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Child Care, Health and Nutrition in the Central Plateau of Haiti: The Role of Community, Household and Caregiver Resources

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ACRONYMS USED

ADP	Area Development Program
BCC	Behavior Change Communication
BF	Breastfeeding
CF	Complementary Feeding
EBF	Exclusive Breastfeeding
FANTA	Food and Nutrition Technical Assistance
HAZ	Height for Age Z-Score
IFPRI	International Food Policy Research Institute
PVO	Private Voluntary Organization
MCH	Maternal and Child Health
MSPP	Ministère de la Santé Publique et de Planification (Ministry of Health)
SD	Standard Deviation
SFB	Soy-Fortified Bulgur
USAID	United States Agency for International Development
WAZ	Weight for Age Z-Score
WHZ	Weight for Height Z-Score
WSB	Wheat-Soy Blend
WV	World Vision

TABLE OF CONTENTS

LIST OF TABLES

LIST OF BOXES

EXECUTIVE SUMMARY

Child Care, Health and Nutrition in the Central Plateau of Haiti presents the main findings of an integrated maternal and child health baseline survey carried out by an Iof the program being implemented by World Vision in the Central Plateau of Haiti. The overall evaluation compares two approaches to targeting food supplements: 1) the traditional, recuperative approach, which targets children identified as being malnourished (weight-for-age < -2 z-scores) through the regular growth monitoring activities; and 2) the preventive approach, which targets all children 6-23 months in an attempt to *prevent* malnutrition, rather than intervene once malnutrition is already established.

The evaluation uses a community level longitudinal pre-post design, and compares 10 paired clusters of communities, which have been randomly assigned to either the preventive or the recuperative program group. The baseline survey was conducted between May and September 2002 and the post-evaluation survey will be conducted exactly three years later, between May and September 2005.

The baseline survey had two main objectives. The first objective was to gather data on the main outcome of the study (i.e. children's nutritional status) before the packages of interventions were implemented in the respective communities, in order to determine the comparability of the two program groups at baseline. The second objective was to assess differences between the groups in the various factors that could influence the response to the interventions and thus, the main outcomes of the evaluation, namely the community, household and caregiver characteristics and the care practices directed to young children.

Thus, the results presented in this report are largely descriptive and are meant to provide detailed information about the communities and households where the study evaluation is being conducted. For the most part, the results are presented comparing the two program groups, to assess whether randomization was generally successful and whether households/individuals from the two program groups are comparable at baseline. Bivariate associations between the different household and caregiver characteristics, care practices and child outcomes are also explored.

Conceptual framework

The conceptual framework used to guide the design of the survey and the data analysis process was based on the expanded UNICEF conceptual framework for child survival, growth and development. Specifically, this framework postulates that child growth is driven primarily by dietary intake and health. These proximal determinants are in turn influenced by three basic determinants: food, health and care. Furthermore, various individual, household and community resources determine the adequacy of the food, health and care that children receive. Care is central to the process of translating resources at the household and community level and making them available to young children. At the same time, in order to ensure that the translation of resources is effective, caregivers need access to certain individual resources, including knowledge and education, adequate time, manageable workloads, social support and physical and mental well-being. In addition, household resources such as food availability, income, labor

and time are critical resources, as are the availability of water, sanitation and health facilities at the community level.

Survey design

The baseline survey instruments were designed using a care resource-oriented perspective that reflected the conceptual framework for the study. In particular, the focus was on assessing availability and access to resources at the level of the community, household and caregiver.

The survey used a household and a community questionnaire. The household questionnaire was administered to the mother of the index child (referred to as the caregiver or the respondent mother), whereas the community questionnaire was administered using a group interview methodology with key community members, such as religious leaders, medical staff or school teachers. Anthropometric measurements (height and weight) were also taken on the survey respondents and eligible children in each household (i.e. index child (18-47 months of age) and a younger sibling (6-17 months) if applicable). Child health and appetite were assessed using a visual analogue scale, which consists of asking the respondent mother to rate the health (or appetite) of her child as compared to other children his or her age and indicate where it falls on a 10 cm long line drawn on the questionnaire. Mothers were also asked to recall whether the child had symptoms of illnesses (diarrhea, cough/cold, pneumonia or fever) in the two weeks prior to the survey. Finally, spot check observations were used to assess the cleanliness of the child, respondent and the household.

The household questionnaire gathered data on household resources such as household composition, socioeconomic status and food insecurity; and on caregiver resources such as education, child care knowledge and experience, women's empowerment and involvement in decision-making, and mental and physical health. It also gathered data on six types of care practices: 1) early infant feeding practices (i.e. around birth); 2) child feeding practices of 18-23 month old children; 3) current child feeding practices, including meal frequency, dietary diversity, intake of animal sources foods, etc.; 4) preventive and curative health care seeking behaviors (e.g.., antenatal care, childhood immunization, treatment for diarrhea); 5) hygiene practices (e.g., child, maternal and house cleanliness); and 6) discipline practices.

The community questionnaire provided data at the community level that allowed a comparison of the different clusters after the randomization process was completed. Community level data were gathered on the smaller community units (called *localités*) within each cluster, because these were more meaningful and finite geographic entities than the clusters themselves. Information was gathered on access to the nearest major town, the main activity of the residents, key geographic characteristics, access to public services such as schools and markets, and access to health services such as hospitals, dispensaries and the services provided by the World Vision program.

Selection and representativeness of survey households

The survey households were selected after conducting a complete census of the general population residing in the communities included in the program evaluation. The census gathered

information on household composition, headship, and the exact age of all children under 5 years of age. A pool of households eligible for inclusion in the survey was generated for each cluster by identifying those households that had a child in the target age range of 18-47 months, where the child's mother also resided in the same house. Eighty-five households were selected at random (without replacement) from each cluster, and the survey administered to the first seventy-five of these households.

A comparison of the data from the baseline survey households and the general population suggest that the data from the baseline survey are a representative sample of households from the general population who have at least one child in the age range of 18-47 months. This is true for all comparisons that could be conducted, except for the data on household headship, where the households selected for the baseline survey included a larger proportion of male headed households than those in the general population.

Comparisons between program groups

The main outcome measures of the survey, i.e., the mean HAZ, WAZ and WHZ, and the prevalence of stunting, underweight and wasting were not different between the two program groups. The comparisons of mean values were done using simple group comparisons as well as pair wise comparisons of the means in each program group within a cluster, and neither method revealed any differences between the two groups. Similarly no differences were found between the two groups in children's health assessed either through the health visual analogue scale or the reported prevalence of morbidity symptoms in the two weeks prior to the survey. Thus, the two comparison groups were found to be very similar in the main child health and nutrition outcomes of the overall evaluation.

Comparisons between the two program groups were also made to assess differences in community, household and caregiver resources. The findings suggest that the randomization process was effective because very few differences between the groups were found in spite of the large number of variables compared. For instance, at the community level we found that the pairs of clusters included in the two program groups were largely comparable in terms of their key geographic characteristics and their access to various services such as closest town, school, market and health services. Households from the two groups were also highly comparable with respect to their socio-demographic characteristics such as household headship, family composition, asset ownership and housing quality, as well as their food insecurity experiences. Finally, the characteristics of the caregivers were also very similar between the two program groups. This was true for the wide range of caregiver resources assessed, including their physical health and nutritional status, employment and time constraints, and a variety of scales used to assess their empowerment, social, emotional and physical support, and their mental wellbeing, and life satisfaction.

The two program groups were also compared relative to a number of care practices related to child feeding, health care seeking, hygiene and discipline. Again, there was no evidence of meaningful differences between the two program groups.

Thus, overall our findings are reassuring in showing that the two program groups to be compared in the final evaluation were very similar at baseline.

Characteristics of survey communities, households and caregivers

Community resources

The community data gathered help develop a picture of the resources available to households and caregivers in our program evaluation area. We found that most of our communities were located in remote areas accessible by unpaved dirt roads, and that up to 40 percent of them were inaccessible by motor vehicle. Thus, many of the communities in our survey area were accessible only by foot or using animals. Agriculture was the most common occupation, followed by petty trade market activities.

Access to daily and weekly markets, health care services, schools, and services such as micro-credit and women's group was extremely limited. These resources, which are important to enhance the care that young children receive, were either far away (like markets and health care services), or simply out of reach (micro-credit and women's groups for example). The long distances to markets have strong implications for the lives of women in the area because women are responsible for most of the household food purchases, and many of them are also involved in petty trade for income generation. Thus, they often have to spend long hours, and in some cases, days, away from their home and young children in order to conduct market activities.

Household resources

Households in this rural part of Haiti do not have a large resource base to draw upon, either in terms of assets or infrastructure. The average household owns about 10 types of durable goods from a list of 17, three types of productive assets (agricultural tools) out of a possible six, and approximately three types of livestock out of a possible six.

The vast majority of households is headed by a man (90 percent), and most of them are spouses of the respondent mothers. Their main occupation is farming. Families are large – on average close to 7 members – with only 2 of them on average being involved in income generating activities. Thus, each employed household member is responsible for an average of 2.5 non-working members. Almost 85 percent of school age children appear to be enrolled in school, an encouraging finding.

The housing, water and sanitation facilities are largely rudimentary with only 30 percent of households having access to public taps for water, and 10 percent to protected springs. More than 50 percent of households have no access to even rudimentary latrines, and electricity is mostly unavailable. Remittances from relatives living either abroad or even in Haiti are also largely absent from the resource base, and less than 10 percent of households report receiving any remittances.

The food security situation of households in our sample is particularly precarious. The data on the availability of food stocks from own production indicate that the staple crops of corn and

millet only last about six weeks on average, and beans last for even less time, about three weeks. Our data on food insecurity related experiences also suggest that food insecurity is highly prevalent and severe in all program areas. Information was obtained on the types of coping strategies and food insecurity related experiences that households had faced in the 30 days prior to the survey, beginning with less severe experiences like decreasing the quantity of beans used in food preparation and ending with what is usually considered the most serious food insecurity related experience – children going to bed hungry. On average, households had experienced 8 of 11 food insecurity related experiences and about three-quarters of all households had been in a situation where their young children had to go to bed hungry. Thus, it appears that the experience of food insecurity cuts deep into families and reaches even young children, who in other, possibly better-off societies, are often buffered from these types of experiences.

Clearly, poverty, food insecurity and limited access to basic services are the norm among our survey households. The following section describes how the women's own personal resources allow them to cope with life in this harsh environment.

Caregiver resources

A universally recognized key maternal resource for care is formal education. Among our sample, however, more than half of the mothers had never attended school and a similarly high percentage was illiterate. Nutrition and health education are sometimes perceived as potential substitutes, at least in the short term, for maternal schooling. It is believed that improving maternal knowledge of specific key aspects related to child care can compensate, at least to some extent, for the lack of formal education. In our sample, we found that in spite of low education levels, mothers' knowledge of feeding practices, especially breastfeeding duration and feeding frequency was quite good. Knowledge of the appropriate timing of introduction of complementary foods, on the other hand, was poor. As will be discussed below both maternal education and feeding knowledge are associated with better care practices in our sample, and thus are important resources for care.

In spite of their low education levels, women in this part of rural Haiti are heavily involved in income-generating activities. In our sample close to 85 percent of caregivers reported working, primarily in farming or petty trading in markets. Most women spend substantial amounts of time away from home, particularly those engaged in petty trade, and most of them usually leave their child behind when they go to work (less than 10 percent report taking their child to work with them). These work patterns raise real concerns regarding the quality of care for young children, and especially for infants in their first year of life.

Women's empowerment was assessed through a variety of questions that tapped into dimensions such as communications between spouses, opinions about gender roles, ownership and control over assets, control over household purchasing and involvement in decision-making. The data indicate that overall, communications between spouses is good, and focuses primarily on issues related to home and expenses rather than work and community happenings. Most respondents scored highly on our gender identity scale, which assessed their opinions regarding the roles of women in Haitian society. These findings indicate that women in Haiti are generally not socialized to accept inferior roles for women.

Consistent with these findings, the majority of women in our sample also indicated that they were involved in most household decisions such as child rearing and buying important items for the household. The majority also reported freedom to make a number of purchasing decisions, especially those related to daily food purchases and small items for themselves. Fewer women, however, indicated having the freedom to buy clothes or medicines for themselves and their children. Consistent with the limited asset base found among these households, few respondents reported owning personal assets such as land, animals or their own home.

The data on social support (emotional, financial/material support and household help) show that about 30 percent of respondents did not know anyone they could talk to when they were sad. Access to financial support was even poorer, with close to 60 percent of women having no access to anyone that they could borrow either food or money from. However, a larger proportion of women had access to a place where they could spend the night if they so needed. Access to help with household tasks was available to most women, particularly for tasks such as fetching water, fuel, cleaning the house and caring for the youngest child. It was less available for tasks such as cooking, laundry and shopping for food.

The participation of women in community groups and activities was generally low; only about a third of women reported participating in groups that discussed issues such as health, education or community problems. Access to microcredit and loans and membership in cooperative groups was even poorer, with less than 10 percent of women having access to these groups and services. The data on caregivers' nutrition and physical health suggest that the majority of women in our sample are well-nourished, although 14 percent are underweight (low BMI) and a similar percentage are overweight or obese. Mothers also generally perceived themselves as being relatively healthy compared to their peers, scoring on average 6 on a 10-point scale of self-rated health.

Data on mental stress and life satisfaction, however, provide some evidence of the harshness of life in rural Haiti, with large proportions of respondents experiencing some or all symptoms of mental stress at least sometimes, if not often. This includes stress related to the lack of time to care for themselves, their children and to complete their daily activities. Close to half of the women reported that they often suffered from headaches, and one third reported often feeling sad or unhappy. Other symptoms such as feeling tired all the time, having trouble thinking clearly and losing interest in their daily activities were also reported by more than one quarter of the women. Only 20 percent reported that they were satisfied with their life in general and as few as 11 percent indicated that they had the important things that they had wanted in their life.

Overall women in our sample have a number of positive personal characteristics that allow them to cope with the challenging environment in which they live. Needless to say that the strategies they use, such as working long hours away from home to make ends meet and juggling between their income-generating, household and child care responsibilities, may have severe consequences for their own health. Anxiety and stress symptoms are extremely common among mothers in our sample, which suggests that they take on much of the burden of protecting their household and children from food insecurity and malnutrition, sometimes at the expense of their own health.

Children's nutritional status and health

In view of the generally poor conditions in which our survey households live and the extremely limited resources available to them, it is not surprising that childhood malnutrition is prevalent in the area. In our sample, 23 percent of children are stunted (low HAZ), 21 percent are underweight (low WAZ) and 5 percent are wasted (low WHZ). On average, however, mothers perceived their child to be generally healthy, as indicated by the mean score of 6.5 on a 10-point scale that they gave their child on the health visual analogue scale. Their perception of their child's appetite compared to other children the same age was equally high (mean 6.7 on a similar visual analogue scale). These high ratings, especially on the health scale, were somewhat surprising, considering the extremely high prevalence of reported symptoms of morbidity experienced by children in the two weeks prior to the survey. According to the respondents, close to half of the children had had fever, two thirds had had symptoms of cough/cold, and approximately one third had had diarrhea. Compared to findings from a review of 42 data sets from the Demographic and Health Surveys, these prevalences are very high, even for rural areas. The latest DHS survey in Haiti, however, reported similarly high levels of fever and diarrhea, suggesting that morbidity among Haitian children is extremely high, even compared to other developing countries.

Care practices

Child feeding

Overall, our survey data confirm many of the findings from our previous formative research on child care practices in the study area (Menon et al. 2003). The positive practices observed are that breastfeeding is almost universal and that the vast majority of mothers breastfeed their child up to at least 18 months of age. A variety of less optimal practices are observed, however, including low rates of exclusive breastfeeding during the first 6 months; the widespread use of baby bottles (40 percent); and the very early introduction of complementary liquids, semi-solid and solid foods (sometimes as early as in the first month of life). The diet of young children in these communities also appears to lack diversity, and nutrient-rich foods like animal source foods and dairy products are consumed infrequently. Meal frequency is also low, with 40 percent of children 18-23 months of age being fed less than the recommended three meals per day. Although low meal frequency may be related to food insecurity and poverty, it appears to also be driven by a cultural belief that evening meals cause indigestion in young children and therefore should be avoided.

Care during feeding and especially responsive feeding are increasingly recognized as key for optimal feeding of the young child, especially in environments where malnutrition may cause poor appetite in children and reduce their interest in food. Our data show that more than three quarters of the children in our sample ate without any assistance from a caregiver. This is consistent with findings from our previous formative research, which suggested that children are expected to learn to feed themselves early on, and especially so after they reach 12 months of age. Among those who received assistance, mothers, as opposed to other family members or substitute caregivers, were the main source of assistance (92 percent). About 74 percent of caregivers reported taking some action to encourage their child to eat when the child refused

food or had a poor appetite for a long time. In a little over 50 percent of cases, the action taken was mostly positive (e.g., caressing or holding the child and encouraging the child to eat), but a fairly large proportion also engaged in the use of aversive methods such as forcing the child to eat. The use of different strategies to encourage children to eat was more common for older children than for infants, suggesting that mothers may have been more worried about refusal to eat and poor appetite among older children than infants.

Data on feeding during diarrhea indicated that mothers were generally well aware of the need to increase (or at least maintain) fluid intake during diarrhea episodes to prevent dehydration. Still, we found 20 percent of mothers who reported giving less fluid to their child during diarrhea and close to 8 percent who reported giving no liquid at all. A fairly large proportion of mothers reported giving less food to their sick children, probably due to the problems of poor appetite and vomiting that often accompany diarrheal episodes.

Preventive and curative health care seeking

In our sample, the percentage of children fully immunized was alarmingly low (18 percent), even compared to Haiti standards. Thus, it seems like access to preventive health services for children is extremely poor in this area. Access to prenatal care for women, on the other hand, appears to be much better. The vast majority of women reported having attended prenatal consultations with a health professional (81 percent) during their last pregnancy and more than half of them had attended between 1 and 3 times. Also, up to two thirds of women had received iron supplements during pregnancy. The majority of births were home-based and attended by midwives. Few women were assisted by a health professional (6 percent), and a disconcerting 4 percent received no assistance at all during delivery. An additional concern is the fact that very few women received vitamin A supplements after delivery, probably a reflection of the unavailability of the supplement, combined with the lack of awareness and training of midwives in their use. This is a crucial strategy for ensuring that young infants receive adequate amounts of vitamin A through their mothers' breast milk, and it is particularly important in this area since 14 percent of women reported having experienced night blindness (a symptom of vitamin A deficiency) during pregnancy.

Regarding the use of health services for curative care, the majority of mothers reported seeking some type of advice when their child experienced symptoms of fever, cough/cold, ARI or diarrhea. The type of advice sought, however, differed depending on the symptoms, with respondents being more likely to seek help from a medical professional when the child had ARI symptoms or fever, suggesting that they recognized the severity and greater risks associated with these symptoms. Only 40 percent of caregivers reported the use of oral rehydration solution (ORS) for treating diarrhea, even though 97 percent said they had heard of ORS.

Hygiene practices

Overall child, maternal and house hygiene were quite good, considering the limited means available to the families in our sample to maintain good hygiene. As expected, more mobile children in their second and third year of life were more likely to be rated as "dirty" by our field

workers than infants in their first year who tend to be held and protected from environmental contamination. Thus, the child cleanliness scale was strongly associated with age.

Discipline strategies

The use of physical punishment to discipline children was very common, with two thirds of parents reporting that they sometimes hit their children to make them listen to them. Physical punishment is strongly discouraged for its negative influence on child developmental outcomes.

In sum, child care practices in this population can be improved, but there is a number of existing positive practices to draw from. Some non-optimal feeding practices seem to be related to cultural beliefs and traditions, but they may be amenable to change through well-designed education messages. Such practices include early feeding practices such as delayed initiation of breastfeeding and the use of *lók* in the first days following birth, as well as the early introduction of liquids and semi-solid foods in the child's diet. Other non-optimal feeding practices, however, such as the lack of diversity and the infrequent use of animal source foods clearly stem from problems of poverty and food insecurity. Approaches to improve these practices will have to take into account the severe economic constraints faced by families with regard to these practices. The behavior change and communication strategy developed by our team in collaboration with World Vision took these factors into account and tried to develop creative ways to overcome some of these constraints (Loechl et al. 2003).

Linkages between care resources, practices and child nutrition and health

In order to explore how the various elements of our conceptual model interact in our survey population, we examined a number of bivariate associations between care resources, practices and child outcomes. The main objective of exploring these bivariate associations was to understand which of the theoretical relationships laid out in the conceptual framework are actually reflected in associations between variables assessed in our survey. It is anticipated that this first stage of analysis will form the basis for future multivariate analyses with these data.

Household resources and caregiver resources

Several associations between household resources and caregiver resources were identified and all were in the expected direction. For instance, caregivers living in households with greater access to resources tended to be better nourished, healthier and better educated and they also enjoyed a higher status and more social support in their households. Household food insecurity, on the other hand, was associated with lower levels of all other household resources as well as with lower caregiver resources. Caregivers from the most severely food insecure households were more likely to report poor health status, higher anxiety and stress levels, lower life satisfaction, and less access to financial and material help. These associations seem to reflect the extreme levels of food insecurity in these communities as well as the immediacy of its impact on various aspects of the daily lives of the survey respondents.

Household resources and care practices

Household resources were also associated with a variety of child care practices. Partner's education was associated with some early feeding practices, as well as feeding practices related to food choice and dietary diversity. As could be expected, food insecurity was closely associated with feeding practices, particularly the feeding practices that reflect food choice and dietary diversity. These practices are more likely to be directly influenced by fluctuations in food security than breastfeeding or practices related to care during feeding for example. The household assets index was also associated with all feeding practices related to dietary diversity and food choice and with children receiving assistance to eat, but less with early feeding, the use of baby bottles and continued breastfeeding.

A number of household resources were associated with the hygiene scales. Partner's education, household assets, dependency ratio and household food insecurity were all associated with child cleanliness in the expected direction. Dependency ratio was associated with the increased use of physical punishment, but associations between other household resources and the use of physical punishment were less interpretable.

Caregiver resources and care practices

The caregiver characteristic most strongly and consistently associated with care practices was maternal education, which was associated positively with practices from all six categories studied. Greater caregiver feeding knowledge was also associated with a number of positive care practices, including optimal early feeding practices, greater dietary diversity, positive response to child food refusal, increased use of liquids during diarrhea and good hygiene practices.

Our data provide no evidence of a negative effect of maternal employment on child care practices, in spite of the fact that working mothers tend to leave their young child at home for extended periods of time when they work. On the contrary, maternal employment and longer absences from home were positively associated with greater dietary diversity, better feeding practices during diarrhea (more liquids) and child cleanliness. The positive associations between maternal employment and dietary diversity may reflect the fact that women whose patterns of work keep them away from home for longer hours are more likely to be the women who work in market trade and thus have better access to a wider variety of foods and possibly greater income.

A number of the women's empowerment and social support scales were associated with early feeding practices, but again the associations were stronger and more consistent with feeding practices related to food availability and access, such as dietary diversity and the use of animal source foods in the child's diet. Hygiene practices were also related positively with couple communication, ownership of assets and household help.

Maternal anxiety/depression was negatively associated with five of the seven feeding practices related to food choices and dietary diversity. Mothers who were in the highest tercile of the anxiety/depression scale were less likely to have fed their child three meals in the previous day compared to mothers in the lowest tercile, and they were less likely to feed their child nutrient-rich (and expensive) foods such as flesh foods and vitamin-A rich foods on a regular basis.

Given the previously described association between severe food insecurity and maternal anxiety/depression symptoms, it seems likely that the poorer diet quality of children who have more anxious/depressed mothers is related to their more acute problem of food insecurity.

Other associations found between the anxiety/depression symptoms scale and child care provide additional support for the hypothesis of a food insecurity link in these associations. Mothers from the highest tercile of the anxiety/depression scale were more likely to help their 18-23 month old child to eat, and were more likely to take action when their child refused to eat than mothers from the other two terciles. Thus, it is likely that more anxious mothers are more concerned about their child's diet (if food is scarce and/or the child is perceived as being less healthy or growing poorly), and therefore they respond by being more active feeders. Again, this explanation is likely, given the fact that anxious/depressed mothers were more likely to be found among households in the most severe food insecurity tercile.

Household and caregiver resources, care practices and child outcomes

Children's nutritional status and health were associated with a number of household and caregiver resources as well as some care practices. The factors most strongly associated with nutritional status were the asset and housing indices (household resources), maternal education (caregiver resources), and some of the dietary diversity indicators (care practices). Few of the maternal resources were associated with child diarrhea and health, but children whose mothers were in the higher anxiety/depression and stress terciles of the scales were more likely to have had diarrhea in the previous two weeks and to have poorer health. These findings, once again, suggest a potential link with food insecurity, which is confirmed by the fact that diarrhea and health were strongly associated with food insecurity in the sample; children from more food insecure households were more likely to have had diarrhea recently and they were also more likely to have a lower score on the health analogue scale.

Of all the care practices studied, the diversity-related feeding practices were the practices most strongly and consistently associated with better child nutritional status and health, and a lower likelihood of having had diarrhea in the previous two weeks. A few feeding practices, namely continued breastfeeding for children 18-23 months, and being helped to eat for children 24-35 months were negatively associated with HAZ and WAZ. Also, aversive responses to food refusal (threatening, forcing children to eat, etc.) were strongly and negatively associated with WHZ. As discussed above, these negative associations could reflect reverse causality, where the positive caregiver behaviors documented in the survey were responses to poor child outcomes, rather than the negative outcome being a result of the positive practices. All of these care practices could represent "compensatory" maternal responses to the needs of smaller or sicker children who could have been perceived to need more care and attention than bigger, more robust children.

Conclusions

Results of the bivariate analyses confirm the importance of a number of the hypothesized relationships between different levels of resources for care and care practices, as well as between care practices and child outcomes. In particular, the strong link between food insecurity, maternal distress, low diet quality and poor child outcomes provides clear evidence of the urgent

need for interventions to alleviate food insecurity in this population. In that respect, the World Vision program can contribute, especially through its food supplements, to increasing food security among households with young children. The World Vision program also has enormous potential to respond to the need for increased access to health care services, especially preventive health services such as childhood immunization and maternal and child vitamin A supplementation, which are desperately lacking. Last but not least, the newly developed behavior change and communication strategy, which was developed for this program using a series of qualitative and formative research activities, is now fully integrated into the overall intervention package in both program groups. The strategy aims at strengthening several care practices that were identified through our qualitative research as key to improving child nutrition and health in this population. The associations between many of these same care practices and child outcomes in the baseline survey, especially the practices related to increased dietary diversity and consumption of animal source foods, confirm the potential of the BCC strategy to contribute to reducing malnutrition and morbidity in this population.

1. INTRODUCTION

With a population of 8 million in the year 2000 and a GDP of $460 (World Development Indicators, 2003), Haiti is one of the poorest and most densely populated nations in the Western hemisphere. The infant mortality rate is 79 per 1000 children, and the under-five mortality rate is above 100 (123/1000) (UNICEF State of the World's Children, 2003). There are no World Bank figures available on the poverty rate in Haiti. However, growth in the already low per capita gross domestic product (GDP) has been negative for the past 4 years (World Development Indicators, 2003), suggesting that the economic situation is deteriorating. Using the UNDP's Human Development Indicators of longevity, quality of life and education, Haiti ranked 145th out of 175 countries in 1993, suggesting that over 70 percent of Haitians are living in poverty (Ministry of Public Health and Population and PAHO/WHO, 1998).

Twenty three percent of Haitian children under the age of five years are stunted, almost five percent are wasted and 17 percent are underweight (EMMUS-III, 2000). Stunting is as high as 33 percent in the poorest regions of the country. The nutrition profile of children under five years of age in Haiti is very similar to that of children from other poor developing nations. On average, children are born of adequate weight and height, but their growth starts to falter soon after birth and gradually deteriorates until they reach two to three years of age (EMMUS III, 2001). The length deficit that children cumulate during this period of growth faltering is generally considered to be largely irreversible (Golden 1994). In addition to small stature, the consequences of poor nutrition during these critical first years include higher susceptibility to infectious diseases, delayed cognitive and motor development, and diminished school performance. In the long term, these in turn may result in reduced intellectual and work performance, limited employment opportunities and income generating capacity, thereby perpetuating the cycle of poverty, food insecurity and undernutrition. At the national level, the consequences are severe - reduced human capital formation and poor economic growth and development.

Traditionally, Maternal and Child Health (MCH) programs to reduce childhood malnutrition have provided food supplements and other program inputs to children once they have become malnourished. Children are usually screened into the program by measuring their weight during growth monitoring activities and those whose weight falls below a predetermined cut-off point for their age become eligible to receive program benefits. There is now increasing recognition that this approach has not been successful in bringing about substantial improvements in reducing childhood malnutrition worldwide, nor is it likely to be the most cost-effective approach to address undernutrition problems at the population level. This understanding comes from research on the process and timing of growth faltering among infants and young children, as well as various studies on the effectiveness of food supplementation interventions in improving childhood nutrition (Schroeder et al. 1995; Lutter et al. 1990; Allen 1994; Rivera and Habicht 1996; Rivera and Habicht, 2002).

This body of evidence suggests that a *preventive* approach that targets children at the age when they are most vulnerable to growth faltering *and* also most likely to benefit from supplementation, i.e., between 6 and 24 months of age, is likely to be more effective than targeting children who are already malnourished. Moreover, by maintaining children's growth at

a higher level throughout their most vulnerable period (0-24 months of age), it is expected that not only short-term, but also long-term benefits on growth will be achieved (Martorell 1995).

Although this preventive approach to targeting MCH and food aid programs is now recognized as more promising than the traditional *recuperative* approach, we are unaware of any rigorous evaluation of the impact and cost-effectiveness of this approach in reducing childhood malnutrition. A process is now underway in Haiti to systematically compare this preventive approach with the traditional recuperative model. The evaluation is conducted by a team of researchers from IFPRI and Cornell University in collaboration with World Vision-Haiti, the implementing institution.

The evaluation will compare 10 pairs of communities randomly allocated to either the preventive or recuperative program model, using a pre-post design. The communities are located in the Central Plateau region of Haiti. The baseline survey, which is described in this report, was conducted between May and September 2002 and covered a total of 1524 households. The post-intervention survey to assess program impact will be conducted at the same time of the year (May to September) in 2005. However, because implementation of all program components became operational only in early 2003, the communities will have been receiving program benefits for approximately 2-2 ½ years at the time of the final impact survey.

This report presents the main findings of the baseline survey. It is largely descriptive in nature and is meant to provide detailed information about the communities and households where the study evaluation is being conducted. For the most part, the results are presented comparing the two program groups, to assess whether randomization was generally successful and whether households/individuals from the two program groups are comparable at baseline.

The report is structured as follows. Chapter 2 presents an overview of the objectives, design and methodology of the survey, as well as the conceptual framework used to guide the development of the survey questionnaire. This is followed by Chapter 3, which compares the baseline survey sample households with the general population from which the sample was drawn. Chapter 4 presents the main outcome measures of the survey, i.e., the health and nutritional status of children in the survey communities. The subsequent three chapters focus on community, household and caregiver resources for care. Chapter 5 describes the community characteristics and availability of services. Chapter 6 describes the household level socio-demographic characteristics, food security situation and economic resources. Chapter 7 focuses on caregiver resources for care, such as education, workload, empowerment and health. Chapters 8 and 9 focus on care practices, with infant and young child feeding practices described in Chapter 8 and other care practices such as preventive and curative health care seeking, hygiene practices and discipline strategies presented in Chapter 9. Finally, Chapter 10 presents results from bivariate statistical analyses that examine the relationships between caregiver and household resources and care practices, as well as their relationship with child nutrition outcomes. Chapter 11 summarizes the results and briefly discusses their implications for children's nutrition, health and well-being in this part of rural Haiti.

2. CONCEPTUAL FRAMEWORK AND METHODS

2.1. Conceptual framework

The conceptual framework that was used to guide the data collection and analysis of the baseline survey was based on the expanded UNICEF conceptual framework for child survival, growth and development (Engle. Menon and Haddad, 1997; Appendix 2.1.). Specifically, this framework postulates that the optimal growth of children is driven primarily by dietary intake and health. These proximal determinants of optimal growth are in turn influenced by the basic determinants of food, care and health. Further, various individual, household and community resources are determinants of the adequacy and quality of the food, health and care that children receive. For example, the resources for ensuring that adequate food is made available to a child include both the adequacy of food at the household level, and various caregiver actions that translate the available food in the household to available food for the child. Similarly, for a child to receive adequate health care, it is essential that the health services be available and accessible, and that a caregiver be equipped to use those services (in terms of knowledge, time, money, etc.). Care is therefore, central to the process of translating resources at the household and community level and making them available to young children who are not capable of accessing those resources for themselves.

In order to ensure that this translation of resources is most effective, caregivers need access to certain individual resources, including knowledge and education, adequate time, manageable workloads, social support, physical and mental well-being. In addition, resources such as food availability, income, labor and time at the household level are critical resources, as are the availability of water, sanitation and health facilities at the community level.

Table 2.1. describes the types of data that were gathered to provide information on the different levels of the conceptual framework. The organization of the table reflects the care resource-oriented perspective that was taken in setting up the study. The development of the baseline survey questionnaire is described in the questionnaire development section in this chapter.

Table 2.1. Data gathered in the baseline survey

Element in conceptual framework	**Relevant data gathered**
Outcomes	
Child growth	- Child nutritional status (height, weight)
Child illness	- Whether child had diarrhea, fever, shortness of breath and/or cough/cold in past 2 weeks
Care practices	
Child feeding practices	- Breastfeeding o Initiation o Duration o Exclusivity - Complementary feeding o Types of foods fed to child in past 24 hrs o Frequency of feeding different foods in past 7 days o Frequency of meals and snacks in past 24 hrs - Feeding style/responsive feeding o Feeding behaviors when child refuses to eat o Assistance to eat
Health care seeking practices	- Use of preventive health services o Use of prenatal care while pregnant o Immunization, vitamin A supplementation - Use of curative health services if child was sick with diarrhea, fever, shortness of breath or cough/cold in past 2 weeks - Use of health services if child had a poor appetite
Hygiene practices	- Proxy measures o Child cleanliness o Maternal cleanliness o House interior cleanliness o House exterior cleanliness
Individual (caregiver) resources for care	
	- Education - Knowledge about infant feeding - Workload and time constraints - Autonomy and control over resources - Social support o Financial/material o Emotional - Mental wellbeing - Physical wellbeing
Household resources for care	
	- *Economic resources* o Durable good assets o Productive assets (e.g., farming tools)

Element in conceptual framework	**Relevant data gathered**
	o Livestock assets - *Food availability* o Types of staples cultivated o Duration of harvest o Experience of food insecurity-related coping behaviors o Whether any pregnant or lactating women were recipients of food aid - *Access to services: water and sanitation facilities* - *House construction materials* (quality of housing)
Community level resources for care	
	- *Health care resources* o Distance to health care center o Community level access to health care (presence of clinics, dispensaries, etc.) - *Access to public services* o Distance to schools, markets, etc.

2.2. Evaluation design

This program evaluation uses a probability design (Habicht, Victora and Vaughn, 1999) and compares paired clusters of communities randomly assigned to either the preventive or the recuperative program group. The comparison between the pairs of clusters will be made using a pre-post community-level longitudinal design. The main outcomes of the evaluation are changes in mean HAZ, WAZ and WHZ, and in the prevalence of childhood stunting, underweight and wasting between baseline and the post-intervention survey.

Twenty clusters of communities, with program services for each cluster covered by one Health Agent were selected from World Vision's program areas for the evaluation. Each cluster was then paired with another one, similar in terms of location (e.g. distance to the main highway and/or main town), geographic and ecologic conditions (e.g. whether located in the plains or the mountains), access to a health care center and finally, the existence of a World Vision private sponsorship program (Area Development Program). Within each pair of clusters, one was randomly assigned to the preventive model and the other one to the recuperative model. Thus, the unit of randomization was the cluster covered by one Health Agent.

The number of clusters (20) was determined by balancing the cost of conducting the surveys with the need to have enough clusters to be able to achieve the desired sample size of 750 children per program model. A larger number of clusters, with fewer second stage sampling units (in this case, households) within each cluster is usually preferable, but the cost of including more clusters is higher than that of including households within clusters.

The evaluation design uses a community-level longitudinal design, i.e. two random household surveys will be conducted in the same communities at baseline and exactly three years later to avoid seasonal variations. The baseline survey was conducted between May and September 2002, but the program was not fully implemented until early 2003. Therefore, the final evaluation will be done after 2-2.5 years of program implementation.

2.2.1. Comparison groups

Children 12-41 months of age were targeted for the survey because children in this age range are expected to benefit the most from the preventive intervention. This expectation comes from current knowledge about the growth patterns of infants and young children, as well as knowledge about the effectiveness of supplementation among children. Specifically, it is now known that:

- Supplementation is more effective if provided before 24 months of age (Schroeder et al., 1995)
- Larger rates of response are achieved with 12 months of supplementation (Rivera and Habicht, 2002)
- The growth patterns of Haitian children show that growth faltering peaks at 18 months of age and plateaus thereafter, suggesting a lack of response (or minimal level of response) after 18 months of age (see Chapter 4).

Thus, in this study, the group considered most likely to benefit from the preventive approach is the group of children who are exposed to the supplementation when they are between 6 and 17

months of age. These children are at the age of largest potential benefit and can be supplemented for 12 months because they fall within the age range of targeting. This is illustrated in Table 2.2. The darker shaded area represents the children who will have been 6-17 months of age at some point during the intervention and thus, who have had the possibility to receive supplementation for 12 months. Note that all these children are born between the two surveys and they will be 18-35 months of age at the time of the second survey. The lighter shaded area highlights children who will not have entirely met both criteria. These include: 1) children who are younger than 18 months at the time of the second survey, and thus will not have received the full 12 months of supplementation (age at the end of the survey: 12-17 months); and 2) children who have started to receive the intervention after the age of 6 months, in which case they will not have had supplementation at the age of maximum potential for response (age at end of study: 12-41 months). Thus, we decided to include all children 12-41 months of age in the two random surveys.

During the field work, households with children 18-45 months of age were selected for inclusion in the study, rather than households with children 12-41 months of age. A total of 1522 children were surveyed, of which 70 percent were in the age range between 18-35 months of age (the dark-shaded area in Table 2.2.), and 96 percent were in the age range originally targeted of 12-41 months. For consistency (using 6-month age intervals), we refer to our index children as being 18-47 months of age throughout this report, although they are in fact 18-45 months of age, with a majority between 18 and 43 months.

Table 2.2. Age distribution of children at the time of the two surveys and at the beginning of the intervention

Age at baseline survey (May 2002)	Age at time of second survey (May 2005)
	0-5
	6-11
	12-17
	18-23
	24-29
	30-35
0-5	36-41
6-11	42-47
12-17	48-53
18-23	54-59
24-29	
30-35	
36-41	
42-47	
48-53	
54-59	

Legend:

Children < 18 months at start of intervention who received food for 6-12 months.

Children <18 months at start of intervention who received food for at least 12 months.

2.2.2. Sampling methodology and sample size calculations

The survey used a two-stage cluster sampling methodology. Twenty clusters comprised the first-stage sampling unit for the survey and households with eligible children[1] were the second-stage sampling unit. The pairs of clusters were selected such that the group of communities (*localités*) within each cluster were comparable with those in the other cluster in terms of location (e.g. distance to the main highway and/or main town), geographic and ecologic conditions (e.g. whether located in the plains or the mountains), access to a health care center and finally, the existence of a World Vision private sponsorship program. Eligible households within each cluster were selected based on information gathered through a census of the evaluation communities prior to the survey.

2.2.3. Census and selection of eligible households

A census was carried out prior to conducting the survey to provide information on the number of eligible households in each cluster. Every household in the communities where the evaluation was to be conducted was visited by a trained community volunteer or World Vision health agent and information was obtained on the residents in the household. In particular, detailed information was obtained on the number of pregnant and lactating women in each household and on children under the age of five years. For all children under five years of age, information was obtained on the date of birth of the child as well as on whether the child's mother resided in the same household. The exact age of all children in the household was then calculated by the survey supervisors based on the date of the census and the date of birth of the child.

Following this, those households that included a child in the targeted age range and whose mother lived in the same household were selected from each cluster. This formed the pool of households eligible from that cluster for the survey. The household number assigned to each eligible household during the survey was written down on individual pieces of paper, and eighty-five eligible households were then drawn at random (without replacement) from the pool of eligible households within each cluster. The number of eligible households in each cluster is presented in Table 2.3., as are the actual number of households from which data were gathered.

Table 2.3. Number of eligible households in each cluster

Cluster	No. of eligible households	No. of households included in the survey
Madame Brun	131	77
Marmont	107	79
Bassin Zim	179	75
Marialapa	135	75
Pablocal	209	75
Bintourib	187	79
Cherival	126	74
Carrefour Ledan	109	72

[1] As indicated earlier, eligible children were in theory between 12-41 months of age. However, in practice, children 18-47 months of age were included in the survey.

Waniketer/Moruque	117	76
Rode/Beganabe	102	78
Casse	142	76
Locaret	103	76
Pareidon II	164	77
Pareidon I	177	80
Tierra II	125	77
Tierra I	116	75
Laloimassouce	100	74
Salmadere	112	78
Ananas	118	78
Locorobe	113	73
TOTAL	*2672*	*1524*

2.2.4. Sample size calculations

Sample size requirements for the survey were estimated based on the desired detectable difference in the prevalence of undernutrition among the two program groups. The necessary sample sizes to examine differences in prevalence rates are the same as those necessary to examine differences between distributions, and they are larger than those necessary to examine differences in means (Brownie et al. 1986).

Sample sizes were estimated using an equation for estimating sample sizes for differences in proportions (Cohen 1988). The effect size (magnitude of improvements in nutritional status between baseline and post-intervention) used for the calculation was based on previous studies of the effect of supplementation on child growth, which ranges from 0.25 to 0.46 z-scores for WAZ and 0.04 to 0.35 z-scores for HAZ (Caulfield, Huffman and Piwoz 1999). Based on their calculations, an improvement of +0.35 z-scores of nutritional status in a population with average z-scores around –2.0 will result in a decline in prevalence of undernutrition from 50 percent to 38 percent (a decrease of 12 percentage points). Detailed calculations are presented in Appendix 2.1.

Since the intervention in this case was randomized at the cluster level rather than at the level of the individual child, it was necessary to account for the clustering of characteristics within a cluster (called the design effect[2]). This must be taken into account when calculating sample sizes because it increases the sample size needed when the intervention is randomized at the cluster, rather than the individual level. In this study, each cluster was the group of communities served by one Health Agent and information about the design effect at this level was not available at the time of sample size calculations.

[2] The design effect is the ratio of the variance for the cluster sample divided by the expected variance of a simple random sample of the same size. Since the design effect is dependent on the variance between cluster, it will be smaller if the number of clusters is large and the number within each cluster is small (Foreman 1991). For complex nutrition surveys, it has been shown that clusters with 30 children in each cluster lead to design effects for stunting (HAZ %<-2) that range from 0.44 to 2.13 and 1 to 1.62 for underweight (defined as W/A <60%) (Katz 1995).

Sample size calculations were made to detect 4 levels of differences of underweight and stunting between the baseline and second survey, using two levels of power (0.8 and 0.9), three design effect sizes (1, 1.5 and 2) and information from the DHS 2000 report on the prevalence of stunting and underweight among 12-41 months old children from rural areas. These estimates are presented in Appendix 2.2. along with a discussion of cost issues in sample size considerations

A final sample size estimate of **750 children per group, for a total of 1,500 children** was made after reviewing the information provided in the tables in Appendix 2.2. with World Vision-Haiti team. This sample size is appropriate to detect a difference in the prevalence of stunting of at least 7.5 percentage points (required sample size = 734 children/group; Table 2, Appendix 2.2.), assuming an average design effect size of 1.5. This sample size will also give us the ability to detect a difference smaller than 7.5 percentage points in underweight (Table 1, Appendix 1) and differences larger than –0.2 in mean z-scores for both WAZ and HAZ. For cost reasons, only 10 pairs of clusters could included in the study, and thus, the required sample size per cluster was a minimum of 75 children in the selected age range per Health Agent.

Data was gathered on a total of 755 index children in the preventive group and 759 index children in the recuperative group, for a total of 1514 index children between 18-47 months of age. In addition, data were gathered on 569 younger children (0-17 months of age) who were born to the same mother and lived in the same household as the index child. Thus, in total, survey data were gathered on a total of 2093 children between 0 and 45 months of age. Anthropometric measurements were only conducted on children aged 6 months and older, and are available for 1825 children between 6 and 45 months of age.

2.3. Design and content of survey questionnaires

The survey involved a household and a community questionnaire. The household questionnaire was administered to the mother of the index child; the community questionnaire was administered using a group interview methodology with key community members, such as religious leaders, medical staff or school teachers in each *localité*. In addition to the questionnaire-based data collection, anthropometric measurements (height and weight) were conducted of the survey respondents and eligible children in each household (between 6 and 47 months of age. The children under 24 months were measured lying down, i.e., their recumbent length was measured, while standing height was measured for those children 24 months or older. Finally, spot observations were used to assess the cleanliness of the child, respondent and the household.

2.3.1. Household questionnaire

The household questionnaire was based on the Demographic and Health Survey questionnaire administered in Haiti in the year 2000 (EMMUS-III, 2001), and was adapted to the purposes of the IFPRI-Cornell-World Vision survey. A short qualitative research study conducted in January 2002 provided the information necessary to adapt the questionnaire, particularly with regards to infant feeding and care practices, and indicators of socioeconomic status (Menon et al., 2002). The survey was adapted by the IFPRI-Cornell team in collaboration with a Haitian consultant and was administered in Haitian Creole.

The questionnaire was pretested in three stages before being finalized for use in the survey. First, it was pretested by the IFPRI-Cornell team and the Haitian consultant. Following the review of this pretest, the questionnaire was revised in preparation for the training of interviewers. Second, parts of the questionnaire were revised as needed during the training of the interviewers. After the training was completed, a final pretest was done by the entire survey team in communities that would not form part of the evaluation area. Minor corrections were made to the questionnaire following this final pretest.

The following nine modules were included in the household questionnaire:

1. Household composition and socioeconomic status
2. Education, civil status and employment of the respondent mother[3] and her spouse
3. Maternal prenatal and delivery care and child care and feeding practices
4. Child health and immunization
5. Child, maternal and household cleanliness
6. Respondent mother's empowerment and decision-making
7. Household food security
8. Knowledge and attitudes about child feeding and care
9. Respondent mother's mental and physical health

Some of the questions on child feeding (Module 3), appetite and feeding during illness (Module 4), and child cleanliness (Module 5) were also asked about the younger child in the household in cases where there was one.

Each questionnaire module is described briefly below.

Module 1. Household composition and socioeconomic status:
This module gathered information on the composition of the household, including household headship, a list of all household members, their age and occupation, and their relationship to the respondent mother. Data on household income and expenditure were not gathered in this survey because of financial limitations. However, information was gathered on household socioeconomic status (SES) by using proxy indicators such as ownership of durable goods, productive assets like agricultural tools and livestock as well as the housing and sanitation situation. These measures have been used reliably in the past as indicators of household SES and are considered useful, particularly in cases where it is too expensive, time-consuming or sensitive to gather information on household income and expenditure (Filmer and Pritchett, 2001).

Module 2: Education, civil status and employment of respondent mother and her spouse
This module included questions to assess the educational and employment status of the respondent mother and her spouse/partner, as well as information on her employment conditions (i.e., number of hours worked, number of days per week she worked, etc.). Information was also gathered on the types of child care arrangements respondent mothers used when they left the house for work and on any child care experience they had had when they were young girls. Previous qualitative research in Bangladesh had shown that child care experience when young

[3] The terms "respondent mother" and "caregiver" are used interchangeably throughout this document because all main caregivers of the index child were the respondent mother.

had an influence on the care practices of primiparous mothers (Menon, 2002) and it was considered important to measure this in a survey context to be able to evaluate its influence on care practices.

Module 3: Maternal prenatal and delivery care and child feeding practices .
In this module, the respondent mother was asked about antenatal care use during her pregnancy with the index child, including number of health center visits, tetanus toxoid immunizations, type and location of delivery, etc. Data were also gathered on child feeding practices of the index child, including initiation of breastfeeding, duration of breastfeeding and the pattern of introduction of complementary foods. Data were also gathered on types of complementary foods fed in the past 24 hours as well as the past week, and on the frequency of feeding meals and snacks to the child in the past 24 hours.

> Module 3A: Child feeding of the younger child (0-17 months of age) of the respondent mother
> Since the preventive program model focuses on children under 24 months of age and includes a behavior change communications component related to infant feeding and care, it was considered important to evaluate these behaviors at least in households where there was a child under the age of 18 months, in addition to the index child who was between 18 and 47 months of age. The information gathered in this module was similar to that in Module 3, but more limited. Data on prenatal care for the younger child was not gathered, but information was obtained on breastfeeding, pattern of introduction of foods to the child, frequency of meals and snacks, as well as the frequency of consumption of liquids and foods in the past 24 hrs and past 7 days.

Module 4: Child health and immunization.
This module was designed to provide data on the immunization status of the child as well as on symptoms of illnesses (diarrhea, cough/cold, pneumonia or fever) the child had suffered from in the two weeks prior to the survey. Data was also obtained on care-seeking patterns for these illnesses. In addition to the illness and immunization data, child appetite and general health were assessed using a visual analogue scale. This method, which was successfully used in Ghana (Armar-Klemesu et al., 2000), consists of asking the respondent mother to rate the appetite of her child as compared to other children his or her age and indicate where it fell on a 10 cm long line drawn on the questionnaire. The left-hand end of the line indicates extremely poor appetite (or health) while the right-hand end indicated an extremely good appetite (or health) compared to other children the same age. This module also included questions about the respondent mother's reported actions when her child refuses to eat or has chronic poor appetite. Questions were also asked about how much assistance the index child was given with eating solid foods, semi-solid foods and liquid foods. These questions were designed based on information from previous qualitative research on infant feeding and care in the survey areas.

