent home visits improved.

- Number of home visits carried out: At the end of 3 months, an average of 8 home visits (out of the target of 12 visits) were carried out by the BM members. This was similar to that carried out in NEC-DIR village (mean: 7 visits). While the reason for not conducting home-visit in NEC-DIR was unavailability of the mothers, the major additional reason as given by some BM members was related to their lack of motivation or time.
- Feedback from mothers for validation of the home visits by BM Members: Interviews with around half of the mothers (n=19) under BM member (in the absence of the BM member) revealed that on an average more than half of the BM members made the expected home visit of one per week/mother. According to the mothers the messages had been communicated properly, about half (57.9%) had been shown all the relevant flash cards on every home visit and more than two third mothers recalled that the BM member filled the checklist during the homevisit. Overall, most of the BM members had filled the checklist completely and correctly for atleast 7 of 12 visits and one member had done so for *all* the visits.

The sections of checklist that were filled relatively easily related to: intake of fruits and vegetables by the child, washing hands with soap after child defecation and before feeding (mother and child). On the other hand, those sections of the checklist which dealt with intake of complementary foods by the child (according to age) were found to be difficult to record by most of the BM members.

Impact evaluation of the intervention

Message recall

Despite some lacunae found in quality of communicating messages during home visits in NEC-BMM village, post NEC, a majority of the mothers in NEC-BMM and NEC-DIR villages remembered 6 or more messages out of 8.

In view of the similarity in impact the tables and figures below present pooled data of both intervention villages and are compared with control village.

Table 5.7 Change in Awareness-Practices of Mothers Regarding IYCF and Care: Comparing Intervention and Control Groups

Item	Intervention group (N = 62)		Control (N = 30)	
	Pre	Post	Pre	Post
	%	%	%	%
Child grows well if CF is initiated at 6 months	10.9	24.2	13.8	10.0
Child will become malnourished if CF is delayed beyond 6 months	12.7	30.6*	10.3	20.0
Food deficiency is a cause of malnutrition	35.5	77.4***	40.0	50.0
Mother practices active feeding	49.1	75.8**	24.1	30.0
Special foods made for the child	12.7	69.4***	55.2	16.7**
Foods avoided for the child	54.5	11.3***	55.2	50
Child is fed fruits	67.3	96.8***	79.3	80
Frequency of feeding fruits				
▪ ≤ 1 time/week	21.6	13.3	39.1	20.8
▪ 2-3 times/week	78.3	33.3***	47.8	75.0
▪ > 3 times/week	0.0	53.3***	13.0	4.2
Child is fed vegetables	45.5	80.6***	41.4	70.0*
Frequency of feeding vegetables				
▪ ≤ 1 time/week	8.0	8.0	0.0	0
▪ 2-3 times/week	60.0	42.0	41.6	47.6
▪ > 3 times/week	32.0	50.0	58.3	52.4
Hygiene practices				
▪ After child defecates mother cleans her and child's hands with soap	33.9	79.0***	43.3	33.3
▪ Before feeding child, mother washes her and child's hands with soap	5.5	53.2***	10.3	3.3
▪ Mother feeds fresh food to child	29.1	24.2	17.2	23.3
▪ Mother covers cooked food	7.3	72.6***	3.4	3.3

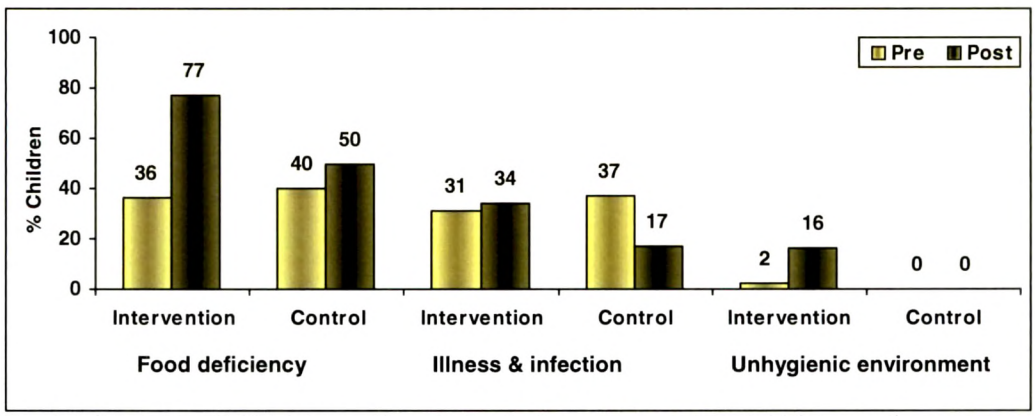
Significant difference (pre to post within each group): *p<0.05, **p<0.01, ***p<0.001, All other values: NS