> Module 4A: Illness and appetite of younger child of the respondent mother.
> As with module 3A, this module was designed to provide information on the appetite and health status of the younger child of the respondent mother if she had one. The appetite visual analogue scales was used in this module as well, but the health analogue scale was not. The only health/illness related questions asked relative to the younger

child was whether the child had ever had an episode of diarrhea, and if so, what feeding modifications the mother had made.

Module 5. Child, maternal and household cleanliness

Cleanliness of the child, mother and the interior and exterior of the house were assessed using a spot check observation method. Spot check methods have been used widely for the assessment of markers of hygiene practices, for example, the cleanliness of different aspects of a house or a person (Ruel and Arimond 2002). This method consists of observing a list of predetermined markers of hygiene practices on a single visit to a household, and is less time and cost intensive than structured or unstructured observations that are designed to observe the actual hygiene practice. Using this method, the interviewers were trained to record their observations related to key aspects of the cleanliness of the respondent and the child (index child as well as younger child) on a three point scale of clean, dusty or dirty. The cleanliness of the hair, hands, face and clothing of both respondent mother and children were observed, and for children, observations of the cleanliness of their body (if naked) was also observed. Observations of household cleanliness were made based on a yes/no observation of key markers of inside and outside household hygiene. For the cleanliness of the exterior of the house, aspects such as the general appearance, whether the courtyard needed to be swept, and the presence of animal feces and garbage around the house were observed. The state of the interior of the house was assessed using a question about the general appearance as well as specific questions about the presence of unwashed clothes inside the house, whether the water container was covered and whether the interior of the house needed to be swept.

Module 6: Respondent mother's empowerment and decision-making.

Various studies have suggested that women's empowerment and autonomy within the household are important determinants of child care practices as well as child well-being (Smith et al., 2003; Doan and Bisharat, 1990). We assessed the respondent mother's empowerment and autonomy relative to her spouse and other household members by gathering data about the nature of the communications between the respondent and the spouse, the respondent's ownership of assets and her level of control over these assets and over purchasing decisions. Questions related to her access to emotional support and participation in community activities were used to assess the level of social support received by the respondent. Finally, a series of questions were asked about the respondent's role in household decision-making related to food preparation, care of children, medical care, child feeding and other topics.

Module 7: Household food security.

This module was designed to assess the food security status of the household, and gathered data on cultivation of different crops, duration of storage and use of harvested crops as well as the overall food insecurity-related experiences of the household. In order to assess the experience of food insecurity by the household, a set of questions were adapted from the Cornell-Radimer food security scale to document the household's experience with food insecurity (Radimer, 1992; Studdert, Frongillo and Valois, 2001). Specifically, questions were designed to tap into food insecurity-related coping behaviors such as reduction in the number of meals or in the variety of foods consumed by the household, changes in cooking ingredients used, and going to bed hungry because of a lack of food.

Module 8: Knowledge and attitudes about child feeding and care.
This module included questions pertaining to knowledge of the respondent mother concerning the ideal age at introduction of various liquids and foods as well as questions on perceptions about ideal duration of breastfeeding and frequency of feeding complementary foods. Finally, some questions related to discipline and to the use of physical punishment were also asked. The purpose of the questions related to infant feeding, in particular, were to assess whether practices and knowledge are related in this population, and also whether non optimal practices are likely to be due to lack of knowledge or lack of resources (or both).

Module 9: Respondent mother's mental and physical health.
Women's physical and mental well-being have been considered important determinants of child care practices and child well-being (Engle, Menon and Haddad, 1999). Very little data is available, however, on these aspects in developing countries. Thus, in this module, respondent mothers were asked questions about their physical health (i.e. whether they suffered from symptoms such as headache, fatigue, lack of appetite, etc.). Questions to assess mental well-being included a set of questions about life satisfaction (e.g., satisfaction with spouse/partner, job, children, etc.) as well as a set of questions about stress, including stress due to a lack of time to do one's work or to take care of children.

2.3.2. Community questionnaire

The community questionnaire was adapted from the instrument used in the Demographic and Health Survey (DHS) conducted in Haiti in 2000 (EMMUS-III, 2001). The purpose of gathering data at the community level was to compare the different clusters after the randomization process and to provide information that might be relevant for interpreting the final evaluation results. Even though the program models were randomized at the level of the cluster, community level data were gathered on the smaller community units (called *localités*) within each cluster because these were more meaningful and finite geographic entities than the clusters themselves.

The community questionnaire was designed to provide information on the following aspects of each *localité*:

- Distance from the nearest major town, type of transportation used to reach this town.
- Main activity of the residents
- Main geographic characteristics
- Distance and mode of transportation to reach the nearest primary school, daily market, weekly market, shop, public transport
- Availability and access to health services such as hospital, health center, dispensary, mobile clinic, pharmacy, private doctor, Rally Post, Health Agent, a World Vision program volunteer (*colvol*) and a trained birth attendant.
- The perceived most important community development problems faced by the residents (e.g., lack of health services, distance to health services, etc.)
- The presence of other organizations or self help groups (e.g., breastfeeding support groups or micro credit groups)

2.4. Training of personnel

This section describes the training and standardization of supervisors and fieldworkers in anthropometric measurements and the training of the fieldworkers in questionnaire administration.

2.4.1. Standardization of supervisors in anthropometric measurements

Since all the supervisors had previously been trained in taking anthropometric measurements, they were not retrained. However, they were re-standardized in a first stage, conducted at an orphanage in Port-au-Prince. Three supervisors and the IFPRI-Haiti staff participated in this standardization exercise. Using the training and standardization manuals developed by FANTA (Cogill, 2001), one of the supervisors was determined to be the standard and the others were then compared to him. Following the standardization calculations, it was determined that another supervisor's accuracy and precision was in fact higher than that of the one selected as a standard. This supervisor was then used as the standard for all remaining standardization exercises.

The second stage of standardization of the supervisors was conducted at the same time as the standardization of the fieldworkers in Hinche, and is described in the following section.

2.4.2. Training and standardization of fieldworkers in anthropometric measurements

The fieldworkers who participated in the survey had never been trained in taking anthropometric measurements before. Therefore, a first step was to train them in the use of the equipment and the recording of anthropometric data. This was done over a period of 2 ½ days and included lectures and equipment demonstrations. This was followed by a day of practical exercises in the measurement of height and weight of infants and children.

The first round of standardization of the fieldworkers and all supervisors was conducted over a two day period. The fieldworkers were only standardized in the measurement of height since weight was being measured using an electronic scale.

First, the height and weight of 5 children under 42 months of age (one of these was less than 24 months old) were measured by all field workers and the supervisors, and each one of them measured each child twice. Spreadsheets were created to compute the standardization data based on the method developed by Habicht (1974), and all data were entered and the results reviewed. Each fieldworker was compared to the supervisor who was considered a standard because of her extremely precise measurements. This first round of standardization revealed the need for another round, which was then conducted a week later. This next round of standardization was supervised by Dr. Jean-Pierre Habicht, and was conducted using the same methodology as the first round.

Based on the results of this final round of standardization, 9 of 12 fieldworkers were selected to conduct the anthropometric measurements for the survey.

2.4.3. Training of interviewers

The training of fieldworkers in the administration of the survey questionnaire was conducted over a two-week period, between April 23, 2002 and May 3, 2002. The training team was led by the Haitian consultant who had assisted the IFPRI-Cornell team in the development of the questionnaire. Other members included the survey supervisors and the survey coordinator. A total of 21 potential fieldworkers were trained, and of these, 12 were selected for inclusion in the final survey team.

A variety of methods were used to train the interviewers in the use of the survey questionnaire. These included role plays, discussions of all potential answers to a question, and discussions related to the coding of different types of responses. Short home-based exercises were also prescribed during the training, and the results of these were discussed each day. The final selection of fieldworkers was based on a short field-based evaluation.

2.4.4. Training of fieldworkers in hygiene spot observations

Fieldworkers were also trained in the use of spot observations to assess the cleanliness of the child, respondent mother and household. The key aspect here was to achieve agreement between the measurements taken by different interviewers/observers. Two approaches were used to achieve concordance between measurements.

First, the spot observation instrument itself was designed so that the decisions about cleanliness could be made easily without resorting to narrow interval scales. For example, the decisions about child and maternal cleanliness were based on three broad categories of dirty, dusty or clean, rather than a more nuanced scale that might have been developed on a five or even ten point basis. The development of this three point scale for the personal cleanliness variables was based on extensive discussions among the survey team, including the fieldworkers. For the household cleanliness variables, the observations were conducted on an even simpler scale of whether certain conditions were observed or not.

Second, a number of field-based training exercises were done where the entire team would visit one household and independently rate the cleanliness of the child, respondent and the household. This was followed by discussions of the ratings and possible reasons for choosing certain ratings over others. This training exercise was repeated until all the fieldworkers reached agreement on their observations.

2.5. Field work logistics

2.5.1. Survey team

The overall field work coordinator was an IFPRI consultant based in Haiti. He was assisted in the field by three supervisors, each of whom managed a team of 4 fieldworkers, for a total of 12 fieldworkers. The survey supervisors had previous experience in the administration of the Demographic and Health Survey questionnaire and various other surveys. The fieldworkers were local people from the Hinche area. Some of them were World Vision health agents, while others were recruited locally, but were not regular World Vision employees. The survey team

used two all terrain vehicles for field transport, and where necessary, mules or horses were rented to transport supervisors and field workers to remote communities that were inaccessible even by dirt roads.

2.5.2. Administration of the household survey

Before the questionnaire was administered in any community, sensitization and information sessions were first organized in that community by World Vision staff. These sessions were conducted at Rally Posts, food distribution points (in some program areas where pregnant and lactating women were already receiving food aid), and other community gathering points. The information sessions were used to explain the purpose of the survey to the community members, reasons for measuring children's heights and weights, and to request cooperation of community members with the survey team.

A few days before the survey was conducted in a community, the list of selected households was handed over to a World Vision program staff member (either a Health agent or a *colvol*). This staff member would inform families about the plans for the survey prior to the day of the survey. In many cases, he or she also functioned as a guide who would put the survey team in contact with the selected household. This was especially important in the remote evaluation communities.

In cases where a respondent mother was absent from her home, the survey team made an appointment with whoever was present in the household for a day when the mother was likely to be home. In cases where the respondent refused to be interviewed, the household was replaced with one of the 10 replacement households previously selected from the pool of eligible households. In total, only two households refused to participate in the survey. In both cases, the partner of the respondent did not want her to participate.

The fieldworker reviewed each questionnaire before leaving the household where it was administered. At the end of each day of fieldwork, the supervisors reviewed each questionnaire for accuracy, logical patterns and legible writing. Fieldworkers were asked to return to survey households in cases where missing data or other problems were observed.
The survey was conducted between May 27 and September 5th, 2002.

2.5.3. Administration of the community questionnaire

Community level data were gathered for each *localité* within a cluster using a group interview methodology. The group interview was conducted by requesting the health agent in each program group to invite health and education professionals, religious leaders and other community members in each *localité* to come to a meeting to assist in filling out a community level questionnaire. The questionnaire was designed to gather information on access to various services, geographic characteristics of the *localité* and general socioeconomic development of the *localité.* The questionnaire was filled out by a supervisor, who made sure that a consensus was reached on all the issues discussed. In addition, the supervisor also made observations about the *localité* and noted them on the questionnaire.

2.6. Data entry and cleaning

Data entry was conducted by the Institut Haitien de l'Enfance (IHE), an independent Haitian organization based in Port au Prince, Haiti, with vast experience in conducting surveys and managing survey data. IHE prepared the template for data entry, which was then conducted using a double entry process. Data entry commenced two weeks after the data collection began, and continued throughout the course of the data collection. IHE prepared quality control reports on a fortnightly basis. These reports flagged any systematic problems with questionnaire administration, and presented results for each survey team and each field worker. These results were discussed by the survey team upon receipt from IHE and any necessary modifications were made either to the supervision process or the questionnaire administration

2.7. Field work constraints

As is often the case in this type of survey, the field work took longer than initially planned. This was due to a number of field work related difficulties such as the remoteness of some of the households, the extremely poor road conditions due to the rainy season, the absence of the respondent mothers on market days and problems with the calculation of children's age during the census. Other difficulties encountered included problems with the quality of questionnaire reproduction and binding, as a result of which, the survey coordinator and supervisors had to spend many hours checking the quality and completeness of each questionnaire prior to its use in the field. Finally, in the course of the survey, one of the fieldworkers had to be dropped because of disciplinary issues, and this reduced the size of the survey team to 11.

3. COMPARISON OF STUDY HOUSEHOLDS WITH CENSUS DATA

3.1. Introduction

This chapter presents a comparison of the study households with data from a census that was collected before the survey to select eligible households. The primary purpose of comparing census households to the baseline survey sample is to ascertain whether our baseline sample is representative of the population from which it was drawn. The baseline sample is also compared to a subset of census households, those who have children between 18-47 months of age, and thus are more likely to be comparable to our survey sample.

Because only a limited amount of information was gathered for the census, the comparisons with our baseline survey sample are limited to the subset of variables for which data are available in the census.

3.2. Variables and analysis

3.2.1. Variables

The census gathered data primarily on household composition, because the main purpose was to use the information to select eligible households for the baseline survey. Information was collected on household headship (age and gender of household head) and on each household member's age and gender. Information on women's physiological status (i.e., whether pregnant or lactating) was also collected. The date of birth of all children younger than five years of age was obtained, as well as information about whether or not their mother was present in the household. Households with a child 18-47 months of age, but whose mother was permanently absent were not considered eligible for inclusion in the baseline survey.

A number of variables were created from the census data for the comparisons with the baseline survey data. These included the following:

- Household size
- Number of adults in the household (18 years and above)
- Number of children under 5 years of age in the household
- Number of school age children (6-15 years old)
- Dependency ratio (Number of dependents (household members less than 15 years of age or over 64 years of age) divided by the number of working age members (household members between 15 and 64 years of age).

3.2.2. Analysis

The baseline survey sample was compared with two sets of households: 1) all census households; and 2) census households who had an 18-47 month old child. For these comparisons, the variables described above and a few additional ones such as the proportion of households with at least one pregnant or lactating woman and the gender and age of the household head were used.

These same variables were also used to compare census households from the recuperative and the preventive areas.

3.3. Results

3.3.1. Comparison between baseline survey households and census households

Comparison between baseline survey households and all census households (entire population)
Table 3.1. presents the comparison between the baseline survey households, all census households, and the census households who had children in the age range targeted by the baseline survey.

A comparison of the data from all census households with the data from the baseline survey indicate that the age of the household head is about five years lower in the baseline survey than in the general population. This is likely due to the fact that households with young children were selected for the baseline survey and thus, these households are more likely to include younger adults than the general population. The household size in the general population was smaller than the household size among the baseline survey households, again probably a result of the observed lower number of children under five years of age in the entire population compared to the baseline survey sample. There were no differences in the number of adults or school age children between the baseline survey households and the general population.

The dependency ratio was higher for the baseline survey households than among the general population. This result is not surprising, considering that the baseline survey sample includes a larger number of young children than in the general population.

Table 3.1. also shows that there was a much higher proportion of male headed households in the baseline survey (90 percent) than in the general population (72 percent). It is not immediately clear, however, why this variable would be so different between our sample and the general population. The proportion of households with at least one pregnant woman was also higher in the baseline survey than in the general population. This is not surprising, because women in our survey sample were more likely to be in their childbearing years than women in the general population.

Table 3.1. Comparison between all census households, and census and baseline survey households with children between 18 and 47 months

Characteristics	Variable name in baseline data	All census households (n=8005)		Baseline survey households (with a child 18-47 months) n=1514)		Census households with a child 18-47 months old (N=3157)	
		Mean	SD	Mean	SD	Mean	SD
Age of household head	*agehh*	45.5	15.6	39.7	11.4	39.9	12.8
Household size	*hhsize*	5.3	2.7	6.7	2.3	6.5	2.4
Number of adults (≥18 years old)	*nadult*	2.4	1.2	2.1	1.0	2.5	1.1
Number of children < 5 years of age	*under5*	0.8	0.9	1.7	0.7	1.7	0.7
Number of school-age children in hh	*schoolag*	1.6	1.5	1.9	1.6	1.9	1.6
Number of dependents	*ndepend*	3.8	1.7	4.0	1.7	3.8	1.7
Number of working age members	*nworkage*	2.7	1.4	2.8	1.2	2.7	1.4
Dependency ratio	*depratio*	1.2	1.0	1.6	0.8	1.7	1.0
		%		**%**		**%**	
Gender of household head (male)	*sexhh*	72.2		90.4		74.8	
Households with at least one pregnant woman	*percent of npreg*	11.9		21.4		18.2	

*Number of household members < 15 or > 64)/number of members 15-64 yrs

Table 3.2. Comparison between preventive and recuperative programs (all census households and those with children between 18 and 47 months)

Characteristic	Variable name	All census households				Census households with a child 18-47 months of age			
		Program group				Program group			
		Recuperative [n=3,568]		Preventive [n=4,437]		Recuperative [n=1,388]		Preventive [n=1,769]	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age of HH head	*agehh*	45.3	15.5	45.6	15.7	39.6	12.8	40.2	12.8
HH size	*hhsize*	5.3	2.7	5.3	2.7	6.5	2.4	6.5	2.4
No. adults (≥18 years old)	*nadult*	2.4	1.2	2.4	1.2	2.5	1.1	2.5	1.1
No. children < 5 years of age	*under5*	0.8	0.9	0.9	0.9	1.7	0.7	1.7	0.7
No. school-age children	*schoolag*	1.6	1.5	1.6	1.5	1.9	1.6	1.9	1.5
No. dependents	*ndepend*	3.8	1.7	3.9	1.7	3.8	1.7	3.9	1.7
No. working age members	*nworkage*	2.7	1.4	2.6	1.3	2.7	1.4	2.6	2.3
Dependency ratio*	*depratio*	1.2	1.0	1.3	1.0	1.6	1.0	1.7	1.0
		%		%		%		%	
Gender of HH head (male)	*sexhh*	71.3		72.9		74.3		75.1	
HH with ≥ 1 pregnant woman	*Npreg*	11.5		12.1		18.4		18.0	

Abbreviation: HH = household;

* Dependency ratio = Number of household members < 15 or > 64)/number of members 15-64 yrs

Comparison between baseline survey households and sub sample of census households with a child between 18 and 47 months of age

As expected, the census households who had a child in the targeted age range (18-47 months of age) were much more similar to our survey sample than the population as a whole (all census households). No differences were found between the two samples in the age of the household head or in the average household size, number of adults, number of school children or number of children under the age of five year. The dependency ratio was also similar between the baseline survey households and the census households with at least one child in the target age range of 18-47 months.

There was, however, still a larger proportion of households in the baseline survey that were headed by a male (90 percent) than in the sub sample of census households with a young child (75 percent). Here again, it is not clear why this variable would be so different between the baseline survey and the general population, particularly among households with children in the same age range. One reason could be that the baseline survey specifically selected only those households where the mother resided in the same household as the child, and it is possible that these households were somehow different from the baseline survey households in terms of household headship. The census data show that there were 7.5 percent of census households where the mother did not reside in the same household as the child, and thus, these households were ineligible for inclusion in the survey. However, there was no difference in the proportion of male-headed households between households where the mother did not live with the child and where the mother did reside in the same household as the child. There was also no difference between preventive and recuperative program populations in terms of household headship (see section 3.2.2. below).

The proportion of households with at least one pregnant woman was similar between the census and baseline survey households with children in the 18-47 month age range, though the proportion of households with at least one pregnant woman was slightly lower among the census households.

3.3.2. Comparison between recuperative and preventive populations

Table 3.2. presents a comparison between the general population (census households) in the preventive and recuperative program groups. Overall, the two program groups were very similar in all aspects assessed. This was true both when comparing all census households and when comparing the samples of households with young children.

3.4. Conclusions

In summary, the demographic characteristics of households in our survey sample are comparable to the general population of households from the area who have a young child. As expected, however, our survey sample has a generally younger household composition (including the age of the household head, number of children, etc.) than the general population as a whole (all census households). The only difference found was in the percentage of households headed by a male, which was more prevalent among our survey sample than among the census households, even those with a young child. Finally, the findings also show no evidence of any differences between census households from the recuperative or the preventive program groups.

4. CHILD NUTRITIONAL STATUS AND HEALTH

4.1. Introduction

This chapter presents data on the main outcome measure of the evaluation, i.e., the nutritional status of children. In addition, results are presented on the health status of the survey children, as assessed by the reported prevalence of morbidity symptoms such as fever, cough/cold, difficult breathing and diarrhea in the two weeks prior to the survey. Finally, data are also presented on maternal perceptions of child health and appetite, assessed using visual analogue scales (described below).

The specific variables used to describe children's nutrition and health are described below, followed by the results. Most descriptive analyses presented in this chapter compare the nutrition and health indicators of children by age, program groups and gender.

4.2. Variables

4.2.1. Child nutritional status

Children's weight and height measurements were used to derive the standard anthropometric indicators: height-for-age, weight-for-age, and weight-for-height. The z-scores were derived by comparing each child's anthropometric measurements to the CDC/NCHS/WHO reference standards (WHO 1979) for his/her age and gender[4].

Height-for-age Z-scores (HAZ) reflect linear growth retardation and are used to describe long-term nutritional status; stunting is defined as HAZ < -2 Z-scores. Weight-for-height Z-scores (WHZ) reflect more current nutritional status and measure the degree of thinness in a child; wasting is defined as WHZ < -2 Z-scores. Finally, weight-for-age Z-scores (WAZ) represent a global measure of malnutrition; and underweight, is defined as WAZ < -2 Z-scores. The present report emphasizes HAZ and WHZ, rather than WAZ, because the latter does not differentiate between wasting and stunting, which are thought to result from two different processes of growth faltering (Ruel 2001).

Anthropometric measurements were taken on all index children (18-47 months old) and their younger sibling 6 months or older.

4.2.2. Child health and appetite

A variety of questions were used to gather information on the index child's health and appetite. These are described in Chapter 2, and a short description is provided here. Data on the younger sibling of the index child was also collected for some of these variables, but the health and appetite results presented in this section focus on the index child only.

[4] A Z-score (or standard deviation score) is defined as the deviation of the value of an individual child from the median value of the reference population, divided by the standard deviation for the reference population (WHO 1995).

Morbidity symptoms and care seeking: The survey respondents were asked whether their child had suffered from any one of the four following symptoms in the 2 weeks prior to the survey: fever, cough/cold, fast breathing/shortness of breast (symptoms of severe acute lower respiratory infections) and diarrhea. They were also asked whether they had sought advice and if so, which type (up to three different types were recorded). For children who had suffered from a recent episode of diarrhea, mothers were asked about whether or not they had modified their feeding behavior during diarrhea and how (e.g. reduced liquids or solid foods, increased or reduced breastfeeding). The findings on morbidity symptoms are reported here while the data on health seeking for children who had any of these symptoms is presented in Chapter 9.

Overall health and appetite: Visual analogue scales were used to assess overall child health and appetite. The visual analogue scales were constructed by drawing a 10-cm long line with numbers ranging from 1 to 10, with "1" denoting a very poor outcome (either appetite or health in this case) and "10" denoting a very good outcome. Mothers were asked to compare the health of their child to that of other children of the same age and to mark where they thought their child stood on the visual scale of 1 to 10[5].

4.3. Results

4.3.1. Children's nutritional status

Appendix 4.1. presents the mean Z-scores for children's height-for-age (HAZ), weight-for-age (WAZ) and weight-for-height (WHZ). As observed in most developing countries (Ruel 2001), children's nutritional status deteriorates rapidly during the first year of life, and up to 17 months of age, as seen by the steep decline in mean Z-scores for all three indicators. Growth faltering (represented by declining mean WAZ and HAZ) continues until 18-23 months, at which age it tends to plateau at relatively low levels (in the case of Haiti, less than –1 Z-scores). WHZ, on the other hand, deteriorates sharply until 17 months of age, but starts to improve gradually with age thereafter. It is still lower than the reference value at 36-47 months, but the mean value is approximately –0.40 Z-scores, suggesting only moderate levels of wasting.

It is important to note also that children in our sample are already significantly malnourished by 6-11 months of age. All three indicators are below the reference population standards, and HAZ and WAZ mean values are already as low as –1 Z-score. This suggests that children are either born malnourished, or they become so very rapidly during their first 6 months of life. Based on data from the most recent Demographic and Health Survey (DHS), it appears that the latter is true – i.e. that children are born of adequate weight and height, but that their nutritional status deteriorates rapidly during the first few months of life (EMMUS-III 2001). This can be observed in Appendix 4.2., which presents the mean anthropometric values for 0-47 month old children from all rural areas in the DHS sample[6].

[5] Visual analogue scales have been used successfully for appetite ranking in Latin America and in Ghana (Maxwell et al 2000; Ruel and Arimond, in press), as well as in developed countries (Stratton et al. 1998).

[6] For comparability with out survey sample, we limited our analysis of the DHS data to the rural sample, and to children up to 47 months of age.

Appendices 4.3. and 4.4. show that there is no evidence of any systematic difference between program groups in the patterns of linear growth faltering (HAZ) or in mean WHZ, respectively. The same is true for WAZ (results not shown). Small differences between genders are found, however, where boys have lower HAZ than girls until 18-23 months of age (Appendix 4.5.). Similarly, they experience a steeper decline in WHZ between 6 and 17 months compared to girls (Appendix 4.6.). The WHZ of girls is more consistent throughout the age range and fluctuates only slightly around –0.6 Z-scores. It is possible that boys are more affected by infections and especially diarrheal diseases in their second year of life because they are more mobile and more likely to explore their environment. This hypothesis will be examined in the section on children's morbidity.

Overall 23 percent of children in our sample are stunted, 21 percent are underweight and 5 percent are wasted. These levels of malnutrition are comparable to, although slightly lower than, those found for 6-47 month old rural children in the recent DHS survey (EMMUS-IIII, 2001), which are 28 percent, 22 percent and 6 percent respectively).

The prevalence of stunting, wasting and underweight children follows similar patterns as the mean Z-score values. Stunting increases sharply from 15 percent among 6-11 month old children to approximately one third of children 18-23 months. Among the older age groups, approximately one quarter of all children are stunted (Appendix 4.7.). The prevalence of underweight children follows a similar pattern, although at slightly lower prevalences throughout the age range studied. The prevalence of wasting is much lower, as is typically the case in countries of Latin America and Eastern and Southern Africa (Ruel 2001). The peak prevalence of wasting – 13 percent -- is found among 12-17 month old children. As indicated previously, this is also the age of lowest mean WHZ.

Again, no differences were found between the recuperative and preventive groups in the prevalence of malnutrition at different ages (see Appendices 4.8. and 4.9.), except for the prevalence of stunting in the 6-11 month old age group. Children assigned to the recuperative group are twice as likely to be stunted at that age as children from the preventive group. This difference, however, appears to be due to chance since it is not observed among any of the other age groups. Male children are more stunted than girls at 12-17 months of age and more wasted between 18 and 23 months (Appendices 4.10. and 4.11.). These differences are consistent with the previous finding of lower mean HAZ and WHZ among male children during their second year of life.

Comparison between the program groups, using pair-wise cluster means: Since the program evaluation design is based on 10 pairs of matched sets of communities, it was also considered appropriate to conduct a pair-wise comparison among the paired sets of communities in each cluster of the main outcome of the evaluation, i.e., the nutritional status of children. In order to do this, the mean of each of the outcome measures (i.e., the three anthropometric indicators of HAZ, WHZ and WAZ) was calculated for each cluster and a paired t-test was then conducted using the 10 pairs of matched clusters. The paired t-test did not reveal any differences in the baseline nutritional status indicators between the paired recuperative and preventive program clusters (shown in Table 4.1.).

Table 4.1. Pair-wise comparison of nutritional status outcomes by program groups*

Nutritional status indicator	Recuperative (N=10 clusters)		Preventive (N=10 clusters)	
	Mean	**SD**	**Mean**	**SD**
Height-for-age z-score (HAZ)	-1.37	0.11	-1.39	0.31
Weight-for-age z-score (HAZ)	-1.25	0.14	-1.26	0.19
Weight-for-height z-score (WHZ)	-0.49	0.14	-0.49	0.11

*None of the pair-wise differences were statistically significant when tested using a paired t-test of the mean HAZ, WAZ and WHZ in the 10 clusters

4.3.2. Prevalence of morbidity symptoms

Table 4.2. presents the prevalence of reported morbidity symptoms in the previous two weeks among children 18-47 months of age. Cough/cold and fever were very commonly reported symptoms, with prevalences of 48 percent and 65 percent respectively. As expected, more severe symptoms of respiratory infections (fast breathing/shortness of breath) were less prevalent, but still, were reported among 15.5 percent of the children. Diarrhea was also highly prevalent with approximately one third of children having had diarrhea during the previous two weeks. The prevalence of diarrhea in the national sample of rural children was very similar, at 31 percent (EMMUS-III, 2001).

Table 4.2. Prevalence of morbidity symptoms (children 18-47 months of age; n=1514)

% of children who had symptom in previous 2 weeks	Program group		Overall
	Recuperative (N=759)	Preventive (N=755)	(N=1514)
Fever	48.0	47.5	47.9
Cough/cold	66.7	64.2	65.4
Fast breathing/shortness of breath	15.5	15.5	15.5
Diarrhea	30.7	33.4	32.1

Appendix 4.12. presents the prevalence of morbidity symptoms by age groups for index children only. All symptoms were more prevalent among the youngest age group and a clear reduction in morbidity symptoms with age was observed for diarrhea and also to a lesser extent for symptoms of severe respiratory infections. The age difference for the prevalence of diarrhea was particularly pronounced, showing that children in the youngest age group were twice as likely to have suffered from diarrhea in the previous two weeks compared to the older age group (36-47 mo). This age pattern is well documented and is associated with the introduction of often contaminated complementary foods in young children's diets, combined with increased exposure to a number of other environmental contaminants as children start moving around more freely and exploring their environment.

There was no evidence of any difference in the prevalence of morbidity symptoms between the two program groups, or between genders (Appendices 4.13. and 4.14.). Even within age groups, there was little evidence of gender differences in the prevalence of morbidity symptoms (not shown). Thus, our hypothesis that the poorest nutritional status of male children during their second year of life may have been associated with higher morbidity was not confirmed.

4.3.3. Maternal perception of child's health and appetite

Overall, the distribution of both the health and the appetite analogue scales is skewed towards values higher than 5 (which represents average health and appetite), suggesting that caregivers generally perceived their child to have good health and good appetite, compared to other children the same age[7]. The overall mean and standard deviations for the scales are 6.5 (1.7) for the health scale and 6.7 (2.2) for the appetite scale. There is a clear positive age trend in both scales, showing that caregivers perceived their child to have increasingly better health and appetite with age (Figure 4.15.). These results are similar to findings from Northern Ghana, where the mean health and appetite scores reported by mothers increased with age after children reached 13 month (IFPRI/UNICEF/UDS, 2003). No differences between program groups were found for either scale (Appendix 4.16.), and only a very small difference (0.4 points) in favor of males was found for the appetite scale (Appendix 4.17.).

4.4. Conclusions

In summary, there was no evidence of systematic differences in children's nutritional status between the two program groups. This was true whether mean values of the nutritional status indicators HAZ, WAZ and WHZ, or the prevalence of stunting, underweight and wasting, were used. This was also true whether simple group comparisons or pairwise comparisons of the means in each pair of program clusters were used.

The age patterns of child nutritional status in our study population were similar to those observed for the country as a whole (as seen in the recent DHS) as well as in other developing countries. Rapid declines in all three anthropometric indicators start as early as in the first few months of life and continue throughout the first 2-3 years. As expected, morbidity symptoms were more common among 18-23 month old children than among children in the older age groups. Similarly, the visual analogue scale results also suggested that mothers of older children were more likely to report higher scores (indicating better than average health and appetite for their age) than mothers of younger children. On average, scores to both analogue scales were greater than 5, suggesting that mothers generally felt that their child was healthier and had better appetite than average for his/her age. No differences between program groups or genders were observed in reported morbidity symptoms or in mean analogue scale scores.

[7] Both scales ranged from 0 to 10, with 0 representing very poor health (or appetite), 5 average and 10 much better than other children the same age.

5. COMMUNITY RESOURCES FOR CARE

5.1. Introduction

The validity of a comparative study of two treatments or interventions is usually dependent on the initial comparability of the groups being compared. In the case of this evaluation, the groups being compared are the ten pairs of clusters, where each cluster in a pair was randomized to a different program model, i.e., the recuperative or the preventive model. An initial rapid assessment prior to the randomization had provided data on key community-level characteristics of the clusters (e.g. socioeconomic development and distance to health care).The clusters were then paired, with the objective of balancing these key characteristics, and then each cluster in a pair was randomized to either the recuperative or preventive program model. In order to confirm the comparability of the clusters assigned to each program model a community questionnaire was administered to key community stakeholders in each program cluster at the time of the baseline survey. Even though the program models were randomized at the level of the cluster, community level data were gathered on the smaller community units (*localités*) within each cluster since these were more meaningful and finite geographic entities than the clusters themselves.

This chapter thus serves two purposes: first, it compares the *localités* within each pair of clusters to ascertain their initial comparability for the purpose of the evaluation. Second, in doing so, it also provides an overview of the community level resources available to caregivers and families in each cluster, particularly those resources related to the care of young children (e.g., access to health care, markets, etc.).

5.2. Variables

The community questionnaire was based on the instrument used in the latest DHS (EMMUS-III, 2001) and was adapted to the design of the IFPRI-Cornell-World Vision evaluation.

The community questionnaire was designed to provide information on the following aspects of each *localité*:

- Key geographic characteristics
- Access to public services (schools, markets, etc.)
- Access to health services
- Access to women's groups and micro credit services.

5.3. Analysis of community data

The community level data were analyzed by comparing the characteristics of the group of *localités* from the recuperative program cluster to the characteristics of the preventive program cluster in the same pair. This comparative analysis was done for each of the 10 pairs of the program clusters, and data are presented for each of the pairs in the results section below. Since the number of *localités* within each program group in a cluster was very small in most cases and ranged from 2 to 6 *localités* per program cluster, statistical comparisons are not made between the clusters in each pair. The data are simply presented in terms of the proportion of *localités* in

each program cluster within a pair that share certain characteristics, and also in terms of means for characteristics like distances to different services. Standard deviations are not presented along with means, again because of small sample sizes. However, where necessary, the range of values observed within each cluster is presented so that the reader will be able to gauge the variability within that cluster.

5.4. Results

5.4.1. Number of localités and size of population

Table 5.1. presents the number of *localités* per program cluster for each pair and the data indicate that for most pairs of clusters, the number of *localités* per cluster is very similar, except in the case of pairs 2 and 10, where the recuperative program clusters included a larger number of *localités*. Also, data on population size from the population census show that the population size covered by the clusters within each pair is similar (see Table 5.2.), except in pairs 3 and 4. In these two pairs of clusters, the overall population covered by the recuperative group is substantially smaller than that covered by the preventive group.

Table 5.1. Number of localities in each pair of clusters, by program group

Pair number	Program group		Total
	Recuperative	Preventive	
1	3	3	6
2	6	2	8
3	2	3	5
4	3	3	6
5	4	4	8
6	4	3	7
7	3	3	6
8	4	3	7
9	2	3	5
10	5	2	7
Total	**36**	**29**	**65**

Table 5.2. Population size of each cluster, by program group (data obtained from census conducted between April and August 2002)

Pair number	Program group		Total
	Recuperative	Preventive	
1	2902	2402	5305
2	2464	2674	5138
3	1309	4345	5654
4	1108	2529	3637
5	612	813	1425
6	1569	2148	3717
7	3556	2916	6472
8	1239	1261	2500
9	1545	1242	2787
10	2282	2818	5100
Total			

5.4.2. Key geographic characteristics

The key geographic characteristics of the clusters are presented in Table 5.3. The type of terrain where the *localités* in the clusters were situated was largely similar, and most of the clusters were in mountainous areas. A few of the clusters had a mix of *localités* in the plains and the mountains but were not similar in terms of the proportion of *localités* in these types of terrains. The implications of the differences in the terrain are related mainly to accessibility to and from the *localités*. *Localités* in the plains are generally more accessible than those in the mountains. The data on accessibility, however, do not show major differences between the clusters. Thus, the differences seen in terms of terrain are unlikely to have a significant impact on program outcomes.

The majority of the program *localités* were accessible from the main urban town only by unpaved dirt roads, rather than paved roads. In most pairs of clusters, the type of access road was similar between the recuperative and preventive clusters and consisted mainly of either easy or difficult dirt roads that could be driven on by a motored vehicle (referred to in Table 5.3. as "motorable dirt roads"). In some cases, most of the *localités* in a cluster were inaccessible by car.

The main occupation of the residents in the program areas was similar between clusters in all pairs, and consisted primarily of agricultural activity. In those few clusters where not all *localités* identified agriculture as their main occupation, market activities were the main activity. This finding is similar to the results of the household survey which showed that over 80 percent of the spouses of the respondents were involved in farming as their main activity.

The proportion of *localités* with either dense or dispersed population (defined simply by the fieldworkers based on their perception of the clustering of houses in a *localité* rather than actual population density per square mile) are similar for the clusters within all pairs, except for pair 1, where all the recuperative group *localités* were identified as being densely inhabited while those in the preventive group were identified as being dispersed.

Table 5.3. Geographic characteristics of *localités* in each cluster, by program group

Characteristic	Pair no.	Program group	
		Recuperative	Preventive
Type of geographic terrain	1	Mountainous (67%)	Plains (100%)
	2	Mountainous (67%)	Mountainous (100%)
	3	Mountainous (100%)	Mountainous (33%)
	4	Mountainous (33%)	Mountainous (100%)
	5	Plains (100%)	Plains (50%)
	6	Marshy/swampy (100%)	Mountainous (67%)
	7	Mountainous (67%)	Mountainous (67%)
	8	Mountainous (75%)	Mountainous (67%)
	9	?? (67%)	Mountainous (100%)
	10	Mountainous (80%)	Mountainous (100%)
Type of access roads to reach *localités*	1	Motorable dirt roads, difficult (67%)	Motorable dirt roads, easy (100%)
	2	Motorable dirt roads, difficult (67%)	Motorable dirt roads, difficult (100%)

Characteristic	Pair no.	Program group	
		Recuperative	**Preventive**
	3	Unmotorable paths (100%)	Motorable dirt roads, difficult (100%)
	4	Motorable dirt roads, easy (67%)	Motorable dirt roads, difficult (100%)
	5	Motorable dirt roads, easy (100%)	Motorable dirt roads, easy (50%)
	6	Motorable dirt roads, difficult (100%)	Motorable dirt roads, difficult (100%)
	7	Unmotorable paths (100%)	Unmotorable paths (100%)
	8	Motorable dirt roads, difficult (100%)	Unmotorable paths (67%)
	9	Motorable dirt roads, difficult (100%)	Unmotorable paths (100%)
	10	Motorable dirt roads, difficult (100%)	Motorable dirt roads, difficult (100%)
Proportion of *localités* engaged in agriculture/fishing as main activity	1	67	100
	2	100	100
	3	100	100
	4	100	100
	5	50	100
	6	100	100
	7	100	100
	8	100	67
	9	100	100
	10	100	100
Type of inhabitation	1	Dense (100%)	Dispersed (100%)
	2	Dispersed (100%)	Dispersed (100%)
	3	Dispersed (100%)	Dispersed (100%)
	4	Dispersed (67%)	Dispersed (100%)
	5	*Dense* (75%)	*Dense* (50%)
	6	Dispersed (100%)	Dispersed (67%)
	7	Dispersed (100%)	Dispersed (100%)
	8	Dispersed (100%)	Dispersed (100%)
	9	Dispersed (100%)	Dispersed (100%)
	10	Dispersed (100%)	Dispersed (100%)
Closest urban town and distance (kilometers) to the town. Range of distances observed within a cluster are in parentheses	1	Thomonde, 4.7 km (4-5)	Hinche, 3.0 km (0-5)
	2	Hinche, 8.2 km (5-10)	Hinche, 6.5 km (6-7 km)
	3	Thomonde 6.0 km (6-6)	Hinche 11.7 km (10-13)
	4	Hinche, 4.0 km (3-5)	Hinche, 7.3 km (6-9)
	5	Hinche, 2.3 km (0-5)	Hinche, 2.0 km (1-4)
	6	Hinche, 19.0 km (18-20)	Thomonde, 15.7 km (14-17)
	7	Lascahobas, 5.0 km (4-6)	Lascahobas, 7.0 km (6-8)
	8	Thomonde, 3.8 km (2–5)	Thomonde, 5.0 km (4-6)
	9	Thomonde, 11.0 km (10-12)	Thomonde, 5.7 km (5-6)
	10	Thomonde, 21.8 (15-26)	Thomonde, 9 km (9-9)

The closest urban town to each of the clusters within a pair was the same in all cases, except for pairs 1, 3 and 6. However, the distance to the closest urban town is different between preventive and recuperative clusters for 5 of the 10 pairs. The distance to the closest town is less for the recuperative group than the preventive for pairs 3 and 4, but is less for the preventive group for

pairs 7, 9 and 10. For pairs 3, 9 and 10, the difference between the clusters is substantial and could have implications for access to goods and services that are only available in the large urban towns. It is important to remember, however, that the real distances traveled by residents of the *localités* depend on the routes taken by them to reach the towns. In many *localités*, residents who move back and forth between the *localité* and markets or nearby town, have found shorter routes that do not take them on the main access road to the *localité.*

5.4.3. Access to public services (schools, markets, shops)

Table 5.4. presents data on access from the program *localités* to various public services like primary schools, markets, and shops. There was no major difference in access to primary schools between the clusters in different pairs, except in pair 6, where the primary school in the recuperative cluster was about on average 6.5 kilometers away from the *localités* and was only 2.7 kilometers away on average in the preventive group.

Table 5.4. Mean distance to community services in each cluster, by program group

Characteristic	Pair no	Program group	
		Recuperative	Preventive
Distance to closest school (kilometers)	1	1.3	3.0
	2	3.5	1.5
	3	6.0	8.0
	4	1.3	0.0
	5	1.3	2.0
	6	6.5	2.7
	7	1.3	0.7
	8	1.0	1.0
	9	1.0	0.3
	10	1.0	0.5
Distance to daily market (kilometers)	1	4.3	4.2
	2	8.2	6.5
	3	6.0	13.3
	4	4.0	7.3
	5	2.5	2.0
	6	19.0	15.7
	7	4.3	3.3
	8	3.8	3.3
	9	11.0	5.7
	10	22.0	3.5
Distance to weekly market (kilometers)	1	4.0	1.0
	2	8.2	6.5
	3	3.0	2.3
	4	7.0	7.3
	5	9.0	2.0
	6	5.5	1.7
	7	4.3	3.3
	8	3.8	3.3
	9	9.0	5.0
	10	13.5	3.5

		Program group	
Distance to closest small shop (*"boutique")* (kilometers)	1	4.3	4.7
	2	8.2	6.5
	3	6.0	13.3
	4	4.0	7.3
	5	3.5	2.0
	6	19.0	15.7
	7	4.3	3.3
	8	3.8	3.3
	9	11.0	5.0
	10	22.0	3.5

For most pairs, there were no major differences between clusters in terms of their access to markets. None of the *localités* in the study area, except for the preventive cluster in Pair 1 had daily markets, weekly markets, or even small shops (called *"boutiques"*) located close by. For pairs 5, 9 and 10, the recuperative cluster *localités* were further away from the weekly markets. The lack of easy access to markets has implications for household food purchasing patterns, particularly for the purchase of perishable foods like animal source foods that cannot be stored safely without refrigeration. However, for pair 5, this is not likely to have a large impact on the ability of program participants to purchase different foods because there was no difference between the clusters in terms of distance to a *daily* market. For the recuperative program *localités* in pairs 9 and 10, on the other hand, the daily markets and small shops were also much further away on average when compared to the preventive program *localités* in those pairs. Thus, it is likely that preventive program participants in pairs 9 and 10 would have easier access to foods promoted by the program than recuperative program participants in the same pairs.

It is important to note that in general, markets are far away for most of the households in our survey. Due to a near total lack of public transportation, combined with poor roads, most rural Haitians travel to markets on foot or on a mule/horse (if they own one). This implies that even distances that seem relatively short (for instance 2-4 kilometers) can translate into long walks that take women away from their homes for long periods of time during the day. Furthermore, a substantial proportion of women actually engage in petty trade for income-generation and travel not only to the markets closest to their *localité* but also to markets that are further away, thus taking them away from their homes for even longer hours, if not days. This has serious implications for child care, particularly for breastfeeding early in infancy, and suggests that in addition to programs that promote exclusive breastfeeding, setting up transportation systems and improving roads could go a long way in removing some of the serious barriers that keep women away from their young infants for long hours.

5.4.4. Access to health services

The community survey was used to gather information on access to health services, including government health services, private health services as well as the program health services offered in the study areas by World Vision. The data on access to government and private health services are presented in Table 5.5., and data on access to World Vision program services are presented in Table 5.6.

Table 5.5. Mean distance to health services in each cluster, by program group

Characteristic	Pair no.	Program group	
		Recuperative	Preventive
Distance to closest hospital (kilometers)	1	6.7	4.7
	2	8.5	6.5
	3	11.0	13.3
	4	4.0	7.3
	5	2.8	2.8
	6	19.0	33.3
	7	15.3	16.3
	8	23.3	18.7
	9	15.0	18.0
	10	28.0	19.0
Distance to health center (kilometers)	1	4.3	8.0
	2	20.5	21.5
	3	6.0	9.0
	4	7.0	7.3
	5	13.5	22.5
	6	9.3	15.7
	7	5.0	6.7
	8	3.8	4.7
	9	11.0	5.7
	10	22.0	12.5
Distance to dispensary (kilometers)	1	0.7	3.0
	2	1.8	1.5
	3	5.0	7.8
	4	0.0	1.0
	5	4.0	2.0
	6	0.5	2.7
	7	2.3	1.0
	8	7.3	3.0
	9	0.0	5.3
	10	8.4	3.5
Distance to closest private doctor (kilometers)	1	4.3	4.7
	2	8.5	6.5
	3	6.0	13.0
	4	4.0	5.0
	5	2.5	2.0
	6	19.0	33.0
	7	12.0	12.7
	8	27.3	4.7
	9	13.5	5.7
	10	0.0	12.0
Distance to Pharmacy (kilometers)	1	4.3	4.7
	2	2.5	1.5
	3	6.0	13.3
	4	4.0	7.3
	5	2.5	2.0
	6	19.0	15.7
	7	6.0	11.0

Characteristic	Pair no.	Program group	
		Recuperative	Preventive
	8	2.5	4.7
	9	11.0	5.7
	10	0.0	12.0

The results in Table 5.5. show that there were no major differences between clusters in terms of access to a hospital, except for pairs 6 and 10. In pair 6, the recuperative cluster *localités* were further away from a hospital than the preventive group *localités*, while in pair 10, this was reversed. Access to a health center was also similar between recuperative and preventive groups for most pairs, except for pairs 5, 6, 9 and 10. For pairs 5 and 9, the health center was more accessible for *localités* in the preventive group while for pairs 6 and 10, the health center was more accessible for *localités* in the recuperative group. Access to a dispensary was more difficult for *localités* in the recuperative group in pairs 5 and 10, while there was no major difference between clusters for the other pairs.

Access to private medical care by a doctor varied substantially between recuperative and preventive *localités* in pairs 6, 8, 9 and 10, with recuperative cluster *localités* in pairs 6 and 10 having easier access to private medical care than the preventive cluster *localités* in the same pair. For pairs 8 and 9, the pattern was reversed and the *localités* in the preventive cluster had better access to private medical care than those in the recuperative cluster. We do not have information on what proportion of the population actually uses private medical care, and thus, the implications of these distances are not entirely clear.

In general, however, the data suggest that residents in all the program areas have to travel long distances to reach most types of medical care, and no patterns of differences between the groups were observed. The closest health services appear to be the dispensaries, suggesting that residents have relatively easy access at least to basic medication and dispensary staff (who are usually nurses and health agents).

Table 5.6. presents data on access to World Vision program services, including access to Rally Posts, health agents and *colvols*. The results indicate that in general, all the *localités* are well served by Rally Post, and that the average distance between any of the cluster community and the Rally Posts for that cluster is short, usually less than 1 kilometer. Also, there were no substantial differences between clusters within the different pairs in terms of their access to Rally Posts, except for pair 3 where the distance to the Rally Post is 3 km in the recuperative group compared with 1.7 in the preventive group.

Table 5.6. Mean distance to WV program services

Characteristic	Pair no	Program group	
		Recuperative	Preventive
Distance to Rally Post	1	0.0	0.3
(kilometers)	2	0.8	0.3
	3	3.0	1.7
	4	0.3	0.0
	5	0.3	0.5
	6	0.8	0.0
	7	0.3	0.7

	8	1.0	0.3
	9	0.0	0.3
	10	1.0	2.0
Distance to Health Agent (kilometers)	1	6.7	3.0
	2	8.5	6.5
	3	8.5	9.0
	4	0.3	7.3
	5	1.3	4.0
	6	7.0	2.3
	7	2.3	1.0
	8	1.8	0.3
	9	10.0	3.3
	10	2.8	2.0
Distance to Colvol (kilometers)	1	1.0	3.0
	2	2.2	1.5
	3	11.0	9.0
	4	3.0	1.0
	5	1.8	0.5
	6	1.0	2.3
	7	2.3	1.0
	8	0.7	0.3
	9	1.0	3.3
	10	0.8	1.0

The data on access to health agents, however, shows that most health agents do not appear to live in the *localités* that they serve, as evidenced by the long distance between the cluster *localités* and the health agents. This could be due to the fact that these rural *localités* do not in fact have the human resource capacity to provide health agents that can serve their own *localité* and that most health agents are recruited from the more urban parts of the Central Plateau region. *Colvols* on the other hand, are expected to be recruited directly from the *localités* that they will serve, since their role is defined as that of a "community volunteer" who will assist the health agents in their duties. The data on the accessibility between the *localités* and the *colvols* suggest that this system appears to be operating as intended in most of the clusters, except for one. Table 5.6. shows that for pair 3, the average distance between the program *localités*, both recuperative and preventive, and the *colvols*, is about 10 kilometers. For all other clusters, it is between one and three kilometers, and thus, the *colvols* appear to live in or close to the *localités* that they serve.