Base N from which percentage values have been calculated varies and depends on presence of the practice (CF, feeding vegetables and fruits)

Change in knowledge-practices

There was an improvement in a majority of the knowledge-practices of mothers reported in the intervention villages regarding IYCF and Care (increased frequency of complementary feeding, active feeding, higher intake of fruits and vegetables, awareness about causes of malnutrition and improved hygiene) and little improvement in control (**Table 5.7 and Figure 5.4**).

Figure 5.4 Change in Knowledge of Mothers Regarding Causes of Malnutrition



Food deficiency: p<0.001 Intervention, Unhygienic environment: p<0.01 Intervention
C: all values NS

On comparing NEC-BM and NEC-DIR as mentioned earlier the impact was similar in both intervention villages except few instances where NEC-DIR village was better like: mothers responses regarding harmful effects of complementary feeding beyond 6 months, reasons/benefits for feeding fruits and reported practices of active feeding and hygiene for the child.

Influence of repeated contact

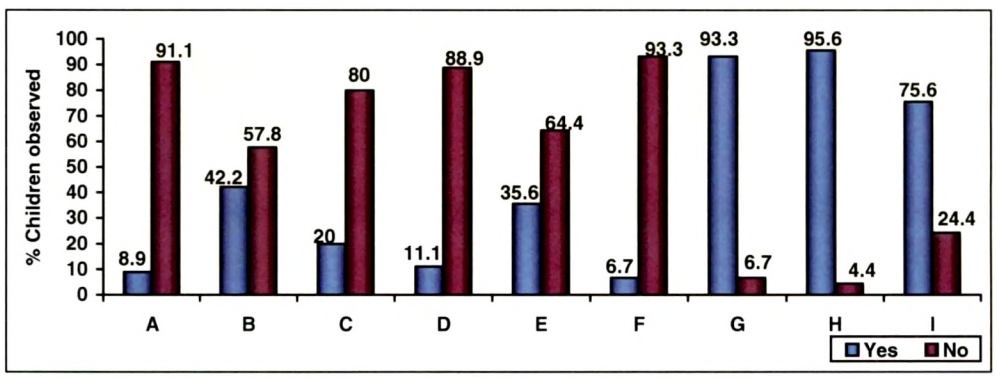
Frequency of home visits was significantly associated with number of messages recalled. Where frequency was 6 or more out of 12 average message recall was 7 and where home visits were less than 6 the average message recall was 5.0. Similarly more the number of home visits made higher was proportion of following positive IYCF practices: feeding special foods, not avoiding foods, active feeding, increased frequency of fruit and vegetable to child, washing mother as well as child's hands with soap after child defecation and before feeding; as well as composite IYCF score (7.9 vs. 6.5).

Sustenance of the positive behaviours

Most of the mothers in the intervention group reported following positive practices 50% or more of the times visited. As regards frequency and amount of complementary foods fed, though an increase from baseline was reported, the increase to

recommended frequency and amount was seen in fewer mothers as compared to other behaviours. Further, age wise analysis revealed that behaviours like feeding suggested quantity of complementary foods, active feeding and washing mothers as well as child's hand after child defecation were practised more for children in younger age group (6-12 months) as compared to older children (13-36 months).

Figure 5.5 Direct Observations Regarding the Positive IYCF Behaviours of the Mothers in NEC-DIR (N=45)



A: Appropriate quantity of CF
B: Fed variety of foods
C: Fed fruits
D: Fed vegetables
E: Caregiver fed the child
F: Caregiver encouraged the child to eat
G: Mother not annoyed/irritated while feeding
H: Fed in separate vessel
I: Fed in clean surrounding

Observation data

Figure 5.5 shows that most of the positive observations were with regard to feeding behaviours: not showing annoyance or irritability and patient during child feeding, serving food to the child in a separate plate and in clean surrounding and giving a diversified diet to the child. The observations indicating unfavourable feeding practices were: very few children were fed appropriate amount of complementary food, few children were observed to be fed fruits and vegetables, many children ate by themselves without mother/family member's assistance and encouragement. However, the interview data showed a contrasting picture with regard to feeding fruits and vegetables to the child and active feeding. The only exception was in the case of feeding appropriate quantity of food to the child – this was reported by few mothers and also observed in few mothers. A limitation of the observation data is that it was

carried out only in NEC-DIR village since the investigator was constantly visiting that village.

Factors facilitating as well as impeding change in feeding behaviours

As **Table 5.8** shows the major reasons which are likely to have influenced a positive change in feeding behaviours were: *mother's willingness* to adopt new practices and the *support of family members* (especially husband). Similarly, the likely deterrent factors obstructing positive beahviour change were mainly *child related factors* such as his/her dislike towards certain foods, poor appetite and irritability (at times associated with illness episodes of the child).

Table 5.8 Major Reasons Behind Positive and Negative Change in Feeding Behaviours

Reasons for positive change	Reasons for negative change
Quantity of complementary foods	
▪ Feeding child more quantity of food than before	▪ Morbidity of child
	▪ Poor appetite of child
	▪ Irritability of child
	▪ Displacement of wholesome foods with water and biscuits
	▪ Child wants only breast milk
Active feeding	
▪ Paying attention to child while feeding	▪ Feeding child forcefully/with anger
▪ Making special foods for the child	
Feeding protective foods	
▪ Father purchasing fruits despite cost	▪ Child finds vegetable spicy
▪ Keeping boiled, less spicy vegetables for child	▪ Fruits and vegetables are expensive
	▪ Child dislikes taste
Hygiene	
▪ Soap is available hence used	▪ Lethargy-disinclination to fetch soap to wash hands
▪ Mother likes child to appear clean	▪ Forget to use soap

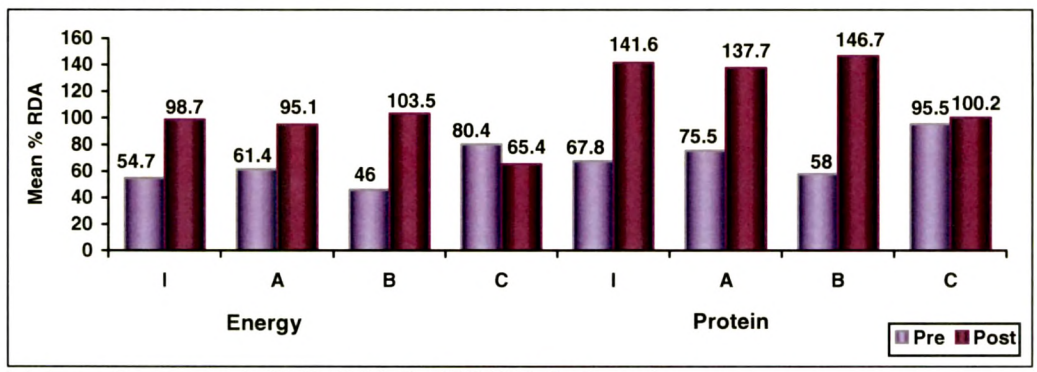
Change in prevalence of morbidity

Regarding change in morbidity, the percentage of children suffering from illness (last 15 days) from pre to post decreased more in intervention group (60% vs. 40%) as compared to control (60% vs. 57%). However, there was a significant increase in the prevalence of mild diarrhoea among the children in intervention group as compared to non significant decrease in control. One possible reason could be that mothers may

have started giving more food to children after receiving NEC but may not have taken due precautions to ensure food safety.