5.4.5. The presence of women's groups and micro credit services

The formative research on infant feeding practices, conducted in 2002 (Menon et al., 2002) had indicated that it would be beneficial for the *localités* to have women's support groups for breastfeeding and other group services like microcredit services that could enable women to work close to their homes rather than in distant markets. We gathered data on the presence of such women's groups and microcredit services in the *localités* served by the program area. These data, presented in Table 5.7., show that the situation related to availability of women's groups and microcredit services in the program areas is quite dismal. Very few clusters are served by any women's groups at all, and where these types of services do exist, they are the Mothers' Clubs that were set up by World Vision. At the time of the survey, the proportion of cluster

localités covered by the Mothers Clubs was different for the preventive and recuperative clusters in all of the pairs. However, this was primarily a result of the schedule of setting up Mothers' Clubs in the different program areas. This situation was corrected and at this time, all the *localités* covered by the World Vision program have access to Mothers' Clubs.

The data on availability of microcredit services in the program *localités* show that none of the program *localités* had access to microcredit services, except for the preventive cluster in pairs 1 and 10. Here again, the access to microcredit services was through World Vision's privately sponsored Area Development Program, rather than through other organizations.

Table 5.7. Access to women's groups and microcredit services

Characteristic	Pair no	Program group	
		Recuperative	Preventive
% of *localités* with access to women's groups	1	100.0	0.0
	2	33.0	100.0
	3	0.0	67.0
	4	0.0	0.0
	5	0.0	0.0
	6	0.0	0.0
	7	0.0	67.0
	8	25.0	67.0
	9	0.0	100.0
	10	0.0	100.0
% of *localités* with access to microcredit services	1	0.0	50.0
	2	0.0	0.0
	3	0.0	0.0
	4	0.0	0.0
	5	0.0	0.0
	6	0.0	0.0
	7	0.0	0.0
	8	0.0	0.0
	9	0.0	0.0
	10	0.0	100.0

5.4.6. Community development problems

The respondents interviewed were also asked to reflect and comment on the types of community development problems their *localités* faced. The data related to health care problems is presented in Table 5.8. It is interesting to note that there is a large difference between recuperative and preventive groups in terms of their perception of whether or not health care access is a problem. In four of the ten pairs, the residents in the preventive group were much more likely to indicate that access to health care was a problem. In one of the pairs (no. 9), the recuperative group indicated this was a problem for them, but in the remaining five, there was no difference between the groups. This difference may have been due to the fact that World Vision had already been operating small scale public health programs in some of the recuperative

localités (through their private sponsorship program), whereas the preventive *localités* were added to their programming arm only recently (at the beginning of the current DAP cycle).

Almost all the *localités* indicated that distance to health care was a serious problem for their *localités*. The proportion of *localités* within a cluster that considered distance to health care a problem differed somewhat between preventive and recuperative groups in pairs 3, 7 and 8, but overall, this appears to be a highly prevalent problem for all *localités*.

Table 5.8. Types of community development problems faced by program *localités*

Characteristic	Pair no	Program group	
		Recuperative	Preventive
% of *localités* where access to health care was a problem	1	0.0	100.0
	2	17.0	100.0
	3	0.0	100.0
	4	33.0	100.0
	5	50.0	25.0
	6	100.0	100.0
	7	0.0	0.0
	8	0.0	0.0
	9	100.0	0.0
	10	100.0	100.0
% of *localités* where distance to health care services was a problem	1	0.0	100.0
	2	83.0	100.0
	3	100.0	100.0
	4	33.0	100.0
	5	50.0	50.0
	6	100.0	100.0
	7	33.0	67.0
	8	25.0	100.0
	9	100.0	100.0
	10	100.0	100.0
% of *localités* where lack of availability of medicines was a problem	1	0.0	100.0
	2	50.0	0.0
	3	0.0	67.0
	4	100.0	0.0
	5	100.0	100.0
	6	100.0	100.0
	7	0.0	0.0
	8	0.0	0.0
	9	100.0	33.0
	10	100.0	50.0
% of *localités* where cost of medicines was a problem	1	0.0	100.0
	2	67.0	100.0
	3	0.0	100.0
	4	100.0	0.0
	5	100.0	100.0
	6	100.0	100.0
	7	0.0	67.0
	8	25.0	100.0
	9	100.0	33.0
	10	100.0	0.0

Lack of medicines, on the other hand, does not appear to be as large a problem, probably due to more easy access to dispensaries when compared to the other types of health care facilities (see section 5.4.3.). The cost of medicines, however, was considered a problem in the majority of the clusters. There were some differences between clusters in each pair in their perception of the cost of medicines, with 100 percent of the preventive group considering it a problem in pairs 1, 3, & 8, compared with less than 25 percent in the corresponding recuperative group in these pairs. The reverse was seen for pairs 4, 9 and 10. One of the issues regarding this question in particular, though, is that the perception of cost as a problem is largely dependent on the resource levels (and the perception of this) of the respondents. At the same time, the fact that most clusters in both pairs consider this issue to be a problem suggests that ways to make access to medication easier for the *localités* are needed.

5.5. Implications of cluster level differences for program evaluation

In conclusion, the community data have provided a good overall picture of the resources available to caregivers and households in our program evaluation area. There are not many major differences between pairs of clusters, suggesting that the selection process and randomization was effective for the most part. It should be noted that the actual selection and randomization of clusters to one program or the other had to be done well before these data were available, and based on much less information than is now available through this questionnaire. Thus, overall it is reassuring for the purposes of the validity of the evaluation that the pairs of clusters are largely comparable in terms of their access to various services and their general characteristics.

When viewed from the perspective of resources for care practices, however, the community data provide a less encouraging picture. Most *localités* in the evaluation area are fairly remote, with poor access roads and poor access to most services. Distances and access to markets are particularly of concern, given their implications for the time that women have to spend away from their homes and from their children. Similarly, the distances and poor access to health care facilities are also of concern, as is the extremely poor availability of services like microcredit and women's groups. It is well known that without access to adequate resources, knowledge is insufficient to bring about large improvements in health. Thus, improved access to the types of resources assessed through our study of the program clusters will be needed to ensure that women who participate in the behavior change programs implemented by World Vision can actually use their improved knowledge.

6. HOUSEHOLD RESOURCES FOR CARE

6.1. Introduction

As outlined in the conceptual framework elaborated in Chapter 2, a variety of household resources are needed to ensure that children can be cared for well. These resources include the demographic, socioeconomic and food security status of the households. These characteristics influence the access that caregivers have to economic food resources. In addition, they influence how a caregiver might allocate her time between child care and other activities, and also the amount of time and labor of alternate caregivers that can be allocated to the most vulnerable children in the household.

This chapter thus presents data on the resource available to households in the program areas, with an emphasis on resources available for child care. As with the other chapters in this report, the characteristics of households in the preventive program group are compared with those in the recuperative program area. Before presenting the findings, a description is provided of the variables used and the composite scales computed to describe the households' demographic, socioeconomic and food security status.

6.2. Variables and composite scales

6.2.1. Household demographic composition

Data from the household roster were used to generate information on the number of members in each household, the number of members in different age categories, the number of members working to earn money, the number of school age children attending school, and the gender, age and occupation of the household head. In addition to these variables, the household roster data were used to compute a dependency ratio and an earner dependency ratio. The dependency ratio was computed by adding the number of members less than 15 years of age to those over 64 years of age, and dividing this by the number of members between 15 and 64 years of age. The earner dependency ratio was calculated by dividing the number of working household members by the number of nonworking household members.

6.2.2. Household socioeconomic status

The baseline survey gathered data on a variety of variables that measure different domains of household socioeconomic status (SES). Data were not gathered on household income, due to insufficient resources for data collection and processing and also because of the difficulty of assessing household income in settings where a large proportion of income is from the agriculture sector and few workers earn a regular wage. However, data were gathered on other domains of household SES, such as ownership of house, land, durable goods (i.e. non-productive assets), productive assets (agricultural tools) and livestock; housing quality (e.g. house construction material, number of rooms); and access to water and sanitation services. These types of variables have been used previously to create summary measures of household SES (Filmer and Pritchett, 1999, 2001; Menon, Ruel and Morris, 2000). A short description of the summary measures of household SES created in this survey is provided below.

Household assets indices

The survey questionnaire gathered household-level data on ownership of 17 durable goods (e.g. cooking utensils, furniture, electronics, and so forth), 9 productive assets (agricultural tools) and 6 types of small animals and livestock. Respondents were asked whether or not they owned these individual assets, and if they did, how many of each one they owned. Current market value of each of the durable goods and productive assets was also assessed. From this data, three types of indices were created:

1. *Simple count indices*: these indices consisted of a simple count of whether or not the households owned the assets listed (using Yes=1 and No=0). The three indices created are referred to as *durable goods count*, *productive assets count* and *livestock count*.
2. *Total number of assets*: these indices were created by summing up the *number* of each asset owned by the households. The three indices created are referred to as: *total number of durable goods*; *total number of productive assets*; *total number of livestock*.
3. *Total value of assets*: for the durable goods and productive assets, two indices were created by using the current estimated market *value* of the different assets and multiplying this value by the number of assets of each type owned by the household. The value of each type of asset was then summed up to derive the value of assets indices. The two indices derived were: *total value of durable goods* and *total value of productive assets*. For livestock, we used a weighting factor called the Tropical Livestock Unit (TLU[8]) to assign a *value* to each type of animal that adjusts for the nutrient consumption, food production capacity and environmental impact of each animal. The TLU value for each type of livestock was multiplied by the number of livestock owned by the household, and the total number of TLU value-adjusted livestock was calculated for each household. This index is referred to as the *value of livestock*.

   The assets included in these three types of indices are presented in Appendix 6.1.

Overall socioeconomic status index

It is often desirable to have an overall measure of SES for descriptive and analytical purposes. As mentioned earlier, since we did not gather information on household income or consumption/expenditure, we used another approach to summarize available data on socioeconomic characteristics into summary scores. The different domains of household SES for which data were available in our survey to create an SES index included: (1) household assets (durable goods, productive assets and livestock); (2) housing quality (construction material used for floor, walls and roof , number of rooms and household members per room); and (3) availability of water and sanitation services (type of water source and sanitation facility). We deliberately did not include information on education of the respondent mother in the creation of the overall SES score because it has previously been shown that maternal education influences child health independently of household wealth, as well as synergistically with it, and thus, education likely represents mechanisms of influence that are different from those influenced by household wealth alone. We also did not include occupation of the household head or the

[8] Tropical Livestock Units are calculated based on a system developed by the International Livestock Research Institute (ILRI) to provide a comparable unit of assessment of the value of different types of livestock held by households. The TLU takes into account the animal's weight and economic value and has been validated in several settings. One TLU usually stands for a standard animal weighing about 250 kg (usually equivalent to 1 cow). http://lead.virtualcenter.org/en/dec/toolbox/Mixed1/TLU.htm

respondent mother in the variables used to define household SES either, mainly because the hierarchical value of occupations in rural Haiti is not well defined.

The statistical data reduction method used to summarize these variables was principal components analysis (Kim & Mueller, 1978). The variables used and the results of the principal components analysis are summarized in Table 6.1. Overall, the model explained 62 percent of the variance in the variables included and yielded three factors, one that reflected household ownership of assets (durable goods, productive assets and livestock), a second one that reflected the quality of housing, and a third one that reflected the availability of water and sanitation services.

Only the crowding variable (measured as the number of household members/room) was dropped from the final model because it did not enter the three factors identified here, nor did its inclusion increase the variance explained by the model.

Table 6.1. Factors and factor loadings from principal components analysis

	Factor 1 (assets)	**Factor 2 (housing quality)**	**Factor 3 (water/sanitation)**
Floor material (2 categories)	-.00	.69	.18
Wall material (3 categories)	.10	.77	-.13
Roof material (2 categories)	.28	.59	.16
Value of durable goods	.66	.39	.28
Value of productive assets	.83	.07	-.11
Value of livestock	.87	.04	.03
Drinking water (4 categories)	-0.02	-.09	.86
Latrine type (3 categories)	.06	.34	.65

Rotation Method: Varimax with Kaiser Normalization.

The individual scores for each of the three factors were further ranked and their distributions were divided into terciles to create three categories for each factor: low, average and high. Thus, terciles of asset scores, housing quality scores and water/sanitation scores were derived and will be used in the descriptive analysis presented in this report.

6.2.3. Household food insecurity

The baseline survey gathered data on two dimensions of household food insecurity: 1) household stocks of foods commonly grown by families in the Central Plateau region (corn, beans and millet); and 2) household *experiences* related to food insecurity. For the latter, data were gathered on a variety of household experiences related to food insecurity. These experiences which covered a range from less extreme to more extreme e.g., cooking with less beans (a preferred food) and cooking without beans were at the less extreme end of the experiences while going to bed hungry or being in a position where children had to go to bed hungry were considered more extreme experiences. These expectations were based on previous studies related to household experiences of food insecurity (Frongillo et al., 1997; Frongillo, 1999; Studdert, Frongillo and Valois, 2001; Frongillo and Nanama, 2003; Frongillo et al., in press).

A model household food insecurity assessment tool was designed after consultation with a technical expert in the measurement of food insecurity (Frongillo, E., personal communication), and was made locally relevant after extensive consultations with the Haitian members of the survey team. The tool was further refined after the field testing of the survey instrument. In total, data were gathered on 11 types of food insecurity experiences. Data on these 11 individual experiences related to food insecurity were used to develop a composite food insecurity scale that could summarize the information from the individual variables into a meaningful composite measure. The scale was constructed by summing the total number of food insecurity-related experiences that a household had faced in the past 30 days. All the variables included contributed a maximum of 1 point to the scale, and variables with multiple categories were recoded so that the highest category contributed 1 point, the lowest category 0 points, and categories in between contributed between 0 and 1 point. Thus, the scale ranged from a minimum of 0 to a maximum of 11, where households with a score of 11 would have experienced extreme levels of food insecurity. The distribution of the composite food insecurity scale was divided into equal terciles to create 3 groups that represented low, moderate and severe food insecurity. The detailed scoring of the variables that were included in the scale is presented in Appendix 6.2. The reliability of the household food insecurity scale was tested using Cronbach's alpha. The scale had a moderate reliability of 0.69.

6.3. Analyses

All the analyses presented in this chapter compare households in the preventive program group with households in the recuperative program group.

6.4. Results

6.4.1. Household demographic characteristics

Household headship

The data on household headship are presented in Table 6.2. There are no apparent differences between the preventive and recuperative program groups. The average age of the household head is about 40 years, and the majority of households are headed by males (90 percent). Close to 83 percent of the household heads are the spouse or partner of the respondent, about 10 percent of the households are headed by the respondent's parent or parent-in-law, and only approximately 5-6 percent are headed by the respondent herself. In about 86 percent of cases, the household head's main occupation is farming, and most of the remaining household heads appear to be engaged in other salaried or remunerated activities. Again, there are no differences between program groups in the type of occupation of the household head.

Household composition

Table 6.2. also presents data on the composition of the households in the baseline survey sample. Again, there are no differences by program group. The average household in both program groups includes about 7 members. The average number of children under 5 years of age is close to 2 in both program groups, while the number of adults above 18 years of age is 2.5. Approximately 85 percent of school-age children (6-14 years of age) attend school on a regular basis.

The average number of household members who work for an income is 2.2, while the number of those who do not work for an income is about 5. The earner dependency ratio, i.e., the number of household members who work for an income divided by those who do not work, is 0.6 in both program groups, and indicates that on average households have less than one adult income earner for each non-working household member. The dependency ratio is high at 1.6 in both program groups, meaning that each adult between 15 and 64 years of age has 1.6 dependents (< 15 or > 64 years of age).

Table 6.2. Household demographic characteristics, by program group

Characteristics	**Variable name**	**Program group**				**Total [N=1514]**	
		Recuperative [N= 759]		**Preventive [N=755]**			
		%		%		%	
Gender of household head (% male)	*sexhh*	90.8		90.1		90.4	
Household head's occupation	*activhh*						
- % farming		85.5		86.8		86.2	
- % other/business		12.0		10.9		11.4	
- % no occupation		2.0		1.4		1.7	
Relationship of household head to respondent	*lienhh*						
- self		5.1		6.1		5.6	
- partner/spouse		82.9		82.3		82.5	
- father/mother		7.5		7.4		7.5	
- in-law		3.2		2.8		3.0	
		Mean	SD	**Mean**	SD	**Mean**	SD
Age of household head	*agehh*	**39.6**	11.7	**39.8**	11.1	**39.7**	11.4
HH size	*hhsize*	**6.8**	2.3	**6.7**	2.3	**6.7**	2.3
Number of adults (≥18 years old)	*nadult*	**2.5**	1.0	**2.5**	1.0	**2.5**	1.0
% adults: (no. adults ≥ 18/hh size) * 100)	*adultp*	**39.6**	13.3	**39.8**	12.5	**39.8**	12.9
Number of children < 5 years of age	*under5*	**1.7**	0.7	**1.8**	0.7	**1.7**	0.7
% of school-age children going to school	*schoolk%*	**85.4**	30.6	**85.6**	32.5	**85.0**	31.5
Number of members who work for money	*nwork*	**2.2**	0.9	**2.1**	0.8	**2.2**	0.9
Number of members who do not work for money	*nnotwork*	**4.6**	2.1	**4.6**	2.1	**4.6**	2.1
Dependency ratio[1]	*depratio*	**1.6**	0.8	**1.6**	0.8	**1.6**	0.8
Earner dependency ratio[2]	*earndep*	**0.6**	0.5	**0.6**	0.5	**0.6**	0.5

[1] Dependency ratio is defined as: (number of children < 15 y. of age + number of adults > 64 y.) / number of working household members

[2] Earner dependency ratio is defined as: number of working household members / number of non working household members.

6.4.2. Household socioeconomic status

House ownership and quality, and availability of services

Table 6.3. presents data on the socioeconomic status of the households in the preventive and recuperative program groups. The majority of households in our sample own their house, and this proportion is slightly higher among the recuperative group (94 percent) than in the preventive group (91 percent). Conversely, a slightly higher proportion of families in the preventive group live in rented homes (5 percent) than in the recuperative group (3 percent). There is no difference between the groups in ownership of the land on which their house is built, with approximately 70 percent being owners.

The data also show that houses have two rooms, on average, and that the number of persons per room is about three. This does not differ between program groups. The houses are generally rudimentary, with more than 90 percent having an earthen or stone floor. Over a third of the houses have walls made of earth or "clissade" (thin pieces of wood, interspersed with earth), whereas the remainder mostly have walls made of wooden planks. The roofs are split fairly evenly between thatched roofing (53 percent of the overall sample) and aluminum roofing (46 percent). Here again, there are no significant differences between program groups.

Table 6.3. House construction and household access to facilities, by program group

Characteristics	Variable name	Program group				Total	
		Recuperative [n=759]		Preventive [n=755]		[n=1514]	
House ownership		%		%			
Own house	*Q24a*	94.1		91.1		92.6	
Owns land on which house built	*Q24b*	71.7		71.2		71.4	
Housing quality		**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Number of rooms	*Q27a*	2.3	0.8	2.2	0.7	2.3	0.8
Crowding (number of people/room)	*crowding*	3.2	1.5	3.2	1.5	3.2	1.5
Type of floor	*Q27b*	**%**		**%**		**%**	
Earth/sand/rocks		95.1		93.6		94.4	
Concrete/masonry		4.9		6.2		5.5	
Type of walls	*Q27c*						
Clissade/earth		39.3		37.9		38.6	
Wood/planks		56.4		58.3		57.3	
Stone blocks/stones		4.1		3.4		3.7	
Type of roof	*Q27d*						
Thatched roof		56.0		51.0		53.5	
Aluminum		43.9		48.9		46.4	
Access to services							
Has electricity	*Q24c*	2.1		1.9		2.0	
Toilet facility	*Q23*						
Latrine (rudimentary)		27.8		26.1		26.9	
Latrine (improved)		14.8		17.7		16.2	
No facility		57.3		56.0		56.6	
Water source (for drinking)	*Q21*						

		Program group		
Tap in house		1.6	0.9	1.2
Public tap		31.9	27.7	29.8
Well		2.9	4.9	3.9
Unprotected spring		50.6	52.7	51.7
Protected spring		10.5	10.0	10.2
River		2.6	3.2	2.9
Garbage disposal	*Q26a*			
Burn		6.2	5.2	5.7
Throw away		87.0	85.4	86.2
Bury		0.1	0.7	0.4
Use as fertilizer		6.7	8.7	7.7

Only about 2 percent of the households have access to electricity, and 15 percent to improved latrines. Of the remaining households, over 55 percent have no access to any toilet facilities and the remaining (about 30 percent) have only rudimentary latrines. The situation with regard to access to safe drinking water is similarly precarious, and slightly over 50 percent of households use water from unprotected springs for drinking and cooking purposes. About 30 percent of households have access to public taps, and 10 percent have access to protected springs.

Access to garbage disposal facilities is also extremely limited and most households simply dispose of their garbage in the outdoors, possibly in communal garbage heaps. Only 7 percent or so compost and reuse their garbage as fertilizer, while close to 6 percent burn their waste.

Household ownership of assets

Table 6.4. presents the data on ownership of three different types of assets, as described previously: durable goods, productive assets and livestock. As with most of the preceding variables, there are no major differences between program groups in the assets count indices or in the total number of assets. Households in both program groups own about 10 out of 17 possible types of durable goods, 3 out of 9 types of productive assets, and 2.5 out of a possible maximum of 6 animals. Households from the two program areas are also very similar with regards to the total number of different types of assets owned, with the exception of total number of animals, which is higher by 1 in the recuperative group.

With regards to ownership of animals, more households own one or more chickens (75 percent) than goats, or pigs (owned by about 50 percent of households). Cows are owned only by 42 percent of households, horses by 34 percent, and mules by only 7 percent of households. Chickens are usually owned in larger numbers, probably due to the lower cost of buying and caring for chickens compared to the other animals. For instance, about 40 percent of households own more than 3 chickens, while only 8-12 percent of households own more than 3 goats, pigs or cows, and only 2 percent of households own more than 3 horses.

Remittances

The survey gathered data on whether respondent households received remittances either from outside Haiti or from family members who had migrated to other parts of Haiti. The results show that surprisingly few households from our sample receive any remittances from within Haiti (only 6.3 percent) or abroad (about 6 percent). There is a slightly higher proportion of

households in the recuperative group (7.3 percent) who receive remittances from within Haiti than in the preventive group (5.3 percent).

Table 6.4. Household asset ownership and remittances from Haiti and abroad

Characteristics	Variable name	Treatment group				Overall [n=1514]	
		Recuperative [n=759]		Preventive [n=755]			
		Mean	SD	Mean	SD	Mean	SD
Durable goods count[1]	*hhasset*	**10.2**	1.9	**10.2**	1.7	**10.2**	1.8
Total number of durable goods[2]	*nasset*	**35.6**	16.2	**34.7**	16.5	**35.1**	16.3
Productive assets count	*prasset*	**3.0**	1.4	**2.9**	1.4	**2.9**	1.4
Total number of productive assets	*nprasset*	**3.9**	2.4	**3.8**	2.2	**3.8**	2.3
Livestock count	*animal*	**2.5**	1.7	**2.4**	1.6	**2.5**	1.6
Total number of livestock	*nanimal*	**7.0**	8.0	**5.9**	6.8	**6.5**	7.4
Remittances received from Haiti	*Q211*	7.3		5.3		6.3	
Remittances received from outside of Haiti	*Q211b*	5.8		5.7		5.7	

[1] Durable goods count is the index that consists of a simple count of whether or not the households owned the assets listed (using Yes=1 and No=0). Productive assets count and livestock count are constructed the same way.
[2] Total number of durable goods is, as its name implies, the total *number* of each asset owned by the households. Total number of productive assets and livestock are constructed the same way.

6.4.3. Household food security

Tables 6.5. and 6.6. present results on the two dimensions of household food security studied. The first measures the nature and duration of household food stocks, and the second one aims at capturing the extent and depth of food insecurity as experienced by the households themselves.

Food stocks

Table 6.5. presents data on the major types of crops cultivated by households in our sample, and the length of time harvest from these crops usually lasts.

The data reveal that most of the households in the study area grow at least some of their own food, primarily corn, millet and beans. Although there is no difference between preventive and recuperative groups in terms of the proportion of households who grow corn and beans, a slightly larger proportion of households in the recuperative group (95 percent) grow millet compared to those in the preventive group (92 percent). The duration of the harvest -- i.e., the length of time food stores from these crops are used by the household -- is almost identical between the program groups, and is extremely short for all crops. The mean duration of harvest is shorter for beans (only about 3 weeks) and is slightly higher for corn (6 weeks) and for millet (7 weeks).

More than 85 percent of households buy corn in addition to the corn they produce, about 80 percent buy millet and almost 100 percent buy beans in the market.

These data suggest that Haitian families in the program areas are experiencing a severe shortage of food from own production and are highly dependent on market availability and prices even for their basic staple food supply such as corn, millet and beans.

Table 6.5. Household food security characteristics, by program group

Characteristic	**Variable name**	**Recuperative [n=759]**		**Preventive [n=755]**		**Total [n=1514]**	
		%		**%**		**%**	
Crops planted:							
- Corn	*Q701a*	95.4		95.4		95.4	
- Millet	*Q701b*	95.0		91.9		93.5	
- Beans	*Q701c*	90.1		91.7		90.9	
Duration of harvest (weeks):		Mean	SD	Mean	SD	Mean	SD
- Corn	*Q702a*	**5.9**	3.1	**5.9**	2.9	**5.9**	3.0
- Millet	*Q702b*	**7.0**	3.0	**6.9**	3.0	**6.9**	3.0
- Beans	*Q702c*	**2.8**	2.6	**3.0**	2.7	**2.9**	2.6
Proportion who buy more:		**%**		**%**		**%**	
- Corn	*Q703a*	84.8		87.6		86.2	
- Millet	*Q703b*	80.5		84.6		82.5	
- Beans	*Q703c*	99.3		99.3		99.3	

Household experiences related to food insecurity

The data on the types of food insecurity-related experiences are summarized in Table 6.6. and show that Haitian families in our study area experience an extraordinarily high level of food insecurity. The data are rank-ordered to show the most frequent food insecurity-related experience towards the top of the table and move downwards towards the least common food insecurity- related experiences, and are concurrent with findings in other countries where these experiential food insecurity measures have been used (Radimer et al., 1992; Studdert, Frongillo and Valois, 2001; Frongillo and Nanama, 2003).

The most common food insecurity-related experiences are based on the use of beans added to staple food (millet, corn or rice), and likely reflect both high prices of beans in the market as well as low production of beans by the study households. Thus, households first reduce the *amount* of beans added to their staple and then decide *whether* or not they can afford to even add beans to their staple food. In our sample, having cooked without beans in the previous 30 days was almost universal (96 percent). These strategies are then followed by reductions in the amounts of food consumed (90 percent), and subsequently by a general anxiety about the lack of food (88 percent). The most extreme experience related to food insecurity is, as in the US and other countries, "going to bed feeling hungry". Again, as in other countries, it appears that children are somewhat buffered from this experience as the proportion of households where adults go to

bed hungry is about 10 percentage points higher than the proportion of households where children are forced to go to bed hungry. However, it should be noted that the prevalence of this "symptom" of food insecurity, i.e., of children going to bed hungry, is still extremely high in this study area, and is seen in about 75 percent of households. There are no real differences between the two program groups on all food insecurity experience related variables, except for the proportion of families who ate 2 meals or less – this was higher by about 5 percentage points in the preventive program group compared to the recuperative group. The reasons for this are not clear, and it is likely that this is due more to chance since none of the other variables show similar patterns of differences.

Table 6.6. Household experiences related to food insecurity

Food insecurity experience	***Variable name***	**Recuperative [n=759] %**	**Preventive [n=755] %**	**Overall [n=1514] %**
Cooked with *less* beans than usual in last 30 days	*Q710*	98.4	97.6	98.0
Cooked without beans in last 30 days	*Q709*	97.1	95.8	96.4
Ate less food due to hardship in last 30 days	*Q706*	90.3	89.1	89.7
Worried about not having enough food more than once in the past 30 days	*Q716*	88.5	87.9	88.2
Cooked without even adding the head of herring in last 30 days	*Q711*	88.1	86.0	87.1
Cooked same food day after day in last 30 days	*Q712*	85.6	84.4	85.0
Ever went to bed hungry in last 30 days	*Q713*	84.0	83.7	83.9
Ate 2 or fewer meals/day	*Q705*	74.1	77.9	76.0
Children ever went to bed hungry in last 30 days	*Q715*	75.9	75.1	75.5
Ate less food due to scarcity of fuel in last 30 days	*Q707*	49.2	51.2	50.2
Mean values on HH food insecurity scale (SD)	*Fdinsec*	7.8 (1.8)	7.8 (1.8)	7.8 (1.8)

Scores on the food insecurity scale ranged from a low of 0.25 (indicating very low food insecurity) to a high of 11 (indicating severe food insecurity), out of a possible maximum of 11. The overall mean and standard deviation of the scale was 7.8 (1.8) and this was identical between the two program groups, suggesting that the experience of food insecurity is similar in the areas covered by the two program models.

The proportion of households in each food insecurity tercile that experienced the different aspects of food insecurity is shown in Appendix 6.3. There is a large variability in experiences in the low food insecurity tercile where at one end, about 38 percent of households have children who went to bed hungry and at the lower end, about 90 percent of households said they had had to cook without beans. In the other two terciles of food insecurity, however, the majority of households had almost all the food insecurity experiences that the scale was based on, with close to 100 percent of households in the severe food insecurity tercile having all 11 food insecurity experiences (including 90 percent where children went to bed hungry). This points to the severity of food insecurity among these Haitian households, both in terms of the range of food insecurity-related experiences and the depth to which they are experienced by households. Also, given the lack of variability in the scale among the two upper terciles of food insecurity suggests that further research, probably qualitative in nature, will be needed to better understand the food insecurity related experiences of Haitian households so that measures of food insecurity that can discriminate better between households can be developed.

6.5. Conclusions

Our findings indicate that households in this rural part of Haiti do not have a large resource base, either in terms of assets or infrastructure, to draw upon. The housing, water and sanitation facilities are largely rudimentary with almost no households having access to electricity and few having access to safe water and sanitary facilities. The large majority of households rely on agriculture as their main source of income, which is often complemented by some market activities undertaken mainly by women. Remittances from relatives living either abroad or in Haiti are largely absent from the resource base, and less than 10 percent of households receive remittances.

The food security situation of households in our survey sample is particularly precarious. The data on the lack of food stocks from own production and the food insecurity experiences of households suggest that food insecurity is highly prevalent and severe. Furthermore, the experience of food insecurity cuts deep into families and reaches even young children, who in other, possibly more well-off societies are often buffered from these types of experiences. Thus, it appears that it is particularly important to have programs in place that can provide families, particularly those with young children, with adequate food resources in the short term, and technical assistance and resources necessary to improve food production in the long term.

7. CAREGIVER RESOURCES FOR CARE

7.1. Introduction

This chapter presents information on the resources available for care at the level of the caregiver. These resources have previously been identified as caregiver education, knowledge and beliefs, workload and time constraints, physical and mental health, autonomy in decision-making, control over resources, and the availability of support (social, emotional and physical) in the household and community (see conceptual model in Chapter 2; and Engle, Menon and Haddad, 1997). The baseline survey gathered data on most of these resources and this chapter presents data on women's education, child feeding knowledge, workload and time constraints, self-reported physical and mental health, household decision-making and control over resources, and support available to the caregiver.

First the variables and composite scales that were used to understand the various caregiver resources are described. Then, caregiver resources are compared between the two program groups.

7.2. Variables and composite scales

Information on a number of caregiver resources was collected in the baseline survey, namely resources related to the caregivers' education, knowledge, time and workload, social support, and mental and physical health. Data on caregiver education and work patterns were obtained using simple survey questions. Experience with the measurement of other caregiver resources such as social support, mental health and stress and women's empowerment, however, is much more limited and therefore, our approach was more exploratory. We measured a number of dimensions for each of the characteristics of interest and created composite scales to capture the key domains measured.

This section presents a brief overview of the variables and scales used to assess individual caregiver resources. The detailed scoring of variables that were used to create the scales described in this section is presented in Appendices 7.1., 7.2. and 7.3. The reliability of all the scales created was evaluated using Cronbach's alpha (Carmines and Zeller, 1979), and the results for each scale are also presented in the Appendices.

7.2.1. Civil status, education and employment of the respondent mothers

The civil status of the respondent mothers was assessed using standard survey questions asking them whether had a spouse or partner, and if so, the type of relationship they shared. Education was assessed by asking the respondents how many years they had attended school. The data gathered on employment status included information on the type of income-generating work the respondent engaged in and how she was remunerated for her work.

Workload and time constraints

The survey also gathered information on the implications of the respondents' work patterns for child care. For instance, data were gathered on the amount of time the respondent spent away

from home when she went to work and the number of days/week that she spent at work. Data were also obtained on characteristics of the alternate caregivers used by mothers when they left the home. Specifically, information was obtained on the age, gender and education of the alternate caregivers and also whether they were paid for their services, and whether the mother left cooked food, ingredients, money or instructions for the child's care.

7.2.2. Women's empowerment

Women's empowerment has typically been measured using a variety of indicators, including but not limited to possession and control over assets, mobility, attitudes about gender roles, spousal or couple communications, involvement in household decision-making (see Malhotra, Schuler and Boender, 2002 for a comprehensive review of measures of empowerment). In our survey, we gathered data on a number of domains of women's empowerment, asking questions on individual behaviors or attitudes within each domain.

The data on the individual questions within each domain were combined to create summary scales for the following domains of women's empowerment: (1) couple communication; (2) gender identity; (3) ownership of assets; (4) control over purchases for household, self and child, and (5) involvement in household decision-making. Details of the scoring system used to create the scales for each of these domains are presented in Appendix 7.1. The five scales are described below:

1. Couple communications: In measuring couple communications, respondents were asked how frequently they discussed four aspects of their lives, i.e. work, home, expenses, and community happenings, with their spouse. For each of these, the category of "never" was assigned of "0", "often" was assigned a score of "2", and the middle category of "sometimes" was assigned a score of "1". The scores on each of four questions were then added up to create a summary scale for couple communications that ranged from a low of 0 for poor communication to a high of 8 that signified a high level of communication between the spouses/partners.
2. Gender identity: To measure gender identity, the respondents were asked if they agreed or disagreed with a variety of statements related to the role and place of women in society. For the creation of the scale on gender identity, these variables were then recoded and assigned scores such that a response in agreement with a *positive* statement about women's roles received a score of 1, while a response in disagreement with the same statement received a score of 0. Conversely, a response in agreement with a *negative* statement about women's roles received a score of 0, while a response in disagreement with the same negative statement received a score 1. The overall gender identity scale thus created went from a low of 0 to a high of 6, with lower scores indicating perceptions of a lower role and place for women in Haitian society.
3. Ownership of assets: The ownership of assets by the respondents was assessed by asking respondents if they owned each of four assets (land, the house they lived in, another house and livestock) either on their own or jointly. For each asset that a woman owned either alone or jointly, a score of 1 was assigned. A score of 0 was assigned if she did not own the asset. All four asset ownership variables were then summed to create a scale of ownership of assets that ranged from 0 to 4.
4. Control over purchases: Women's control over purchasing was assessed by asking respondents if they could purchase various items on their own if needed (a total of 6

items). These included household items like food, and personal items like clothes, medication and toiletries, either for herself or her children. An affirmative response for each of these items received a score of 1, and a negative response a score of 0. The scores for each of the items were then summed to create a scale that assessed overall control over purchasing. The scale ranged from a minimum of 0 to a maximum of 6.

5. Involvement in household decision-making: The survey gathered data on who made household decisions related to a variety of domains, ranging from decisions about daily life like what to cook to decisions about larger issues such as selling property, rearing children, etc. The data on these decisions were used to create a summary scale that was based primarily on whether the respondent was at all involved in the decision or not. This was done because there is no clear consensus on which of these, i.e., decision-making that is completely individual or decision-making that is consultative, is indicative of better status of a woman within a household. Thus, it was decided that the scoring system would simply evaluate whether a woman was involved in a decision or not, a system that has been used previously by other researchers (Sethuraman, K., personal communication). This system of scoring eliminated the need to assign a differential value to a decision made alone by a woman versus a decision which was taken jointly by a woman and someone else (usually her spouse). Thus, each decision was scored "0" if the woman was not involved at all in the decision, and "1" if she was involved in the decision, either on her own or jointly with someone else. The scores on all the decisions were then added up to create a summary scale of women's involvement in decision-making. The final scale had a minimum possible score 0 and a maximum of 11, which would indicate that the woman was involved in all the decisions that the survey asked about. Decisions about family planning were not included in this scale because a large proportion of women did not use family planning and thus, this question did not seem relevant to them. Using this variable would have necessitated either making a decision about how to rate those who did not use contraception or dropping all those women from the scale creation. This would have led to a large number of missing cases, and it was thus decided that this variable would be left out of the summary scale.

7.2.3. Women's physical health and nutritional status

Women's physical health and nutritional status were assessed using the following variables:

- Self rated health (visual analogue scale): Respondents were also asked to self-rate their health on a visual analogue scale. The scale comprised of a line, 10 centimeters long, where the left end of the line symbolized extremely poor health compared to other women of the respondent's age, and the right hand end of the line stood for better health than other women her age. The respondent was asked to mark the spot on the line where she felt her health stood, thus generating data on self-perceived health status.
- Body mass index (BMI): Women's nutritional status was assessed by measuring their heights and weights and using these data to calculate their body mass index (BMI). The mean values of the BMI were compared for the respondents in the two program groups. Also, the BMI values were categorized using the current WHO categories to assess whether women were underweight (BMI <18.5), normal weight (BMI of 18.5-25), overweight (BMI between 25.1 and 30) or obese (BMI >30) (WHO 1995).
- Disease conditions: We also obtained information on women's physical health by asking about a variety of disease conditions that the respondent might have been diagnosed with

as well as about the frequency with which she experienced different symptoms of poor health. Although the intention was to create an overall scale of physical health based on the number of illnesses a woman suffered from, this could not be done because a large proportion of women were unaware of whether or not they suffered from certain illnesses, especially chronic diseases such as diabetes, coronary heart diseases, which require a diagnosis from a medical professional. It was clearly easier for women to report about whether they suffered from certain *symptoms* rather than from specific *illnesses*, so our data on symptoms are likely to be more accurate to characterize women's health.

7.2.4. Women's mental health and stress

Women's mental wellbeing and stress have been hypothesized to influence the quality of care, particularly psychosocial care, that their children receive. In an attempt to measure the mental health and stress levels of women in the program evaluation areas, we assessed the presence and absence of various symptoms associated with poor mental/emotional wellbeing (e.g., feeling sad or unhappy, difficulty sleeping, difficulty in enjoying daily activities, etc.), as well as the frequency with which women experienced various symptoms of poor mental health. Data were also obtained on women's satisfaction with their current life situation and their perceptions about the amount of time they had for their daily activities. These data were further combined to create summary scales of overall mental stress, frequency of stress symptoms, time stress and life satisfaction. Detailed information on the scoring of the variables used to create the different scales is presented in Appendix 7.2., along with the Cronbach's alpha values used to assess the reliability of the scales.

- Mental stress: In order to assess overall mental stress, the variables that measured the presence (coded as 1) or absence (coded as 0) of different symptoms were summed up to create an overall scale that assessed the extent of poor mental wellbeing. A total of six variables were used to create the mental stress scale, and the scale had a minimum of 0, which indicated that the respondent experienced none of the mental health symptoms, and a maximum of 6, which indicated that the respondent suffered from all six symptoms, or a high level of stress.
- Frequency of stress symptoms: Variables that assessed the frequency of occurrence of different symptoms related to anxiety and stress (such as poor appetite, headaches, poor digestion, fatigue, etc.) were combined by recoding each variable such that for each symptom, the lowest frequency of "never" received a score of 0 and the highest frequency of "often" received a score of 2. Following this, the scores on each of the variables were summed to create an overall scale that had a minimum value of 0 and a maximum of 20. A high score on the scale indicated higher levels of stress, in terms of the number of symptoms a woman suffered from, and the frequency with which she experienced them.
- Time stress: Women's time and workload are often referred to as crucial resources in enabling them to care for their children. We assessed the amount of time women spent working outside their homes in order to measure this construct. However, it was also determined that it was important to assess a woman's own perception of how much pressure she felt for time to spend on her daily activities and caring for her children. We asked women how often they felt that they did not have enough time to take care of their homes, their children, and themselves, and also how often they worried about not having enough time to finish their daily work. The information on these four variables was

combined by assigning scores of 0 to responses of "never", 1 to a response of "sometimes" and 2 to a response of "often" to each of the four variables. These scores were then summed to create an overall time stress scale where a low score indicated a low level of stress due to time pressures and a high score reflected a high level of time pressures. The scale thus created ranged from 0 to 8.

- Life satisfaction: This was assessed by asking respondents about their satisfaction with various aspects of their lives, including their daily work and the help they received from their spouse and other family members. The individual variables were recoded to assign points to the level of satisfaction that women reported; this was done by assigning a score of 0 to women who reported being dissatisfied with a particular aspect of their lives, 1 if they were ambivalent, and 2 if they were satisfied. The scores on 10 individual variables were then summed to create an overall scale of a respondent's level of life satisfaction where a low score (minimum of 0) indicated a low level of satisfaction and a high score (a maximum of 20) a high level of satisfaction.

7.2.5. Social support

The baseline survey gathered information on women's access to different components of social support: financial/material support and help with household chores and child care. In addition, data were also gathered on participation in social group activities. These data were combined to create summary scales of financial/material support, household help and childcare help. A scale to assess the overall group membership and participation in community groups and activities was also created. Detailed information on the scoring of the variables used to create each of these scales is presented in Appendix 7.3., as are the Cronbach's alpha values for each scale. The scales are described below:

- Financial and material support: Data on whether women had access to financial and material support (e.g., food or accommodation) when they needed were gathered by asking respondents whether they had access to a place to spend the night if needed, someone who could lend them money when needed, and someone to help when they didn't have enough food at home. These variables were summed to generate a summary scale that measured the extent of support respondents received on this component of social support. A score of 3 indicated a high level of support and lower scores a lower level of support, with 0 being the lowest possible score.
- Help with household chores: This component of social support was assessed by asking respondents if they had access to help to perform various household tasks, including cooking, gathering fuel, water, washing clothes, caring for children, etc. Respondents who reported receiving help for a task were assigned a score of 1 for that task; those who did not receive help were assigned a score of 0 for the same task. The total number of tasks that respondents were asked about was then added up to generate a scale that measured the number of tasks that a respondent received assistance with. Those who had a low score received help on fewer tasks than those with a higher score. The scale had a maximum possible score of 9 and a minimum of 0.
- Help with child care: Although the physical support scale described above also included some child care tasks, a separate scale was created to assess the level of child care support that each respondent received. This scale used 3 variables that assessed whether the respondent received help with feeding, bathing and caring for her children. Respondents who received help on each of these tasks were assigned a score of 1, while

those who did not receive help were assigned a score of 0. The scores for each of the tasks was then added up to create a 3 point scale that assessed the level of child care support. The child care support scale had a minimum of 0 points and possible maximum of 3.

- Group membership and participation in community groups and activities: Respondents were asked about their participation in women's groups to discuss issues such as community problems, education issues, health issues, etc. The overall level of participation in community activities was assessed by adding up the number of types of groups that women participated in. This was combined with information on whether women had participated in any cooperatives and if they had received loans from a micro-credit program. The maximum possible score on the social capital scale was 7 (indicating a high level of social capital) and the lowest possible score was 0.

7.2.6. Child feeding knowledge

Although formal education is often used as a proxy for caregiver knowledge, it is often important to also assess actual caregiver knowledge related to specific care practices. In our survey, we assessed caregiver knowledge related to infant feeding practices, focusing on knowledge about the ideal duration of breastfeeding, the appropriate introduction of complementary foods, and appropriate feeding frequency for children in different age groups. The instrument that evaluated respondent knowledge on infant and young child feeding also asked respondents a question on the appropriate duration of breastfeeding. This variable was included in the overall feeding knowledge scale described below.

- Knowledge of appropriate introduction of complementary foods: The survey instrument included a module that asked respondents about their knowledge related to the introduction of liquids and foods from six different food groups (water/liquids, semisolids, staple foods, vegetables, eggs and meats) to infants, using types of liquids and foods commonly fed to infants and young children in this area (Menon et al. 2002). Respondents were asked when (in months after the birth of an infant) they thought it was appropriate to introduce each liquid or food. The data on the age of introduction of individual liquids and foods were then used to create a summary scale of the overall knowledge of a respondent about appropriate introduction of foods, using the current PAHO/WHO Guiding Principles on complementary feeding to define the appropriateness of the introduction of complementary foods (PAHO/WHO, 2003). For each food group, the scoring distinguished between appropriate introduction (i.e., at between 6 and 8 months of age) and introduction that was either too early (before 6 months of age) or too late (9 months or older). Introduction of any of the foods in the food group at the appropriate time was assigned a score of 1, and introduction of none of the foods in the appropriate window was assigned a score of 0. The scores for a total of 6 food groups were then added up to create a summary knowledge scale that ranged from a possible minimum of 0 to a maximum of +6. Details regarding the scoring are provided in Appendix 7.4.
- Knowledge of appropriate feeding frequency: Six questions in the feeding knowledge questionnaire asked respondents about their knowledge of the appropriate frequency of feeding meals and snacks to infants and young children in 3 different age groups (6-8 months, 9-11 months and 12-23 months). These data were combined to create an overall scale that assessed the knowledge of appropriate feeding frequency. The scoring of the

variables to be combined was based on current age-specific recommendations on the frequency of feeding complementary foods to breastfed infants between 6 and 23 months of age (PAHO/WHO, 2003). The detailed scoring is presented in Appendix 7.4.; based on this scoring, respondents whose answers for each age group matched or exceeded the currently recommended meal and snack frequency for that age group received a point of 1, while those whose responses indicated a lower frequency than the recommendations received a score of 0. The scale thus created went from a possible minimum of 0 to a maximum of 6 points.

- Overall feeding knowledge: The two scales described above, i.e., the adequacy of respondents' knowledge of introduction of new foods and of their knowledge on appropriate feeding frequencies for children at different ages, were combined with information on knowledge about the optimal duration of breastfeeding to create a scale to assess overall feeding knowledge. The two 6-point scales on knowledge of appropriate timing of introduction of complementary foods and on knowledge of age-specific feeding frequency were weighted to contribute a total of 2 points each to the overall feeding knowledge scale. This was done by dividing each of the two 6-point scales by 3, in order to re-scale them to a range from 0 to +2.
- The respondents' knowledge about the optimal duration of breastfeeding was assessed by asking then how many months they believed infants and young children should be breastfed. Responses to this question were also coded based on the current recommendations for feeding infants and young children, i.e., that children should be breastfed up to at least 24 months of age. Responses that were further away from 24 months received lower points than responses closer to 24 months, e.g., a response between 0 and 5 months received 0, while a response of 24 months and beyond received a full 2 points. The total possible points for the breastfeeding question ranged from 0 to +2.

  The points on breastfeeding knowledge were summed with the points on the two other weighted scales to create an overall feeding knowledge scale that ranged from a possible minimum of 0 to a possible maximum of +6. As with the previous feeding knowledge scales, the detailed scoring for this overall scale is presented in Appendix 7.4.

7.3. Analyses

All the analyses presented in this chapter compare households in the preventive program group with households in the recuperative program group.

7.4. Results

7.4.1. Respondents' age, civil status, education, and employment

Civil status: Data on the respondents' age and civil status are presented in Table 7.1. The mean age of the respondents in recuperative and preventive program groups was the same, about 31 years on average. A little over 20 percent of the respondents in both groups reported that they were pregnant at the time of the interview.

Thirty-five percent of respondents in the recuperative group were married, compared to 30 percent among the preventive group. A larger proportion of respondents in both groups (55 percent in the recuperative group; 61.5 percent in the preventive group) had formal live-in relationships that were not religiously solemnized (called "*placage*" in Haiti). The proportion of respondents living alone was slightly different between the two program groups, but was very small on the whole: 5.5 percent in the recuperative group and 3.8 percent in the preventive group.

Table 7.1. Civil status, education and literacy of respondent mother, by program group

Characteristics	Variable name	Program group				Overall [N=1514]
		Recuperative [N= 759]		Preventive [N=755]		
		Mean	SD	Mean	SD	
Years of schooling	*mschyr*	1.4	2.3	1.6	2.5	1.5 (2.4)
Age	*Q31*	30.8	7.0	30.8	8.0	30.8 (7.5)
		%		%		%
Never attended school		53.2		50.7		51.6
Cannot read		50.3		48.2		49.3
Married	*q201*	34.9		30.3		
Single (living alone)	*q202*	5.5		3.8		
Pregnant	*Q34*	20.6		22.2		21.4
Highest level of schooling	*q207c*					
- Primary		42.9		43.1		43.0
- Secondary		3.8		6.8		5.3
- Higher secondary		0.1		0.0		0.1

Table 7.1. also presents information on the levels of schooling attained by the respondents in the different program groups. The mean number of years of schooling was very low among both groups (about 1.5), and more than 50 percent of respondents in both groups had never attended school. The percentage who had attended primary school was similar between the two program groups, but a higher percentage of respondents from the preventive group (6.8 percent) had attended secondary school, compared to the recuperative group (3.8 percent).

7.4.2. Employment

Information on the employment characteristics of survey respondents is presented in Table 7.2. Close to 85 percent of the respondents engaged in some type of income-generating activity either at home or outside their home. The predominant occupations were farming (43 percent of all respondents) and small trade or market activities (33 percent). Small percentages of women were engaged in other activities such as office work, manual labor, midwifery/traditional healing or trade through a shop (approximately 1-2 percent in each activity).