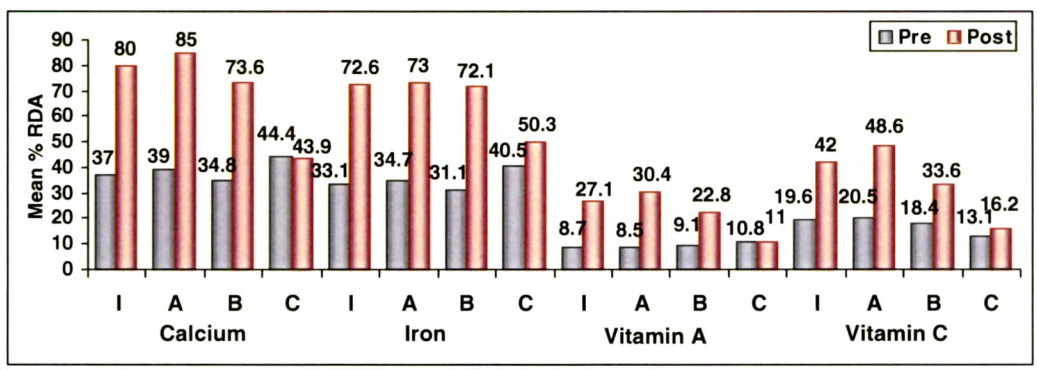
Figure 5.6 Summary Picture of the Change in Nutrient Intake of the Children

Energy and Protein



I: Intervention group, A: NEC-BMM, B: NEC-DIR, C: Control
Energy: p<0.001 I, p<0.01 A, p<0.001 B; Protein: p<0.001 I, A & B; C: all values NS

Minerals and Vitamins



I: Intervention group, A: NEC-BMM, B: NEC-DIR, C: Control
Calcium: p<0.001 I, p<0.05 A, p<0.01 B; Iron: p<0.001 I, A & B;
Vitamin A: p<0.001 I, p<0.01 A, p<0.05 B; Vitamin C: p<0.05 I & A; C: all values NS

Change in food and nutrient intake

Post intervention the mean intake of different food groups increased significantly in the intervention group while there was no significant increase in the control group. The intake of vegetables, fruits, oil and sugar was relatively lower as compared to other foods in the intervention group. The nutrient intake as mean %RDA improved markedly in the intervention villages with the children consuming above 70% of the

RDA of all nutrients (**Figure 5.6**). While in control, there was negligible change and the energy intake decreased from pre to post intervention. However micronutrient consumption especially Vitamin A and C remained low in the intervention villages, perhaps due to continued poor intake of vegetables and fruits. Boys and girls had similar improvements in nutrient intake in the intervention group.

Change in nutritional status of the children

Table 5.9 presents the change in nutritional status of the children post intervention.

- Mean increments in weight (0.9 vs. 0.5 kg) and heights (5.8 vs. 3.1 cm) of the children in the intervention villages were significantly better than in control. As regards gender differences, both boys as well as girls in the intervention group had significantly higher mean increments in height as compared to control group.
- Unfortunately underweight and wasting expressed as Z scores did not improve post intervention and infact showed a non significant increase. However, the prevalence of severe stunting (Height-for-age Z score <-3 SD) decreased from pre to post intervention in the intervention villages while there was an increase in control village (33 % vs. 37%). The gender differences for underweight, stunting and wasting were not found to be significant in both the intervention as well as control groups perhaps because of the small sample size.