Table 7.2. Employment characteristics of respondent, by program group

Characteristics	Variable name	Program group		
		Recuperative [N= 759] %	Preventive [N=755] %	Overall [N=1514] %
Employment	*q209*			
Unemployed		16.1	16.5	16.3
Farming		43.1	42.5	42.8
Business (shop)		1.6	1.2	1.4
Trade/market		32.7	32.0	32.3
Office work		1.2	1.6	1.4
Manual labor		2.1	3.0	2.6
Traditional healer/ midwife		1.2	0.4	0.8
Other				
Among those who work (n=1267):				
Regularity of employment	*q208b*			
All year round		28.7	27.0	27.9
Seasonally		54.3	54.3	54.3
Occasionally		17.0	18.8	17.8
Has a second employment	*q209a*	38.0	35.1	36.5
Location of main employment (n=1267)	*q209d*			
At home		18.4	21.0	19.7
Away from home		57.1	55.4	56.3
Both		24.5	23.7	24.1
Times per week away from home (n=1026)	*q209e*			
Once/week		6.3	7.4	6.8
2-3 times/week		52.0	56.0	54.1
4-6 times/week		39.3	36.2	37.5
7 times/week		2.5	0.4	1.5
Hours spent away from home (n=1018)	*Q209f*			
Less than 4 hrs		2.7	2.4	2.6
½ a day		41.3	48.6	44.9
A full day		49.7	42.8	46.3
More than 1 day		6.3	6.2	6.3
Child care arrangements when at work (n=1018)	*Q213*			
Take child to work		8.5	8.4	8.4
Leave with someone		85.8	84.9	85.4
Both		5.8	6.6	6.2

Among working mothers, approximately 35 percent also undertook a second income-generating activity. For most women whose primary occupation was farming, the secondary occupation was market activity, while for those whose primary occupation was market trade, the secondary occupation was usually farming. Thus, it appears that the majority of respondent mothers in this area of Haiti earned their income through a combination of farming and market activities.

7.4.3. Work load and time constraints

Time away from home: The implications of women's work for caring practices and child welfare, particularly for very young children, depend primarily on the nature of women's work and the types of care arrangements they use to take care of their children when they are away from home. This section presents data on the nature of women's work in terms of time spent away from home and briefly presents data on child care arrangements used by working women.

The data presented in Table 7.2. show that more than half of the working women in our sample work 2 or 3 days per week (54 percent), while 27 percent work 4 to 6 days per week. When working outside the home, the vast majority of women spend either half a day or one full day away from home. A very small proportion of women work for less than 4 hours a day (2.5 percent), whereas 6.2 percent spend more than a day away from home when they work. A cross-tabulation of type of work by time spent away from home) showed that the majority of women whose primary occupation was farming spent less time (< 4 hrs or ½ day) away from home than women whose primary occupation was trade and market work (results not shown). The women who bought and sold goods and produce in markets made up the bulk of those who spent a full day (63 percent) or more than a day (48 percent) away from home. This last group of women is likely those women who live in the most remote areas of our study communities and have to walk extremely long distances to conduct their business in the markets. There were no differences between program groups in employment characteristics.

Child care arrangements: In our sample, the overwhelming majority of women who work outside the home do not take their infant or young child to work with them. Only 8 percent said that they took their child to work, whereas 86 percent said that they left their child in the care of someone else when they went to work. Again, this proportion differed depending on type of work performed by the respondents. A larger proportion of those who worked on farms took their children with them (13.7 percent), compared to those who worked in the markets (only 2 percent of them reported always taking their child along).

Table 7.3. presents details of the child care arrangements used for young children when the mother leaves the home, either to go to work or to the markets. There were no differences by program group. The majority of substitute caregivers were females and about 60 percent were family members. Less than 2 percent were paid for their services but in 43 percent of the cases, the mother left behind cooked food for their child. A much larger proportion of mothers (84 percent) left behind ingredients for the caregiver to prepare food for the child, and some left money for the alternate caregiver to purchase food for the child (27 percent). A large proportion of mothers did not give any instructions to the caregiver (40 percent).

The average age of the alternate caregiver was similar in both program groups and was around 33 years, but approximately 30 percent were younger than 15 years of age, and roughly the same proportion was over 50 years of age. A smaller proportion of alternate caregivers was between 20 and 40 years of age, probably indicating that older siblings and grandparents were likely the most common alternate caregivers.

Table 7.3. Characteristics of alternate caregiver, by program group

Characteristics of alternate caregiver	***Variable***	**Recuperative**	**Preventive**	**Total**
Mean age (SD)	*Q215c11*	34.6 (22.3)	33.0 (21.9)	3.8 (22.1)
Is a family member (%)	*Q215a1*	59.4	59.7	59.6
Is female (%)	*Q215c21*	71.4	74.0	72.7
Is paid for caregiving services (%)	*Q215e1*	1.3	1.3	1.3
Mother leaves cooked food behind (%)	*Q215f11*	42.0	43.9	42.9
Mother leaves ingredients behind (%)	*Q215f21*	86.0	81.9	83.9
Mother leaves money to buy ingredients (%)	*Q215f31*	25.3	29.0	27.2
Mother gives alternate caregiver instructions (%)	*Q215f41*	60.4	60.0	60.2

A comparison of women's work patterns by the age of the index child shows no differences by child age. This is probably because index children are already toddlers and older children (18-47 months of age). Our previous formative research in the program areas had suggested that mothers were more likely to modify their work patterns to accommodate the caring needs of their young infant (during the first 6 months of life) than in later infancy and childhood. An examination of the work patterns of the respondents for the younger siblings (0-6 mo old, n=260) of the index children showed that this was indeed true. Appendix 7.5. shows that although some women delay their return to work outside the home for the first two months, a large proportion (close to 40 percent) of women are returning to work as early as when their infant is one month old. Further, the data in Appendix 7.6. show that over 50 percent of the respondents begin spending one half to a full day outside the home as early as when their infant is 2 months old. This proportion increases to about 70 percent when infants are 6 months old. These work patterns are clearly not compatible with the recommended exclusive breastfeeding of infants for the first 6 months of life, unless women are able to express enough breast milk for alternate caregivers to feed the infant in their absence. Our qualitative work indicates that breast milk extraction is very rarely practiced in the communities of Central Plateau.

Overall, the data on women's work show that the majority of women in our study sample are engaged in some type of income-generating activity. The most common types of work are farming and market activities, and, in this culture, neither of these activities appears to be compatible with taking a young child along. An examination of the work patterns of women with young infants, particularly those younger than 6 months, suggests that maternal employment is

likely to interfere with optimal feeding practices during this critical period, especially through its potentially negative effect on exclusive breastfeeding.

7.4.4. Women's empowerment

Couple communication: Table 7.4. presents data on how often women communicate with their spouse about their work, issues related to the home, expenses and community happenings. Very few women, only between 3.5 and 7.5 percent report having no communication with their spouse about work, home or expenses. The proportion of women who never communicate with their spouse about work is slightly higher than the proportion of couples who never communicate about home and expenses, which are about the same. For community happenings, however, the proportion of women who never communicate with their spouse is substantially higher (about 36 percent). Conversely, a much larger proportion of women communicate often with their spouse about home, work and expenses than about community happenings.These results probably reflect the hierarchy of needs as far as couple communications are concerned, and suggest that couples prioritize issues related to home and expenses over work, though only marginally, and that communications related to community happenings are assigned the lowest priority. We did not ask questions about other issues that couples might communicate about, e.g., children, health care, etc., and thus might have missed those issues that fell in between home and expenses on one end and community happenings on the other.

The mean of the overall measure of couple communications was 5.4 of a possible maximum 8 points (presented at the bottom of Table 7.4.). The mean scores on the scale did not differ significantly by program group.

Gender identity: Findings related to how women view their role compared to men rural Haitian society are also shown in Table 7.4. The data reveal that Haitian women have strong opinions about their role in society and in general a large proportion of women disagree with statements that reflect a lower status for women in compared to men within households and societies. For instance, virtually none of the women agreed with the statement that boys should preferentially be sent to school rather than girls. Similarly, a very small proportion of women agreed with the statement that a woman should accept being beaten in order to maintain peace in their households.

Table 7.4. Couple communications and gender identity, by program group

Characteristic	Variable name	Recuperative [n=717] %	Preventive [n=727] %	Total [n=1444] %
Communications with spouse				
Related to work, never	*Q602a*	5.0	7.4	6.2
Related to work, often	*Q602a*	60.3	60.1	60.2
Related to home, never	*Q602b*	3.6	5.8	4.7
Related to home, often	*Q602b*	62.9	58.7	60.8
Related to expenses, never	*Q602c*	4.5	5.4	4.9

		Recuperative [n=717]	Preventive [n=727]	Total [n=1444]
Related to expenses, often	*Q602c*	61.8	60.5	61.1
Related to community happenings, never	*Q602d*	36.5	36.5	36.5
Related to community happenings, often	*Q602d*	9.9	10.3	10.1
Gender identity: attitudes about women's roles				
Only men should take important decisions	*Q603a*	36.9	37.1	37.0
Husband should help at home if the woman works outside	*Q603b*	96.2	96.4	96.4
Husband should not let woman work outside home	*Q603c*	39.6	37.7	38.7
Woman has the right to express her opinion, even when she disagrees	*Q603d*	90.1	89.0	89.6
Woman should accept being beaten to maintain peace in the household	*Q603e*	3.8	4.5	4.1
It is better to send a boy to school than a girl	*Q603f*	0.4	0.5	0.5
Means of scales				

		Mean	SD	Mean	SD	Mean	SD
Couple communications scale (n=1444 (Range: 0 to 8)	*Q602comm*	5.5	1.8	5.3	1.9	5.4	1.9
Gender identity scale (n=1498 (Range: 0 to 6)	*Q603attd*	5.1	0.9	5.1	0.9	5.1	0.9

The mean value of the overall scale to assess gender identity was 5.1 of a possible maximum of 6 points and did not differ by program group (also shown in Table 7.4.).

Ownership of assets: Table 7.5. presents information on the assets owned by the survey respondents, as well as their degree of control over these assets. About 21 percent of respondents in both program groups own land independently, whereas close to 50 percent own land jointly with their spouse. The proportion of respondents who own the house that they live in is slightly higher in the recuperative program group (13.6 percent) than in the preventive group (11.3 percent). However, this is offset by the fact that a slightly larger proportion of women in the preventive group (65.7 percent) own their homes jointly compared to women in the recuperative group (63.5 percent). The same pattern is also seen for animal ownership, with a slightly larger

proportion of women in the recuperative group owning animals independently (21.6 percent) than in the preventive group (18.3 percent), but a larger proportion in the preventive group owning animals jointly compared to the recuperative group. Only a small proportion of any of the families in the survey owned a second house, less than 2 percent of women independently owned a house other than the one they lived in and less than 5 percent owned a second house jointly with their spouse. Finally, the mean of the overall measure of asset ownership was 2.2 (range 0-4; shown in Table 7.5.) for both program groups combined and did not differ significantly by program group.

Control over sale of assets: For all assets that the survey respondents owned independently, they were asked about their ability to sell these assets if needed (results presented in Table 7.5.). A large proportion of the respondents who owned land independently indicated that they could sell it if they needed to (about 70 percent of those who possessed land on their own). Similarly, the majority of women who owned their own home (and who owned animals) indicated that they could sell these assets if needed.

Slightly over half of the women in both program groups indicated that they had access to their own money and that they could use it when they needed to. The proportion of women who had access to and control over their own finances was slightly larger in the recuperative group (58.5 percent) than in the preventive group (55.1 percent).

Control over household purchases: The survey respondents were asked questions to assess their level of autonomy in decisions related to the purchase of various items for the household, for themselves and for their children. The results suggest a large variability in autonomy, depending on the types of items to be purchased (Table 7.5.). For example, in both program groups, respondents had the least autonomy in purchasing food in bulk (only 13 percent said they could do this on their own), and the most autonomy in purchasing small food items or toiletry items for themselves (62-68 percent said they could make these purchases on their own). Similarly, the proportion of women who indicated they could buy clothes for themselves or for their children without consulting anyone else was close to 50 percent. The proportion of women who said that they had full autonomy in buying medicines for their children was higher in the recuperative group (38.8 percent) than in the preventive group (33.6 percent). A similar pattern was seen for decisions related to the purchase of medicines for themselves.

Table 7.5. also shows the mean values of the scale that assessed the overall control of respondents over purchases for their households, themselves and their children. The mean of this scale was identical for respondents in both program groups (mean=3.0, range 0-6), indicating that there was no difference between the groups.

Women's involvement in household decision-making: Table 7.6. presents data on women's involvement in decision-making at the household level. The survey respondents were asked who made decisions related to various common household issues like major expenses, working to earn money, care-seeking for ill children, and so forth. In the majority of cases, decisions about all the domains investigated were made either by the respondent, their spouse or jointly with their spouse. Decisions were made by someone other than the respondent or her spouse in a very small proportion of households (less than 7 percent) for all decisions except those related to

having another child, where in about 16 percent of the households someone other than the respondent or her spouse was reported to have made the decision.

The data also indicate that there are clearly some decision-making domains where women play a more important role than others. In particular, a high percentage of women reported being the key decision maker (over 60 percent) on decisions related to cooking, breastfeeding and weaning a child, and feeding an infant in the first year of life. For other domains, although the majority of women were involved in the decision-making process, many of them made the decision jointly with their spouse. Some of these domains included buying major household items, employment, the use of family planning, and attending prenatal clinics when pregnant. For some other domains, more than half of the households took decisions jointly, such as for decisions regarding sending children to school, caring for a sick child and raising and disciplining children. Decisions about having another child also seemed to be made jointly in most households (about 48 percent), with a significant proportion of decisions also being made by an individual other than the respondent or her partner (in approximately 16 percent of the cases).

In examining the data to evaluate simply whether women are involved in decision-making or not, it is apparent that women are in fact highly involved in making decisions about a number of domains in these communities. The proportion of households where women are *not* involved at all in the decision-making, i.e., where the decision is made by a spouse/partner or by another member of the household, ranges from less than 10 percent for decisions about infant feeding and breastfeeding to about 30 percent for decisions about buying important things for the household. Overall, women are involved in a mean of 8.6 decisions out of 11 (data shown in Table 7.6.), and this value does not differ between the two program groups.

Table 7.5. Women's ownership and control over assets, by program group

Characteristic	Variable name	Recuperative [n=759] %	Preventive [n=755] %	Total [n=1514] %
Women's ownership of assets				
Owns alone:				
Land	*Q604a*	21.5	20.9	21.2
House when she lives	*Q604b*	13.6	11.0	12.3
Other house	*Q604c*	1.1	1.7	1.4
Animals	*Q604d*	21.7	18.3	20.0
Possess jointly:				
Land	*Q604a*	48.5	50.6	49.5
House when she lives	*Q604b*	63.5	66.0	64.7
Other house	*Q604c*	4.0	5.2	4.6
Animals	*Q604d*	40.8	43.2	42.0
Control over sale of assets (ability to sell assets owned alone if needed)				
(*only includes those women who possess each of the assets alone)*				
Can sell land	*Q605a*	71.0	69.6	70.1
Can sell own house	*Q605b*	68.9	85.5	76.3
Can sell other house	*Q605c*	100.0	92.3	95.2
Can sell animals	*Q605d*	81.8	79.7	80.8

		Recuperative [n=759]	Preventive [n=755]	Total [n=1514]
Control over purchase of:				
Small amounts of food items	*Q606a*	63.5	61.6	62.5
Food items in bulk	*Q606b*	13.4	12.6	13.0
Clothes for self	*Q606c*	48.7	48.7	48.7
Medicines for self	*Q606d*	39.0	36.7	37.8
Toiletries for self	*Q606e*	68.2	66.9	67.6
Clothes for children	*Q606f*	44.5	41.7	43.1
Medicines for children	*Q606g*	38.9	33.6	36.3
Have own money to use when needed	*Q607*	58.6	55.1	56.9
Means of scales				
		Mean SD	**Mean SD**	**Mean SD**
Ownership of assets (Range: 0 to 4)	*Q604poss*	2.1 1.1	2.2 1.1	2.2 1.1
Control over purchasing (Range: 0 to 6)	*Q606purc*	3.0 2.2	3.0 2.2	3.0 2.2

Table 7.6. Women's involvement in household decision-making by program group

Decisions related to	***Variable name***	**Program group**	***Decisions usually made by***			
			Self	**Spouse/ Partner**	**Joint**	**Other**
			%	**%**	**%**	**%**
Buying important things for the family	*Q615an*	*Recuperative*	38.3	22.6	32.1	7.0
		Preventive	35.3	22.5	36.1	6.0
		Total	36.8	22.6	34.1	6.5
What food is prepared everyday	*Q615bn*	*Recuperative*	83.8	3.8	7.6	4.7
		Preventive	81.5	5.0	7.7	5.8
		Total	82.6	4.4	7.7	5.3
Working to earn money	*Q615cn*	*Recuperative*	38.2	24.3	35.1	2.4
		Preventive	33.3	26.3	38.5	2.0
		Total	35.8	25.3	36.8	2.2
Visiting relatives & friends	*Q615dn*	*Recuperative*	47.1	18.1	33.9	0.9
		Preventive	41.5	22.2	34.4	1.9
		Total	44.3	20.1	34.2	1.4
Clinic visits when pregnant	*Q615en*	*Recuperative*	42.3	25.5	30.9	1.2
		Preventive	38.9	25.4	33.1	2.6
		Total	40.6	25.5	32.0	1.9
Use of family planning	*Q615fn*	*Recuperative*	39.6	23.4	36.8	0.2
		Preventive	32.1	27.9	39.2	0.8
		Total	35.7	25.7	38.1	0.5
Sending children to school	*Q615gn*	*Recuperative*	18.8	20.8	59.5	1.0

					Decisions usually made by	
		Preventive	17.3	23.8	57.5	1.3
		Total	18.0	22.3	58.5	1.1
Care when a child is ill	*Q615hn*	*Recuperative*	21.2	19.3	57.7	1.9
		Preventive	18.4	21.5	57.0	3.1
		Total	19.8	20.4	57.4	2.5
Raising and disciplining children	*Q615in*	*Recuperative*	20.8	15.3	61.1	2.8
		Preventive	17.1	17.5	62.5	2.9
		Total	18.9	16.4	61.8	2.8
Having another child	*Q615jn*	*Recuperative*	29.7	12.3	57.3	0.6
		Preventive	26.6	15.5	57.9	0.0
		Total	28.1	13.9	57.6	0.3
Breastfeeding and weaning a child	*Q615kn*	*Recuperative*	70.6	5.8	23.10	0.5
		Preventive	69.2	8.1	22.2	0.5
		Total	70.0	7.0	22.6	0.5
How to feed an infant in the first year of life	*Q615ln*	*Recuperative*	62.8	6.9	29.4	0.9
		Preventive	64.7	7.4	26.5	1.3
		Total	63.8	7.2	27.9	1.1
Means of scales		***Recuperative***		***Preventive***	***Total***	
		Mean	SD	Mean SD	Mean	SD
Involvement in HH decision-making scale (Range: 0 to 11)	*Q615invl*	8.7	2.5	8.5 2.6	8.6	2.6

7.4.5. Physical health and nutritional status

Nutritional status: Women's nutritional status was measured using the body mass index (BMI) (see Table 7.7.). The mean BMI of women is the same in the two program groups (21.6). The majority of women have a normal BMI (about 71 percent), while a small proportion of women are obese (2 percent). The proportion of women who are underweight, using a BMI cut-off of 18.5 is about 15 percent, while overweight mothers make up approximately 12 percent of the sample. There were no major differences between the program groups, although the proportion of normal weight women was slightly higher in the recuperative group, while that of overweight women was slightly higher in the preventive group.

Table 7.7. Women's nutritional status and physical health

Health status	**Variable name**	**Recuperative [n=765]** %	**Preventive [n=759]** %	**Total [n=1524]** %
Body mass index categories (%)	*categbmi*			
Underweight (< 18.5)		14.2	15.2	14.7
Normal (18.5-24.9)		72.5	70.1	71.3
Overweight (25-29)		11.4	12.9	12.2
Obese (≥ 30)		2.0	1.7	1.9
		Mean SD	Mean SD	Mean SD
Mean Body mass index (kg/m^2)	*bmi*	21.6 3.1	21.6 3.4	21.6 3.2

		Recuperative [n=765]	**Preventive [n=759]**	**Total [n=1524]**
Scores on self health perception scale (visual analogue) (Range: 0 to 10)	*Q901*	6.1 1.8	6.1 1.8	6.1 1.8
Women who said they suffered from :				
- Diabetes	*Q902a*	0.9	0.5	0.7
- Hypertension	*Q902b*	27.5	22.0	24.8
- Asthma	*Q902c*	2.0	2.0	2.0
- Migraines/headaches	*Q902d*	86.2	85.6	85.9
- Anemia/weakness	*Q902e*	51.6	51.0	51.3
- Dizziness	*Q902f*	65.3	62.6	64.0
- Stomach-ache	*Q902g*	53.9	48.7	51.3
- Tiredness/lack of energy	*Q902h*	65.6	64.1	64.9

Physical health and symptoms of chronic illnesses: The first assessment of physical health of the survey respondents was conducted using a visual analogue scale to assess the respondents' perception about their own health status relative to other women their age. The average values on a scale from 0 to 10 were identical for the two program groups (mean=6.1, SD=1.8). The fact that the mean value was greater than 5 (which corresponds to the perception of average health compared to other women their age) suggests that mothers in our sample generally perceived themselves as being slightly healthier than average women of the same age.

The survey respondents were also asked if they suffered from a list of symptoms and illnesses. Although over half of the respondents indicated that they suffered from conditions like anemia/weakness, migraines/headaches, dizziness and stomachaches, a much smaller proportion indicated that they suffered from diabetes, hypertension and asthma (Table 7.7.) The proportion of women who did not know whether they suffered from diabetes (13 percent) and hypertension (7 percent) was much higher than for the other conditions, where the proportion of women who did not know whether or not they suffered from the condition was between 0 percent and 2 percent. This is probably due to the fact that conditions like diabetes and hypertension, in particular, require formal medical diagnosis, whereas the other questions inquired mainly about symptoms.

There were no differences between the two program groups for any of the illness conditions, except with regards to the proportion of respondents who suffered from hypertension, which was about 5 percentage points larger in the recuperative group than in the preventive group. For all the other illnesses, the two program groups were within 3 percentage points of each other.

Mental wellbeing, stress and life satisfaction

Mental stress and frequency of experiencing stress symptoms: A variety of questions were asked to survey respondents to assess their mental wellbeing and level of stress. One set of questions assessed whether respondents suffered from certain symptoms on a regular basis, while another set of questions assessed the frequency with which the respondents experienced various symptoms of stress. The findings show that less than 20 percent of respondents experienced

trembling of their hands, while close to 40 percent of respondents experienced poor appetite on a regular basis (Table 7.8.). More than half of the respondents said they had difficulties carrying out their daily work as well as enjoying their work, and felt that they were easily excited or irritable. The large majority of respondents (72 percent) said that they got tired very easily. This figure was about 20 percentage points higher than the proportion of women who had indicated that they suffered from anemia or weakness. There were no differences between the two program groups for most of these questions, except that the proportion of women who reported that they experienced difficulty in doing their daily work in the preventive group (63 percent) was slightly higher than in the recuperative group (60 percent).

Results of the frequency with which women experienced different symptoms of mental wellbeing are also presented in Table 7.8. (the table only presents the proportion of women who reported experiencing the symptoms *often*). These data indicate that the least often experienced symptoms were feeling too tired to play with children or not wanting to play with children (about 10 percent), while the most often experienced symptoms were having frequent headaches (46 percent) and often feeling sad or unhappy (34 percent). Symptoms like feeling tired, having trouble thinking clearly and losing interest in things were experienced *often* by 23 to 26 percent of the women. The proportion of women who often experienced symptoms like difficulty sleeping, poor digestion and getting frightened easily was between 16 percent and 18 percent.

Table 7.8. Mental stress, frequency of stress symptoms and life satisfaction by program group

Health status	***Variable name***	**Recuperative [n=759]**	**Preventive [n=755]**	**Total [n=1514]**
*Proportion of women who reported **usually** experiencing the following:*				
Poor appetite	*Q904a*	37.7	40.1	38.9
Shaking/trembling hands	*Q904b*	17.0	19.1	18.0
Being easily excited/irritable	*Q904c*	62.2	60.9	61.6
Difficulty in enjoying daily life	*Q904d*	59.4	63.2	61.3
Difficulty to do daily work	*Q904e*	52.7	53.1	52.9
Getting easily tired	*Q904f*	72.3	71.9	72.1
*Proportion of women who reported **often** experiencing the following symptoms**:***				
Headaches	*Q905a*	47.4	45.3	46.4
Get easily frightened	*Q905c*	17.0	15.9	16.4
Sleep poorly	*Q905b*	16.9	18.5	17.7
Suffer from poor digestion	*Q905d*	18.2	16.8	17.5
Have trouble thinking clearly	*Q905e*	27.8	24.5	26.2
Feel sad or unhappy	*Q905f*	34.1	33.6	33.9
Lose interest in things	*Q905g*	26.4	22.8	24.6
Feel tired all the time	*Q905h*	24.5	21.6	23.1
Don't want to play with the children	*Q905i*	11.3	8.9	10.1

Health status	***Variable name***	**Recuperative [n=759]**	**Preventive [n=755]**	**Total [n=1514]**
Too tired to play with children	*Q905j*	12.0	9.5	10.8
Feel there is not enough time to care for house	*Q905k*	14.8	12.6	13.7
Feel there is not enough time to care for children	*Q905l*	12.1	13.0	12.5
Feel there is not enough time to care for self	*Q905m*	15.2	15.4	15.3
Feel worried there is not enough time to do daily work	*Q905n*	27.1	24.1	25.6
Life satisfaction: proportion of women who reported they:				
- are satisfied with the way they live	*Q903a*	19.2	21.5	20.3
- have the important things they wanted in their life	*Q903b*	10.8	11.8	11.3
- would change their life over if they could	*Q903c*	94.6	94.4	94.5
- are happy with their last child	*Q903d*	97	96.0	96.5
- like their daily work	*Q903e*	61.7	58.3	60.0
- satisfied with husband/partner's help	*Q903f*	73.8	72.1	72.9
- satisfied with help from mother-in-law	*Q903g*	49.0	46.8	47.9
- satisfied with help from mother	*Q903h*	70.0	66.0	68.0
- satisfied with help from those outside their family	*Q903j*	65.3	62.1	63.7
- satisfied with help received from other family members	*Q903i*	63.5	64.4	63.9
Mean values of scales		**Mean SD**	**Mean SD**	**Mean SD**
Mental stress scale (Range: 0 to 6)	*Q904ment*	3.0 1.6	3.1 1.6	3.0 1.6
Frequency of stress symptoms scale (Range: 0 to 20)	*Q905hlth*	10.2 3.5	10.0 3.6	10 3.5
Time stress scale (Range: 0 to 8)	*Q905time*	3.9 1.9	3.9 1.8	3.9 1.9
Life satisfaction scale (Range: 0 to 20)	*Q903lsat*	11.2 3.8	11 3.8	11.1 3.8

The survey respondents were asked a set of four questions to assess how they perceived lack of time as a source of stress in their lives. The responses to these questions are also in Table 7.8. and show that between 12 and 15 percent of respondents indicated that they often felt they did not have enough time to care for their house (13.6 percent), their children (12.5 percent) and themselves (15.3 percent). Further, over 25 percent of the respondents indicated that they often worried about not having enough time to do their daily work. It should be noted that a large proportion of respondents (about 60 percent, results not shown) fell into the middle group of experiencing these feelings "sometimes".

The differences between the two program groups on all of the mental wellbeing and stress variables were small, usually within 2-3 percentage points of each other.

The means of the scales used to assess mental stress, frequency of experiencing stress symptoms and time stress are presented at the bottom of Table 7.8., and show that the mean scores on these three scales were not different between the two program groups. The mean scores of the sample for all three scales were approximately 50 percent (i.e. mean of 3 on a scale of 6 points; mean of 10 on a scale of 20 points; and mean of 4 on a scale of 8 points).

Life satisfaction: The data indicate that very few women (about 20 percent) were in fact satisfied with the way they currently lived; only 11 percent said they had the important things they wanted in their lives, and over 94 percent of women in both program groups indicated that they would change their life over if they could (Table 7.8.). However, close to 100 percent of women responded in the affirmative when asked about their happiness with their last child, and over 70 percent were satisfied with the help they received from their partner. Between 60 percent and 70 percent of the respondents were satisfied with the help they received from their mothers, other family members (excluding mothers-in-law) and from others outside their family. The proportion of women who were satisfied with the help from their mother-in-law was the lowest, about 48 percent. As with the previous variables on mental wellbeing, the differences between the program groups was only 0.7-3 percentage points in all cases, except satisfaction with help from the respondents' mother where the difference between the recuperative and preventive groups was 4 percentage points. Finally, the means of the scale used to assess overall life satisfaction was very similar between the two program groups (11.0 in the recuperative group, and 11.2 in the preventive group on a scale of 20 points), and there was no statistical difference between the two groups.

7.4.6. Social, emotional and physical support

Emotional support: We used the frequency of contact with one's natal family as a proxy for emotional support and also asked respondents whether they knew someone who they could communicate with if they felt sad or unhappy. The data in Table 7.9. show that about half the respondents had close contacts with their natal families, and communicated with them several times per week. The proportion of respondents who communicated with their natal families several times per month and a few times a year was approximately the same, and very few respondents indicated that they had no contacts at all with their natal families. There were no substantial differences between the two program groups for any of these questions, and close to 70 percent of respondents in both groups indicated that they had access to someone who they could communicate with when they felt sad or unhappy.

In general, the data suggest that most women had access to some type of emotional support, but it was alarming to see that about a third of the women indicated that there was nobody they could talk to when they felt unhappy.

Table 7.9. Social, emotional and physical support available to the respondent, by program group

Type of support	Variable name	Recuperative [n=759] %	Preventive [n=755] %	Total [n=1514] %
Emotional support				
Communications with natal family	*Q610*			
- never		1.2	1.5	1.3
- few times/year		11.6	10.9	11.2
- several times/mo		14.5	12.6	13.5
- several times/week		49.9	50.1	50.3
Respondent knows someone who she can talk to when sad	*Q611d*	70.5	69.8	70.1
Financial and material support				
- a place to sleep at night	*Q611a*	77.6	78.0	77.8
- lending money	*Q611b*	40.1	41.7	40.9
- providing food	*Q611c*	40.2	39.7	40.0
Help with household chores and child care				
Cooking	*Q218a1*	42.3	39.5	40.9
Laundry	*Q218b1*	44.7	39.6	42.1
Fetching water	*Q218c1*	74.4	72.3	73.4
Fetching fuel	*Q218d1*	86.4	86.6	86.5
Cleaning the house	*Q218e1*	65.6	61.3	63.5
Buying groceries	*Q218i1*	36.1	36.2	36.1
Caring for youngest child	*Q218f1*	80.6	79.0	79.8
Feeding youngest child	*Q218g1*	81.8	81.3	81.5
Bathing youngest child	*Q218h1*	79.6	77.7	78.6
Community participation				
Participation in community discussions related to:				
- community	*Q612a*	34.9	37.5	36.2
- education	*Q612b*	35.3	38.01	36.7
- health	*Q612c*	41.6	44.6	43.1
- women's issues	*Q612d*	39.0	40.5	39.8
- receiving information on health and nutrition	*Q612e*	39.4	39.6	39.5
Have benefited from a loan or microcredit program	*Q609*	4.98	8.5	6.7
Respondent is a member of a co-operative	*Q613*	2.4	5.0	3.7
Mean values of scales		**Mean SD**	**Mean SD**	**Mean SD**

Type of support	Variable name	Recuperative [n=759] %		Preventive [n=755] %		Total [n=1514] %	
Financial/material support (Range: 0 to 3)	*Q611supp*	1.6	1.1	1.6	1.1	1.6	1.1
Overall help with household chores and child care (Range: 0 to 9)	*ntasks*	5.9	2.7	5.7	2.6	5.8	2.6
Child care support (Range: 0 to 3)	*chtasks*	2.4	1.1	2.4	1.1	2.4	1.1
Group membership and participation in community activities (Range: 0 to 7)	*Q612scap*	2.0	2.2	2.1	2.3	2.1	2.3

Financial/material support: The respondents in our survey were asked if they knew people who could help them when they had certain types of material problems, for instance, if they needed a place to sleep at night, a monetary loan or food. These data are also presented in Table 7.9.

A much larger proportion of respondents had access to persons who could help them if they needed a place to spend the night (78 percent) than if they needed some money (40 percent) or food (40 percent). The difference between the two program groups for these three variables was less than 2 percentage points. Also, the mean score on the financial/material support scale was the same for the two program groups (see Table 7.9.).

The low levels of financial and food related support could be representative of the overall poverty in these communities, rather than a deliberate lack of support on the part of family and friends of the respondents. Providing a place to sleep is likely to be easier to do than providing food or money, and this is borne out by the data.

Help with household chores and child care: The most common type of help received by survey respondents was with fetching water and fuel and caring for their youngest children (Table 7.9.). Over 85 percent of the respondents received help with fetching fuel and about 74 percent received help with fetching water. Close to 80 percent of respondents received assistance with caring for their youngest child, including feeding and bathing the child. On the other hand, less than 40 percent of the respondents received assistance with buying groceries for their home, possibly because most market activities are conducted by the women themselves. Finally, only about 40 percent of respondents said that they received assistance with cooking and doing laundry. The proportion of women who received assistance with laundry was slightly higher in the recuperative group, as was the proportion of women who received help with cleaning their homes. For the other types of assistance, there were no substantial differences between the two groups. Less than 2 percent of the respondents indicated that they paid for any of the assistance they received, suggesting that most of the assistance was from family members. On average, respondents in the recuperative program group received help with 5.9 household chores, and 2.4 child care tasks, while those in the preventive group received help with 5.7 household tasks and 2.4 child care tasks (data shown in Table 7.9.). There was no significant difference in the means of these scales between the two program groups.

Group membership and participation in community activities: More than a third of all survey respondents reported usually participating in group discussions about their community, education issues, health and women's issues. The largest proportion of respondents (43.1 percent) participated in discussions related to health, probably through their participation in health programs like the program run by World Vision in the Central Plateau.

The survey respondents were also asked if they were members of a cooperative. Less than 5 percent of the respondents indicated that they were members of a cooperative; this proportion was higher in the preventive group (5 percent) than in the recuperative group (2.3 percent). The overall scale that assessed the level of social capital did not show any difference between the two groups; the mean values on the scale were identical for the two program groups (2.1 on average).

7.4.7. Knowledge, attitudes and child care experience

Child feeding knowledge: Assessment of the caregivers' knowledge regarding child feeding focused on three aspects: the timing of introduction of various foods and liquids, the duration of breastfeeding and the frequency of feeding meals and snacks to infants in different age groups (Table 7.10.).

Introduction of complementary foods: There was a large variability in the responses to questions about the introduction of different liquids and foods. The general pattern of responses about the most appropriate month in which to introduce a particular liquid or food to an infant was very similar among the two program groups, with earlier responses seen for liquids and semisolids than for staple foods, vegetables and animal source foods. On average, the respondents appeared to suggest that liquids like water, other liquids, and semisolid foods like bread soup and gruels could be introduced between 3 and 4 months of age. Bean sauce and vegetables were considered appropriate for introduction by 7-8 months of age, on average. Staple foods like cornmeal, rice and millet were considered appropriate at a later age, around 8-9 months of age, while animal source foods like eggs, meat, chicken and fish were considered appropriate closer to one year of age, on average. The only animal source food for which responses were earlier was salted herring, which was considered appropriate at around 7-8 months of age.

The only differences between the program groups were for the age of introduction of bread soup, which was 0.5 months later in the recuperative group, for vegetables cooked with the food (0.7 months earlier in the recuperative group), introduction of egg yolks and whole eggs (0.6 and 0.7 months later in the recuperative group) and for perceptions about the introduction of fish, which was a whole 2 months earlier in the recuperative group than the preventive group.

Table 7.10. Knowledge about infant feeding by treatment group

Knowledge	**Variable name**	**Recuperative [n=759]**		**Preventive [n=755]**		**Total [n=1514]**	
		Mean (mo)	SD	Mean (mo)	SD	Mean (mo)	SD
Appropriate age of introduction of :							
- water	*Q801a*	3.1	6.3	3.2	7.2	3.1	6.8
- other liquids	*Q801b*	3.4	5.3	3.7	8.0	3.5	6.7

		Recuperative [n=759]		Preventive [n=755]		Total [n=1514]	
- bread soup	*Q801c*	4.4	7.9	3.9	6.3	4.1	7.1
- gruels	*Q801d*	3.8	2.1	3.9	6.3	3.9	4.7
- rice	*Q801e*	7.6	4.4	7.9	7.9	7.8	6.4
- millet	*Q801f*	9.5	10.1	10.0	11.9	9.8	11.1
- cornmeal	*Q801g*	8.1	4.3	8.4	6.4	8.3	5.4
- bean sauce	*Q801h*	5.5	4.2	5.8	6.4	5.7	5.4
- vegetables added to the food	*Q801i*	7.2	6.3	7.9	9.7	7.6	8.2
- vegetables on their own	*Q801j*	7.7	5.4	8.5	9.1	8.1	7.5
- egg yolk	*Q801k*	10.6	17.6	10.0	16.2	10.3	16.9
- whole egg	*Q801l*	11.6	16.5	10.9	13.9	11.2	15.3
- chicken	*Q801m*	11.7	8.5	11.7	7.9	11.7	8.3
- fish	*Q801n*	12.8	16.8	14.4	20.4	13.6	18.7
- salted herring	*Q801o*	7.3	8.6	8.8	14.2	8.1	11.8
- meat	*Q801p*	12.0	9.1	12.1	9.1	12.0	9.1
Age until when a child should be breastfed (mo)	*Q802*	21.5	8.6	21.5	8.1	21.5	8.3
No. of meals/day for a 6-8 mo old child	*Q803*	2.2	0.8	2.3	0.8	2.2	0.8
No. of snacks/day for a 6-8 mo old child	*Q804*	2.9	2.2	2.9	2.2	2.9	2.2
No. of meals/day for a 9-11 mo old child	*Q805*	2.8	0.8	2.8	0.7	2.8	0.8
No. of snacks/day for a 9-11 mo old child	*Q806*	3.2	2.0	3.3	2.0	3.2	2.0
No. of meals/day for a 12-24 mo old child	*Q807*	3.2	0.8	3.3	0.8	3.2	0.8
No. of snacks/day for a 12-24 mo old child	*Q808*	4.4	2.2	4.4	2.2	4.4	2.2
Means of scales		**Recuperative**		**Preventive**		**Total**	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Appropriateness of introduction of new foods (Range: 0 to 6)	*Intrknow*	2.4	1.7	2.3	1.7	2.4	1.7
Appropriateness of frequency of feeding (Range: 0 to 6)	*Apprfreq*	5.3	0.9	5.4	0.9	5.4	0.9
Overall knowledge scale (Range: 0 to 6)	*Feedknow*	4.3	0.7	4.3	0.7	4.3	0.7

It should be noted that the standard deviations around the mean ages of introduction considered appropriate are very large for most foods, highlighting the fact that the variability in the responses is also very large. In general, the reported patterns of introduction of complementary foods corresponded well with the findings of the formative research study conducted in the same areas, using qualitative research methods (Menon et al., 2002).

The mean knowledge score for the introduction of complementary foods (Table 7.10.) was at the lower end of the range for both program groups, suggesting that in both groups the respondents were more likely to give responses that were either substantially earlier or later than the age of introduction of complementary foods that is considered appropriate in current infant feeding recommendations (PAHO/WHO, 2003). The mean scores did not differ between the two program groups.

Appropriate duration of breastfeeding: Current infant feeding recommendations (PAHO/WHO, 2003) suggest that infants and young children should be breastfed until they are at least 24 months of age. The survey respondents were asked to indicate what they thought about the most appropriate duration of breastfeeding, and these data are also presented in Table 7.10. The data suggest that Haitian norms of breastfeeding correspond fairly well with the current recommendations: the average appropriate duration of breastfeeding reported was 21.5 months, and was consistent across the two program groups.

Appropriate feeding frequency: Table 7.10. also presents results on the respondents' perceptions about the ideal frequency of feeding meals and snacks to infants and young children in three different age groups: 6-8 months of age, 9-11 and 12-23 months of age. The data indicate a progression in the number of meals considered appropriate as children grow older, with the mean number of meals considered appropriate going from 2.2 for infants 6-8 months old, to 2.8 for 9-11 months old infants and 3.2 for children 12-23 months old. There was no difference between the two program groups in the responses to these questions. The mean value of the scale for knowledge of appropriate feeding frequency was 5.4 (range 0 to 6), and again, no difference was found between the two program groups.

Thus, it appears that the caregivers seem to understand the general principle that infants and young children require an increasing number of meals as they age. The average number of meals reported for the different age groups is also not so far away from current recommendations, which are 2-3 meals for 6-8 month old infants and 3-4 for older children (PAHO/WHO, 2003).

The average number of snacks considered appropriate for these age groups was also the same for both program groups and was quite high: average of 3 for 6-8 and 9-11 month old infants and 4 for older children. The variability in responses for the snack frequency questions, however, was very large. Current recommendations are not specific about the exact number of snacks recommended at each age. The recommendation states that infants and young children should receive at least one snack per day in addition to their age-specific recommended number of meals.

Overall feeding knowledge scale: The overall feeding knowledge scale, which combined knowledge on the introduction of new foods, breastfeeding duration and feeding frequency, indicates rather good feeding knowledge for both program groups, with a mean of 4.3 on a scale of 6 points.

7.4.8. Attitudes about child discipline

The survey also gathered data on one dimension of psychosocial care practices, i.e., parental management of child behavior. Survey questions to evaluate other dimensions of psychosocial

care practices, e.g., parental responsiveness, support for learning, etc., are currently not well developed, except for questions on the use of physical punishment to manage child behavior. Our questions about attitudes and practice related to two levels of physical punishment: "taps" and hitting. Taps are considered less severe than hitting, and the respondents were asked their opinions about the use of taps and hitting to make their children listen to them, and also on how often they had to use these strategies with their own children.

The results indicate that the perceptions about taps and hits among the respondents are quite different (Table 7.11.). The large majority of respondents in both groups thought that it was acceptable to use taps to make their children listen, while only about a third of respondents thought it was acceptable to hit a child to make them listen to their parents. In practice, however, the majority of respondents had used both strategies, i.e. taps and hitting, to make their children listen to them. The discrepancy between attitude and reported practice was small for the use of taps, but very large for the use of hitting. For example, although only 33 percent of respondents thought it was acceptable to hit a child to make him or her listen, above 80 percent of the respondents had actually used hitting, either sometimes or often, as a strategy to make a child listen.

Table 7.11. Attitudes/practices related to strategies for disciplining children, by program group

Attitude/practice	Variable name	Recuperative [n=759] %	Preventive [n=755] %	Total [n=1514] %
Attitudes re. disciplining children				
Think it is acceptable to give children a few small taps to make them listen	*Q809*	96.3	95.5	95.9
Think it is acceptable to hit children to make them listen	*Q809b*	33.6	33.0	33.3
Disciplining practices				
Have given children a few taps to make them listen	*Q809a*			
- often		39.4	33.2	36.3
- sometimes		58.4	63.0	60.7
Have hit children to make them listen	*Q809c*			
- often		17.3	13.2	15.3
- sometimes		66.3	67.9	67.1

7.4.9. Previous experience with child care

The respondents' responses questions regarding previous child care experience when they were young girls are presented in Table 7.12. A previous ethnographic study in Bangladesh showed that this type of experience had a strong influence on care practices among primiparous mothers (Menon, 2002). It was therefore considered important to assess this aspect among caregivers in our study area. The results show that the large majority of women had had substantial child care

experience when they were young (over 80 percent of women reported having taken care of a young child during their childhood). The types of child care activities that almost 100 percent of these women were involved in as young girls included feeding other infants and young children, preparing food for them, cleaning them and playing with them.

Table 7.12. Previous child care experience of respondents, by program group

Child care experience	*Variable name*	Recuperative [n=759] %	Preventive [n=755] %	Total [n=1514] %
Respondents who had some experience caring for children when they were younger	*Q219*	83.1	82.0	82.6
Types of child care experiences that respondents had:	*Q223*	**[n=631]**	**[n=619]**	**[n=1250]**
- feeding		96.4	97.3	96.8
- preparing food		97.9	98.7	98.3
- cleaning, changing clothes, etc.		99.2	99.5	99.4
- playing		91.1	88.2	89.7

7.5. Conclusions

This chapter describes a wide range of caregiver resources among respondent mothers in our survey sample. It highlights large contrasts between very low levels of some resources such as schooling or ownership of assets on the one hand, and rich endowment relative to other aspects such as women's gender identity, child care experience and even knowledge concerning some aspects of child feeding. Women in our study areas also seem to be actively involved in a number of important household decisions, including the allocation of resources within the household and specifically for their young child.

Women in this part of rural Haiti also do not suffer from extreme malnutrition, as indicated by the large proportion of women with normal BMI. They are, however, living in harsh conditions and are exposed to tremendous levels of stress due to economic constraints and the need to ensure their household's livelihood and food security. This is evidenced by the number and frequency of stress and fragile mental health symptoms reported by the respondent mothers. Moreover, although mothers appear to have access to some types of emotional support and help with household tasks, the availability of financial and material support is low. This is possibly an indication of extreme overall poverty.

Finally, the survey also provided evidence that while the respondents appeared to be well informed about appropriate breastfeeding duration and feeding frequency, their knowledge related to appropriate introduction of complementary foods was poor. This is already an area of focus for the behavior change communications arm of the World Vision programs in the Central Plateau.

Overall, the data on caregiver resources suggest that programs to alleviate some of the stresses associated with women's time-intense work patterns and limited access to financial and material

resources will be essential to improving their caring capacity. Providing caregivers with improved knowledge and relieving some of the barriers to behavior change will be key to improving child nutrition and health

8. CHILD CARE PRACTICES I: FEEDING

8.1. Introduction

Current infant and child feeding recommendations (PAHO/WHO 2003;Dewey and Brown 2003) are that infants should be exclusively breastfed starting from soon after birth and up to 6 months of age. Starting at 6 months of age, complementary foods should be gradually introduced in the diet, while frequent, on demand breastfeeding should be continued until 2 years of age or beyond. The quantity, frequency and variety of complementary foods should be increased as the child gets older. For the average healthy breastfed infant, complementary foods should be provided 2-3 times at 6-8 months of age and 3-4 times per day at 9-23 months of age. If energy density or amount of food per meal is low, more frequent feedings may be required. Diversity in the diet is also recommended to ensure that nutrient needs are met, and it is recommended that meat, poultry, fish, or eggs be eaten daily, or as often as possible. The consistency of foods should also be adapted to the infant's requirements and abilities, and responsive feeding should be practiced, applying the principles of psychosocial care. Safe preparation and storage of complementary foods and appropriate feeding during and after illnesses are other key elements of optimal complementary feeding of the young child (PAHO/WHO 2003). These recommendations have been developed as the Guiding Principles for Complementary Feeding of the Breastfed Child (PAHO/WHO 2003) and are summarized in Appendix 8.1.

This chapter compares child feeding practices in the study area to these recommendations. Only information on selected practices that could be measured through simple recall methods in the context of a survey was gathered. Data on these practices were collected for both the index child (18-47 months of age) and his/her younger sibling (0-17 months of age). The types of information collected, the variables available and the composite scales created are described below, followed by the results and discussion.

8.2. Variables and composite scales

Information was collected by maternal recall on the following aspects of child feeding: 1) early child feeding practices (timing of breastfeeding initiation, use of complementary liquids during the first day and feeding of colostrum); 2) timing of introduction of various liquids, semi-solids and solid foods in the child's diet; 3) use of baby bottles to feed the child; 4) current feeding practices (recall of breastfeeding, frequency of feeding complementary foods and food group intake and in the previous 24 hours; and frequency of intake of micronutrient-rich food groups in previous week); 5) encouragement to eat (helping the child to eat; feeding the child with poor appetite); and 6) feeding the child during diarrhea (i.e. changes in the amount/frequency of liquids and foods fed to the child).

Data on current feeding practices based on intake of foods from different food groups were used to create a composite scale of dietary diversity. The creation of this composite scale is described below.

8.2.1. Dietary diversity index

The survey did not gather complete dietary information because of limited resources. Instead, data were collected on food/food group intake by asking mothers to recall whether the child had consumed the list of liquids and foods presented in Table 8.1. in the previous 24 hours. Although the approach does not allow assessing the quantity of food consumed, it provides a rough proxy for the quality of the diet (Ruel 2003). Both the number of food groups consumed can be assessed and whether or not the child consumed specific types of foods of interest such as meat, fish or eggs, dairy products or vitamin-A rich fruits or vegetables. This type of data is routinely collected in the DHS surveys and we have previously used it successfully to derive a dietary diversity index (Arimond and Ruel 2002) (Ruel and Menon 2002).

In the present study, we collected data on 20 foods/food groups (see Table 8.1.), which were later combined into the following 8 food groups to derive a *food group diversity index*: grains; roots and tubers; legumes; vitamin A-rich fruits and vegetables; other fruits and vegetables; dairy products (including breast milk substitutes); meat products (all meat, organ meats, poultry, fish and eggs); and nuts. Each food group received a score of "1" if the child had consumed any of the foods in that group in the previous 24 hours and a score of "0" if he/she had not. The scores for each food group were added to derive the diversity index, which ranged from 0 to 8 points. A detailed scoring table is presented in Appendix 8.2. The reliability of the diversity index was assessed using Cronbach's alpha, and was found to be 0.54.

The data on food groups were also used to create variables that assessed the frequency of consumption of nutrient-rich foods like animal source foods and vitamin-A rich foods. Three such variables were created to assess if the child had received (a) flesh foods on three or more days in the past seven days; (b) eggs on three or more days in the past seven days, and (c) orange/red vitamin A-rich fruits and vegetables in the last seven days.

Table 8.1. List of foods/food groups and classification used to create the food group diversity index

Foods/food groups	Food group used in food group diversity indicator
Cereals such as millet, maize, wheat (without beans)	Cereals
Bread soup, salt cracker gruel, wheat flour gruel (without milk)	Cereals
Cereals with beans	Cereals, legumes
Bean sauce (without cereals)	Legumes
Plantain gruel	Roots/tubers
Pumpkin, orange yam, orange/red-flesh sweet potato, carrots	Vitamin A-rich fruits and vegetables
Green leafy vegetables	Vitamin A-rich fruits and vegetables
Papaya or mango	Vitamin A-rich fruits and vegetables
Other fruits such as oranges, banana, grapefruits	Other fruits and vegetables
Other vegetables such as avocados,	Other fruits and vegetables

tomatoes, peas	
Other starchy vegetables: potatoes, yam, manioc, cassava, plantain	Roots and tubers
Liver, heart, kidneys	Meat/poultry/egg/fish
Meat such as beef, goat, pork	Meat/poultry/egg/fish
Chicken and other birds (guinea fowl, duck, pigeon)	Meat/poultry/egg/fish
Fish (dried herring)	Meat/poultry/egg/fish
Sea food (crab, etc.)	Meat/poultry/egg/fish
Eggs	Meat/poultry/egg/fish
Peanuts, groundnuts, other nuts	Nuts
Milk, breast milk substitute	Dairy

8.3. Results

8.3.1. Early child feeding practices

As documented in the latest Haiti DHS (EMMUS-III, 2001), breastfeeding is almost universal in Haiti and in rural areas in particular. In our survey sample, up to 99.5 percent of mothers reported having breastfed their child.

There were no significant differences between program groups or gender of the infant in the prevalence of optimal early feeding practices, as seen in Appendices 8.3. and 8.4. Overall, less than half of the mothers (42 percent) started breastfeeding within the first hour, approximately half gave only breast milk to the newborn during the first day and two thirds gave the colostrum. A laxative called *lòk* (a mixture of various herbs, palm oil, etc.) was fed to almost 45 percent of newborn infants after birth. Although the use of *lòk* has been discouraged actively by public health programs in Haiti in the past few years, it is clear that much work is needed to stop the use of this laxative for newborn infants.

Exclusive breastfeeding in the previous 24-hours was reported by less than half of the mothers of infants 0-5 months of age (42 percent), with no differences between program groups or gender (Appendices 8.5. and 8.6.). The prevalence of exclusive breastfeeding dropped sharply from 54 percent among mothers of infants less than 3 months to 29 percent among those of infants 3-5 months of age[9] (not shown).

Note that the percentages reported here do not represent the rates of exclusive breastfeeding among young infants, because they reflect only whether or not infants were exclusively breastfed in the previous 24 hours. It is well recognized that information about the previous day does not provide an accurate estimate of the true exclusive breastfeeding rates of infants between birth and 6 months of age. Even 7-day recalls usually result in systematically different (lower) estimates of exclusive breastfeeding prevalences than 24-hour recalls. Our recent analysis of the Ethiopia Demographic and Health Surveys 2000 found that estimates of exclusive breastfeeding based on 7-day recall were about half (18 percent) the estimates derived from the 24-hour recall (36 percent) among 4-6 month old urban children. Similar discrepancies have also been reported

[9] Sample sizes were too small to examine the changes in exclusive breastfeeding by monthly age intervals.

in three other studies, which compared single 24-hour recalls with either longitudinal information (Zohoori, Popkin, and Fernandez 1993) (Aarts et al. 2000), or monthly reports of usual practices (Piwoz et al. 1995). In all studies, the 24-hour recalls dramatically over-estimated the true (longer-term) prevalence of exclusive breastfeeding. As pointed out by the authors, the main explanation for these discrepancies is not that maternal recall is systematically biased or inaccurate, but rather, that infant feeding practices vary widely within short periods of time (Zohoori, Popkin, and Fernandez 1993) (Marquis et al. 1998) (Piwoz et al. 1995). The movement from exclusive breastfeeding to mixed feeding and to the family diet does not follow a unidirectional, consistent pathway. Both maternal and child factors influence child feeding decisions, and these decisions are reversible within short periods of time (Marquis et al. 1998). Thus, the length of the recall period greatly affects the estimated prevalence of feeding practices because of the true fluidity of these practices during early infancy and the rapid changes occurring when mothers move in and out of certain practices.

Therefore, it is likely that the true prevalence of exclusive breastfeeding among our sample of Haitian mothers is substantively lower than estimated by our 24-hour recall approach. Our estimates of exclusive breastfeeding rates are also higher than the prevalence of exclusive breastfeeding documented in the latest DHS survey, which also used 24-hour recall data. At the national level, the DHS reports that 23 percent of infants younger than 6 months of age were exclusively breastfed, whereas our estimate is 42 percent. Some of this difference may be attributable to the fact that the DHS survey includes urban children, who are typically exclusively breastfed for shorter periods than rural children (Ruel et al. 1998).

In conclusion, the prevalence of exclusive breastfeeding documented in our survey (as well as in the DHS survey) should be interpreted with caution because it is based on a 24-hour recall, which tends to overestimate the true prevalence of exclusive breastfeeding.
Similar to findings reported in the DHS survey, the most common complements to breast milk reported in our survey were water and cereals, both of which were fed to approximately one in five infants younger than 6 months (20 percent, see Appendices 8.5. and 8.6.). The baseline survey results also confirm the findings from our formative research (Menon et al. 2003) that mothers in the Central Plateau introduce liquids, semi-solids and solid foods in their infant's diet, much earlier than the recommended 6 months of age. Appendix 8.7. illustrates this point for semi-solids, solids, meat and eggs. It is particularly striking that by 6 months of age, the age at which infants should start receiving semi-solid foods, up to 70 percent have already been introduced to semi-solid foods and close to 30 percent to solid foods. The percentage of infants who receive semi-solids and solids increases rapidly with age, but 15 percent have already been introduced to semi-solid foods during their first month of life. Animal-source foods such as meat and eggs are less likely to have been introduced to infants before 6 months of age, however, and in fact, there appears to be a tendency to delay their introduction until later than recommended, i.e. after 9 months of age. Thus, Appendix 8.7. shows that although most infants are fed complementary foods too early, there is still a significant percentage of infants who start receiving solid foods, and especially meat and eggs, after the recommended age of 6-9 months (80 percent for meat products and 40 percent for eggs). Moreover, we found that up to 7 percent of 6-9 month old children in our sample had not received any solids/semi solid foods during the previous 24 hours.

Thus, the baseline survey results confirm previous findings from our formative research that although breastfeeding is widely practiced, it tends to be complemented very early by a number of liquids and semi-solid and solid foods (Menon et al. 2003). Few mothers are able to follow current recommendations, especially that of exclusively breastfeeding for up to 6 months, which, according to our formative research, seems to be largely due to their work and time constraints. This is of much concern because the liquids and foods introduced during the first few months are likely to displace breast milk and its essential nutrients, and to be a main source of contamination, especially in poor environments with limited access to clean water such as our survey communities. Our findings also show that although most mothers in our sample tend to complement breastfeeding too early, a significant number of mothers delay introduction of semi-solid foods beyond the recommended age of 6-9 months. There is no evidence of differences in early feeding patterns between program areas or gender.

8.3.2. Complementary feeding practices

Complementary feeding practices encompass a number of inter-related practices. These include continued breastfeeding, appropriate frequency and energy and nutrient content of complementary foods, interactive feeding using the principles of psychosocial care, appropriate feeding during illness and convalescence, and hygiene during food preparation, storage and feeding. These various *dimensions* of complementary feeding are all important for child growth, development and health, but some are more difficult to measure than others through large survey approaches (Ruel and Arimond, in press). Efforts to develop simple survey tools to capture the complex behaviors related to complementary feeding practices are currently underway, but we still lack appropriate measurement approaches and valid and reliable indicators for a number of the dimensions of complementary feeding, especially in the area of psychosocial care during feeding.

In this survey, the following aspects of complementary feeding practices were measured: 1) continued breastfeeding (whether mother was currently breastfeeding the child); 2) use of baby bottles to feed the child liquids or thin gruels; 3) feeding frequency (number of meals of complementary foods and snacks the mother reported giving to her child in the previous 24 hours); 4) dietary diversity (types and number of food groups fed to the child in the previous 24 hours); 5) care during feeding (helping the child to eat and encouragement to eat when child has poor appetite); and 6) feeding during diarrhea (whether mother increased or reduced liquids and complementary foods during diarrhea). The findings related to these practices are presented below.

Continued breastfeeding: Breastfeeding rates are generally very high in our sample until 18 months of age – 87 percent of 12-18 month old children are still being breastfed – but these rates drop rapidly thereafter, with only 36 percent of 18-23 month old children being still breastfed at that age (Appendices 8.8. and 8.9.). Thus, it appears that the majority of mothers stop breastfeeding sometime between 18 and 23 months of ages, which is up to 6 months earlier than the recommended 24 months of age. No differences were found in rates of continued breastfeeding between program groups or between genders at different ages.

Use of baby bottles: Close to 40 percent (38.9 percent) of children in our sample were regularly fed with a baby bottle. This percentage varied slightly by age, ranging from 30 percent among

young infants (< 6 months of age) to 46 percent among 30-35 month old children. There were no differences between program groups (38.1 and 39.6 percent for recuperative and preventive respectively) or between genders (38.9 and 38.8 percent for boys and girls respectively) in the practice of bottle-feeding.

The fact that bottle use is such a common practice in the survey communities raises real concerns. The use of baby bottles, which are difficult to clean properly in poor environments with limited access to clean water, has been repeatedly associated with increased risks of morbidity and mortality from diarrhea (Victora et al. 1989;Popkin et al. 1990;Brown et al. 1989).

Frequency of feeding complementary foods: Infants and young children have very high energy and nutrient requirements for their size and limited gastric capacity. Therefore, they need to be fed energy and nutrient-dense foods frequently in order to meet their daily requirements. In our sample children were fed an average of 2.3 meals a day, with no difference between program groups or genders. As expected, the number of meals increased slightly with age, from an average of 2.1 at 6-11 months to 2.7 among children 36 months or older.

Current recommendations for feeding frequency suggest that 6-8 month old children should receive 2-3 meals/day and 9-23 month old children, 3-4 meals/day (PAHO/WHO 2003). There are no recommended feeding frequencies for older children because by two years of age children are expected to consume the family diet and to be able to eat larger amounts of food at one meal because of their increased gastric capacity compared to younger infants.

The percentage of children 6-23 months of age who were fed at least the age-specific minimum number of meals recommended in the previous 24 hours is illustrated in Appendix 8.10. A higher percentage of infants 6-8 and 9-11 months from the preventive group was fed the recommended number of meals, but sample sizes are small for the youngest age group (less than 50 infants per group) and thus, the results should be interpreted with caution. No differences between program groups were found for the two older age groups, which had sample sizes larger than 100. A slight difference in favor of girls is observed for children 6-17 months of age, but the pattern is reversed for older children (Appendix 8.11.). Overall, approximately three quarters of children 6-8 months old were fed the recommended number of times, whereas roughly 40 percent were among the next two age groups (9-11 and 12-17), and 60 percent among the 18-23 month old.

It is important to note that current complementary feeding recommendations are for **breastfed** children only. Recommendations have not yet been released for non breastfed children. However, because non breastfed children rely solely on food to meet their daily recommended intakes of energy and nutrients, they are likely to require higher feeding frequency and larger amounts of food at each feeding than breastfed children. In our sample, 13 percent of 12-17 month old children were no longer breastfed and 64 percent of the 18-23 month olds. On average, children 12-23 months who were no longer breastfed received complementary foods more often than breastfed children (mean 2.7 and 2.5 respectively), and they were more likely to have received 3 or more meals of complementary foods in the previous day (64 percent compared to 46 percent among breastfed children). Thus, it appears that mothers are sensitive to the increased dietary needs of children when they are no longer breastfed, and that they respond appropriately by increasing the frequency of feeding semi-solid and solid foods.

The baseline survey also gathered information on the frequency of feeding snacks to the children in our sample. The results for this variable, however, are less interpretable than the measure of meal frequency, probably because of differences between respondents in how the word "snack" was interpreted. For instance, we found that about 5 percent of respondents reported feeding snacks to their children between 5 and 20 times per day which is extremely high, and likely represents data-related problems. Therefore, we did not include these children in any further analyses of the data on snacks. Of the remaining 95 percent of the sample (n=1425), however, 14 percent reported not feeding their child any snacks during the day and 22 percent reported feeding a snack only once per day. About 60 percent of children had received either 2 or 3 snacks a day and the remaining 5 percent had received 4 snacks per day. There were no differences between program groups.

Overall, however, the results on snack frequency should be interpreted with some caution. As mentioned earlier, the interpretability of the data on snack frequency is limited because it is not really known how different respondents define a snack. Further, it is possible that the reported high frequency of feeding snacks could reflect, in some cases at least, a compensatory behavior for cooking and feeding children fewer meals. This will be explored in future analyses of these data.

The pattern of feeding children throughout the day is presented in Table 8.3., and shows that while most children receive at least one meal in the morning, one around lunch time and one in the afternoon, the proportion of children who are fed a meal later in the day is very low. Indeed, only 17 percent of children older than 6 months receive an evening meal, and less than 1 percent of children are fed at night time. These data concur with findings from the formative research study (Menon et al., 2003), which suggested that Haitian children are not likely to be fed a meal late in the day, either due to beliefs that this causes indigestion or due to a scarcity of food. The formative research indicated that mothers felt it was appropriate to feed infants and young children snacks consisting of juices or a light gruel in the evening, and therefore it will be important for programs in Haiti to encourage the feeding of more nutrient-dense foods like gruels and other nutritious snacks in the evening, rather than only teas or juices.

Overall, low feeding frequency of complementary foods appears to be a problem especially for infants and young children between 9 and 17 months of age. This period is critical, however, because it is the period of greatest growth faltering (see Chapter 4, child nutritional status and health) and vulnerability to infectious, which often reduces appetite and children's interest to eat. Therefore it is particularly important to feed children small, frequent meals, rather than expect them to meet their nutrient requirements from one or two large meals per day. Finally, further analyses will be needed to truly understand the role of snacks in meeting the nutrient needs of infants and young children in this area.

Table 8.2. Feeding patterns for infants 6 months and older, by time of day

Time of day	Proportion of children who received at least one meal at this time of day
Morning	91.2
Noon	69.2
Afternoon	71.8
Evening	16.7
Night	0.3

Dietary diversity: As indicated earlier, dietary diversity – or the number of food groups consumed in the previous 24 hours – was used in this study as a rough proxy for dietary quality. The rationale is that as the number of food groups increases in the child's diet, the likelihood of the child meeting his/her daily requirements for all essential nutrients increases (Krebs-Smith et al. 1987). Although dietary diversity indicators still need to be validated to assess their performance in predicting nutrient adequacy (i.e. achievement of recommended intakes of energy and other essential nutrients), they have been shown to be associated with children's nutrient intake, nutrient adequacy, and growth in some developing countries (Ruel 2003).

Mean food group diversity scores (or the number of food groups consumed by the child during the previous day) are presented in Table 8.3. by age, program group and gender. As expected, diversity scores increase gradually as children age, from 6 months to 24 months, but stabilize thereafter at around 5 food groups. This means that on average, children after 2 years of age consume foods from approximately 5 out of 8 potential food groups. Only 3 percent of the 6-48 month old children have the maximum score of 8 on the food group diversity index. No differences are found between program groups or genders in mean dietary diversity scores.

Table 8.3. Mean dietary diversity by age, program group and child gender (only children ≥ 6 months of age)

	N	Mean	SD
Child age			
- 6-8	90	3.0	2.0
- 9-11	89	4.3	1.6
- 12-17	133	4.8	1.5
- 18-23	290	5.0	1.5
- 24-29	405	5.2	1.5
- 30-35	369	5.1	1.4
- 36-41	403	5.1	1.4
- 42-48	52	4.9	1.4
Program group			
- Recuperative	919	4.9	1.6
- Preventive	912	4.9	1.5
Child gender			
- Male	917	4.9	1.6
- Female	914	4.9	1.6

In order to get a clearer picture of what the dietary diversity scores represent, we examined the types of food groups that children at each dietary diversity score had consumed in the previous 24 hours. These results are shown in Appendix 8.12. The figure shows that among children who scored "1" on the food group diversity index, approximately one quarter had consumed foods from the cereals group, another quarter had foods from the Vitamin A-rich fruits and vegetables[10] group, and one fifth had consumed foods from the dairy group. The remainder of the sample had consumed foods from the roots/tubers group, legumes or the meat/poultry/fish/eggs group. The percentage of children who consumed grains and Vitamin A-rich fruits and vegetables increased rapidly to 70 percent among children who scored "2" on the food group diversity index, while the percentage who consumed other food groups remained below 30 percent. At scores of "5", the mean value for the sample, most children were consuming cereals (98 percent), Vitamin A-rich foods (96 percent), foods from the meat/fish/egg group (95 percent), and legumes (79 percent). The percentage of children who consumed dairy products and roots and tubers, however, was very low (13 and 26 percent respectively), and only approximately half of the children had consumed nuts. Dairy products continued to lag behind as food group diversity increased, and this was the food group most likely to be absent from children's diets even at food group diversity scores as high as 7. It was followed by roots and tubers, which were consumed by only half of the children who had scored 7 to the food group diversity index. The lack of dairy products in young children's diets is of greater concern than the lack of roots and tubers, since there are other sources of complex carbohydrates in these Haitian children's diets, while good sources of calcium are few.

Appendices 8.13. and 8.14. present data on the percentage of children 6-47 months of age who consumed foods from the selected 8 food groups the previous day. The findings show similar patterns as those described above, mainly that a large proportion of children had consumed cereals, Vitamin A-rich fruits and vegetables and meat products and legumes (all above 70 percent) the previous day, but that the consumption of other fruits and vegetables, roots and tubers, nuts, and especially dairy products was much less common (dairy products were consumed by only 18 percent of the children). There were no differences by program group or gender in the percentage of children who consumed these different food groups in the previous day.

Reported consumption of eggs and meat products is presented in Appendix 8.15., by age groups. A clear trend is observed towards an increase in the percentage of children consuming all five animal products as they get older. Fish is the most commonly consumed animal source food, followed by beef and pork. It is noticeable also that fish is consumed by up to half of the infants 6-11 months of age. As demonstrated in our recipe trials, however, fish is often added to porridges prepared as complementary foods for young infants, but quantities used are generally small and fish is used mostly for flavor. Surprisingly few children in our sample had consumed eggs (36 percent) or chicken (20 percent) in the previous day, in spite of the fact that the large majority of households (73 percent) reported owning chicken. Liver also appeared unpopular, and was consumed overall by less than 17 percent of the children sampled. This is likely to be related to the lack of availability of liver and other organ meats documented in our qualitative study (Menon et al. 2003).

[10] The survey was conducted during mango season, which explains the high percentage of children who had consumed a source of Vitamin A-rich fruits or vegetables in the previous day.

The same age trends were observed when looking at the percentage of children who had consumed eggs or meat products on three days or more in the previous week. As expected, however, the absolute percentages of children who had consumed these micronutrient-rich foods for 3 days or more were markedly lower than those who had consumed them in the previous day (not shown). There were also no differences between program groups in the percentage of children who had consumed eggs, meat products or vitamin A-rich foods on three or more days in the previous week (Table 8.4.).

Table 8.4. Frequency of consumption of nutrient-rich foods, by program group

Consumption of nutrient rich foods	Variable name	Recuperative [n=919]	Preventive [n=912]	Overall [n=1831]
Child consumed eggs on 3 or more days of the past seven days	*q325rn*	9.5	6.5	8.0
Child consumed flesh foods on 3 or more days of the past seven days	*flesh3d*	30.1	36.1	33.1
Child consumed orange/red fruits or vegetables on 3 or more days of the past seven days	*orange3d*	64.3	62.5	63.4

The low consumption of eggs was somewhat unexpected because the survey indicated that up to 75 percent of households owned one or more chickens and among them, 90 percent indicated that they fed the chicken's eggs to their children. Forty two percent of the respondents had said that they fed these eggs to their children once a week, 39 percent twice a week and 14.3 percent said they fed the eggs from their poultry three times or more per week. There was no difference between the program groups in these figures, but they are much more frequent than the overall low reported frequency of feeding eggs to children in the previous 7 days. This could be because other older children were eating the eggs, or because when asked about the use of the eggs from home production of poultry, respondents were more likely to indicate what they would have *liked* to do rather than what they actually were able to do.

Care during feeding

"How" the child is fed – that is, how the caregiver interacts with the child during feeding – is increasingly recognized as a key factor in determining child intake and nutritional status (Pelto, Levitt, and Thairu 2003). Drawing from a series of ethnographic studies in Mali, Dettwyler (1989) describes a range of caregiver feeding styles and argues that the level and nature of caregiver control over feeding may be as important as food availability or socioeconomic status in determining dietary intake of the child (Dettwyler 1989). In a totally "laissez-faire" approach, young children and even older infants are allowed much autonomy in eating; they are assumed to know when they are hungry and when they are satiated. In this setting if a child refuses food, it is not considered necessary or appropriate to force or even encourage him/her to eat. At the other end of the spectrum, extreme caregiver control of feeding may involve threats, bribes, or force-feeding. Somewhere in the middle in this spectrum, an optimal style of "responsive" feeding has been described (Birch and Fisher 1995;Engle, Menon, and Haddad 1997;PAHO/WHO 2003). Encouragement to eat is particularly important for children with poor appetite, a problem

commonly observed among children suffering from frequent morbidity episodes, parasitic infections, micronutrient deficiencies and undernutrition.

Table 8.5. summarizes the results from our survey on a few of these aspects, comparing the two program groups. More than three quarters of children 6 months or older in our sample received no assistance to eat. Those who did, received help mainly from their mother (90 percent). The majority of mothers reported taking action when their child refused to eat (73 percent). While a large proportion of mothers (61 percent) reported playing or changing the type of food to encourage the child to eat, close to 40 percent reported using more coercive approaches such forcing, threatening or beating the child. The large majority of mothers (80 percent) also indicated that they did not wake their child up for the evening meal if the child was already asleep. This may be a factor contributing to the finding that more than half of the 9-23 month old children in our sample was fed less than the recommended 3 meals per day.

As expected, maternal assistance with feeding and response to a child who refuses to eat varied with the age of the child (see Table 8.6.). For instance, the percentage of children who ate by themselves increased rapidly with age: whereas only 3 percent of 6-11 month old children were feeding themselves, already 57 percent did so among the 12-23 months old. This percentage increased to 92 percent between 2-3 years and 96 percent afterwards. Although it is desirable that young children experiment with feeding themselves, they still need assistance in their second and third years of life, and especially so if they have poor appetite. As documented in our formative research, Haitian mothers believe that children after 12 months of age are ready to eat family foods and do not need special care (Menon et al. 2003).

Table 8.5. Assistance and care during feeding, by program group

Variable (question number)	Variable name	Recuperative [n=919]	Preventive [n=914]	Overall [n=1833]
Child normally eats by himself	*q430*	76.1	77.1	76.6
Person who helps child eat solid foods (among children who do receive help)	*q431a*	n=186	n=166	n=352
- Mother		91.4	87.4	89.5
- Other adult		4.3	6.0	5.1
- Another child		4.3	6.6	5.4
Mother does something when the child refuses to eat (*Q422*)	*q422*	73.2	73.1	73.3
Action taken by mother when child refuses to eat	*q427*			
- Force him/her		38.5	34.5	36.5
- Threaten him/her		1.5	2.4	1.9
- Beat him/her		1.2	0.9	1.0
- Play, caress him/her		52.6	56.1	54.4
- Give other types of food		6.3	6.1	6.2
Action taken by mother if child is sleeping at time of evening meal	*q323*			

- Nothing (lets child sleep)	79.2	79.6	79.4
- Wakes child up to eat	20.2	20.4	20.3
- Child does not eat yet	0.5	0.0	0.3

It is also interesting to see the changes in maternal response to children who refuse to eat as children grow older. In particular, there is a marked increase by child age in the proportion of mothers who report taking action when their child refuses to eat. A similar pattern is seen by child age for taking action when children have a poor appetite in general. Mothers of older children are much more likely to report taking some kind of action when their child has a poor appetite than mothers of younger children. This could be because mothers of younger infants expect them to have different types of reactions when they are introduced to new foods, and therefore, they may not see food refusal or even poor appetite as something requiring immediate action. Mothers of older children, however, may feel that something is really wrong when the child refuses to eat, and therefore, they need to take action to encourage children to eat, or to compensate for the child's poor appetite.

Table 8.6. Changes in care practices during feeding, by child age

Practice	Age (months)			
	6-11	**12-23**	**24-35**	**36-48**
Caretaker takes action if child refuses to eat	56.8	70.5	77.5	74.9
Caretaker takes action if child has poor appetite	59.8	84.0	96.6	96.1
Child eats alone	3.4	57.3	92.4	96.0

Feeding during diarrhea

Continued breastfeeding, feeding of complementary foods and fluid replacement are particularly important during diarrhea in order to prevent dehydration and malnutrition. Findings from our formative research suggested that the importance of fluid replacement during diarrhea was well understood by mothers (Menon et al. 2003). These results are partially confirmed in the quantitative survey, but we still find close to 20 percent of mothers who report giving less liquids to their child during diarrhea and close to 8 percent who report giving no liquids at all (Table 8.7.).

An even larger percentage of mothers gave less semi-solid or solid foods to their child during diarrhea (60 percent) and 4 percent stopped giving solid foods all together. This may be due to the fact that children with diarrhea often experience anorexia or vomiting, and thus mothers just cannot feed their children the same amounts as usual. Unfortunately, this type of information is not available in our survey. Increased feeding *after* diarrhea and other infectious diseases is also key to adequate recovery and prevention of nutritional deficiencies and poor growth. This information, also, was not collected in our survey.

Table 8.7. Changes in feeding of liquids and food during diarrhea

	Recuperative [n=396][1] %	Preventive [n=447][1] %	Total [n=843][1] %
Liquids (*q411)*			
- much less	4.3	4.3	4.3
- little less	17.2	13.0	14.9
- about the same	23.0	22.1	22.5
- more	48.5	51.5	50.1
- gives nothing to drink	6.8	8.3	7.6
- does not know	03	0.9	0.6
Semi-solid and solid foods (*q412)*			
- much less	15.7	18.1	17.0
- a little less	45.2	40.9	42.9
- about the same	25.3	25.5	25.4
- more	4.8	6.9	5.9
- stopped giving food	4.3	4.0	4.2
- does not know	4.8	4.5	4.6

[1]Note: these questions were asked only for children who had had diarrhea previously, which explains the smaller sample sizes.

8.4. Conclusions

In summary, the survey data on child feeding practices concurred well with the previous findings from our formative research on child feeding practices. The positive practices observed are that breastfeeding is almost universal and that the vast majority of mothers breastfeed their child up to at least 18 months of age. A variety of less optmal feeding practices are observed, however, including low rates of exclusive breastfeeding, widespread use of baby bottles and very early introduction of complementary liquids, semi-solids and solid foods. The diet of young children in these communities also appears to be inadequate in terms of dietary diversity and the frequency of feeding nutrient-rich foods like animal source foods. Most children in our sample were not assisted to eat by a caregiver, suggesting that children are expected to learn to feed themselves early on, especially so after they reach 12 months of age. Finally, the data indicate that although most caregivers report taking some action when children refuse to eat or have a poor appetite, this is much more common for older children than for infants. Programs to improve infant and young child feeding practices in rural Haiti, thus, have a variety of challenges to address in order to improve infant and young child feeding practices on the whole, and feeding practices for infants under the age of 12 months in particular.

9. CHILD CARE PRACTICES II: HEALTH CARE SEEKING, HYGIENE AND DISCIPLINE

9.1. Introduction

This chapter examines the child care practices related to the use of preventive and curative health care, as well as hygiene practices and discipline strategies used by the survey respondents.

The types of information collected, the variables available and the composite scales created are described below, followed by a presentation and discussion of the results.

9.2. Variables and composite scales

Information was collected by maternal recall on the following aspects: 1) preventive health care seeking behaviors (use of immunization and prenatal care); 2) curative health care seeking behaviors for episodes of diarrhea, fever and ARI; 3) hygiene behaviors related to bathing children; and 4) the use of physical punishment to discipline children. Spot check observations were also used to observe markers of child, respondent and household hygiene practices, for example the cleanliness of the mother and child's hands, hair, clothes and face, and the cleanliness of the interior and exterior of the house. Data on these markers were collected for both the index child (18-47 months of age) and his/her younger sibling (0-17 months of age).

According to WHO's recommended schedule for immunization (WHO 2002), a 12-month old child should be fully immunized, that is he/she should have received BCG at birth, 4 doses of polio, 3 doses of DTP and a measles vaccination. Field workers recorded the information on immunization from the child's health card, and completed it with maternal recall when the card was either unavailable or incomplete. Three indicators were derived for all index children in our survey sample to determine whether or not they were fully immunized (since all index children were older than 12 months, they should all have been fully immunized based on the WHO schedule of immunizations). The three indicators are the following:

1. *Fully immunized by card*: this indicator was given a score of 1 if, according to the child health card, he/she had received all immunizations; and 0 if he/she was missing one or more vaccines.
2. *Fully immunized by recall*: the same coding as above was used, but with the information obtained by maternal recall.
3. *Fully immunized by recall or card:* the same coding as above was used, but with the information obtained either by maternal recall, health card, or both.

Composite scales were created to assess the overall cleanliness of the child, mother, as well as the interior and exterior of the house. The coding table for the cleanliness scales is presented in Appendix 9.1. All scales were created in such a way that higher scores meant better hygiene or "cleanliness". The scales created are described below.

Child cleanliness scale: Five aspects of child cleanliness were observed by spot check observations, which were done both for the index child and his/her younger sibling. Four of the observations assessed the cleanliness of the child's hands, hair, clothes and face, while the fifth

assessed whether the child had a runny nose that had not been cleaned. The cleanliness of the child's hands, hair, clothes and face were assessed on a 3-point scale that measured whether each part of the body observed was dirty (scored as 1), dusty (scored as 2) or clean (scored as 3). For children who were naked at the time of the observation, the cleanliness of their body was observed in place of the cleanliness of their clothes. The variable that evaluated whether the child had an *unattended* runny nose was coded as a yes/no variable, where a score of "0" was assigned to "yes" and a score of "1" was assigned to "no". The overall child cleanliness scale was created by summing the scores on all five observations, including the cleanliness of the nose, and ranged from a possible minimum of 4 to a possible maximum of 13. The child cleanliness scale had a high reliability (Cronbach's alpha=0.91 for the scale created for naked children, and 0.92 for the scale created for the clothed children).

Respondent mother cleanliness scale: The respondents' cleanliness was assessed by observing the cleanliness of their hands, hair, clothes and face. As with child cleanliness, the assessment of cleanliness was made on a 3-point scale that measured whether each aspect observed was dirty (coded as 1), dusty (coded as 2) or clean (coded as 3). The overall respondent cleanliness scale was created by summing the scores on the four variables, and ranged from a possible minimum of 4 to a possible maximum of 12. The respondent cleanliness scale had a reliability of 0.83 as assessed by Cronbach's alpha.

House interior cleanliness scale: The cleanliness of the interior of the house was assessed using observations of 3 individual features of cleanliness as well as an overall assessment of interior cleanliness. The individual features that were observed were evaluated on a simple yes/no basis, and the observations assessed whether the interior of the house needed to be swept, whether the drinking water container was covered and whether one could observe piles of dirty clothes inside the house. These latter 3 variables were combined as a summative scale of house interior cleanliness after ensuring that all the variables were coded in such a way that a 0 code indicated poorer hygiene and a code of 1 indicated better hygiene. The house interior cleanliness scale thus created ranged from a minimum of 0 to a maximum of 3, and had a Cronbach's alpha of 0.86. The sample size for the observations of the house interior was somewhat smaller than for the other observations because not all observers were able to conduct observations inside the houses.

House exterior cleanliness scale: The cleanliness of the environment around the house was assessed using observations of 4 individual features of cleanliness as well as an overall assessment of environmental cleanliness. As with the variables that assessed the cleanliness of the interior of the house, those used to observe the cleanliness of the exterior were also evaluated on a simple yes/no basis. The observer recorded whether the space outside the house needed to be swept, whether any human or animal feces could be observed and whether there was any garbage around the house. These four individual observations were combined to create a summative scale of house exterior cleanliness. The house exterior cleanliness scale ranged from a minimum of 0 to a maximum of 4, and had a Cronbach's alpha of 0.62.

9.3. Results

9.3.1. Preventive care seeking behaviors

Immunization

The percentage of fully immunized index children (18-47 months) was assessed by asking mothers to show their child's health card, and verifying the vaccines recorded. For mothers who did not have a health card available, field workers asked them to recall whether or not the child had received the different vaccines. Only 62 percent of mothers had a health card. Of those, 23 percent had a child fully immunized. Among the remaining mothers, only 9 percent reported that their child had received all immunizations required and thus could be considered fully immunized based on maternal recall. Overall, 17.8 percent of all index children were fully immunized, based on either their health card or maternal recall (data shown in Table 9.1.). This is a very low percentage, and is substantially lower than the rate documented for all rural areas of Haiti in the latest DHS survey (EMMUS-III 2001). It is possible that the area included in our study is particularly poorly served by health services and that the newly implemented program by World Vision will significantly improve immunization coverage. There were no differences between program groups or child gender in the percentages of fully immunized children, or in the percentage who had a health card and those who did not.

Table 9.1. Immunization status by program group

Immunization status	Program group		Total
	Recuperative	Preventive	
Fully immunized (according to card) (N with card=933)	21.7	24.4	23.0
Fully immunized (from recall; (N=581)	11.6	6.9	9.3
Fully immunized (card or recall); (N=1514)	17.8	17.7	17.8

Use of prenatal and postpartum care

The proportion of women using different types of prenatal care is shown in Table 9.2. The findings related to the use of prenatal care are encouraging in that about 80 percent of respondents reported having consulted a health professional when they were pregnant with their last child. However, there were still about 14 percent of respondents who had not consulted any one for prenatal care. The proportion of women who consulted a health professional during their pregnancy is very similar to that reported in the Haiti DHS data gathered in 2000 (79 percent). There were small differences in the use of prenatal care by program group; respondents in the recuperative group were slightly more likely to have consulted a health professional than those in the preventive group. Similarly, a slightly larger proportion of women in the recuperative group reported taking iron pills during their pregnancy. In both groups, a large proportion of women were likely to have had their first consultation with a health professional around 3-4 months into their pregnancy, about 60 percent of women had between 1 and 3 prenatal consultation visits, and about 20 percent had 4 visits or more.

The proportion of respondents who reported having experienced signs of night blindness during pregnancy was 13.7 percent, with no difference between the program groups. Although the percentage of women who reported night blindness during pregnancy is not as high as in some countries of Asia, it is still raises serious concerns. Mortality among mothers who suffered from night blindness during pregnancy in Nepal was four times higher than among non-night blind women (Christian et al. 2000). The risk of mortality for their young infant was also greater among the group of night blind, compared to the non-night blind mothers (Christian et al. 2001). Prevention of vitamin A deficiency during pregnancy in poor countries such as Haiti must therefore be taken very seriously.

The majority of women reported being attended by a midwife for their child's delivery (Table 9.3.), and a very small proportion were attended by health professionals or others such as family members. About 5 percent of respondents in the recuperative group reported having received no assistance at all during delivery. This proportion was 3 percent in the preventive group. The survey results are, in general, comparable with the results of the Haiti DHS (EMMUS-III, 2001) regarding the assistance received during delivery, except that a larger proportion of the baseline survey respondents were assisted by midwives than the proportion reported in the DHS.

Table 9.2. Use of prenatal care by program group

Characteristic	***Variable name***	**Recuperative [n=759]** %	**Preventive [n=755]** %	**Total [n=1514]** %
Prenatal consultations during pregnancy	*Q3011*			
- Did not consult anyone		13.3	14.1	13.7
- Health professional		82.7	79.1	80.9
- Other		4.0	6.9	5.4
Number of prenatal visits to a health professional	*Q304*			
- Never visited		17.3	20.9	19.1
- 1 to 3 visits		62.2	56.9	59.5
- 4+ visits		19.9	21.5	20.9
Stage of pregnancy at first visit to a health professional	*Q303*			
- Never visited		17.3	20.9	19.1
- < 6 months pregnant		65.5	66.9	66.1
- 6-7 months pregnant		14.9	10.5	12.7
- 8+ months pregnant		1.6	1.5	1.5

		Recuperative [n=759]	**Preventive [n=755]**	**Total [n=1514]**
Took iron pills when pregnant	*Q305*	66.3	63.2	65.1
Experienced night blindness when pregnant	*Q307*	13.4	13.9	13.7
		Median	**Median**	**Median**
Months of pregnancy at first use of prenatal consultation	*Q303*	4.0	3.0	3.0

Table 9.3. Assistance during delivery and postnatal care by program group

Characteristic	***Variable name***	**Recuperative [n=759] %**	**Preventive [n=755] %**	**Total [n=1514] %**
Assistance during delivery	*Q3091*			
- No one		4.9	2.9	3.9
- Health professional		5.3	7.4	6.3
- Midwife		83.5	83.3	83.4
- Other		6.0	5.7	5.9
Place of delivery	*Q310*			
- Health institution		4.3	6.9	5.6
- Own home		87.5	85.2	86.3
- Other home		7.5	7.0	7.2
- Other		0.7	1.0	0.7
Received Vitamin A supplement at birth or soon after	*Q312*	8.0	7.7	7.9
Size of child at birth	*Q308*			
- Very big		20.8	21.7	21.3
- Big		6.9	5.3	6.1
- Average		30.6	30.1	30.3
- Smaller than average		16.5	17.4	16.9
- Very small		25.3	25.4	25.4

Over 85 percent of survey respondents reported giving birth at home, the majority in their own home and a small proportion in someone else's home. This proportion was not different between

the two program groups. Overall, only about 6 percent of respondents reported giving birth in a health institution. When asked about the size of their infant's at birth compared to other infants about 25 percent of respondents indicated that their infant was very small, and about 17 percent said their infants were smaller than average. Although these data cannot be used as an indicator of low birth weight, the large proportion of women who reported smaller than average and very small infants (combined total of over 40 percent) is of concern.

Finally, only 8 percent of women reported receiving a vitamin A supplement immediately after they had given birth. This low figure is of real concern given the important role of supplementing women immediately after delivery to ensure that their infant receives adequate amounts of vitamin A through breast milk, and the reported prevalence of night blindness among pregnant women. Reaching women soon after delivery to administer a vitamin A supplement and ensure postnatal care is a component of World Vision's program services in the Central Plateau area. Our data suggest that this aspect of their programming, which is done through a system of home visits, will need to be strengthened to ensure that women do in fact receive the supplement within the first two weeks following delivery.

9.3.2. Curative health care seeking practices

This section reports the health care seeking practices of respondents whose children had experienced fever, cough/cold, fast breathing or diarrhea in the two weeks preceding the survey. Table 9.4. presents the types of health care seeking practices used by caregivers in our sample for each type of illness.

A high percentage of caregivers reported having sought advice when their child was sick. More than 80 percent of the caregivers reported seeking advice for fever, cough/cold or more severe respiratory symptoms, and 72 percent for diarrhea. Interestingly, the most common sources of advice were the medical sector and family members. For fever or severe respiratory symptoms, caregivers were more likely to seek advice from the medical sector, whereas for the common cold or for diarrhea, family members were the most common source of advice. A very low percentage of caregivers reported consulting program health agents or *colvols*, although they were more likely to do so for diarrhea than for the other symptoms. This is probably due to the fact that health agents give lectures about diarrhea in the rally posts and thus, may appear knowledgeable and a good source of information on that topic. The relatively low reliance on health agents or *colvols* overall, may also be due to the fact that many of them do not live in (or close to) the communities where they work.

There was little evidence of differences between treatment groups or between genders in the percentage of caregivers who reported seeking advice for the different symptoms (see Appendices 9.2. and 9.3.). The source of advice for the different types of symptoms was also very similar between the groups (not shown), with the medical services and family being favored for all symptoms.

Table 9.4. Use of curative health services (children 18-47 months of age; n=1514)

	Fever	Cough/cold	Fast breathing/ shortness of breath	Diarrhea
% who had in previous 2 weeks	47.9	65.4	15.5	32.1
% who sought advice (among those who reported symptom)	82.2	81.0	80.9	72.0
% who sought different treatments (among those who reported symptom)				
- Medical sector	43.0	27.8	53.9	25.4
- Family	33.2	55.1	37.7	29.7
- Health agent/colvols	2.3	0.9	1.6	4.9
- Traditional doctors	5.7	10.5	2.6	3.5
- Pharmacy	6.8	1.9	3.1	4.1
- Itinerary vendor	7.7	2.4	0.5	3.1

Feeding during diarrhea

There seems to be a relatively good understanding of the need to increase the amounts of liquids offered to children during diarrhea, as seen by the fact that half of the mothers reported doing so (Appendix 9.4.). There is, however, still a large proportion of mothers who report decreasing the amount of liquid offered to the child during diarrhea. The majority of mothers report reducing the amount of food offered to the child, a phenomenon widely documented in other settings and often associated with the child's refusal to eat, severe anorexia and/or vomiting during diarrhea episodes.

Health care seeking for diarrhea

Although 97 percent of the mothers interviewed reported having heard of oral rehydration salts, only 40 percent reported using it (Appendix 9.5.), and as little as 10 percent had used a home-made preparation. Traditional medicines were a more popular treatment for diarrhea, which more than half of the mothers reported using. It would be important to investigate what the most common traditional medicines are, whether they are made with water and what their electrolyte content is. A slightly higher percentage of caregivers from the preventive group reported using oral rehydration salts and syrups for treatment of diarrhea than caregivers from the recuperative group (Appendix 9.5.). Traditional medicines, on the other hand, were more popular among caregivers from the recuperative group. Treatments used for diarrhea did not differ by gender of the child (Appendix 9.6.).

9.3.3. Hygiene practices

As described in section 9.2., data on hygiene practices were gathered primarily by spot observations and information was gathered on markers of hygiene behaviors rather than on the behaviors themselves. The only hygiene practice for which recall was used was child bathing, where respondents were asked how often they usually bathed their child, and what they used to bathe the child (e.g., water, soap and water).

The recall data on bathing practices indicate that over 95 percent of respondents in both program groups reported bathing their children either twice or even thrice a day. Furthermore, more than 96 percent of respondents reported using soap and water to bathe their child with, rather than just water. There were no differences in these reported practices either by child age or child gender. Given the water scarcity and time constraints faced by women in our sample, and their reported frequent absences from home, the overwhelmingly positive responses to these questions could indicate a social desirability bias rather than actual practice.

Mean values for the summary hygiene scales are presented in Table 9.5. There were no differences between the program groups in any of the mean scores to the hygiene scales. For all scales, the mean values were towards the upper end of the possible range of values, indicating that in general, the cleanliness of most children, respondents and houses were rated highly by the observers.

Table 9.5. Mean hygiene scale scores for index children and houses, by program group

Characteristic	*Variable name/ range*	Recuperative [n=759]			Preventive [n=755]			Total [n=1514]		
		N	Mean	SD	N	Mean	SD	N	Mean	SD
Child cleanliness scale (naked children)	*nchclean* (4-13)	482	9.3	2.8	463	9.2	2.8	945	9.2	2.8
Child cleanliness scale (clothed children)	*cchclean* (4-13)	276	9.9	2.7	293	10.0	2.7	569	9.9	2.7
Overall child cleanliness score	*chclean* (4-13)	758	9.5	2.8	753	9.5	2.7	1511	9.5	2.8
Maternal cleanliness scale	*motclean* (4-12)	759	9.9	2.2	755	9.8	2.3	1514	9.8	2.2
House interior cleanliness scale	*intclean* (0-3)	647	2.3	1.0	649	2.3	1.0	1296*	2.3	1.0
House exterior cleanliness scale	*extclean* (0-4)	759	3.40	1.0	755	3.4	0.9	1514	3.4	0.9

*The sample size is lower for the observation of the interior of the houses because not all observers had access to the interior of the house.

The scores on the child cleanliness scales differ somewhat with child gender, and are higher for girls than for boys (mean of 9.9 for girls and 9.2 for boys). The scores also change considerably with child age (Appendix 9.7.), and the highest scores are seen for youngest children (0-5 months). The difference in scores between this age group and the following one (6-11 months) is almost 2 points on the overall scale, and the difference between the 6-11 month group and the

12-18 month group is about half that magnitude (about one point on the scale). Subsequent age differences are generally small.

The sharp decrease in mean scores on the hygiene scales with child age in the first year of life is not unexpected and it is related to the child's developmental and motor abilities at the time of the observation. An examination of the mean hygiene scores by the child's activity at the time of the observation shows that the scores are strongly influenced by what children were doing when they were observed. As shown in Appendix 9.8., the child cleanliness scores are highest for children who were being carried or who were sitting on a chair/bed, compared to children who were sitting on the bare ground, crawling or walking. There is also a strong relationship between age and child activity, again not unexpected given the different motor skills of children in these different age groups. For example, whereas 87.5 percent of children between 0 and 5 months of age were being carried when the observation was conducted, only 70 percent of children 6-11 months were, and 15 percent of children in this age group were crawling. In the 12-18 month age group, even fewer (44.5 percent) were being held, and more children were either crawling or walking.

These findings are useful in helping to interpret the results of the spot observations of children's cleanliness. They suggest that cleanliness of the child should be interpreted within narrow age ranges, just as feeding practices are, because the child's cleanliness is largely dependent on his/her developmental stage. The fact that an18 month old child is less clean than a 4 month old one does not necessarily reflect a negligent or unhygienic caregiver, but rather it is related to the greater mobility of older children and their need to explore their environment. Clearly, some active toddlers get more dirty than others through their exploration and these differences are, at least in part, related to the cleanliness of their environment, as well as to the level of attention (and care) that they receive from their caregiver and other family members. So, the child cleanliness scale can be useful to compare children within age ranges, but our findings suggest that it should not be used to compare children across age ranges.

9.3.4. The use of physical punishment

Table 9.6. shows the use of physical punishment strategies by respondents in the two program groups. Respondents were asked about their frequency of use of two types of physical punishment: "taps", which are small taps usually given to children as a preliminary strategy to make them listen to their parents, and the use of hitting, which is considered a more extreme form of physical punishment than the use of "taps". The use of both forms of physical punishment was high, in general, with over 95 percent of respondents reporting the use of taps, and about 80 percent reporting the use of hitting to make children listen.

Table 9.6. Child discipline strategies, by program group

Discipline practice	Variable name	Recuperative [n=759] %	Preventive [n=755] %	Total [n=1514] %
Have given children a few taps to make them listen	*Q809a*			
- often		39.4	33.2	36.3

		Recuperative [n=759]	Preventive [n=755]	Total [n=1514]
- sometimes		58.4	63.0	60.7
- never		2.2	3.7	3.0
Have hit children to make them listen	*Q809c*			
- often		17.3	13.2	15.3
- sometimes		66.3	67.9	67.1
- never		16.5	18.8	17.6

There were no large differences between the two program groups in the frequency of use of these strategies, but more respondents in the recuperative group appeared to have used both taps and hitting often than those in the preventive group. There were also no large differences by child gender, though respondents who had a boy index child reported a slightly larger propensity to use both taps and hitting to make their children listen. Since this question was not asked in relation to a specific child, but rather in relation to the use of the practice by the *respondent* to make any of her children listen to her, it is not really possible to interpret the data in terms of the use of physical punishment for children of either gender. For the same reason, there are no apparent differences in the frequency of use of these strategies by child age. If the question had been asked about one child in particular, the pattern by child age would likely have been different, possibly with a greater use of physical punishment for older children than for infants and toddlers.

9.4. Conclusions

Our findings indicate that access to preventive health services for children, particularly the coverage of immunization services, is alarmingly low, even compared to Haiti standards. Access to prenatal care for women, on the other hand, appears to be much better: the vast majority of women reported having attended prenatal consultations with a health professional (81 percent) during their last pregnancy; up to two thirds of those who attended prenatal visits did so for the first time during their first 6 months of pregnancy; and more than half of them attended prenatal consultations between 1 to 3 times during their last pregnancy. Close to two-thirds of women also reported having received iron supplements during pregnancy. The majority of births took place at home with the help of a midwife. Few mothers were assisted by a health professional (6 percent), and a troubling 4 percent received no assistance during delivery. Very few women received vitamin A supplements after delivery, probably a reflection of the unavailability of the supplements, combined with the lack of awareness and training of midwives in their use. These aspects of programming in the Central Plateau area need to be strengthened substantially, especially given that 14 percent of women reported having suffered from night blindness during their last pregnancy.

Regarding the use of health services for curative care, the majority of mothers reported seeking advice when their child experienced symptoms of fever, cough/cold, ARI or diarrhea. The type of advice sought, however, differed depending on the symptoms, with respondents being more likely to seek help among medical professionals when the child had ARI symptoms or fever, suggesting that they recognized the severity and greater risks associated with these symptoms. World Vision program health agents and *colvols* were rarely mentioned as a source of advice for any of the symptoms listed. This is probably a reflection of the fact that the program was new in

the area and therefore the staff may not have established credibility yet, combined with the fact that most health agents did not reside in the communities.

Overall, child, maternal and house hygiene were quite good, considering the limited means available to these poor families to maintain good hygiene. As expected, more mobile children in their second and third year of life were more likely to be rated as "dirty" by our field workers than infants in their first year who tend to be held and protected from environmental contamination. Finally, our survey found a high prevalence of the use of physical punishment to make children listen to their parents (two thirds reported using it sometimes), a practice that is highly discouraged for its negative influence on child developmental outcomes. As highlighted in Chapter 7, these findings are somewhat in contradiction with the reported perceptions of the respondents about discipline, where only one third of them believed that hitting was an appropriate disciplinary approach. Programs focused on parenting practices will clearly have to pay attention to this high prevalence of using physical punishment and attempt to sensitize parents to the detrimental impact on children.