Table 5.9 Change in Nutritional Status of Children

Study groups	N	Mean increment in weight (kg) ± SE		Mean increment in height (cm) ± SE			
Intervention group	62	0.9 ± 0.1*		5.8 ± 0.4***			
Control	30	0.5 ± 0.1*		3.1 ± 0.4***			
		Z scores					
		WAZ [1] (%)		HAZ[1] (%)		WHZ[1] (%)	
		<-2 SD	<-3 SD	<-2 SD	<-3 SD	<-2 SD	<-3 SD
Intervention group	62						
▪ Pre		66.1	30.6	62.9	37.1	20.9	4.8
▪ Post		80.6	45.2	67.7	32.3	30.6	3.2
Control	30						
▪ Pre		60.0	30.0	63.3	33.3	16.7	3.3
▪ Post		76.7	33.3	66.7	36.7	20.0	3.3

1: as %NCHS standards (1983), *p<0.05, ***p<0.001

CONCLUSIONS

To conclude, the results of Study I clearly indicate that the knowledge and practices of majority of the rural mothers regarding breastfeeding, complementary feeding and Caregiving were unsatisfactory. Grandmothers (where ever present) were the major support system for the mothers in terms of help in household work and child Care activities. Also a few desirable IYCF practices were more likely to be followed if grandmother was present. At the same time grandmother's presence also encouraged some undesirable practices, which need to be addressed by including them and other family members in nutrition education efforts. The other resources for Care (sufficient family income, small family size, education and nutritional status of the women and clean environment) were not available to majority of the mothers.

Cumulatively the results of Study II indicate that with adequate training focusing on both content and communication, the knowledge of village based women's groups like *bachat mandals* as regards IYCF can significantly improve and they can effectively communicate these messages to neighbourhood women as part of their routine work. Further, with supportive supervision such empowered local women can become effective Change Agents in their community. A simple monitoring system usable by these Change Agents can be a valuable tool to track progress. Further, since the *bachat mandals* already exist in the community this can be a cost effective strategy to deliver IYCF and Care messages for rural communities.

Unique Contributions of Present Research

The present study has increased understanding and provided new insights regarding various dimensions of IYCF practices which have not been adequately researched in this region. For instance:

- This study explored Caregiving behaviours and Resources for Care among poor rural families in Gujarat. In particular family support as an important Resource for Care has been studied, and given useful insights on the role of Grandmothers in the

family. We now understand better the influence of Grandmother's Support on mother's Caregiving behaviours.

- Although studies with regard to Care have been carried out in various developing countries, we need to understand Caregiving in our unique culture and context.
- Meaningful data regarding association of Caregiving behaviours with food intake and child's nutritional status has been obtained.

As regards interventions to improve IYCF practices...

- The present research utilized the potential of local women's savings groups or *bachat mandals* as communicators for improving child feeding and Care practices among the rural mothers. Few interventions have utilized community groups for maternal and child nutrition improvement and most experiences of women's community groups relate to other social or economic areas.
- The present study experience have given us information regarding the 'how to' of effective communication in the area of behaviour change for nutrition. Systematic nutrition education communication (NEC) strategy was used and documented in detail giving us a unique understanding of what are best practices in the area of behaviour change communication and what are the motivating and obstructing factors influencing change.

Recommendations for Future Research

- There is a need for improving Infant and Young Child Feeding and Care practices, in rural Vadodara and in other regions of our country as well.
- Intervention programs should take into account the resources required in households for Caregiving and if possible attempt should be made to empower the Caregivers to increase their resources. In particular women's own nutrition and health status is a powerful resource for their own well being as well as for child Care hence women, as a beneficiary group should occupy a central place in nutrition health intervention.
- There is clearly a need for further research to understand specifically the role of grandmothers in child Care in the Indian context including role of maternal and

paternal grandmothers. The influence of grandmother's support should also be studied vis-a-vis other household level factors and other socio-demographic variables influencing infant-young child feeding and healthcare. Grandmothers' participation in interventions to improve maternal and child survival, health and nutrition status needs to be encouraged, as including only mothers in behaviour change interventions may have limited impact.

- Mobilization and continued support of local Women's groups (engaged in any development activity) could be one answer to empower the Caregivers/mothers towards improved IYCF and Care knowledge-practices.
- Often not obvious, but subtle gender discrimination against the girl child continues to exist in poor rural communities. Hence child feeding and Caregiving interventions should be gender sensitive with special focus on girl child.
- For long-term behaviour change at household level frequent and sustained contact with mother, based on the principles of effective communication, is required.
- Future research could explore various communication approaches using diverse community groups.