10. ASSOCIATIONS BETWEEN HOUSEHOLD AND CAREGIVER RESOURCES, CARE PRACTICES AND CHILD OUTCOMES

10.1. Introduction

In the conceptual model presented in Chapter 2, child survival, growth, and development are postulated to depend on adequate nutrient intake (adequate food), health, and care practices. Each of these, in turn, depends on community, household, and caregiver resources. One fundamental contribution of this conceptual model is the recognition that none of these, alone, is sufficient to ensure good outcomes. Adequate food, in the absence of care and a healthy environment, will not be enough to protect and nurture children. Similarly, exceptional care, in the absence of adequate food, will not be enough. In different contexts, lack of adequate food, illness and lack of health care, or less than optimal care practices (child feeding, hygiene, care-seeking, etc.) may be the most important constraint on child growth and development. Further, adequate caregiver resources are not enough to ensure optimal care in the absence of the household and community resources that are needed for that care to occur.

The results presented in this chapter, thus, explore how the various elements in the conceptual model – as measured in the baseline survey – interact in the context of the communities covered by the program evaluation. This is done through an assessment of bivariate relationships between a variety of household and caregiver resources, care practices and child outcomes. The objective of exploring these bivariate associations was to understand which of the theoretical relationships laid out in the conceptual framework are actually reflected in associations between variables assessed in the baseline survey. It is anticipated that this first stage of analysis then will form the basis for future multivariate analyses with these data.

10.2. Variables and analysis

The variables and scales used in the analyses presented in this chapter have already been described in previous chapters.

In this chapter, analyses were conducted only for the index children (between 18 and 47 months). Including the younger children would mean including more than one child per household and would have created the problem of non-independent observations. Bivariate associations were explored using cross-tabulations and comparisons of means. The tests used to assess the statistical significance of the associations included Chi-square and Fisher's exact tests for categorical variables and analysis of variance for continuous variables. Where appropriate, linear trends were also assessed.

The approach taken to interpret the results of the bivariate analyses was to examine statistical significance as well as the consistency of the results and magnitude of effects. For example, when a proxy variable for wealth (for example, the asset index) was consistently and strongly associated with other variables, in the expected direction, we were more confident that the proxy is representing the domain of interest, and would be of use in further analyses. The magnitude of differences between groups is also important; for example, some comparisons for age subsets may not reach significance because of a limited sample size in the subset but the differences between age groups might in fact be of a large enough magnitude to warrant further

investigation. When differences are large and consistent, variables may be well measured and useful even when comparisons are not statistically significant. Conversely, some statistically significant differences may be too small to be of practical importance.

If associations are not observed, either the association does not exist in this study sample, or one or both variables were not well-measured. If variables are not well-measured, associations cannot be detected. In either case – where there is no true association or where constructs are not well measured – the variables will be less useful in further analyses.

The associations explored through the bivariate analyses are outlined briefly in Appendix 10.1. In addition to exploring relationships between the elements shown in Appendix 10.1., relationships between child appetite (as reported by the mother), feeding practices, and outcomes, are also explored. While child appetite is not explicit in the conceptual framework in Appendix 2.1., research on care and nutrition has recognized the important role of appetite and other characteristics of the child, both in determining intake and in shaping caregivers' responses (Ruel and Arimond, in press).

Detailed information on variables that were used to represent different elements in the conceptual model is presented in Table 10.1. For some elements (for example, household socio-economic status) the number of variables is small, reflecting the fact that there is much experience with operationalizing these concepts, and with reducing a large number of original variables to a small, manageable number of proxy indices (such as the asset and housing indices). For other elements (for example, some caregiver resources) experience with measurement is limited, especially in the context of nutrition studies, so a more exploratory approach was taken and many comparisons were assessed. Finally, a number of child feeding variables constructed from the 24-hour and 7-day food group recall are used here considered both as proxies for food intake and nutrient adequacy, and as reflecting current child feeding practices.

10.3. Results

The presentation of results reflects the relationships outlined in Appendix 10.1., and the overall conceptual framework. Those elements further away from child outcomes in the conceptual framework (household and caregiver resources) are presented first, then care practices and finally outcomes. Relationships between household and caregiver resources are presented first, followed by associations between these resources and care practices. Then, the associations between the resources and child outcomes are presented and finally, associations between care practices and child outcomes.

For each set of bivariate relationships explored, Boxes 10.1. through 10.17. and Tables 10.2. through 10.14. show relationships that were both statistically significant *and* conceptually meaningful. The statistical criterion used was a p-value of $< .05$ (Chi-square, Fisher's exact, or ANOVA) and/or evidence of a linear trend (also $p < .05$). However, in certain cases associations were statistically significant but not meaningful; these associations are not listed in the boxes. For example, there was a significant difference between the mean health self-perception of women in low, middle, and high dependency ratio households. However, the relationship was not ordered, with the lowest health self-perception scores observed in the middle group for the

dependency ratio. There is no conceptual basis for expecting health self-perception and dependency ratios to have a U-shaped relationship, and the observed significance may be due to chance.

Because numerous comparisons were made many results are presented in a summarized form in the boxes, which are explained below. Where particularly strong or interesting relationships were observed, tables are used to present selected descriptive statistics.

Table 10.1. List of variables and composite scales included in bivariate analyses

Element in conceptual model	**Variables and composite scales**
Household resources	Partner's education Asset index (value of durable goods, productive assets, and livestock) Housing quality index (floor, wall and roof materials) Dependency ratio Household access to food (food insecurity scale)
Caregiver resources	Maternal BMI Health self-perception scale Maternal education Feeding knowledge scale Maternal occupation Main occupation Employed in last year Location of work How often away from home How long away when she goes Maternal empowerment/social support scales Contact with own family Has someone to talk to Couple communication scale Ownership of assets scale Control over purchases scale Involvement in decision-making scale Frequency of anxiety/depression-related symptoms scale Time stress scale Life satisfaction scale Help with household tasks scale Financial/material support scale Community participation scale
Care practices	Early feeding practices (by recall) Initiation of breastfeeding Only breastmilk on day one Gave colostrum Current feeding practices Ages 18-23 months Use of baby bottles Still breastfed Adequacy of frequency of feeding Child is helped to eat Ages 24-35 months Child is helped to eat

Element in conceptual model	**Variables and composite scales**
	Ages 18-47 months Number of meals yesterday Dietary diversity yesterday Number of animal source foods yesterday Number of vitamin A-rich plant foods yesterday Any flesh foods 3 or more days in last 7 Eggs 3 or more days in last 7 Orange/red vitamin A-rich plant foods 3 or more days in last 7 Feeding during diarrhea More liquids Same or more food What is done when child refuses food Proxies for hygiene practices Child cleanliness scale Maternal cleanliness scale Exterior (compound) cleanliness scale Interior (house) cleanliness scale Discipline practices Giving child "taps" Hitting child
Child outcomes	Height-for-age z-scores Weight-for-age z-scores Weight-for-height z-scores Diarrhea in the last two weeks

In each box, there are two sets of variables, one along the left and the other set along the top. For example, in Box 10.1., variables representing household-level resources are on the left, and variables representing caregiver resources are along the top. Statistically significantly and meaningful associations between a variable on the left side and another along the top are represented by a "+", a "-" or a "*". A "+" indicates a positive relationship (for example, between the asset index and maternal education). A "-" indicates a negative relationship (for example, as the dependency ratio increases, maternal BMI declines). In cases where one or both variables are not linear or ordered (for example, main occupation) neither a "+" nor a "-" is shown. Rather a "*" represents that there was a statistically significant relationship between the two variables.

10.3.1. Associations between household resources and caregiver resources

Because of the large number of variables representing caregiver resources, the results in this chapter are presented using several boxes, each with the same household resources on the left, but with the following three sub-groups of maternal resources along the top: (1) Caregiver health, education, and knowledge; (2) Caregiver employment characteristics; and (3) Women's empowerment and social support (scales).

First, however, we briefly examine the associations between household food insecurity and other household resources, as measured by partner's education, the housing quality index, the assets

index and the dependency ratio. Although household food security (or insecurity, as assessed by our index) is also a resource characteristic of the household, we examined separately the association between food insecurity and other household resources because food availability is likely to be a more proximal determinant of child feeding practices than the other household resources characteristics. Thus, it was important to understand what some of the determinants of household food availability (as measured by the food insecurity scale) might be.

Associations between household resources and food insecurity

The results presented in Table 10.2. show that food insecurity, as measured by the scale described in Chapter 6, is strongly and negatively associated with three of the four household resource indicators (partner's education, asset index, and housing index). Food insecurity is also associated with the dependency ratio, but the relationship is not as clearly linear[11]. The findings related to the asset and housing indices show that households in the higher terciles (i.e. who have higher socioeconomic status) scored on average one point less to the food insecurity scale (meaning that their food insecurity is less severe) than poorer households.

Table 10.2. Relationships between household resources and food insecurity

Household resource	**Variable name**	**Food insecurity scale score**	
		Mean	SD
Partner's education	*q204n*	*	
- None		8.0	(1.60)
- Primary		7.8	(1.85)
- Secondary		6.8	(2.32)
Asset index terciles	*nfac1_2*	*	
- Low		8.2	(1.56)
- Middle		7.9	(1.71)
- High		7.3	(2.08)
Housing index tercile	*nfac2_2*	*	
- Low		8.2	(1.73)
- Middle		7.8	(1.69)
- High		7.4	(2.00)
Dependency ratio terciles	*ndeprati*	*	
- Low		7.6	(1.99)
- Middle		8.0	(1.73)
- High		7.9	(1.76)

* $p<0.05$

Caregiver nutrition, health, education and knowledge

Box 10.1. presents the results of the associations between household resources and caregiver nutrition, health, education and knowledge. The household asset index was positively associated with all caregiver resources, meaning that households with a higher asset base were more likely to have a better nourished and healthier caregiver, who also had more education and greater child feeding knowledge. The housing index was similarly associated with the first three maternal resources, but not with knowledge.

[11] The test for linearity was not significant when terciles were cross-tabulated; when means were compared the test for linearity was significant

Greater household food insecurity was associated with poorer caregiver's health and education, but surprisingly, it was not related to her nutritional status. Women in the highest food insecurity tercile were more likely to have no schooling than those in the lowest food insecurity tercile (54 percent versus 48 percent). Women from more insecure households were also more likely to self-rate their health lower (by a one point difference on a 10 point scale) than women from less food insecure households. We would have expected that food insecurity may have been associated with poorer nutritional status, but this association was not found.

Maternal education was strongly associated with all four household resources, and the magnitude of the differences in these resources by maternal education level was generally large. For example, among mothers with no education: 69 percent also had a partner with no education, compared to 30 percent among mothers with some education; 57 percent were in the lowest asset tercile, compared to 41 percent among mothers with some education; 61 percent were in the lowest housing tercile, compared to 37 percent among mothers with some education; and 30 percent were in the lowest food insecurity tercile compared to 51 percent among mothers with secondary schooling or higher.

Box 10.1. Household-level resources and caregiver resources: Nutrition, health, education, and knowledge

	Caregiver resources (health, education and knowledge)			
Household level resources	Maternal BMI (categories)	Health self-perception (mean)	Maternal education (categories)	Knowledge of feeding (mean)
- Partner's education			+	+
- Asset index	+	+	+	+
- Housing index	+	+	+	
- Dependency ratio	-			-
- Food insecurity		-	-	

A number of the other significant differences summarized in Box 10.1. are not very large. For example, the proportion of women with low BMI (< 18.5) is 18 percent in the lowest asset index tercile and 11 percent in the highest. The difference in maternal knowledge of feeding between the lowest and highest asset index groups is only 0.1 point on a knowledge scale ranging from 0-6. Similarly, the difference in health self-perception is only 0.2 on a scale ranging from 0-10.

Finally, there were also some results that were not statistically significant but where the trend was in the expected direction. For instance, the difference in prevalence of overweight/obesity between the lowest and highest food insecurity tercile was about 6 percent with a linear trend, but this was not statistically significant.

Caregiver employment characteristics

Box 10.2. summarizes the associations between household resources and employment characteristics of the respondent, including main occupation, location of work (i.e., at home or away from home), and the time spent away from home.

Box 10.2. Household-level resources and caregiver resources: Caregiver employment characteristics

Household level resources	Caregiver resources (maternal employment)				
	Employed in last 12 months	Main occupation	Location of work	How many days away? (categories)	How long when she goes? (categories)
- Partner's education		*			
- Asset index		*	*	+	+
- Housing index			*		
- Dependency ratio	+	*	*	+	+
- Food insecurity	-	*	*	-	-

Partner's education level and women's main occupation were strongly related. Women whose husbands had some secondary education (14 percent of the sample) were much less likely to mention farming as their main occupation than were women whose husbands had less education (22 percent as compared to 42 percent of those whose husbands had some primary, and 49 percent of those whose husbands had no education). They were also somewhat more likely to report not working (24 percent as compared to 14-16 percent for the other groups), possibly due to less need for them to contribute to the household finances.

The dependency ratio and the household food insecurity scale were associated with all the caregiver employment variables and the asset index was associated with all but one employment variable (whether mother was employed or not in the previous 12 months). Respondents with higher levels of food insecurity (i.e. in the highest tercile of food insecurity) had the following employment characteristics: 1) they were least likely to have been employed in the last 12 months, compared to the other two terciles of food insecurity; 2) they were less likely to be involved in market work, compared to the respondents from the least food insecure tercile; 3) they were more likely to work at home than away from home; and 4) if they did work away from home, they were more likely to do so on less than 3 days a week, compared to the less food insecure mothers. It could be that the market-based work, which keeps women away from home for longer hours and more days a week, provides a buffer for the food security situation of the household by increasing access to different markets and more income. This is also suggested by the positive association found between the asset index and the caregivers' time spent away from home for work: women who spent longer hours and more days away from home were more likely to be in the higher asset index tercile than those who worked at home or spent less time away from home.

Thus, overall it appears that the women's market activities have a protective effect on their household food security. The fact that these activities keep them away from home and, in most cases separated from their young children for extended periods of time, however, may have a negative impact on their caregiving practices and ultimately on their children's health and nutrition. These aspects are examined below.

Women's empowerment and social support

Box 10.3. summarizes the associations between household resources and various aspects of women's empowerment and available social support for women. Again, the asset index and food insecurity scale were consistently associated with most of these caregiver resources, whereas the partners' education and the housing index were associated only with a few of these practices. The associations between the household assets index and caregiver resources related to women's empowerment and social support were all positive. For instance, women from wealthier households (i.e. in the higher asset tercile) were more likely to have access to a variety of resources such as good communication with their partners, ownership of personal assets and better access to financial and material support. They were also more likely to participate in social groups and to score higher on the life satisfaction scale, and less likely to be have symptoms of depression or stress.

For most of these maternal resources, the direction of the associations with the food insecurity scale was reversed because of the scoring of this scale (higher score means higher food **in**security). Thus, mothers in the highest food insecurity tercile were less likely to enjoy good couple communication and financial/material help or to own personal assets, they scored lower on the life satisfaction scale and they were more likely to suffer from anxiety and depression symptoms. The association between community participation and household food insecurity, however, was positive, as was the case for the association with household assets. In other words, women from more food *insecure* households reported participating in a larger number of social groups than those from less food insecure households, as were women from the highest tercile of the asset index (i.e. wealthier women). This difference might reflect that fact that social group participation is, on the one hand, easier for those with more access to wealth (as measured by the assets index), and on the other hand, *necessary* for those with less access to resources such as food (as measured by the food insecurity scale).

Associations between the dependency ratio and the women's empowerment and social support scales run counter to expectations for the most part. With the exception of financial/material help, they are consistently positive, indicating that a high dependency ratio is in fact associated with better status and support for women in this setting. This suggests that although a high dependency ratio is generally taken to represent a stress or vulnerability (lack of adult labor, earning possibilities, etc.), in this data set it is associated with some positive indicators of women's empowerment and support.

Box 10.3. Household-level resources and caregiver resources: Women's empowerment and social support

Household level resources	**Caregiver resources (women's empowerment and social support)**								
	Has someone to talk to (yes/no)	Couple communication (mean)	Ownership of assets (mean)	Involvement in decision-making (mean)	Anxiety/ depression symptoms (mean)	Life satisfaction (mean)	Household help (mean)	Financial /material help (mean)	Community participation (mean)
- Partner's education	+					+		+	+
- Asset index	+	+	+		-	+	+	+	+
- Housing index				+			+		
- Dependency ratio		+	+	+			+	-	+
- Food insecurity	*	-	-	*	+	-	*	-	+

10.3.2. Associations between household resources and care practices

This section presents findings related to the associations between household level resources and care practices. The care practices assessed through the baseline survey are represented by a large number of variables, which for the purpose of this analysis are grouped into 6 categories: (1) Early feeding practices; (2) Feeding practices for children 18-23 months; (3) Feeding practices reflecting food choice and dietary diversity for all index children 18-47 months old; (4) Care during feeding and feeding during diarrhea; (5) Child, respondent and house cleanliness; and (6) Discipline practices. Each category of care practices is presented in a separate box, to look at their association with the same 5 types of household resources as in the previous section.

Early feeding practices

Early feeding practices refer to the following three practices: breastfeeding initiation, exclusive breastfeeding during the first day and the use of colostrums. All three of these early feeding practices were associated positively with the housing index (Box 10.4.). The exact nature of this association is not clear, except that housing quality is a reflection of wealth. Partner's education was also positively associated with two optimal early feeding practices: feeding only breast milk on the first day after birth and giving colostrums to the child. An increasing dependency ratio was also associated with some positive practices. Taken together with some of the results presented above (for example, the positive associations between the dependency ratio and maternal status/support variables), it appears that in this context the dependency ratio does not function as a proxy identifying households that are "worse off" as is often the case; relationships in our study sample seem more complex.

Household food insecurity was negatively associated with initiation of breastfeeding, such that fewer respondents in extremely food insecure households (11 percent) were likely to report initiating breastfeeding within one hour than those in less food insecure households (23 percent).

Box 10.4. Household-level resources and care practices: Early feeding practices

Household level resources	**Care practices (Early feeding practices)**		
	Breastfed within one hour (yes/no)	Only breast milk the first day (yes/no)	Gave colostrum (yes/no)
- Partner's education		+	+
- Asset index			
- Housing index	+	+	+
- Dependency ratio	+		+
- Food insecurity	-		

Current feeding practices for children 18-23 months

Box 10.5. summarizes results for the age sub-group 18-23 months and includes selected variables that reflect recommended practices for this age group, namely avoidance of baby bottles, continued breastfeeding and feeding frequency. This subgroup of index children was chosen for the analysis because recommendations for these aspects of complementary feeding

have been developed only for children up to the age of 24 months. After this age, the transition from complementary feeding to family diet is expected to be completed.

The recommendations against which the survey data for children 18-23 months were compared include avoidance of the use of baby bottles, continued breastfeeding, and ensuring a minimum level of adequate frequency of feeding of three meals a day[12, 13](PAHO/WHO 2003). Because of the age restriction for this analysis (children 18-23 months of age), the sample size is much smaller than the one used for the other sets of comparisons (approximately 287 instead of 1514).

Few of the associations between household resources and care practices among 18-23 month old children reached statistical significance, probably because of the lower sample sizes. Results for bottle use, for example, showed an expected pattern, although some of the associations were not significant. In households with higher male education, higher asset index scores or higher housing quality, children were more likely to be fed using baby bottles (for example, 45 percent of children from households where the partner had some secondary education were fed with bottles, as compared to 27 percent of in households where the partner had no education).

Box 10.5. Household-level resources and care practices: Feeding practices for children 18-23 months

Household level resources	**Care practices (Feeding practices for children 18-23 months)**		
	No use of baby bottles (yes/no)	Still breastfeeding (yes/no)	Fed at least 3 times per day (yes/no)
- Partner's education - Asset index - Housing index - Dependency ratio	-		
- Food insecurity			-

Household food insecurity was associated strongly and in the expected direction with the frequency of feeding; children were more likely to receive their recommended three meals a day if they were from less food insecure households than if they were from the more food insecure ones. There was, however, still a large proportion of children from the lowest food insecurity tercile who did not receive 3 meals a day (34 percent), but this percentage was much higher among the most severe food insecurity group (52 percent). Associations between the other household-level variables and continued breastfeeding or adequate frequency of feeding were not evident.

Feeding practices reflecting food choice/dietary diversity

Data on child feeding practices that reflected food choice and dietary diversity were gathered using primarily 24-hour and 7-day recalls of foods consumed from different food groups. This

[12] These recommendations assume an adequate energy-density of the diet, continued breastfeeding, and average breast milk intake. In order to maintain a sufficient sample size, however, we included all children aged 18-23 months (whether or not they were breastfed) in this analysis.

[13] Note that, although there are currently no specific feeding recommendations for children over the age of 24 months, the use of baby bottles is discouraged at all ages in developing countries.

information is used both to represent the food choices made by caregivers and as proxies for food intake and nutrient adequacy. The associations between household resources and some of these variables are shown in Box 10.6. Data on all index children between 18 and 47 months were used for these analyses.

Box 10.6. Household-level resources and child feeding practices: Dietary diversity

Household level resources	**Child feeding practices**						
	No. meals in past 24 h (mean)	Dietary diversity in past 24 h (mean)	No. of ASF in past 24 h (mean)	No. of VA-rich plant foods in past 24 h (mean)	Any flesh foods ≥ 3 d in past 7 d (yes/no)	Eggs ≥3 d in past 7 d (yes/no)	Vitamin A-rich plant foods ≥ 3 d in past 7 d (yes/no)
- Partner's education		+	+	+	+	+	
- Asset index	+	+	+	+	+	+	+
- Housing index	+	+	+	+			
- Dependency ratio		-	-				
- Food insecurity	-	-	-	-	-	-	-

Abbreviations: ASF = animal source foods; d = days; h = hours.

The statistically significant associations shown in Box 10.6. are all in the expected direction, with all the feeding variables strongly associated with the asset index and the food insecurity scale. A number of other associations, also in the expected direction, were found between these feeding practices and the partners' education and the housing index. Appendix 10.2. illustrates some of the associations between household food insecurity and feeding practices of 18-47 month old children in the previous 24 hours. These associations are all strong, consistent, linear, and statistically significant. On average, children from more food insecure households consumed approximately ½ meal less per day compared to those from less food insecure households; they were fed close to 1 less food group yesterday and more importantly, 1 less animal source food, and were less likely to have been fed vitamin A-rich fruits and vegetables. The same magnitude of differences were observed when looking at the association between these practices and the asset index terciles, whereby children from wealthier households were fed a larger number of meals in the previous day and had a diet with greater diversity, especially a higher number of nutrient-dense animal-source foods.

Only dietary diversity and the number of animal source foods were associated with the dependency ratio, and again, in the expected direction, with increasing dependency ratios being associated with lower dietary diversity and a lower number of animal source foods in the past 24 hours.

Care during feeding and feeding during diarrhea

Care during feeding was assessed using a variety of questions that focused on providing assistance to children when they ate and on strategies used by caregivers to encourage children to eat when they refused food. Whether or not children are helped to eat is dependent on the child's age, and beyond a certain age very few children are likely to be helped. Therefore responses to this question were assessed within fairly narrow age ranges (18-23 months and 24-35 months). For the strategies used by caregivers to encourage children who refused to eat, data on all index children 18-47 months were used in the analysis. The associations between household resources and care during feeding and feeding during diarrhea episodes are summarized in Box 10.7.

Box 10.7. Household-level resources and care practices: Care during feeding and feeding during diarrhea

Household level resources	**Care practices (care during feeding and feeding during diarrhea)**				
	Helped to eat (18-23 mo) (yes/no)	Helped to eat (24-35 mo) (yes/no)	Response to food refusal (categories)	More liquids during diarrhea (yes/no)	The same or more food (yes/no)
- Partner's education		+			
- Asset index					
- Housing index					
- Dependency ratio					
- Food insecurity			*	-	-

Very few associations were found between household resources and the care practices examined. There were no associations or observable patterns between the asset and housing indices and either care during feeding or feeding during diarrhea. For partner's education, only one significant relationship was observed, with more children aged 24-35 months being fed by someone (14 percent) in households with some (male) secondary education, as compared to households with no (male) education (7 percent).

There was a significant association between household food insecurity and caregiver responses to food refusal. Caregivers in highly food insecure households were more likely to report doing nothing (29 percent) when the child refused food than those from less food insecure households (22 percent), but they were also more likely to report using positive encouragement strategies (49 percent) than those in the low food insecurity group (42 percent).

Feeding during diarrhea was assessed relative to recommendations for increased liquids and maintained (the same or more) feeding of solid foods. Only household food insecurity was significantly associated with feeding practices during diarrhea. A much larger proportion of caregivers in the low food insecurity group reported giving more liquids when their child had diarrhea than in the high food insecurity group (67 percent compared to 47 percent). A similar pattern was seen for maintaining food intake during diarrhea, with more caregivers in the low food insecurity group indicating that they gave the same amount or a larger amounts of food when their child had diarrhea (33 percent versus 39 percent).

Hygiene practices

Box 10.8. summarizes the results on the associations between household resources and hygiene practices, as measured by the hygiene scales based on spot check observation data[14]. Many associations between household resources and the hygiene scales are statistically significant and differences are meaningful in size.

Box 10.8. Household-level resources and care practices: Hygiene practices

	Hygiene practices			
Household level resources	Child cleanliness (quartiles)	Respondent cleanliness (terciles)	House exterior cleanliness (two groups)	House interior cleanliness (two groups)
- Partner's education	+	+	+	+
- Asset index	+	+		+
- Housing index				+
- Dependency ratio	+			
- Food insecurity	-	-		-

Partner's education was positively associated with all four scales, such that higher education of the spouse was associated with overall better hygiene. The results indicate that differences in child, respondent and house interior cleanliness were particularly large between households where the partner had no education as compared to households where the partner had some secondary education. Child, respondent and house interior cleanliness also varied significantly between the extreme terciles of the asset index and between low and high food insecurity terciles. All three sets of comparisons are shown in Table 10.3.

Table 10.3. Relationships between household-level resources and hygiene scales

Cleanliness scales	**Partner's education**			**Asset index tercile**			**Food insecurity**		
	None	Some primary	Some secondary	Low	Middle	High	Low	Middle	High
Child - % in highest quartile (*nchclea*)	13	15	24	11	13	21	34	31	25
Mother - % in highest tercile (*nmotclean*)	22	29	53	23	28	38	30	31	27
Interior -% in upper half (*nintclea*)	52	62	78	52	60	70	64	63	53

Discipline practices

Discipline practices were assessed by asking caregivers how often they gave their child a few "taps" and how often they hit their child, with response categories of "never" "sometimes" and "often" for each. Several significant associations were observed between household resource variables and responses to these questions, but some differences are small and are also difficult to interpret. For example, the housing index is significantly associated with each reported practice, but in opposite directions such that fewer respondents reported using taps often in the

[14] Note that scales were divided into different numbers of groups depending on their distributions; for example, the child cleanliness scale was divided into quartiles, mothers' cleanliness into terciles, and the house cleanliness scales into two groups.

higher terciles of the housing index, but more respondents reported using hitting often in the higher terciles of the housing index. This could indicate that respondents living in better conditions use harsh methods of punishment more often than the less harsh methods. This is reflected somewhat in the significant relationship between food insecurity and the use of taps as well as well hitting. Respondents from highly food insecure households reported a more frequent use of taps than those from less food insecure households. At the same time, however, those in the more food insecure households were also more likely to report never *hitting* their children.

A more easily interpretable association was observed between the dependency ratio groups and discipline strategies. Caregivers in households with higher dependency ratios (more children per adult) were more likely to report "often" for both taps and hitting their children.

10.3.3. Associations between caregiver resources and care practices

For this analysis, we looked at the associations between seventeen caregiver resources and twenty-five proxies for intake and/or care practices. In order to summarize such a large number of comparisons, maternal resources are divided into the following two groups for presentation in the boxes: (1) Nutrition, health, education, knowledge of feeding practices, and employment; and (2) Women's empowerment and social support scales. The feeding practices are grouped in the same 6 categories as in the previous section.

Early feeding practices

Boxes 10.9. and 10.10. summarize associations between caregiver resources and both early feeding practices and feeding of children aged 18-23 months.

The positive associations between maternal level of education and early feeding practices are largely due to the much higher prevalence of positive practices among women with some secondary education. However, this group comprises a very small proportion of the sample (6 percent). Differences in these early practices between women with no education and those with some primary education are small and of little practical importance (for example, 61 percent of those with no education gave colostrum, as compared to 66 percent of women with some primary education; 38 percent initiated breastfeeding within the first hour, as compared to 41 percent of women with some primary education).

Associations between the feeding practices knowledge scale and early feeding practices were large and significant (see Table 10.4. Mothers who scored higher on the knowledge test (higher tercile) were more likely to have breastfed within the first hour following birth (51 compared to 34 percent among mothers who scored in the lowest tercile of the knowledge scale); they were much more likely to have offered only breast milk to the child during the first day (60 percent vs. 39 percent among mothers with poorer knowledge scores); and to have given the child the colostrums (72 vs. 58 percent among the lowest knowledge tercile group). It should be noted that the questions forming the knowledge scale did not, in fact, include any on early feeding practices. This suggests that women who scored high on the knowledge scale may have a generally higher knowledge of good feeding practices, extending beyond the particular questions in the scale. Mothers with higher knowledge were also more likely to be still breastfeeding their child and to avoid bottle feeding.

Box 10.10. shows that very few associations were found between early feeding practices and women's empowerment and social support variables, and in general the sizes of differences observed were small.

Box 10.9. Caregiver resources (maternal health, education and employment) and care practices: Early feeding practices and feeding of 18-23 month-old children

Caregiver resources (health, education & employment)	**Care practices (early feeding & feeding of children 18-23 mo)**					
	Early feeding			**Feeding of children 18-23 mo**		
	Breastfed within 1 h of birth	Only breast milk on 1st d	Gave colostrum	No use of baby bottles	Still breast-feeding	Fed ≥ 3 times /d
- Health self-perception (terciles)						+
- Level of education (categories)	+	+	+	+		
- Knowledge of feeding practices (terciles)	+	+	+	-	+	
- Employed (yes/no)			+			
- Away three days/week or more? (yes/no)			+	-		
- Away more than one day when she goes?						

Box 10.10. Caregiver resources (women's empowerment and social support) and care practices: early feeding practices and feeding of 18-23 month old children

Caregiver resources (empowerment and support)	**Care practices (early feeding & feeding of children 18-23 mo)**					
	Early feeding			**Feeding of children 18-23 mo**		
	Breastfed within 1 h of birth	Only breast milk on 1st d	Gave colostrum	No use of baby bottles	Still breast-feeding	Fed ≥ 3 times/d
Couple communication (terciles)						
Control over purchases (terciles)						
Ownership of assets (lower vs upper half)						
Involvement in decision-making (terciles)	+	+	+			
Anxiety/depression symptoms (terciles)			+			
Time stress (terciles) (-6)						
Life satisfaction (terciles)						
Household help (terciles)						
Financial/material help (lower vs upper ½)				-		
Community participation (lower vs upper ½)	+	+	+	+		

Table 10.4. Relationship between maternal knowledge of feeding practices, early feeding and feeding of children 18-23 months

Feeding practices	Knowledge of feeding practices (terciles)		
	Low	Middle	High
Early feeding practices (maternal recall)		(n ˜ 1514)	
- Breastfed within one hour of birth (*bf1hr*)	34	36	51
- Only breast milk the first day (*q315a*)	39	42	60
- Gave colostrums (*q316*)	58	62	72
Current practices: Children 18-23 months		(n ˜ 287)	
- Does not usually feed child with bottle (*q319*)	67	72	55
- Still breastfeeding (*q317*)	27	37	43
- Frequency of feeding = 3 times/day (*mealad*)	61	60	59

Current feeding practices for children 18-23 months

As seen in many developing country contexts, bottle feeding use was associated with higher maternal education level: 60 percent of women with higher education level reported using baby bottles (67 percent), compared to 44 percent among women with some primary schooling and 27 percent among those who have no education. Bottle use was also positively associated with a variety of indicators of socio-economic status, including housing quality, asset index and partner's education, but only the association with housing quality reached statistical significance (see Box 10.5.).

Maternal education was not associated with the other two feeding practices examined for 18-23 month old children, i.e. continued breastfeeding and appropriate feeding frequency in the previous 24 hours. Greater maternal feeding knowledge, however, was associated with both greater use of baby bottles and a higher likelihood of continued breastfeeding (see Table 10.4. Interestingly, feeding knowledge was the only variable – among all comparisons made – significantly associated with a higher likelihood of continued breastfeeding for children 18-23 months. No association was seen between knowledge of feeding practices and frequency of feeding, however, even though this was one of the three components of the knowledge scale.

Few of the women's empowerment and social support scales were associated with current feeding for ages 18-23 months (see Box 10.10. above). Only community participation and financial/material help were significantly associated with the use of baby bottles, but the magnitudes of differences were small and probably of little significance. The associations, however, were in the same direction as socioeconomic variables, greater financial and material help and participation in community activities were associated with greater use of baby bottle.

Feeding practices reflecting food choice & dietary diversity

Box 10.11. summarizes the associations between caregiver resources such as self-rated health, education, knowledge and employment, and feeding practices reflecting food choice and dietary diversity for all index children between 18 and 47 months of age. The most striking results are that maternal education is consistently and positively associated with all child feeding practices;

and dietary diversity is associated with all maternal resources related to health, education, knowledge and employment.

Appendix 10.3. illustrates the association between maternal education and some of the feeding practices examined. As expected, children whose mothers are more educated are fed a larger number of meals on average and they have a more diverse diet, especially with respect to intake of animal source foods, compared to mothers with no education. Children of mothers with secondary school level or higher consume on average one more food group overall, and 1 more animal source food, compared to children of mothers with no education. Children of more educated mothers were also much more likely to have consumed meat products at least 3 times in the previous week (50 percent), compared to those with non-educated mothers (31 percent); and eggs (22 percent among more educated compared to 6 percent among non educated mothers) (not shown).

Maternal feeding knowledge and employment were both associated with greater dietary diversity and intake of a larger number of animal source foods in the previous 24 hours. Dietary diversity was associated positively not only with whether a woman was employed or not, but also with the number of days she worked away from home, and the amount of time during the day that she spent away from home. These findings concur with the findings described above, which showed that women's employment and number of days away from home are positively associated with greater household food security. It seems like the greater household food security among women who are engaged in market activities away from home, also translates into better quality diets for their young child.

Box 10.12. shows the associations between women's empowerment and social support variables and these same child feeding practices reflecting food choice and dietary diversity. For the variables listed in Box 10.12., there were a number of significant associations that reflect very small differences, and are of questionable practical significance. In order to present a clearer picture of the more important associations, only differences of = 0.2 were included for number of meals and for number of food groups yesterday; also, non-linear (U-shaped) relationships are not included.

Maternal ownership of assets, financial/material help and anxiety/depression, followed by control over purchases were the resources most consistently associated with child feeding practices (each was associated with 4 or 5 of the 7 practices listed in Box 10.12.). All associations were in the expected direction: positive maternal resources such as control over resources and help received were associated with better child feeding practices, and maternal stress/anxiety was associated with poorer feeding practices. This negative association is expected because the scale is in the opposite direction to the others; that is low scores indicate fewer symptoms of stress and anxiety, whereas on all other scales, higher scores represent more resources.

As shown above for the first set of maternal resources, dietary diversity and intake of animal foods were associated with a wide range of the women's empowerment and social support scales, for example with couple communications, control over purchasing, ownership of assets, life satisfaction, household help, financial and material support, and community participation.

Both feeding practices were also negatively associated with the maternal anxiety and depression scale. As shown previously (section 10.3.2.), these same feeding practices were also associated with household resources (particularly the asset scale and household food insecurity). Future analyses will, therefore, evaluate these associations when controlling for factors such as household SES and also examine any possible interactive relationships among these variables.

Box 10.11. Caregiver resources (maternal health, education, and employment) and child feeding practices: Food choices and dietary diversity

Caregiver resources (health, education & employment)	**Child feeding practices reflecting food choice and dietary diversity**						
	Number of meals in past 24 h (mean)	Dietary diversity in past 24 h (mean)	Number of animal source foods in past 24 h (mean)	Number of Vit. A-rich plant foods in past 24 h (mean)	Any flesh foods ≥ 3 days in last 7 days (yes/no)	Eggs ≥ 3 days in last 7 days (yes/no)	Vit.A-rich plant foods ≥ 3 days in last 7 days (yes/no)
- Health self-perception (terciles)	+	+	+	+			
- Level of education (categories)	+	+	+	+	+	+	+
- Knowledge of feeding practices (terciles)		+	+				-
- Employed (yes/no)		+	+				
- Away three days/week or more? (yes/no)		+					-
- Away more than one day when she goes?		+					

Box 10.12. Caregiver resources (women's empowerment and support) and child feeding practices: Food choices and dietary diversity

Caregiver resources (status and support)	**Child feeding practices: food choice and dietary diversity**						
	Number of meals in past 24 h (mean)	Dietary diversity in past 24 h (mean)	Number of animal source foods in past 24 h (mean)	Number of Vit. A-rich plant foods in past 24 h (mean)	Any flesh foods ≥ 3 days in last 7 days (yes/no)	Eggs ≥ 3 days in last 7 days (yes/no)	Vit. A-rich plant foods ≥ 3 days in last 7 days (yes/no)
- Couple communication (terciles)		+	+	+		+	
- Control over purchases (terciles)		+	+			+	+
- Ownership of assets (lower vs. upper half)		+	+		+	+	+
- Involvement in decision-making (terciles)						+	
- Anxiety/depression symptoms (terciles)	-	-	-		-		-
- Time stress (terciles)						-	
- Life satisfaction (terciles)		+	+			+	
- Household help (terciles)		+	+			+	
- Financial/material help (lower vs. upper half)		+	+		+	+	+
- Community participation (lower vs. upper half)		+	+			+	

Care during feeding & feeding during diarrhea

Boxes 10.13. and 10.14. show associations between caregiver resources and both care during feeding and feeding during diarrhea. Overall, relatively few associations were observed between caregiver resources and these practices. As with previous comparisons, some significant differences were of small magnitude (for example, differences of 2-5 percent in responses to the child's refusal of food), and are therefore not shown in the Boxes.

Box 10.13. Caregiver resources (maternal health, education and employment) and care practices: Care during feeding and feeding during diarrhea

Caregiver resources (health, education & employment)	**Care practices (care during feeding & feeding during diarrhea)**				
	Care during feeding			**Feeding during diarrhea**	
	Helped to eat (18-23 mo)	Helped to eat (24-35 mo)	Response to food refusal (categories)	More liquids during diarrhea	Same or more food
- Health self-perception (terciles)	-		*		+
- Level of education (categories)			+	+	
- Knowledge of feeding practices (terciles)			+	+	
- Employed (yes/no)				+	
- Away three days/week or more? (yes/no)				+	
- Away more than one day when she goes?					

Maternal education was significantly associated with caregiver responses to child refusal of food, and feeding more liquids to a child sick with diarrhea.

Few significant differences in practices were seen between women with low or high knowledge of feeding practices, although women with high knowledge scores were more likely to report giving more liquids to the child during diarrhea. They were also somewhat less likely to report taking no action when children refused food, and more likely to report caressing, playing or using other encouragement strategies.

There is a large and negative association between maternal self-rated health and helping children to eat at age 18-23 months. Only 17 percent of women in the highest tercile for health self-perception reported their child was helped to eat, as compared to 30 percent of women in the

lowest tercile. Women in the highest tercile for health self-perception were also more likely to report doing nothing when children refuse food. One possible explanation for this is that women who perceive themselves as healthier also have children who are – or who are perceived to be – healthier and less in need of help/intervention with feeding. This possibility is supported by the fact that average child appetite scores (reflecting maternal perception of child appetite) also increase with women's health self-perception terciles (average scores of 5.9, 6.3, and 7.3 on a scale of 1-10) (not shown).

Several empowerment and social support scales were significantly associated with children between 18-23 months receiving help with eating (see Box 10.14.) even though the sub-sample in this age range was relatively small (approximately 287). Both the control over purchases scale and the life satisfaction scale were negatively associated with children receiving assistance with eating, i.e., women who are "better off" on these scales were less likely to report that their child is helped to eat. This difference was particularly large for the life satisfaction scale, with 40 percent of women in the lowest tercile reporting that their child is helped to eat, compared with 17 percent in both the middle and the highest tercile.

Conversely, the anxiety/depression symptoms scale was positively associated with a child between 18 and 23 months receiving assistance to eat. Thus, the more symptoms of anxiety a woman reported, the more likely she was to also say that her child is helped to eat. It may be that the children of these women are – or are perceived to be – less healthy and robust, and therefore more in need of help and encouragement. Consistent with this, looking across the 18-47 month age group, women with higher number of anxiety/depression symptoms are much more likely to report taking action when their child refuses to eat. A number of the other scales indicating higher status/more support (couple communication, involvement in decision-making, amount of household help, and community participation) are also associated with a higher likelihood of using responsive methods to encourage children to eat (caressing, playing, offering other food).

The relationships between self-rated health as well as anxiety/depression and caregiver responses to feeding children all speak to the complexity of assessing responsive feeding behaviors and interpreting the implications of these behaviors. Clearly, caregiver behaviors around feeding children appear to be driven by their perceptions of what their children's needs are, and as previously documented in other cultures, women who appear to engage in responsive feeding behaviors appear to be compensating for perceptions about child weaknesses rather than being active feeders.

Very few associations were seen between women's empowerment and social support and feeding during diarrhea, and results were not consistent. Only the life satisfaction scale was positively associated with both increased liquids and maintained feeding during diarrhea.

Box 10.14. Caregiver resources (women's empowerment and support) and care practices: Care during feeding and feeding during diarrhea

Caregiver resources (status and support)	Care practices				
	Care during feeding			Feeding during diarrhea	
	Helped to eat (18-23 mo)	Helped to eat (24-35 mo)	Response to food refusal (categories)	More liquids during diarrhea	Same or more food
- Couple communication (terciles)			*		
- Control over purchases (terciles)	-				+
- Ownership of assets (lower vs upper half)					
- Involvement in decision-making (terciles)			*	-	
- Anxiety/depression symptoms (terciles)	+	+	*		
- Time stress (terciles) (-6)			*		
- Life satisfaction (terciles)	-		*	+	+
- Household help (terciles)			*		
- Financial/material help (lower vs. upper half)					
- Community participation (lower vs. upper half)			*		

Hygiene practices

Box 10.15. documents the associations between the first set of caregiver resources (nutrition, health, education and employment), and hygiene practices and discipline practices. Positive and consistent associations were seen between maternal education and the hygiene scales, as assessed by the spot check observations, as well as between feeding knowledge and the hygiene scales.

Box 10.15. Caregiver resources (maternal health, education, and employment) and care practices: Hygiene and discipline practices

Caregiver resources (health, education & employment)	Care practices (Hygiene and discipline practices)					
	Hygiene practices				Discipline practices	
	Child cleanliness (quartiles)	Respondent cleanliness (terciles)	House exterior cleanliness (two groups)	House interior cleanliness (two groups)	Use taps	Hit child
- Health self-perception (terciles)			-			+
- Level of education (categories)	+	+	+	+		-
- Knowledge of feeding practices (terciles)	+	+	+	+		*
- Employed (yes/no)	+				-	+
- Away three days/week or more? (yes/no)	+			+		
- Away more than one day when she goes?						

Box 10.16. Caregiver resources (women's empowerment and social support) and care practices: Hygiene practices, and discipline practices

Caregiver resources (empowerment and support)	Care practices (hygiene practices and discipline)					
	Hygiene practices				Discipline practices	
	Child cleanliness (quartiles)	Respondent cleanliness (terciles)	House exterior cleanliness (two groups)	House interior cleanliness (two groups)	Use taps	Hit child
- Couple communication (terciles)	+	+	+	+	+	+
- Control over purchases (terciles)	-	-	-	-	+	
- Ownership of assets (lower vs upper half)	+	+	+	+	+	
- Involvement in decision-making (terciles)		+			-	*
- Anxiety/depression symptoms (terciles)					+	+
- Time stress (terciles)	-			-	+	+
- Life satisfaction (terciles)					+	
- Household help (terciles)	+	+		+	+	
- Financial/material help (lower vs. upper half)					+	
- Community participation (lower vs. upper half)					+	+

Box 10.16. shows associations between the second set of caregiver resources (women's empowerment and social support) and hygiene practices. A number of scales were positively associated with the hygiene scales, for instance, the scales that assessed couple communications, ownership of assets, involvement in decision-making, and household help. There were more differences for the personal cleanliness scales (child and mother) than for the household/compound cleanliness scales, and differences tended to be slightly larger for personal cleanliness as well.

The scale reflecting maternal control over purchases was consistently and *negatively* associated with all four hygiene scales. In order to understand why a higher level of control over purchases would be associated with poorer hygiene, we compared dependency ratios, help with tasks, and sex of household head for households where women scored low, middle, and high for control over purchases. No differences were seen in dependency ratios or in the amount of (unpaid) help available, but there were many more female-headed households in the highest tercile for control over purchases. Among households where women had low control over purchases, only 3 percent were female-headed, but in the highest tercile of control over purchases, up to 22 percent of households were female-headed. These households may be different in a number of ways, particularly in that the female heads of households possibly have to pay more attention to activities such as income-generation rather than household hygiene.

Discipline strategies

Boxes 10.15. and 10.16. also present associations between caregiver resources and the discipline strategies used by the respondents. Several maternal variables were negatively associated with giving "taps" but positively associated with hitting, suggesting the use of harsher discipline strategies. A comparison of discipline strategies between feeding knowledge groups shows that women with low knowledge are both more likely to report "never" hitting but also slightly more likely to report "often" hitting. The chi-square test for this association was significant, but it is not clear how these results should be interpreted.

A number of the women's empowerment/support scales were also positively associated with frequency of giving "taps" or hitting the child. For giving "taps", differences of 10-12 percent in responses of "often" were seen between low and high groups for couple communication, control over purchases, and community participation. Differences of this magnitude were also seen with the scales that assessed symptoms of anxiety and stress and of time stress; as stress increased, the proportion of women reporting the use of taps "often" increased. Fewer and smaller differences were seen between groups when considering the proportion that reported hitting their child "often". The exception to this is the time stress scale: those scoring in the highest tercile for time stress were twice as likely to report hitting their child "often" than were women in the lowest tercile for time stress (22 percent in the highest tercile vs. 11 percent in the lowest).

10.3.4. Associations between household resources and child outcomes

In the conceptual model, the effects of resources (household and maternal), access to food and the health environment on child outcomes flow through the proximate determinants: food intake and child health. However, for the purposes of understanding relationships in this data set, it is useful to first examine associations between elements at all levels of the model with child outcomes. In the UNICEF model, the "outcomes" are survival, growth, and development. In our

analyses we use children's anthropometric measurements as reflecting child growth. We also examine the relationships between resources and child health outcomes as defined by the prevalence of diarrhea in the 2 weeks preceding the survey, and results to the visual child health analogue scale, which represent the caregiver' perception of her child's health compared to other children the same age (see chapter 4).

Box 10.17. summarizes these associations. Both the asset and the housing indices were associated with some of the child anthropometric and health outcomes in the expected direction. Children from households with greater asset base and who had better housing conditions had a better nutritional status, were less likely to have had diarrhea in the previous 2 weeks (true only for the asset index) and scored higher to the health analogue scale (true only for housing index). With respect to nutritional status, the strongest associations were between the asset and housing indices and height-for-age z-scores (HAZ) (see Table 10.5.); the magnitude of the difference between the lowest and highest terciles for both these indices and HAZ was greater than 0.2 z-scores.

Household food insecurity was not associated with children's nutritional status, but was strongly associated with greater likelihood of the child having had diarrhea in the previous 2 weeks and with a poorer score on the health analogue scale (see Table 10.5.). Up to 39 percent of children from the most food insecure households (highest tercile) had had diarrhea in the previous 2 weeks compared to 28 percent among the less food insecure.

Partner's education and dependency ratio were not significantly associated with any of the anthropometric and health outcomes, although some linear relationships were found between the dependency ratio terciles and HAZ and WAZ (positive) and between parner's education and diarrhea. This latter association was in the opposite direction than expected, with children in households where the partner had no education having being less likely to have had diarrhea in the previous week (29 percent) compared to those where the partner had some secondary education (38 percent). This association is not easily interpretable.

Box 10.17. Household-level resources and child anthropometry and health outcomes

Household resources	HAZ	WAZ	WHZ	Diarrhea	Child health analogue scale (mean)
- Partner's education					
- Asset index	+	+		-	
- Housing index	+	+	+		+
- Dependency ratio					
- Food insecurity				+	-

Table 10.5. Relationships between household resources and child anthropometry and health outcomes

Household resources	Mean z-scores			Diarrhea (%)	Child health scale (mean)
	HAZ (mean)	WAZ (mean)	WHZ (mean)		
Partner's education (*q204n)*				§	
- None	-1.34	-1.27	-0.53	28.9	6.44
- Some primary	-1.44	-1.26	-0.52	33.6	6.47
- Some secondary	-1.24	-1.08	-0.38	37.6	6.61
Asset index (terciles) (*nfac1_2*)	*	*		*	
- Low	-1.45	-1.29	-0.51	34.4	6.50
- Middle	-1.40	-1.30	-0.57	33.8	6.42
- High	-1.25	-1.12	-0.43	27.7	6.60
Housing index (terciles) (*nfac2_2*)	*	*	*		*
- Low	-1.49	-1.36	-0.58	29.9	6.28
- Middle	-1.42	-1.27	-0.51	34.2	6.51
- High	-1.19	-1.09	-0.42	31.8	6.73
Dependency ratio (terciles) (*ndprati*)	-1.31	-1.17	-0.48	34.2	6.48
- Low	-1.32	-1.21	-0.49	32.4	6.50
- Middle	-1.46	-1.32	-0.54	29.7	6.54
- High					
Food insecurity scale (terciles) (*nfdinsec*)				*	*
- Low	-1.33	-1.21	-0.51	28.0	6.65
- Middle	-1.34	-1.22	-0.52	30.4	6.46
- High	-1.44	-1.29	-0.47	38.7	6.30

*p < .05 (ANOVA); § ANOVA: test of linearity < 0.05

10.3.5. Associations between caregiver resources and child outcomes

Box 10.18. summarizes the associations between all caregiver resources and child anthropometry, diarrhea and perceived health. Details about some of some of these associations are also presented in Tables 10.11. and 10.12.

Caregiver education was associated with HAZ and WAZ, but contrary to expectations, it was not associated with diarrhea or perceived child health. Also, the difference is only seen at the highest education level, which, as noted earlier, includes only a small proportion of the respondents. A strong association is seen between maternal BMI and the two weight related indicators (WAZ

and WHZ) (see Table 10.6.), in the expected direction; mothers with higher BMI had children with higher WAZ and WHZ. There was also a linear association between BMI and children's diarrhea, whereby children whose mothers were in the lowest BMI tercile were more likely to have suffered from diarrhea in the previous 2 weeks (36 percent) than children whose mothers were in the normal BMI category (32 percent had diarrhea), or in the overweight/obese category (27 percent had diarrhea).

Women's health self-perception and knowledge of child feeding were not significantly associated with child nutritional status outcomes, except for WHZ, which showed a significant linear trend. Mothers with greater feeding knowledge had children with higher WHZ. Maternal perception of her own health was associated both with diarrhea and with her perception of her child's health. Mothers in the highest health self-perception tercile scored their child's health higher (analogue scale) than mothers from the two lower terciles. An intriguing finding, however, was the higher prevalence of child diarrhea among mothers who perceived *themselves* as being healthier than other women their age. The finding was also surprising, given that these same children (whose mothers were in the higher self-perceived health tercile), were also scored significantly higher on the child health scale by their mother (as indicated above).

No associations between the maternal occupation variables and child diarrhea or the health analogue scale were seen. Some slight differences in nutritional status were seen by the mother's main occupation, but they were relatively small and non significant. For example, mothers who engage in market work for income-generation have slightly better nourished children than women working in farming, but, with the exception of WAZ, the differences were not statistically significant. Considering the positive association described above between greater household food security and women's employment in market activities on the one hand, and between market work and greater child dietary diversity, we had hypothesized that market work may be associated with better child nutritional status.

There were also no differences in child nutritional status, diarrhea or health by the location of maternal work (at home or away), the number of days/week away from home, or the amount of time absent (half day or less vs. whole day or more each time she goes).

Few significant associations were found between women's empowerment and social support and child outcomes (see Box 10.17. and Table 10.7. for selected results of significant associations).

No associations were observed between any maternal status/support scale and HAZ, and no associations were observed between any of the nutritional status outcomes and the scales that assessed couple communication, anxiety/depression symptoms, time stress, life satisfaction, household help, financial/material help, and community participation. Only ownership of assets, control over purchasing and women's involvement in decision-making were weakly associated with WAZ and/or WHZ.

Box 10.18. Caregiver resources and child anthropometry and health outcomes

Caregiver resources	Mean z-scores			Diarrhea (%)	Child health analogue scale (mean)
	HAZ	WAZ	WHZ		
Nutrition, health, education and knowledge					
- Maternal BMI		+	+		
- Health self-perception				+	+
- Education	+	+			
- Knowledge of feeding					
Employment					
- Employed in past 12 mo					
- Main occupation		*			
- Location of work					
- How many hours away?					
- How long when she goes?					
Women's empowerment and support					
- Couple communication					
- Ownership of assets		+	+		
- Control over purchases			-		
- Involvement in decision-making			+		
- Anxiety/depression				-	-
- Time stress					-
- Life satisfaction					+
- Household help					
- Financial/material help					+
- Community participation					

Table 10.6. Relationships between caregiver resources (nutrition, health, education, knowledge and employment) and child anthropometry and health outcomes

Caregiver resources	Mean z-scores			Diarrhea (%)	Child health scale (mean)
	HAZ (mean)	WAZ (mean)	WHZ (mean)		
Mother's BMI (*cat2bmi*)		*	*	§	§
- Low (< 18.5)	-1.40	-1.54	-0.88	36.2	6.33
- Normal (18.5 to < 25)	-1.39	-1.24	-0.50	32.2	6.51
- High (= 25)	-1.19	-0.89	-0.14	27.0	6.66
Health self-perception (terciles) (*nq901*)					*
- Low	-1.42	-1.32	-0.60	27.1	5.77
- Middle	-1.35	-1.22	-0.48	29.7	6.27
- High	-1.35	-1.20	-0.46	38.7	7.25

Mother's education (*q207cn*)	*	*			
- None	-1.37	-1.26	-0.52	31.5	6.49
- Some primary	-1.41	-1.25	-0.50	31.9	6.51
- Some secondary	-0.98	-0.88	-0.30	37.8	6.66
Knowledge of child feeding (terciles) (*nfeedkno*)			§		
- Low	-1.40	-1.30	-0.56	34.0	6.46
- Middle	-1.32	-1.22	-0.51	31.6	6.61
- High	-1.38	-1.20	-0.44	30.7	6.44
Main occupation (*mainocc*)		*			
- No employment	-1.24	-1.13	-0.49	34.0	6.42
- Farms	-1.46	-1.30	-0.52	30.5	6.44
- Market/trade	-1.32	-1.20	-0.46	32.8	6.65
- Manual labor	-1.38	-1.56	-0.86	25.6	6.15
- Other	-1.27	-1.14	-0.50	37.3	6.51

* $p < .05$ (ANOVA); § test for linearity $p < .05$

The anxiety/depression and the time stress indices, however, were associated with the two health outcomes in the expected direction. Mothers in the highest terciles of anxiety/depression or time stress were more likely to have given a lower score to the health rating of their child, and their child was much more likely to have had diarrhea in the previous two weeks (Table 10.8.). These associations are consistent with the food insecurity and child health and diarrhea associations described earlier, and the link between food insecurity and maternal anxiety/depression.

Table 10.7. Relationships between care giver resources (women's empowerment and support scales) and child anthropometry and health outcomes

	HAZ (mean)	**WAZ (mean)**	**WHZ (mean)**	**Diarrhea (%)**	**Child health scale (mean)**
Ownership of assets (lower vs upper half) (*nq604pos*)		*	*		
- Low	-1.40	-1.29	-0.55	32.8	6.46
- High	-1.34	-1.18	-0.45	31.2	6.45
Control over purchases (terciles) (*nq606pur*)			§		
- Low	-1.36	-1.19	-0.42	32.4	6.42
- Middle	-1.38	-1.27	-0.53	34.5	6.47
- High	-1.35	-1.25	-0.55	29.1	6.66
Involvement in decision-making					

(*nq615inv*)			*		
- Low	-1.35	-1.29	-0.59	34.2	6.47
- Middle	-1.41	-1.22	-0.42	30.8	6.48
- High	-1.34	-1.19	-0.47	30.6	6.57
Anxiety/stress scale (terciles)					
(*nq905hlt*)				*	*
- Low	-1.39	-1.21	-0.45	27.1	6.70
- Middle	-1.32	-1.22	-0.49	29.7	6.57
- High	-1.39	-1.19	-0.56	38.7	6.28

* p < .05 (ANOVA); § ANOVA: test for linearity p < .05

10.3.6. Associations between care practices and child outcomes

Box 10.19. summarizes findings related to the associations between the 6 categories of care practices and child nutrition and health outcomes. A description of these associations, by types of feeding practices follows.

Box 10.19. Caregiver practices and child anthropometry and health outcomes

Care practices	**Mean z-scores**			**Diarrhea (%)**	**Child health scale (mean)**
	HAZ	**WAZ**	**WHZ**		
Early child feeding practices					
- Breastfeeding within 1 hour					
- Only breastfeeding 1st day				-	
- Gave colostrums					
Feeding 18-23 month olds					
- No use of bottles					
- Still breastfeeding	-	-			
Food choices/dietary diversity					
- Fed ≥ 3 meals yesterday				-	
- Dietary diversity	+	+			+
- Number of animal source foods in previous day					
- Child was fed chicken previous day	+	+			
- Any flesh foods ≥ 3 days in past 7 days					
- Eggs ≥ 3 days in past 7 days					
- Vitamin-A rich plant foods ≥ 3 days in past 7 days				-	+
Care during feeding and feeding during diarrhea					
- Child is helped to eat	-			+	
- Adverse response to food		-	-		-

Care practices	Mean z-scores			Diarrhea (%)	Child health scale (mean)
	HAZ	WAZ	WHZ		
refusal					
- More liquids during diarrhea					
- Same/more food during diarrhea			+		
Hygiene practices proxy					
- Child cleanliness scale		+			
- Mother cleanliness scale	+	+			
- House exterior cleanliness			+	-	
- House interior cleanliness	+	+	+		
Discipline					
- Small taps for discipline	-	-			
- Hits child for discipline					+

Early feeding practices

No associations were found between any of the early child feeding practices and the child nutritional status outcomes. This was expected since these early feeding practices are much less likely to have an impact on anthropometric outcomes measured later on in childhood (our index children are between 18-47 months of age) than say, in the first months. Furthermore, these practices are primarily of importance for establishing successful breastfeeding patterns, and thus for preventing child mortality, rather than to stimulate growth. An association with growth could have been found, however, if these practices had been particularly strongly correlated with other positive practices throughout early childhood. This may be the situation for exclusive breastfeeding during the first day, for instance, which is associated with a lower likelihood of the child having had diarrhea recently; among children who were exclusively breastfed on their first day, 43 percent had diarrhea in the 2 weeks prior to the interview, compared to 49 percent among those who had received other liquids on their first day. The likely explanation for this association is that failure to exclusively breastfed the child on the first day may reduce the chances that a mother will exclusively breastfeed thereafter, which in turn, can be associated with poorer growth in the short and medium term.

Current feeding practices for children 18-23 months

No significant differences in anthropometric or health outcomes were observed between children whose mothers reported using baby bottles and those who did not. Children in this age group who were still breastfed had significantly lower HAZ and WAZ, by about 0.4 z-score units. WHZ was also 0.26 units lower, but this difference were not significant, probably because of the smaller sample size used for this analysis (n=285). Lower z-scores have previously been found to be associated with the positive practice of continued breastfeeding (Marquis et al., 1997; Simondon et al., 2001). This finding has been attributed to reverse causality; that is, mothers may be more likely to continue to breastfeed more sickly and vulnerable children who are growing poorly than stronger, healthier children, thus giving rise to the negative association between continued breastfeeding and child outcomes.

Finally, children who were fed at least three meals yesterday had higher z-scores by approximately 0.12-0.14 units, but again, these differences were not statistically significant.

Feeding practices reflecting food choice and dietary diversity

Selected associations between dietary diversity variables and child anthropometric and health outcomes are shown in Table 10.8. Children who were fed less than the 3 recommended number of meals in the previous day did not have a worst nutritional status, but they were more likely to have had diarrhea in the previous 2 weeks (Table 10.8.). It may be, however, that this association is due to reverse causality, whereby children who have had diarrhea recently have less appetite (or mothers withheld food) and therefore are less likely to have normal eating patterns.

Dietary diversity (or the number of food groups consumed in the previous day) was positively associated with child nutritional status (HAZ and WAZ), and with a higher reported child health score. The prevalence of stunting (HAZ < -2 z-scores) and underweight (WAZ < -2 z-scores) were also significantly associated with dietary diversity terciles. The prevalence of stunting was 34 percent among children with low dietary diversity, compared to 30 percent among those with average dietary diversity and 23 percent among those with high dietary diversity (see Appendix 10.4.). For underweight children, prevalences were 27, 24 and 21 percent for the lowest, middle and higher dietary diversity terciles, respectively. The association between dietary diversity and child anthropometry has been demonstrated in a number of settings and is thought to be due to the fact that as diversity increases, individuals are more likely to meet their daily nutrient requirements for a large number of essential nutrients (Arimond and Ruel 2002; Ruel 2003). Carefully conducted validation studies are still required, however, to confirm this assumption.

Another indicator of diversity, i.e. the number of animal source foods consumed in the previous day, also showed a linear trend with HAZ and with terciles of the health analogue scale (not shown). A similar pattern was observed for WAZ, but the difference was not statistically significant. It is likely that by consuming a greater variety of micronutrient-rich animal source foods, children increase their chances of meeting their daily nutrient requirements, both through greater total intake of these foods and possibly through greater variety as well. Intake of chicken in the previous day, as opposed to intake of any other animal source food, was also associated with significantly higher HAZ and WAZ. Chicken was consumed by approximately only one third of children in the sample in the previous day. The specific nature of the association between chicken intake and child growth is intriguing and will be explored in future analyses.

Intake of any flesh foods, eggs or vitamin A rich plant foods on more than 3 days in the previous week was not associated with better nutritional status. The frequency of intake of vitamin A-rich plant foods, however, was associated with lower likelihood of the child having had diarrhea in the previous two weeks and with a higher reported score on the child health analogue scale (Table 10.8.).

It is important to recognize that the findings related to associations between dietary diversity indicators and child outcomes are highly susceptible to confounding factors and thus, bivariate associations should be interpreted with caution. For example, we have shown in Chapter 8 that dietary diversity and the likelihood of consuming animal source foods in particular, increases with child age in this population. At the same time, child nutritional status generally improves

after 24 months, as do the child health analogue scores (see Chapter 4). Thus, the associations found between dietary diversity indicators and child outcomes may be confounded by age. Similarly, we have shown above that a number of household and caregiver resources, including the asset index and maternal education, were significantly associated with both dietary diversity and child outcomes. For these reasons, it will be particularly important to conduct multivariate analyses of the data to explore the mechanisms that explain these associations and to disentangle the effects of different factors on child outcomes.

Table 10.8. Relationship between dietary diversity (yesterday) and child anthropometric and health outcomes

	HAZ	WAZ	WHZ	Diarrhea (%)	Child health scale (mean)
Dietary diversity yesterday (terciles) (*ddterc*)	*	*			*
- Low	-1.47	-1.30	-0.52	31.2	6.33
- Middle	-1.38	-1.30	-0.55	35.1	6.45
- High	-1.27	-1.15	-0.46	31.0	6.68
Number of animal source foods consumed (*asfgr*)	§				§
- 0	-1. 44	-1.30	-0.51	29.7	6.32
- 1-2	-1.43	-1.27	-0.49	30.6	6.46
- 3-6	-1.28	-1.19	-0.51	34.0	6.60
Child consumed chicken in previous day (*chicken*)	*	*			
- No (n=1123)	-1.44	-1.29	-0.52	31.2	6.49
- Yes (n=376)	-1.15	-1.09	-0.46	34.5	6.55
Child consumed vitamin A-rich plant foods ≥ 3 days in previous week (*orange3d*)				*	*
- No	-1.36	-1.23	-0.49	36.9	6.36
- Yes	-1.37	-1.24	-0.51	29.7	6.57

* $p < .05$ (ANOVA); § ANOVA: test for linearity $p < .05$

Care during feeding & feeding during diarrhea

Since children are not usually assisted with eating beyond a certain age, we examined associations between self-feeding and z-scores within narrow age ranges (18-23 months, and 24-35 months). In both age groups, children who were helped to eat had lower z-scores, though the difference is significant only for the older children (with a larger sub-sample). The size of the difference is substantial in this age group (about 0.4 z-score units for HAZ and about 0.3 units for WAZ). Children who were helped to eat also were more likely to have had diarrhea in the previous 2 weeks (and possibly less appetite). Again, these findings might reflect compensatory behaviors where mothers and other caregivers are more concerned about smaller children or

children who have been sick recently, and therefore pay more attention to assisting them while they eat.

Similar associations were seen between responses to food refusal and child WAZ and WHZ, particularly when the entire range children 18-47 months was included in the analysis. Children whose mothers reported using "aversive" methods (threatening, forcing) had significantly lower z-scores, by approximately 0.2 units and also had lower health scores on the visual analogue scale. One explanation for this may be that mothers are most concerned to feed these thinner and less healthy children and therefore, use stronger tactics to get them to eat than mothers of healthier children who do not have to resort to more aversive methods.

There was no association between giving increased liquids during diarrhea and anthropometric outcomes among children who had recently had diarrhea. On the other hand, maintaining feeding during diarrhea (offering the same or more food) was associated with greater WHZ among children who had recently had diarrhea, with a difference of 0.18 z-scores between the two groups. This suggests that maintaining feeding during episodes of diarrhea can be effective in preventing wasting. Alternatively, it could also be related to the severity of diarrhea, where children who had more severe episodes of diarrhea also had poorer appetites, could not be fed adequately and therefore lost weight (and had lower WHZ scores when measured). No associations were found between feeding practices during diarrhea and recent diarrhea episode or health scale scores.

Hygiene practices

The associations between the hygiene scales and child anthropometry are shown in Table 10.9. Child cleanliness was associated with a small difference (0.1 z-scores) in WAZ between children in the lowest and highest quartile of the scale, and no significant differences in HAZ or WHZ, diarrhea or child health scores. Maternal cleanliness was associated with HAZ and WAZ and there was a linear trend with WHZ. The difference in HAZ and WAZ between the lowest and highest terciles of maternal cleanliness was a little less than 0.2 z-scores, and for WHZ it was 0.13 z-scores.

The cleanliness of the exterior of the house was associated with higher WHZ and with less diarrhea among children; children who lived in a house that scored higher on the exterior cleanliness scale were less likely to have had diarrhea (30 percent) in the previous 2 weeks than those who lived in a house that scored in the lower half (35 percent). Finally, strong associations were found between cleanliness inside the house and all three indicators of nutritional status, with differences of about 0.2 z-scores between the lower and upper half of the cleanliness scale. Surprisingly, house hygiene was not associated with diarrhea or the child health score.

Discipline practices

No differences in child anthropometry were observed between children whose mothers reported that their youngest child was never, sometimes, or often hit. Children whose mothers reported that they "never" gave their child a "tap" had markedly lower HAZ and WAZ than children whose mothers reported "sometimes" or "often". However, only a very small proportion of mothers responded "never" to this question (3 percent). As indicated previously, this question was not asked in relation to the index child, but as a behavior that the respondent engaged in, and

as such, associations with child outcomes can be expected to be less strong. Further, it is more likely that the use of harsh physical punishment has an impact on child emotional and social wellbeing, rather than indicators of physical wellbeing such as anthropometry.

Table 10.9. Relationships between hygiene variables and child anthropometry

Hygiene scales	Child anthropometry		
	Height-for-age z-scores (mean)	Weight-for-age z-scores (mean)	Weight-for-height z-scores (mean)
Child cleanliness (*nchclea*)		*	
- Lowest quartile	-1.38	-1.21	-0.44
- Highest quartile	-1.21	-1.11	-0.45
Mother cleanliness (*nmotclea)*	*	*	§
- Lowest tercile	-1.39	-1.28	-0.55
- Highest tercile	-1.25	-1.12	-0.42
Exterior (compound) cleanliness (*nextclea*)			*
- Lower half	-1.39	-1.30	-0.59
- Upper half	-1.35	-1.20	-0.47
Interior cleanliness (*nintclea*)	*	*	*
- Lower half	-1.47	-1.35	-0.58
- Upper half	-1.30	-1.15	-0.43

* $p < .05$ (ANOVA); § ANOVA, test for linearity < 0.05.

10.4. Conclusions

This chapter used the conceptual framework outlined in Chapter 2 to bring together the data on household and caregiver resources with the findings related to care practices and child outcomes. This was done by exploring bivariate associations between these different levels of the conceptual framework, with the primary objective of the explorations being to identify associations that will later be examined in greater depth using more sophisticated statistical analyses.

Our findings related to the associations between household resources such as assets, housing quality and food insecurity, and caregiver resources such as nutrition, health, education and women's empowerment and social support revealed a number of significant and meaningful associations. Most of the associations were in the expected direction, with caregivers living in households with greater access to resources being better nourished, healthier and better educated, and enjoying a higher status in their households and more social support. Household food insecurity was associated with all other household resources and with most of the caregiver resources examined. Highly food insecure households had fewer assets, poorer housing quality,

lower partner's education and a higher dependency ratio. Caregiver resources were also more limited in highly food insecure households: compared to more food secure households, caregivers in highly food insecure households tended to have lower levels of education, were more likely to work in farming than in the markets, and they were less likely to own personal assets and to enjoy good couple communication and support from their family. Caregivers from highly food insecure households were also significantly more likely to suffer poorer physical and mental health, as seen by their lower scores on the self-reported health scale and their higher scores on the anxiety/depression and time stress scales.

It is important to mention, however, that our measure of household food insecurity is an experiential measure, and thus, could have captured a variety of coping behaviors that in fact led to the higher levels of stress experienced by the survey respondents. The strong relationship between the two sets of variables could also reflect the extreme level of food insecurity in these communities and the impact it has on the daily lives of the survey respondents. The exact directionality of effects in this case is not clear and is likely to be truly bi-directional.

A number of associations were also seen between household resources and care practices, and between caregiver resources and care practices. As could be expected, household resources, and especially household food insecurity were more closely associated with care practices related to child feeding, particularly the practices that reflected food choice and dietary diversity. These practices are more likely to be directly affected by fluctuations in food security than breastfeeding or practices related to care during feeding for example.

As documented in studies in other contexts, the strongest and most consistent determinant of care practices in this study was maternal education (Armar-Klemesu et al. 2000), which was associated with practices from all six care categories studied. Caregiver feeding knowledge was also associated with a number of positive practices, including optimal early feeding practices, dietary diversity, positive response to child food refusal, increasing liquids during diarrhea, and hygiene practices. Note that the feeding knowledge questionnaire focused on breastfeeding duration, the timing of introduction of complementary foods and feeding frequency. Although the instrument did not include questions related to early feeding practices, dietary diversity, feeding during diarrhea or hygiene practices, it appears that mothers who have greater knowledge of some feeding practices are probably better informed about a number of other dimensions of child feeding and are more knowledgeable about child care practices in general.

Maternal employment was associated positively with a few child care practices, including greater dietary diversity, better feeding practices during diarrhea (more liquids) and child cleanliness. Our study, however, provides no evidence to support commonly held views that maternal employment has negative effects on child care practices, since none of the maternal employment characteristics were associated with any negative care practices.

A variety of women's empowerment and social support variables were also associated with feeding practices, and again the associations were more consistent with feeding practices related to food availability and access, such as dietary diversity and the use of animal source foods in the child's diet. Hygiene practices were also related positively with couple communication,

ownership of assets and household help. An unexplained negative association was found between the caregivers' control over purchases and hygiene.

Maternal anxiety/depression was negatively associated with five of the seven feeding practices related to food choices and dietary diversity. Mothers who were in the highest tercile of the anxiety/depression scale were less likely to have fed their child three meals in the previous day compared to mothers with fewer anxiety/depression symptoms; the diet of their child was also less diverse, and the child was less likely to have been fed nutrient-rich (and expensive) foods such as flesh foods and vitamin A-rich foods 3 times or more in the previous week. Clearly, these findings are related to the food insecurity and caregiver anxiety/stress associations, and the food insecurity and child dietary diversity associations described above. Taken together these findings indicate that severe food insecurity, or reduced access to food, affects women's physical and mental health and also affects their ability to provide their family and particularly their young child, with a high-quality diet. Thus, food insecurity in this population is severe and has far reaching consequences for families, and especially so for their most vulnerable members – women and young children.

Other associations were found between the anxiety/depression symptoms scale and child care. These include the positive associations with a child between 18 and 23 months receiving assistance to eat and the caregiver taking action when the child refuses to eat. These associations also suggest that mothers from the highest tercile of the anxiety/depression scale may be more concerned about their child's diet (if food is scarce and/or the child is perceived less healthy or growing poorly), and therefore they respond by being more active feeders. Active response to the child's food refusal is also positively associated with a number of the women's empowerment and support scales as are discipline strategies such as giving taps and hitting the child.

Children's nutritional status and health were associated with a number of household and caregiver resources as well as with selected care practices. The strongest positive associations with HAZ (= 0.2 z-scores) were observed for the asset and housing indices, maternal education, and some of the dietary diversity indicators. Similar patterns were observed for WAZ. Differences in WHZ were generally of smaller magnitude and were significant only for a few resources such as the housing index, maternal BMI and the house hygiene scales. Diarrhea and health were strongly associated with food insecurity, i.e. children from more food insecure households were more likely to have had diarrhea recently and they were also more likely to have a lower score on the health analogue scale. Few of the maternal resources were associated with child diarrhea and health, but children whose mothers were in the higher anxiety/depression and stress terciles of the scales were more likely to have had diarrhea in the previous two weeks and to have poorer health (as perceived by the mother).

Of all the care practices studied, the diversity-related feeding practices were the practices most strongly and consistently associated with better child nutritional status and health, and with less diarrhea. A few feeding practices, namely continued breastfeeding for children 18-23 months, and being helped to eat for children 24-35 months were negatively associated with HAZ and WAZ. Also, aversive responses to food refusal (threatening, forcing children to eat, etc.) were strongly and negatively associated with WHZ. As documented previously, these negative associations could reflect reverse causality, where the positive caregiver behaviors documented

in the survey were responses to poor child outcomes, rather than the negative outcomes being a result of the positive practices. All of these care practices could represent "compensatory" maternal responses to the needs of smaller or sicker children who could have been perceived to need more care and attention than bigger, more robust children.

The lack of strong associations between many of the care practices and child nutritional status in this sample is not entirely surprising because most of our index children are beyond the period of active growth faltering, which occurs mainly between 0 and 24 months of age. Thus, their current nutritional status, especially their HAZ, is largely the result of the cumulative effect of their "life" experiences, rather than merely a reflection of their current feeding and care practices. Because of the well-known difficulties of using recall methods to assess past practices, our survey, like most surveys of this type focused primarily on current practices, recognizing the potential limitations of the approach. Our survey also gathered data on younger siblings of index children (where applicable) and future analyses of the data will use a similar approach as the one described here to examine associations between care practices and child outcomes in this younger age group.

In our study, hygiene practices were weakly associated with diarrhea, with only the cleanliness of the compound being associated with reduced diarrhea rates among children in the previous two weeks.

Overall, the results of the bivariate analyses reported in this chapter provide confirmation regarding the importance and the strength of many of the hypothesized relationships between various levels of resources for care and care practices, as well as between care practices and child outcomes. At the same time the identification of these significant relationships also provides evidence that a number of the resources and care practices assessed through this baseline survey are well measured and particularly that the measures appear to tap into the larger constructs embodied in the conceptual framework.

The substantive findings reported here raise a variety of concerns, particularly about the role of food insecurity in determining the overall wellbeing of children and their caregivers in this setting. Furthermore, the relationship between caregiver resources such as feeding knowledge, and care practices, as well as the negative association between high levels of anxiety/depression among caregivers and child feeding practices point in the direction of a need to develop programs that help caregivers alleviate some of the constraints they face in caring for their children. It is clear that ensuring caregiver access to appropriate knowledge, adequate material resources like food, and interventions that increase support and time available for child care are all necessary to promote better care and to improve children's health and nutrition in this population.

11. SUMMARY AND IMPLICATIONS OF KEY FINDINGS

11.1. Introduction

The baseline survey, which was conducted in the context of an overall evaluation of the World Vision integrated maternal and child health program, had two broad objectives. The first objective was to gather data on the main outcome of the study (i.e. children's nutritional status) before the packages of interventions were implemented in the respective communities, in order to determine the comparability of the two program groups at baseline. The second objective was to assess differences at baseline between the groups in the various factors that could influence the main outcome of the evaluation, namely the community, household and caregiver characteristics, and the care practices directed to young children. In making these comparisons, the baseline survey was designed to present a full picture of care practices as well as the resources that could influence the adequacy of care for young children in the Central Plateau of Haiti and their health and nutritional status.

This chapter summarizes the results related to these two broad objectives and is structured as follows. First we review the findings related to the comparisons between program groups with respect to child outcomes and their main determinants: i.e. care practices, and resources at the level of the caregiver, household and community. The second section describes the main characteristics of our survey sample and provides an overview of the general conditions in which the children, caregivers and households in our survey live. This section is followed by a review of the findings and implications of our preliminary analysis of the bivariate associations between care resources, practices and child outcomes in this population. The main purpose of the bivariate analyses is to start exploring the mechanisms by which care resources may facilitate or constrain the provision of care for young children in this population and affect their health and nutritional status. This analysis is the first step in the more in-depth exploration of these mechanisms, which will use more appropriate multivariate analysis techniques.

11.2. Comparisons between program groups

The main outcome measures of the survey, i.e., the mean HAZ, WAZ and WHZ, and the prevalence of stunting, underweight and wasting were not different between the two program groups. The comparisons of mean values were done using simple group comparisons as well as pair wise comparisons of the means in each program group within a cluster, and neither method revealed any differences between the two groups. Similarly no differences were found between the two groups in children's health assessed either through the health visual analogue scale or the reported prevalence of morbidity symptoms in the two weeks prior to the survey. Thus, the two comparison groups were found to be very similar in the main child health and nutrition outcomes of the overall evaluation.

Chapters 5-7 of this report reviewed the different resources available to households in our survey sample at the community, household and caregiver level, and assessed whether they were similar between program groups. The findings suggest that the randomization process was effective because very few differences between the groups were found in spite of the large number of variables compared. For instance, at the community level we found that the pairs of clusters included in the two program groups were largely comparable in terms of their key geographic

characteristics and their access to various services such as closest town, school, market and health services. Households from the two groups were also highly comparable with respect to their socio-demographic characteristics such as household headship, family composition, asset ownership and housing quality, as well as their food insecurity experiences. Finally, the characteristics of the caregivers were also very similar between the two program groups. This was true for the wide range of caregiver resources assessed, including their physical health and nutritional status, employment and time constraints, and a variety of scales used to assess their empowerment, social, emotional and physical support, and their mental wellbeing, and life satisfaction.

The two program groups were also compared relative to a number of care practices related to child feeding, health care seeking, hygiene and discipline. Again, there was no evidence of meaningful differences between the two program groups.

Thus, overall our findings are reassuring in showing that the two program groups to be compared in the final evaluation were very similar at baseline. This will certainly make the analysis and interpretation of the findings of the evaluation more straightforward, although it does not preclude the need for rigorous multivariate analysis to control for potentially confounding factors in the final analysis and interpretation of the results.

11.3. The lives and struggles of our survey sample households, caregivers and children

11.3.1. Community resources

The community data gathered help develop a picture of the resources available to households and caregivers in our program evaluation area. We found that most of our communities were located in remote areas accessible by unpaved dirt roads, and that up to 40 percent of them were inaccessible by motor vehicle. Thus, many of the communities in our survey area were accessible only by foot or using animals. Agriculture was the most common occupation, followed by petty trade market activities.

Access to daily and weekly markets, health care services, schools, and services such as micro-credit and women's group was also extremely limited. These resources, which are important to enhance the care that young children receive, were either far away (like markets and health care services), or simply out of reach (micro-credit and women's groups for example). The long distances to markets have strong implications for the lives of women in the area because women are responsible for most of the household food purchases, and many of them are also involved in petty trade for income generation. Thus, they often have to spend long hours, and in some cases, days, away from their home and young children in order to conduct market activities.

Similarly, distances and poor access to health care facilities are also of concern; overall access to basic health care, such as that offered at dispensaries, is easier than access to care at hospitals or through private doctors. All the *localités* covered in our community survey had good access to the Rally Posts run by World Vision, and thus to the services provided at the Rally Posts (mainly preventive: immunization, oral rehydration, growth monitoring, etc.). Key informants from the different communities concurred that distance to health care, lack of availability of medicines and the cost of medicines are major concerns in their communities.

The data on availability of services like microcredit and women's groups point to a near lack of microcredit services in these poor communities. The extremely few womens' groups in operation were those organized and run by World Vision.

11.3.2. Household resources

Our data highlight that households in this rural part of Haiti do not have a large resource base, either in terms of assets or infrastructure, to draw upon. The average household owns about 10 types of durable goods from a list of 17, three types of productive assets (agricultural tools) out of a possible six, and approximately three types of livestock out of a possible six.

The vast majority of households is headed by a man (90 percent), and most of them are spouses of the respondent mothers. Their main occupation is farming. Families are large – on average close to 7 members – with only 2 of them on average being involved in income generating activities. Thus, each employed household member is responsible for an average of 2.5 non-working members. Almost 85 percent of school age children appear to be enrolled in school, an encouraging finding.

The housing, water and sanitation facilities are largely rudimentary with only 30 percent of households having access to public taps for water, and 10 percent to protected springs. More than 50 percent of households have no access to even rudimentary latrines, and electricity is mostly unavailable. Remittances from relatives living either abroad or even in Haiti are also largely absent from the resource base, and less than 10 percent of households report receiving any remittances.

The food security situation of households in our sample is particularly precarious. The data on the availability of food stocks from own production indicate that the staple crops of corn and millet only last about six weeks on average, and beans last for even less time, about three weeks. Not surprisingly, the overwhelming majority (over 80 percent) of households report having to buy staple foods in the market at some point during the year, and close to all of them have to purchase beans for their consumption.

Our data on food insecurity related experiences suggest that food insecurity is highly prevalent and severe in all program areas. Information was obtained on the types of coping strategies and food insecurity related experiences that households had faced in the 30 days prior to the survey, beginning with less severe experiences like decreasing the quantity of beans used in food preparation and ending with what is usually considered the most serious food insecurity related experience – children going to bed hungry. On average, households had experienced 8 of 11 food insecurity related experiences and about three-quarters of all households had been in a situation where their young children had to go to bed hungry. Thus, it appears that the experience of food insecurity cuts deep into families and reaches even young children, who in other, possibly better-off societies, are often buffered from these types of experiences.
Clearly, poverty, food insecurity and limited access to basic services are the norm among our survey households. The following section describes how the women's own personal resources allow them to cope with life in this harsh environment.

11.3.3. Caregiver resources

A universally recognized key maternal resource for care is formal education. Among our sample, however, more than half of the mothers had never attended school and a similarly high percentage was illiterate. Nutrition and health education are sometimes perceived as potential substitutes, at least in the short term, for maternal schooling. It is believed that improving maternal knowledge of specific key aspects related to child care can compensate, at least to some extent, for the lack of formal education. In our sample, we found that in spite of low education levels, mothers' knowledge of feeding practices, especially breastfeeding duration and feeding frequency was quite good. Knowledge of the appropriate timing of introduction of complementary foods, on the other hand, was poor. As will be discussed below both maternal education and feeding knowledge are associated with better care practices in our sample, and thus are important resources for care.

In spite of their low education levels, women in this part of rural Haiti are heavily involved in income-generating activities. In our sample close to 85 percent of caregivers reported working, primarily in farming or petty trading in markets. Most women spend substantial amounts of time away from home, particularly those engaged in petty trade, and most of them usually leave their child behind when they go to work (less than 10 percent report taking their child to work with them). These work patterns raise real concerns regarding the quality of care for young children, and especially for infants in their first year of life.

Women's empowerment was assessed through a variety of questions that tapped into dimensions such as communications between spouses, opinions about gender roles, ownership and control over assets, control over household purchasing and involvement in decision-making. The data indicate that overall, communications between spouses is good, and focuses primarily on issues related to home and expenses rather than work and community happenings. Most respondents scored highly on our gender identity scale that evaluated respondent opinions about the roles of women in Haitian society. This indicates that women in Haiti are generally not socialized to accept inferior roles for women.

Consistent with these findings, the majority of women in our sample also indicated that they were involved in most household decisions such as child rearing and buying important items for the household. The majority also reported freedom to make a number of purchasing decisions, especially those related to daily food purchases and small items for themselves. Fewer women, however, indicated having the freedom to buy clothes or medicines for themselves and their children. Consistent with the limited asset base found among these households, however, few respondents reported owning personal assets such as land, animals or their own home.

The data on social support (emotional, financial/material support and household help) show that about 30 percent of respondents did not know anyone they could talk to when they were sad. Access to financial support was even poorer, with close to 60 percent of women having no access to anyone that they could borrow either food or money from. However, a larger proportion of women had access to a place where they could spend the night if they so needed. Access to help with household tasks was available to most women, particularly for tasks such as

fetching water, fuel, cleaning the house and caring for the youngest child. It was less available for tasks such as cooking, laundry and shopping for food.

The participation of women in community groups and activities was generally low; only about a third of women reported participating in groups that discussed issues such as health, education or community problems. Access to microcredit and loans and membership in cooperative groups was even poorer, with less than 10 percent of women having access to these groups and services.

The data on caregivers' nutrition and physical health suggest that the majority of women in our sample are well-nourished, although 14 percent are underweight (low BMI) and a similar percentage are overweight or obese. Mothers also generally perceived themselves as being relatively healthy compared to their peers, scoring on average 6 on a 10-point scale of self-rated health.

Data on mental stress and life satisfaction, however, provide some evidence of the harshness of life in rural Haiti with large proportions of respondents experiencing some or all symptoms of mental stress at least sometimes, if not often. This includes stress related to the lack of time to care for themselves, their children and to complete their daily activities. Close to half of the women reported that they often suffered from headaches, and one third reported often feeling sad or unhappy. Other symptoms such as feeling tired all the time, having trouble thinking clearly and losing interest in their daily activities were also reported by more than one quarter of the women. Only 20 percent reported that they were satisfied with their life in general and as few as 11 percent indicated that they had the important things that they had wanted in their life.

Overall women in our sample have a number of positive personal characteristics that allow them to cope with the challenging environment in which they live. Needless to say that the strategies they use, such as working long hours away from home to make ends meet and juggling between their income-generating, household and child care responsibilities, may have severe consequences for their own health. Anxiety and stress symptoms are extremely common among mothers in our sample, which suggests that they take on much of the burden of protecting their household and children from food insecurity and malnutrition, sometimes at the expense of their own health.

11.3.4. Child nutrition and health

In view of the generally poor conditions in which our survey households live and the extremely limited resources available to them, it is not surprising that childhood malnutrition is prevalent in the area. In our sample, 23 percent of children are stunted (low HAZ), 21 percent are underweight (low WAZ) and 5 percent are wasted (low WHZ). The age patterns of growth faltering are similar to those observed for the country as a whole as well as in other developing countries. Rapid declines in all three anthropometric indicators start as early as in the first few months of life and continue throughout the first 2 years. The steepest declines in HAZ and WAZ appear between about 6 and 17 months of age, and z-scores for both indicators stabilize thereafter at approximately –1. During this period of active growth faltering, the prevalence of stunting peaks at 30 percent between 18 and 23 months of age.

On average, however, mothers perceived their child to be generally healthy, as indicated by the mean score of 6.5 on a 10-point scale that they gave their child on the health visual analogue scale. Their perception of their child's appetite compared to other children the same age was equally high (mean 6.7 on a similar visual analogue scale). These high ratings, especially on the health scale, were somewhat surprising, considering the extremely high prevalence of reported symptoms of morbidity experienced by children in the two weeks prior to the survey. According to the respondents, close to half of the children had had fever, two thirds had had symptoms of cough/cold, and approximately one third had had diarrhea. Symptoms were more common among 18-23 month old children than among the older age group. Compared to findings from a review of 42 data sets from the Demographic and Health Surveys, these prevalences are very high, even for rural areas. The latest DHS survey in Haiti, however, reported similarly high levels of fever and diarrhea, suggesting that morbidity among Haitian children is extremely high, even compared to other developing countries.

11.3.5. Care practices

Child feeding

Overall, our survey data confirm many of the findings from our previous formative research on child care practices in the study area (Menon et al. 2003). The positive practices observed are that breastfeeding is almost universal and that the vast majority of mothers breastfeed their child up to at least 18 months of age. A variety of less optimal practices are observed, however, including low rates of exclusive breastfeeding during the first 6 months; the widespread use of baby bottles (40 percent); and the very early introduction of complementary liquids, semi-solid and solid foods (sometimes as early as in the first month of life). The diet of young children in these communities also appears to lack diversity, and nutrient-rich foods like animal source foods and dairy products are consumed infrequently. Meal frequency is also low, with 40 percent of children 18-23 months of age being fed less than the recommended three meals per day. Although low meal frequency may be related to food insecurity and poverty, it appears to also be driven by a cultural belief that evening meals cause indigestion in young children and therefore should be avoided.

Care during feeding and especially responsive feeding are increasingly recognized as key for optimal feeding of the young child, especially in environments where malnutrition may cause poor appetite in children and reduce their interest in food. Our data show that more than three quarters of the children in our sample ate without any assistance from a caregiver. This is consistent with findings from our previous formative research, which suggested that children are expected to learn to feed themselves early on, and especially so after they reach 12 months of age. Among those who received assistance, mothers, as opposed to other family members or substitute caregivers, were the main source of assistance (92 percent). About 74 percent of caregivers reported taking some action to encourage their child to eat when the child refused food or had a poor appetite for a long time. In a little over 50 percent of cases, the action taken was mostly positive (e.g., caressing or holding the child and encouraging the child to eat), but a fairly large proportion also engaged in the use of aversive methods such as forcing the child to eat. The use of different strategies to encourage children to eat was more common for older children than for infants, suggesting that mothers may have been more worried about refusal to eat and poor appetite among older children than infants.

Data on feeding during diarrhea indicated that mothers were generally well aware of the need to increase (or at least maintain) fluid intake during diarrhea episodes to prevent dehydration. Still, we found 20 percent of mothers who reported giving less fluid to their child during diarrhea and close to 8 percent who reported giving no liquid at all. A fairly large proportion of mothers reported giving less food to their sick children, probably due to the problems of poor appetite and vomiting that often accompany diarrheal episodes.

Preventive and curative health care seeking

In our sample, the percentage of children fully immunized was alarmingly low (18 percent), even compared to Haiti standards. Thus, it seems like access to preventive health services for children is extremely low in this area. Access to prenatal care for women, on the other hand, appears to be much better. The vast majority of women reported having attended prenatal consultations with a health professional (81 percent) during their last pregnancy and more than half of them had attended between 1 and 3 times. Also, up to two thirds of women had received iron supplements during pregnancy. The majority of births were home-based and attended by midwives. Few women were assisted by a health professional (6 percent), and a disconcerting 4 percent received no assistance at all during delivery. An additional concern is the fact that very few women received vitamin A supplements after delivery, probably a reflection of the unavailability of the supplement, combined with the lack of awareness and training of midwives in their use. This is a crucial strategy for ensuring that young infants receive adequate amounts of vitamin A through their mothers' breast milk, and it is particularly important in this area since 14 percent of women reported having experienced night blindness (a symptom of vitamin A deficiency) during pregnancy.

Regarding the use of health services for curative care, the majority of mothers reported seeking some type of advice when their child experienced symptoms of fever, cough/cold, ARI or diarrhea. The type of advice sought, however, differed depending on the symptoms, with respondents being more likely to seek help from a medical professional when the child had ARI symptoms or fever, suggesting that they recognized the severity and greater risks associated with these symptoms. Only 40 percent of caregivers reported the use of oral rehydration solution (ORS) for treating diarrhea, even though 97 percent said they had heard of ORS.

Hygiene practices

Overall child, maternal and house hygiene were quite good, considering the limited means available to the families in our sample to maintain good hygiene. As expected, more mobile children in their second and third year of life were more likely to be rated as "dirty" by our field workers than infants in their first year who tend to be held and protected from environmental contamination. Thus, the child cleanliness scale was strongly associated with age.

Discipline strategies

The use of physical punishment to discipline children was very common, with two thirds of parents reporting that they sometimes hit their children to make them listen to them. Physical punishment is strongly discouraged for its negative influence on child developmental outcomes. In sum, child care practices in this population can be improved, but there is a number of existing positive practices to draw from. Some non-optimal feeding practices seem to be related to cultural beliefs and traditions, but they may be amenable to change through well-designed education messages. Such practices include early feeding practices such as delayed initiation of

breastfeeding and the use of *lók* in the first days following birth, as well as the early introduction of liquids and semi-solid foods in the child's diet. Other non-optimal feeding practices, however, such as the lack of diversity and the infrequent use of animal source foods clearly stem from problems of poverty and food insecurity. Approaches to improve these practices will have to take into account the severe economic constraints faced by families with regard to these practices. The behavior change and communication strategy developed by our team in collaboration with World Vision took these factors into account and tried to develop creative ways to overcome some of these constraints (Loechl et al. 2003).

11.4. Linkages between care resources, practices and child outcomes

In order to explore how the various elements of our conceptual model (see Chapter 2) interact in our survey population, we examined a number of bivariate associations between care resources, practices and child outcomes. The main objective of exploring these bivariate associations was to understand which of the theoretical relationships laid out in the conceptual framework are actually reflected in associations between variables assessed in our survey. It is anticipated that this first stage of analysis will form the basis for future multivariate analyses with these data.

11.4.1. Household resources and caregiver resources

Several associations between household resources and caregiver resources were identified and all were in the expected direction. For instance, caregivers living in households with greater access to resources tended to be better nourished, healthier and better educated and they also enjoyed a higher status and more social support in their households. Household food insecurity, on the other hand, was associated with lower levels of all other household resources as well as with lower caregiver resources. Caregivers from the most severely food insecure households were more likely to report poor health status, higher anxiety and stress levels, lower life satisfaction, and less access to financial and material help. These associations seem to reflect the extreme levels of food insecurity in these communities as well as the immediacy of its impact on various aspects of the daily lives of the survey respondents.

11.4.2. Household resources and care practices

Household resources were also associated with a variety of child care practices. Partner's education was associated with some early feeding practices, as well as feeding practices related to food choice and dietary diversity. As could be expected, food insecurity was closely associated with feeding practices, particularly the feeding practices that reflect food choice and dietary diversity. These practices are more likely to be directly influenced by fluctuations in food security than breastfeeding or practices related to care during feeding for example. The household assets index was also associated with all feeding practices related to dietary diversity and food choice and with children receiving assistance to eat, but less with early feeding, the use of baby bottles and continued breastfeeding.

A number of household resources were associated with the hygiene scales. Partner's education, household assets, dependency ratio and household food insecurity were all associated with child cleanliness in the expected direction. Dependency ratio was associated with the increased use of

physical punishment, but associations between other household resources and the use of physical punishment were less interpretable.

11.4.3. Caregiver resources and care practices

The caregiver characteristic most strongly and consistently associated with care practices was maternal education, which was associated positively with practices from all six categories studied. Greater caregiver feeding knowledge was also associated with a number of positive care practices, including optimal early feeding practices, greater dietary diversity, positive response to child food refusal, increased use of liquids during diarrhea and good hygiene practices.

Our data provide no evidence of a negative effect of maternal employment on child care practices, in spite of the fact that working mothers tend to leave their young child at home for extended periods of time when they work. On the contrary, maternal employment and longer absences from home were positively associated with greater dietary diversity, better feeding practices during diarrhea (more liquids) and child cleanliness. The positive associations between maternal employment and dietary diversity may reflect the fact that women whose patterns of work keep them away from home for longer hours are more likely to be the women who work in market trade and thus have better access to a wider variety of foods and possibly greater income.

A number of the women's empowerment and social support scales were associated with early feeding practices, but again the associations were stronger and more consistent with feeding practices related to food availability and access, such as dietary diversity and the use of animal source foods in the child's diet. Hygiene practices were also related positively with couple communication, ownership of assets and household help.

Maternal anxiety/depression was negatively associated with five of the seven feeding practices related to food choices and dietary diversity. Mothers who were in the highest tercile of the anxiety/depression scale were less likely to have fed their child three meals in the previous day compared to mothers in the lowest tercile, and they were less likely to feed their child nutrient-rich (and expensive) foods such as flesh foods and vitamin-A rich foods on a regular basis. Given the previously described association between severe food insecurity and maternal anxiety/depression symptoms, it seems likely that the poorer diet quality of children who have more anxious/depressed mothers is related to their more acute problem of food insecurity.

Other associations found between the anxiety/depression symptoms scale and child care provide additional support for the hypothesis of a food insecurity link in these associations. Mothers from the highest tercile of the anxiety/depression scale were more likely to help their 18-23 month old child to eat, and were more likely to take action when their child refused to eat than mothers from the other two terciles. Thus, it is likely that more anxious mothers are more concerned about their child's diet (if food is scarce and/or the child is perceived as being less healthy or growing poorly), and therefore they respond by being more active feeders. Again, this explanation is likely, given the fact that anxious/depressed mothers were more likely to be found among households in the most severe food insecurity tercile.

These complex associations will be explored more thoroughly in the future, using multivariate analyses techniques.

11.4.4. Household and caregiver resources, care practices and child outcomes

Children's nutritional status and health were associated with a number of household and caregiver resources as well as some care practices. The factors most strongly associated with HAZ were the asset and housing indices (household resources), maternal education (caregiver resources), and some of the dietary diversity indicators (care practices). Similar patterns were observed for WAZ. Differences in WHZ, however, were generally of smaller magnitude and were significant only for a few resources such as the housing index, maternal BMI and the house hygiene scales. Few of the maternal resources were associated with child diarrhea and health, but children whose mothers were in the higher anxiety/depression and stress terciles of the scales were more likely to have had diarrhea in the previous two weeks and to have poorer health. These findings, once again, suggest a potential link with food insecurity, which is confirmed by the fact that diarrhea and health were strongly associated with food insecurity in the sample; children from more food insecure households were more likely to have had diarrhea recently and they were also more likely to have a lower score on the health analogue scale.

Of all the care practices studied, the diversity-related feeding practices were the practices most strongly and consistently associated with better child nutritional status and health, and a lower likelihood of having had diarrhea in the previous two weeks. A few feeding practices, namely continued breastfeeding for children 18-23 months, and being helped to eat for children 24-35 months were negatively associated with HAZ and WAZ. Also, aversive responses to food refusal (threatening, forcing children to eat, etc.) were strongly and negatively associated with WHZ. As discussed above, these negative associations could reflect reverse causality, where the positive caregiver behaviors documented in the survey were responses to poor child outcomes, rather than the negative outcome being a result of the positive practices. All of these care practices could represent "compensatory" maternal responses to the needs of smaller or sicker children who could have been perceived to need more care and attention than bigger, more robust children.

11.5. Conclusions

Results of the bivariate analyses confirm the importance of a number of the hypothesized relationships between different levels of resources for care and care practices, as well as between care practices and child outcomes. In particular, the strong link between food insecurity, maternal distress, low diet quality and poor child outcomes provides clear evidence of the urgent need for interventions to alleviate food insecurity in this population. In that respect, the World Vision program can contribute, especially through its food supplements, to increasing food security among households with young children. The World Vision program also has enormous potential to respond to the need for increased access to health care services, especially preventive health services such as childhood immunization and maternal and child vitamin A supplementation, which are desperately lacking. Last but not least, the newly developed behavior change and communication strategy, which was developed for this program using a series of qualitative and formative research activities, is now fully integrated into the overall intervention package in both program groups. The strategy aims at strengthening several care practices that were identified through our qualitative research as key to improving child nutrition and health in this population. The associations between many of these same care practices and child outcomes in the baseline survey, especially the practices related to increased dietary diversity and

consumption of animal source foods, confirm the potential of the BCC strategy to contribute to reducing malnutrition and morbidity in this population.

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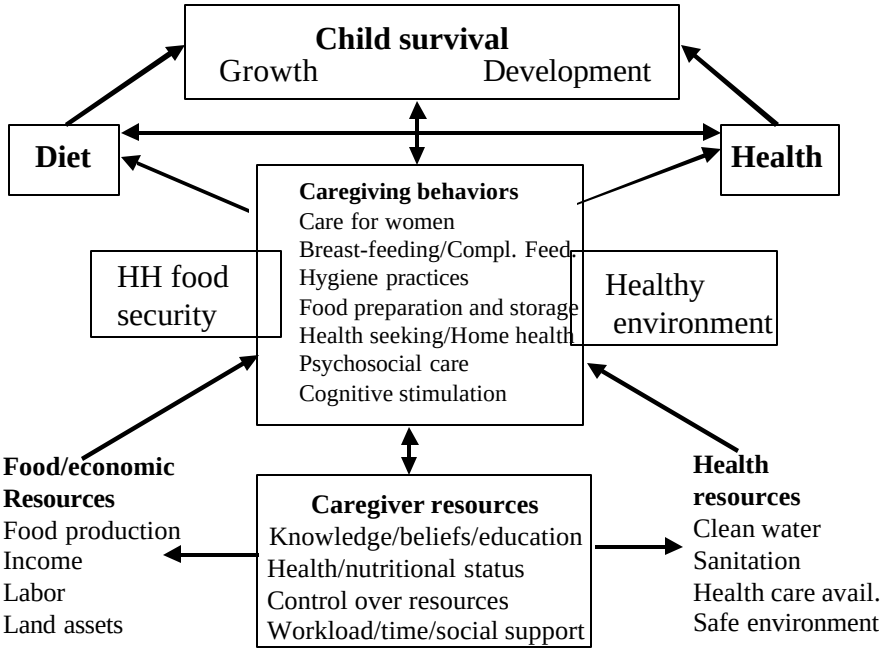
APPENDIX 2.1. Extended model of care



(Engle, Menon, and Haddad, 1997)

APPENDIX 2.2. Sample size calculations

Sample size calculations

Sample size requirements for the survey were estimated based on the desired detectable difference in the prevalence of undernutrition among the two program groups. The necessary sample sizes to examine differences in prevalence rates are the same as those necessary to examine differences between distributions, and they are larger than those necessary to examine differences in means (Brownie et al. 1986).

Sample sizes were estimated using an equation for estimating sample sizes for differences in proportions (Cohen 1988). This formula is designed for standard statistical comparisons of differences in proportions and uses the arcsine transformation of the square root of the proportions expected at time 1 and time 2 (P_1 and P_2) to estimate the effect size h. This effect size is then used to estimate the sample size (rather than simple differences in proportions).

Specifically,

$$h=\phi_1-\phi_2,$$

where,

- h = effect size
  ϕ_1 = 2 arcsin (sqrt P_1), and
  ϕ_2 = 2 arcsin (sqrt P_2)

The sample size needed to detect the effect size h with a specific alpha level and power is defined by:

$$N_r=N_{.10}/100h^2 \text{ (p. 204, Cohen 1988)}$$

where,

N_r	=	required sample size
$N_{.10}$	=	sample size required for a given alpha and the desired power at h=0.10 (value available from Table 6.4.1 in Cohen 1988 for one-tailed alpha of 0.05 and power of 0.80 is $N_{.10}$ =1237; for a power of 0.90, the N with the same alpha and effect size is 1713).

Effect size: The effect size (magnitude of improvements in nutritional status between baseline and post-intervention) documented from previous studies of the effect of supplementation on child growth ranges from 0.25 to 0.46 z-scores for WAZ and 0.04 to 0.35 z-scores for HAZ (Caulfield, Huffman and Piwoz 1999). According to their calculations, an improvement of 0.5 z-scores in nutritional status in a population with average z-scores around –1.5 will result in a 50% reduction in the prevalence of undernutrition (from 31% to 15%). Also, an improvement of +0.35 z-scores of nutritional status in a population with average z-scores around –2.0 will result in a decline in prevalence of undernutrition from 50% to 38% (a decrease of 12 percentage points).

Design effect: Children within a same village are more likely to be similar than children across

villages. This clustering (design) effect must be taken into account when calculating sample sizes because it increases the sample size needed when the intervention is randomized at the cluster, rather than the individual level. The design effect is the ratio of the variance for the cluster sample divided by the expected variance of a simple random sample of the same size.

Since the design effect is dependent on the variance between cluster, it will be smaller if the number of clusters is large and the number within each cluster is small (Foreman 1991). For complex nutrition surveys, it has been shown that clusters with 30 children in each cluster lead to design effects for stunting (HAZ %<-2) that range from 0.44 to 2.13 and 1 to 1.62 for underweight (defined as W/A <60%) (Katz 1995).

In this study, the clusters are the Health Agents and information about the design effect at this level were not available at the time of the calculation of sample size requirements. Design effect will be calculated using information from the baseline survey and will then be used to refine our sample size calculations for the final survey.

Sample size calculations were made to detect 4 levels of differences of underweight and stunting between the baseline and second survey, using two levels of power (0.8 and 0.9), three design effect sizes (1, 1.5 and 2) and information from the DHS 2000 report on the prevalence of stunting and underweight among 12-42 months old children from rural areas. These estimates are presented in Appendix 2 along with a discussion of cost issues in sample size considerations.

Final sample size: After reviewing the information provided in Tables 1 and 2 (Appendix 1), a decision was made between World Vision and the IFPRI/Cornell team to use a sample size of **750 children per group, for a total of 1,500 children.** This sample size is appropriate to detect a difference in the prevalence of stunting of at least 7.5 percentage points (required sample size = 734 children/group; table 2, Appendix 1), assuming an average design effect size of 1.5. This sample size will also give us the ability to detect a difference smaller than 7.5 percentage points in underweight (Table 1, Appendix 1) and differences larger than –0.2 in mean z-scores for both WAZ and HAZ. The required sample size is thus a minimum of 75 children per Health Agent (roughly 25 per community in the selected age range: 12-42 months old) at the time of the baseline survey.

APPENDIX 2.3. Sample size estimates

This section presents the sample size estimates for detecting 4 levels of differences in prevalence of underweight and stunting between the baseline and second survey. The baseline prevalence used in our calculations is the prevalence of underweight and stunting among rural children between 12 and 42 months, as reported in the DHS 2000 report (EMMUS–III 2000).

For our sample size calculations, one-tailed tests are used rather than two-tailed because biologically, the preventive intervention is expected to reduce faltering *and* improve recuperation, while the recuperative intervention is only expected to improve recuperation, and not prevent faltering. Therefore, one would not expect the recuperative intervention to improve children's nutritional status more than the preventive intervention. If, indeed, a difference in that unexpected direction was found, it would likely be due to operational reasons, rather than biological. As outlined in the Operations Research sections, we will be collecting information on the operations of both types of interventions. This information will be used to explain why the better expected outcomes were not found. Differentiating between the a finding of a less than expected effect or one that goes in the wrong direction is irrelevant for the purposes of this study. What would be important is that the expectation was not met (the rational for using the one-tailed test), and why.

In the tables below, sample sizes are presented for 80% and 90% power, as well as for different design effects between 1 and 2. Comparison between groups will be done using a 1-tailed t-test with an expected significance of 0.05.

1) Sample sizes required to detect differences in underweight

Estimated prevalence of underweight among rural children 12-42 months of age =~20% (Haiti EMMUS-III 2000).

Range of effect sizes for change in WAZ due to supplementary feeding intervention studies (Caulfield, Huffman and Piweoz 1999)= 0.25-0.46 SD, equivalent to a difference of 5-12% for initial prevalence of 20%

Table 1. Sample sizes required (1-tailed tests) to detect differences in prevalence of underweight for 12-42 months old children

Expected decrease in prevalence of underweight	Power	Design effect	Required sample size per group
(from 20 to 15)=5	0.8	1.0	710
		1.5	1064
		2.0	1410
(from 20 to 15)=5	0.9	1.0	983
		1.5	1474
		2.0	1966
(from 20 to 12.5)=7.5	0.8	1.0	255
		1.5	383
		2.0	510

(from 20 to 12.5)=7.5	0.9	1.0	354
		1.5	531
		2.0	708
(from 20 to 10)=10	0.8	1.0	154
		1.5	232
		2.0	308
(from 20 to 10)=10	0.9	1.0	214
		1.5	321
		2.0	416
(from 20 to 8)=12	0.8	1.0	99
		1.5	149
		2.0	298
(from 20 to 8)=12	0.9	1.0	138
		1.5	206
		2.0	276

2) Sample sizes required to detect differences in stunting

Estimated prevalence of stunting among rural children 12-42 months of age =~30% (Haiti, EMMUS-III 2000)

Range of effect sizes for change in HAZ due to supplementary feeding intervention studies (Caulfield, Huffman and Piwoz 1999) = 0.04-0.35 SD, equivalent to differences of 5-13% for 30% initial prevalence of stunting.

Table 2. Sample sizes required to detect differences in prevalence of stunting among children 12-42 months old with different levels of power and design effects

Expected decrease in prevalence of stunting	Power	Design effect	Required sample size per group
(from 30 to 25)=5	0.8	1.0	936
		1.5	1404
		2.0	1872
(from 30 to 25)=5	0.9	1.0	1366
		1.5	2048
		2.0	2732
(from 30 to 22.5)=7.5	0.8	1.0	489
		1.5	734
		2.0	978
(from 30 to 22.5)=7.5	0.9	1.0	678
		1.5	1017
		2.0	1356
(from 30 to 20)=10	0.8	1.0	230
		1.5	345
		2.0	460

(from 30 to 20)=10	0.9	1.0	318
		1.5	477
		2.0	636
(from 30 to 17)=13	0.8	1.0	154
		1.5	232
		2.0	308
(from 30 to 17)=13	0.9	1.0	214
		1.5	321
		2.0	428

It is evident from this table and the previous one that measuring an age range where one could expect less than a 5% difference in prevalence between groups or between one time point and the other (i.e., above 42 months) will be prohibitively expensive.

The final decision regarding the exact number of communities and children within communities must be based on the resources available for the fieldwork and also better estimates of the design effects expected in communities in the Central Plateau in Haiti. The cost estimates can be based on the following equation (from Foreman 1991):

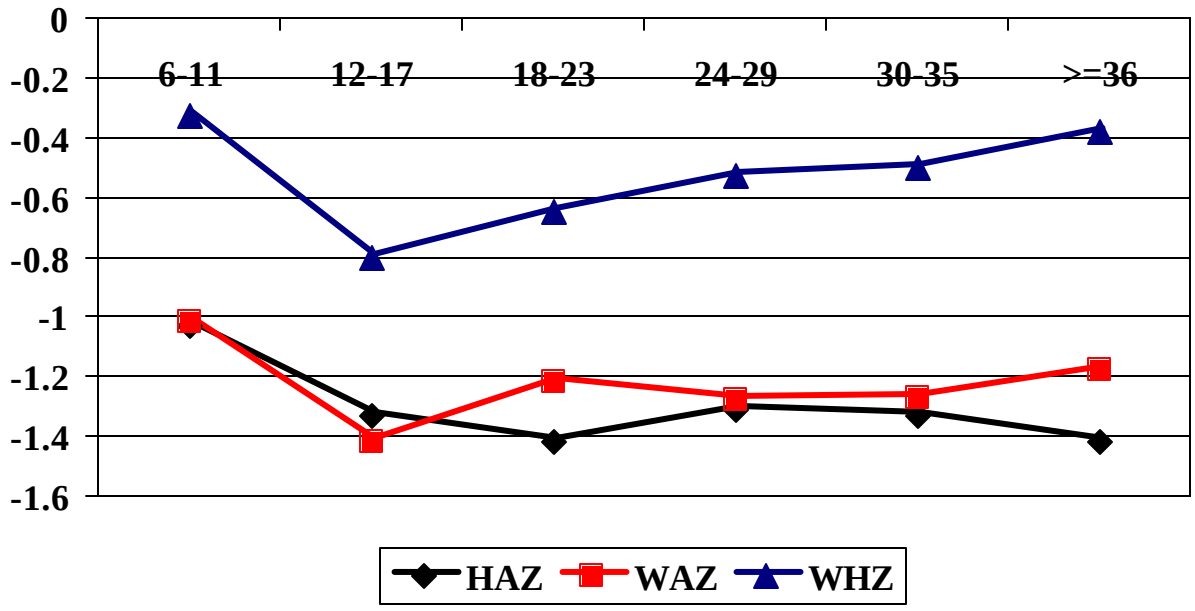
$$\text{Total cost of survey, } C=C_0 + M*C_1 + M*N*C_2,$$

where,

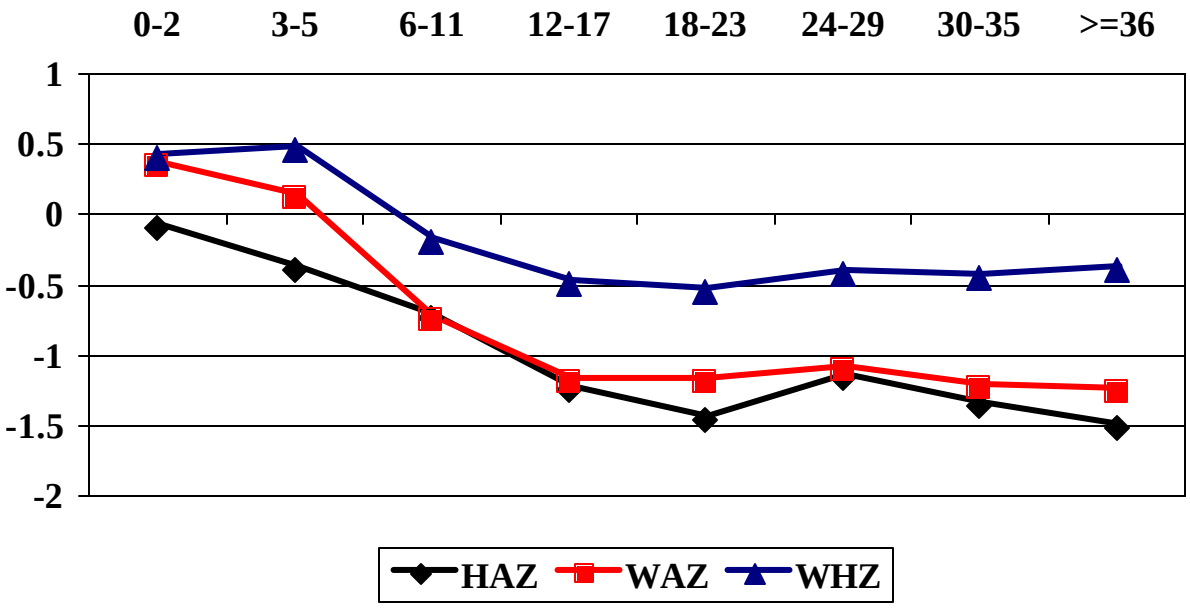
- C_0 = fixed overhead costs
- C_1 = costs of sampling the first stage (here, the communities)
- C_2 = costs of sampling the second stage within each first stage (here, children within communities)
- M = number of clusters (communities)
- N = number of units per cluster (children)

According to Foreman (1991), the final information on costs and the appropriate variances necessary to calculate the actual design effect will ideally come from pilot testing or from a previous survey. We will use the first survey for this purpose.

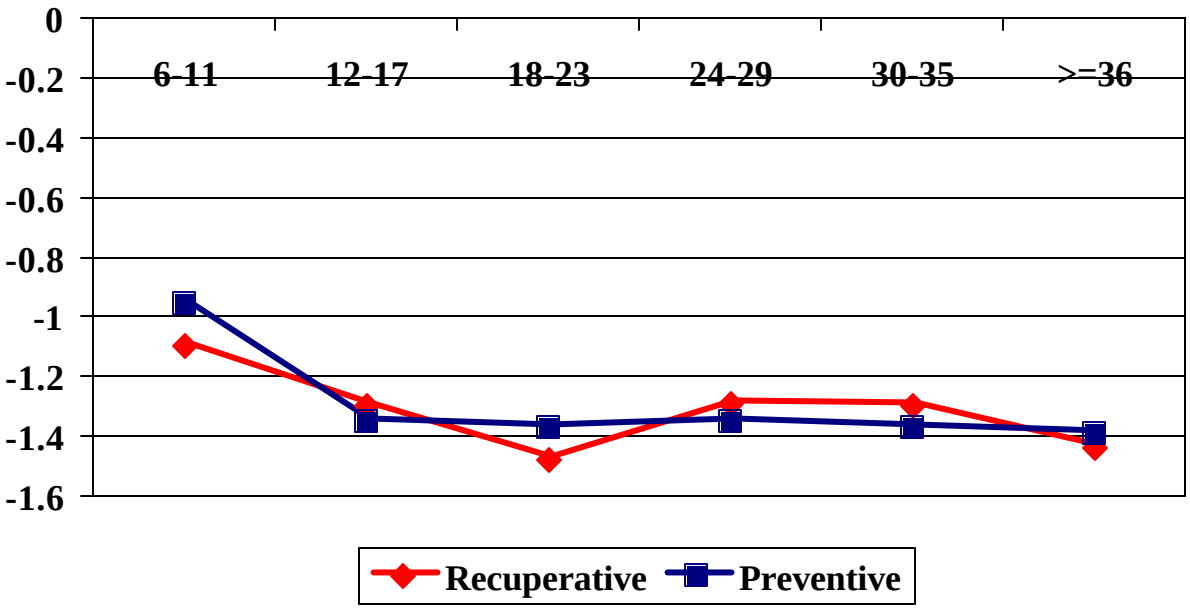
APPENDIX 4.1. Child anthropometry by age groups (mean Z-scores)



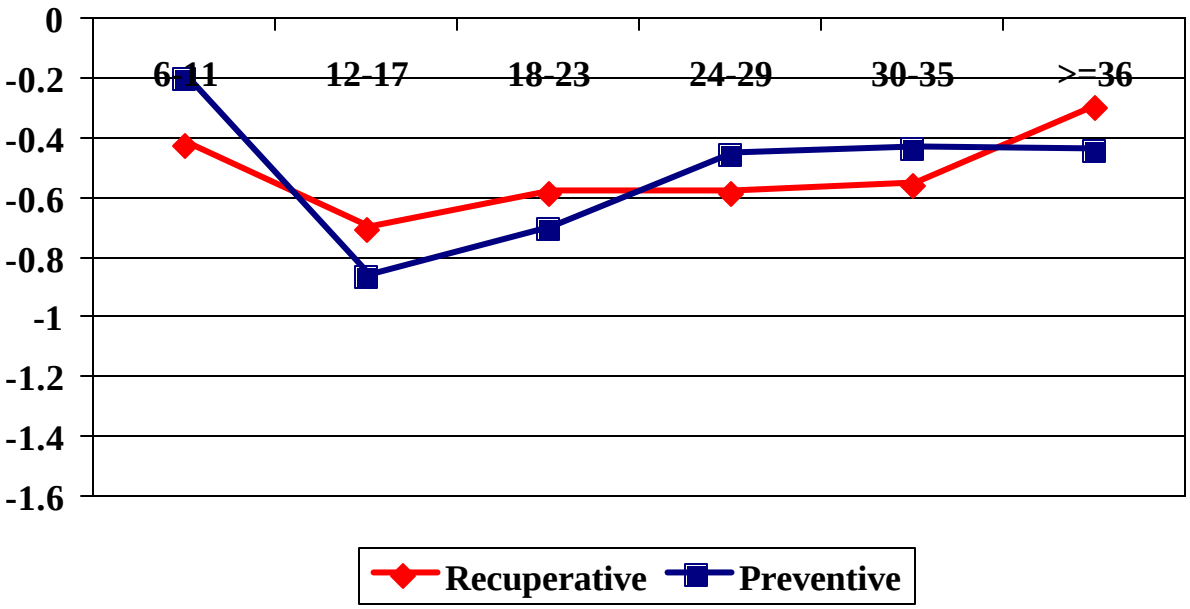
APPENDIX 4.2. Child anthropometry among rural children from the Haiti Demographic and Health Survey 2000



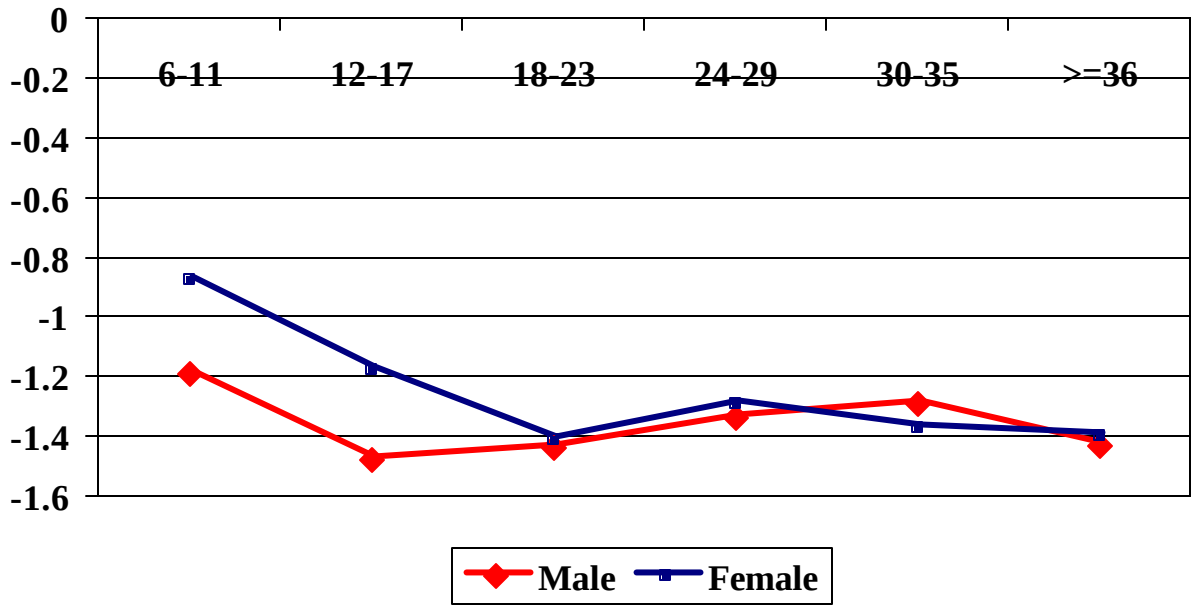
APPENDIX 4.3. Mean height-for-age Z-scores, by age and program group



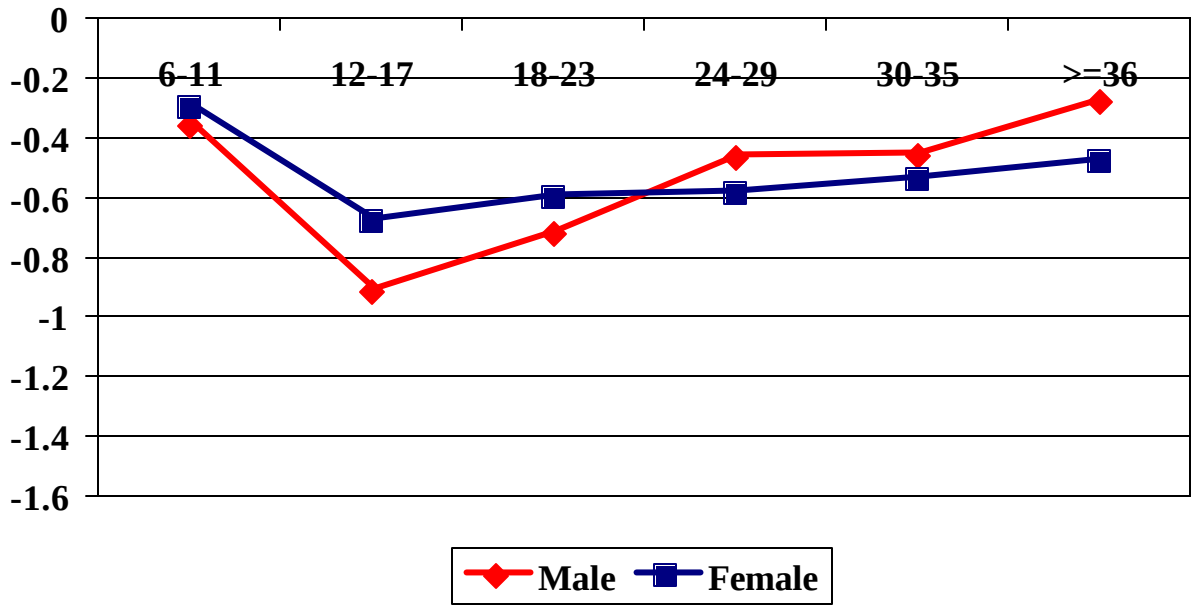
APPENDIX 4.4. Mean weight-for-height Z-scores, by age and program group



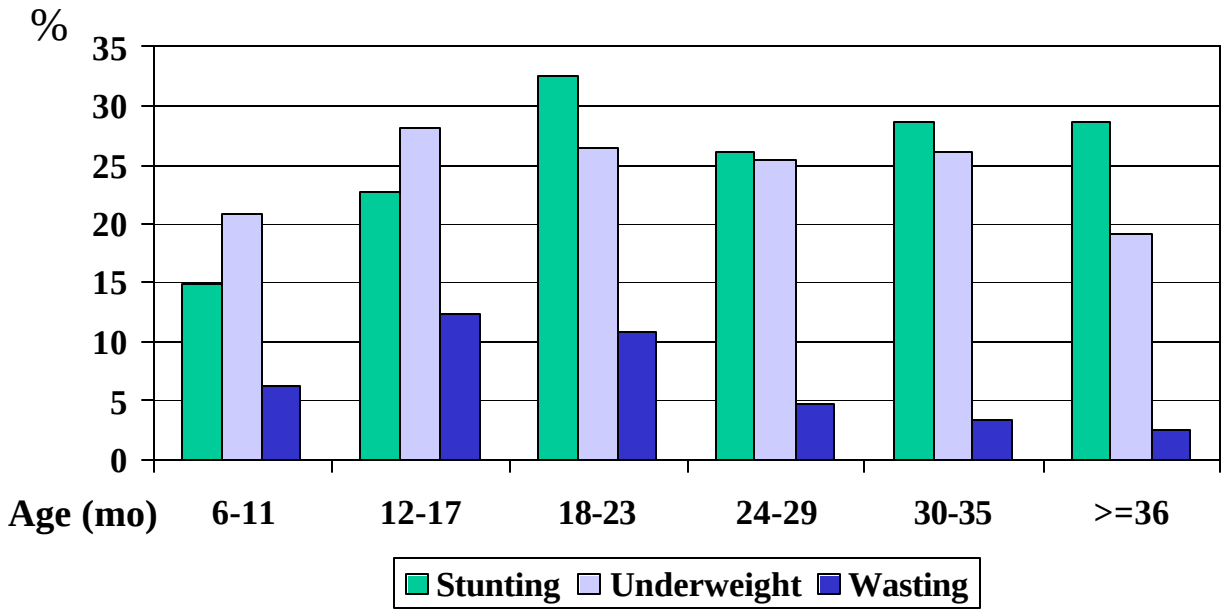
APPENDIX 4.5. Mean height-for-age Z-scores, by age group and gender



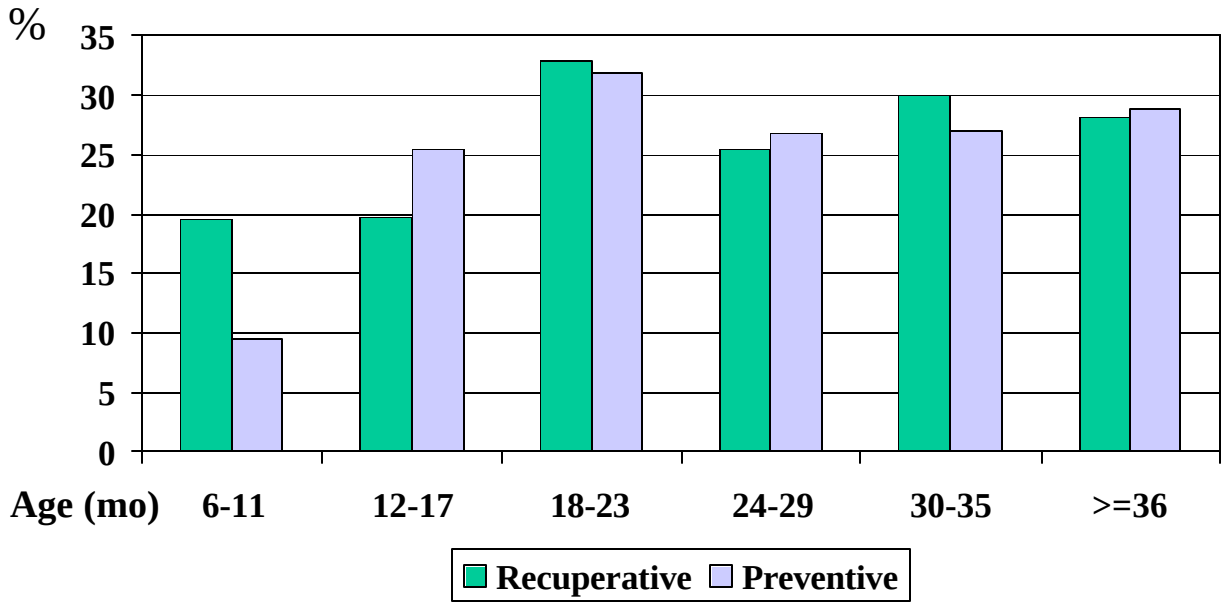
APPENDIX 4.6. Mean weight-for-height Z-scores, by age group and gender



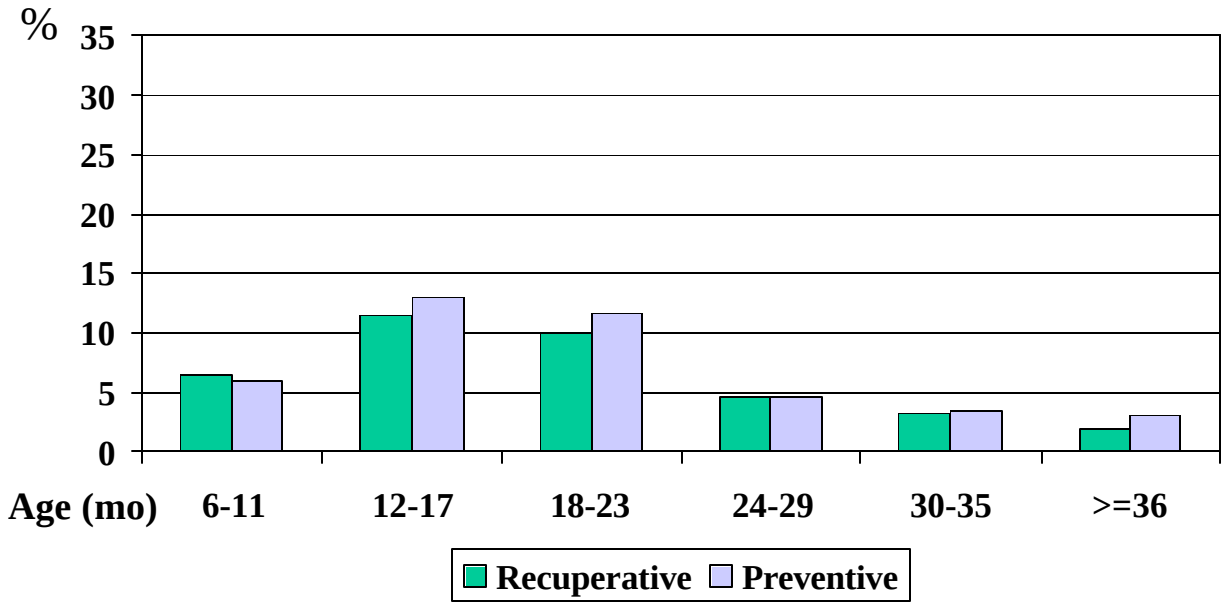
APPENDIX 4.7. Prevalence of stunting, underweight and wasting, by age group



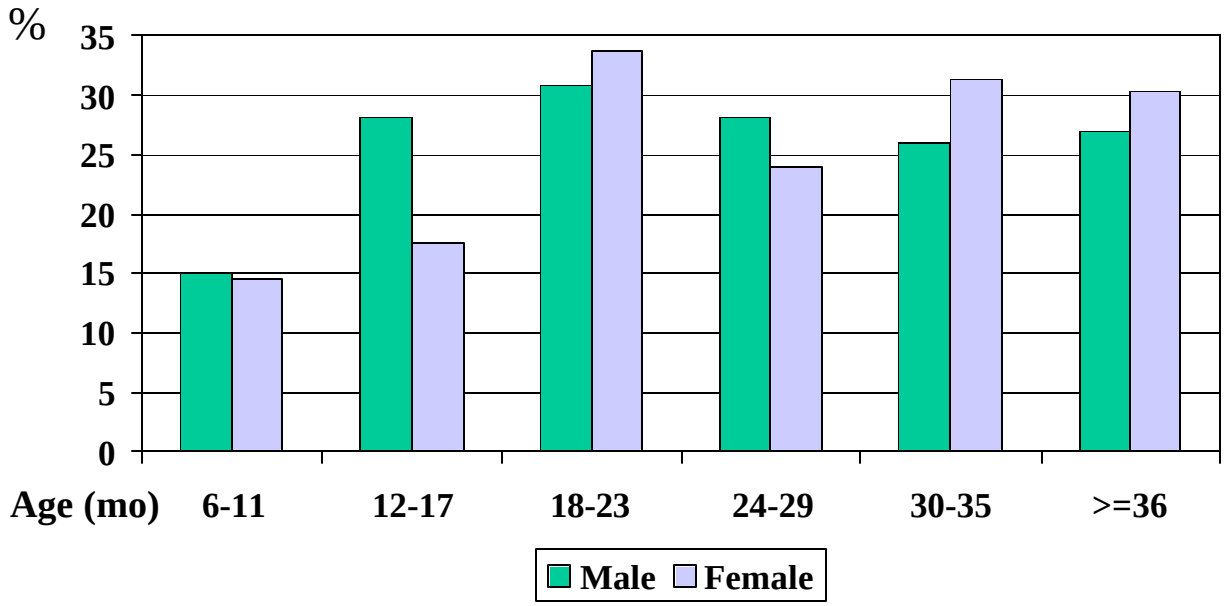
APPENDIX 4.8. Prevalence of stunting, by age and program group



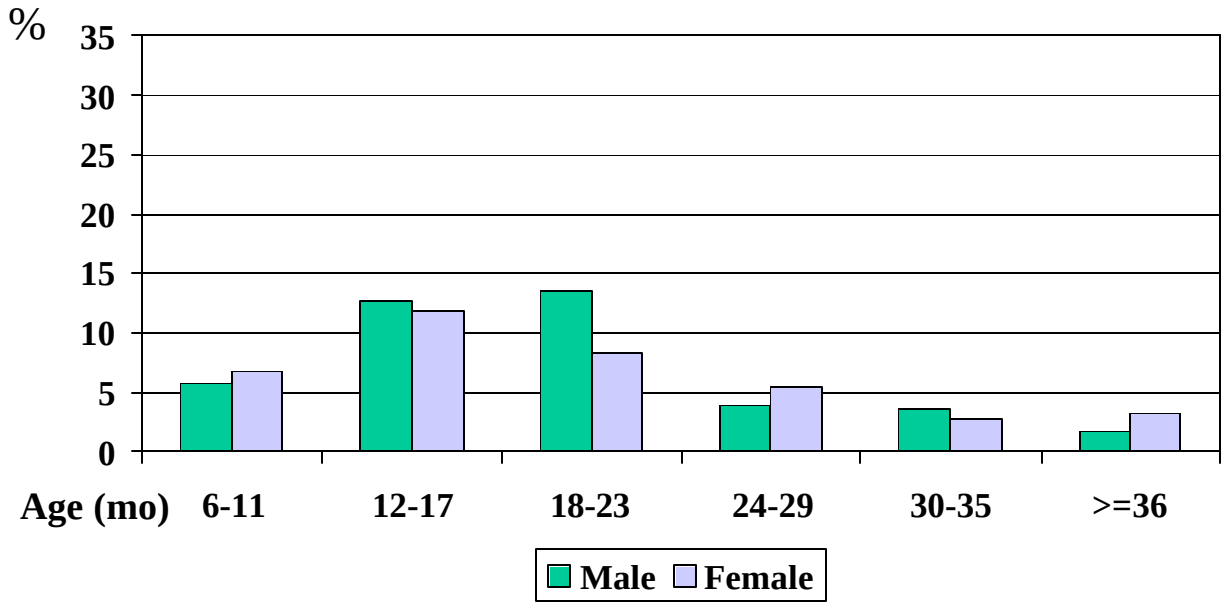
APPENDIX 4.9. Prevalence of wasting, by age and program group



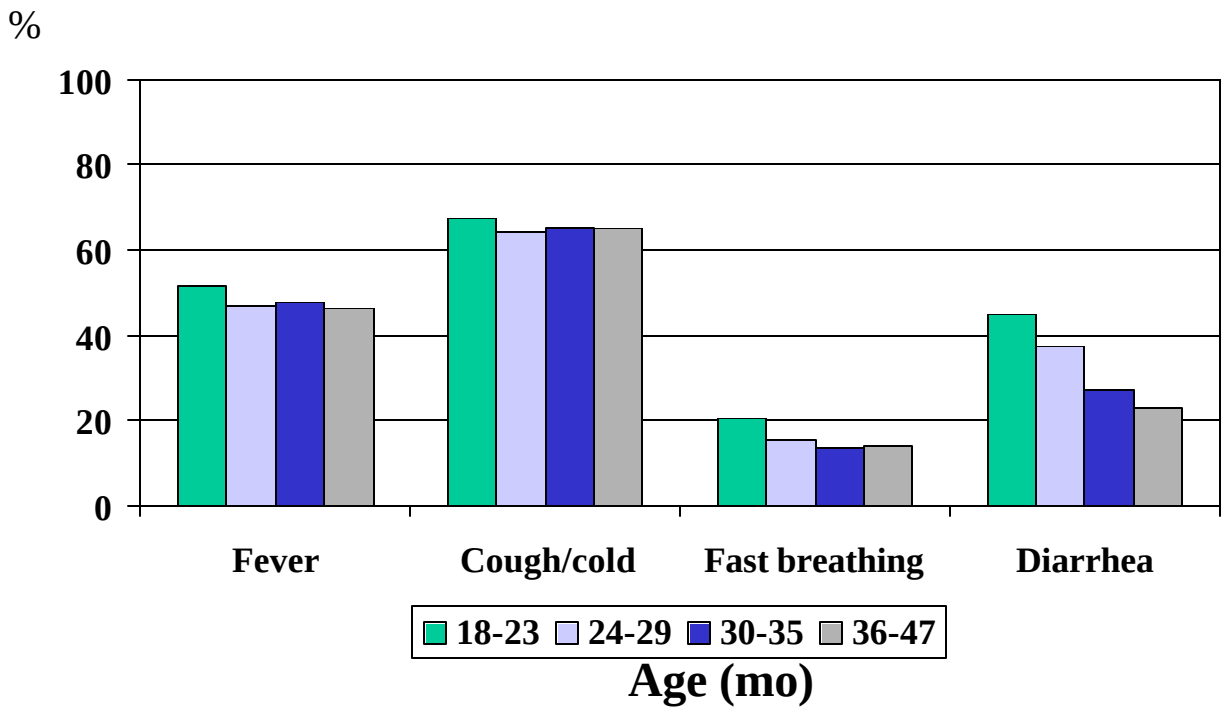
APPENDIX 4.10. Prevalence of stunting, by age group and gender



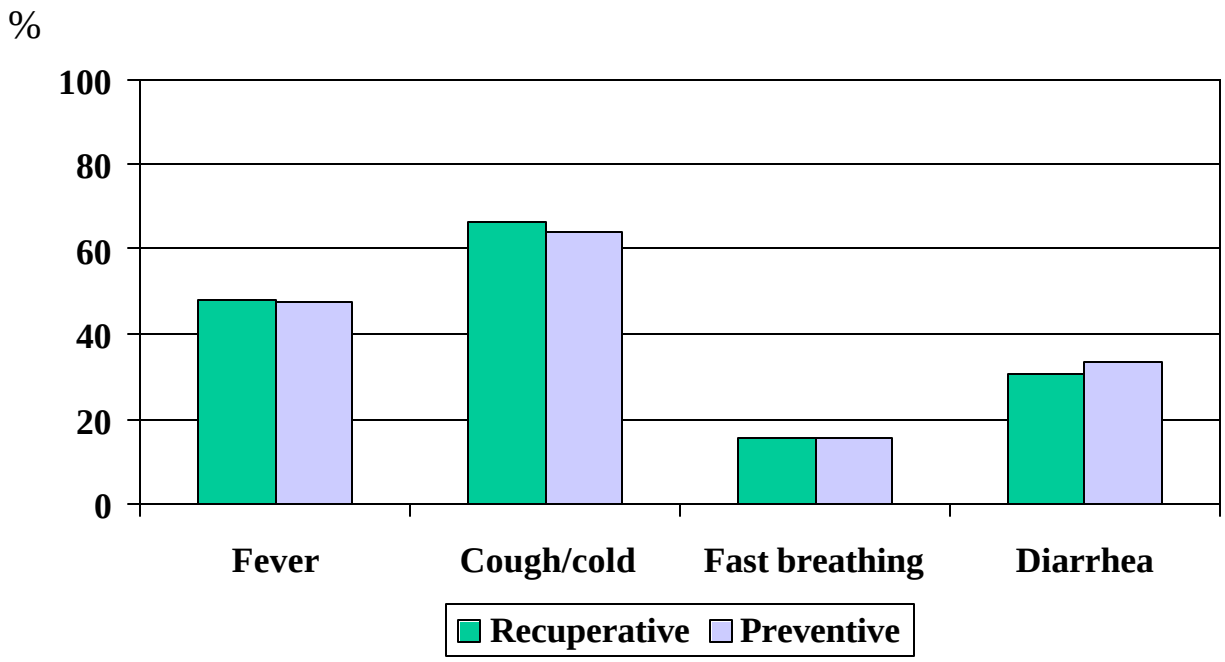
Appendix 4.11. Prevalence of wasting, by age group and gender



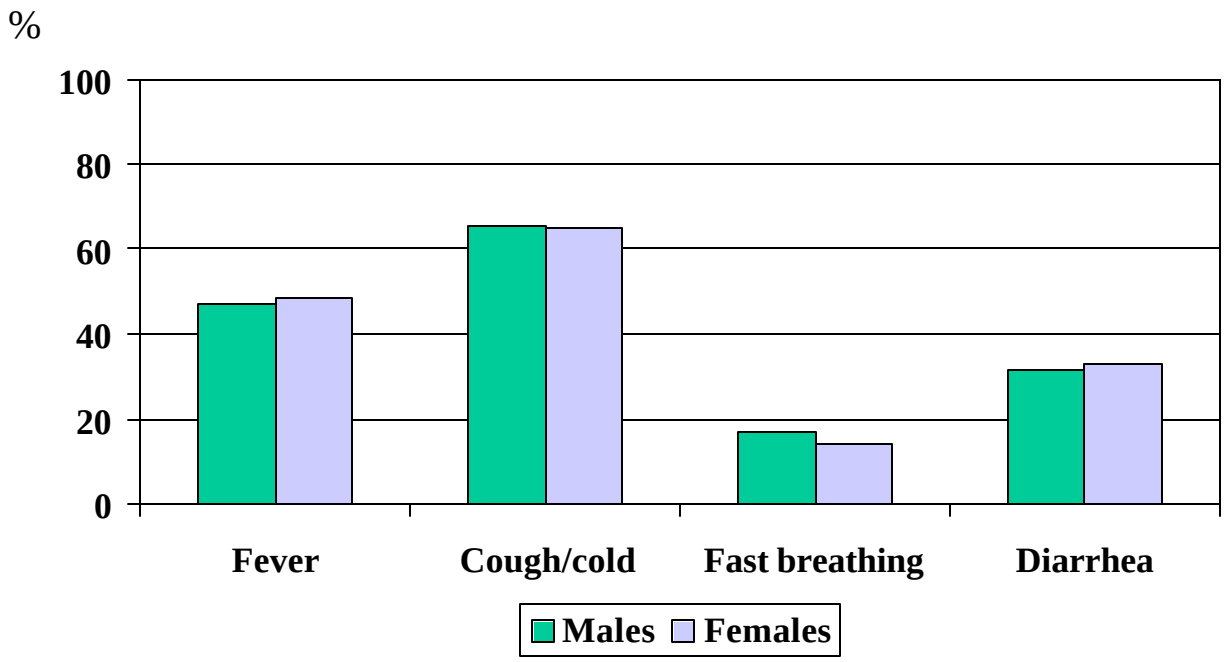
APPENDIX 4.12. Prevalence of selected morbidity symptoms in previous 2 weeks, by age group (children 18-47 mo)



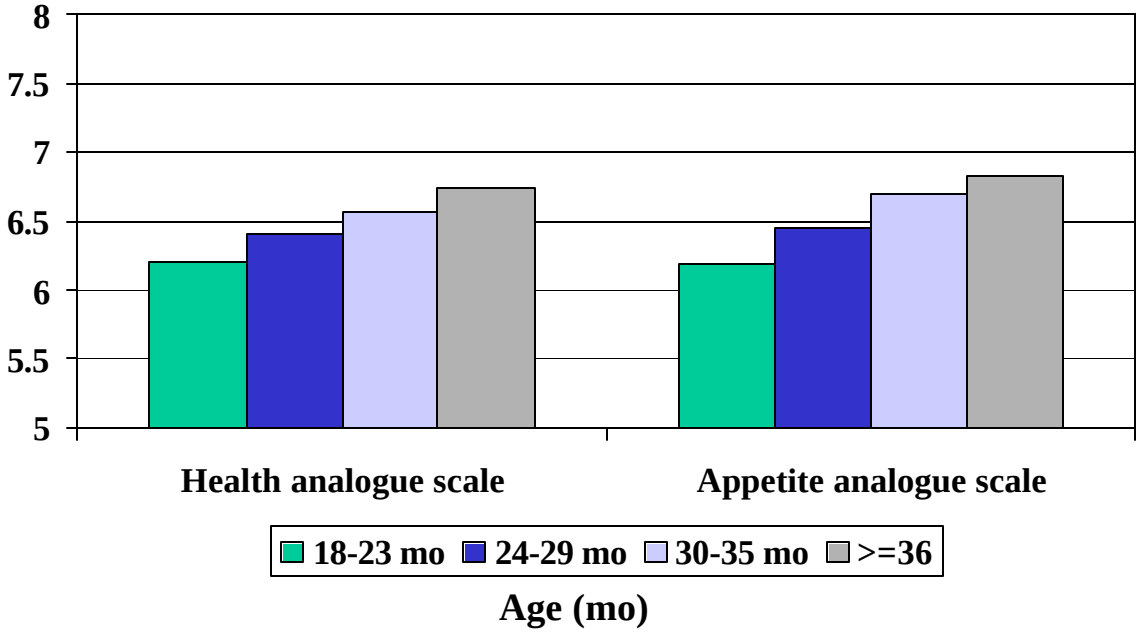
APPENDIX 4.13. Prevalence of selected morbidity symptoms in previous 2 weeks, by program group (children 18-47 months)



APPENDIX 4.14. Prevalence of selected morbidity symptoms in previous 2 weeks, by child gender (children 18-47 months)

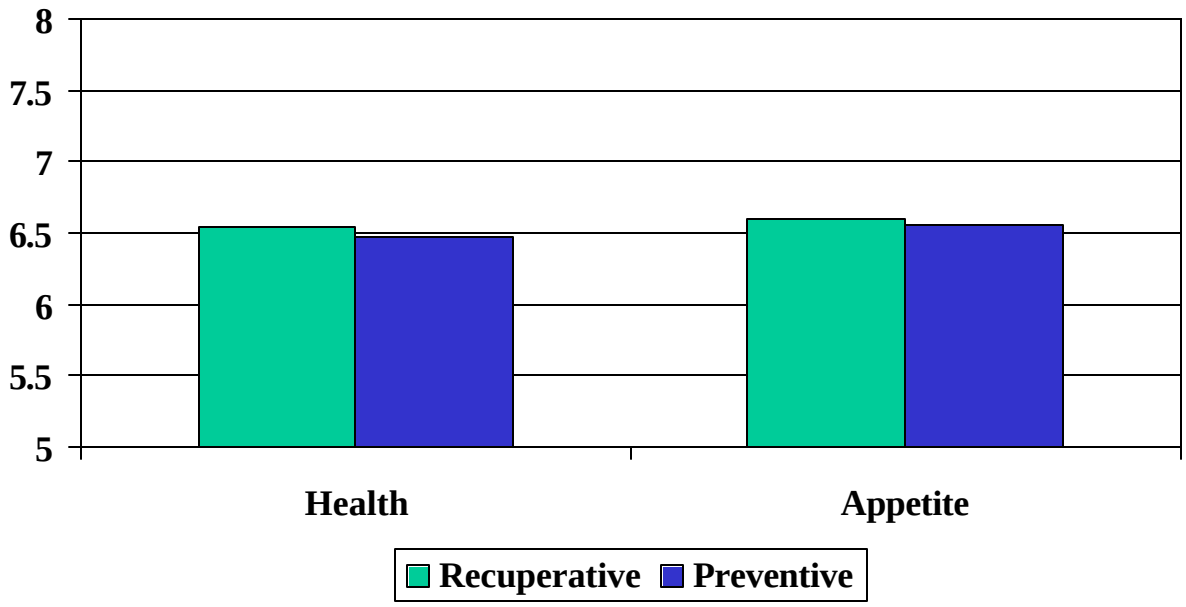


APPENDIX 4.15. Health and appetite visual analogue scales (mean values), by child age group (children 18-47 months)



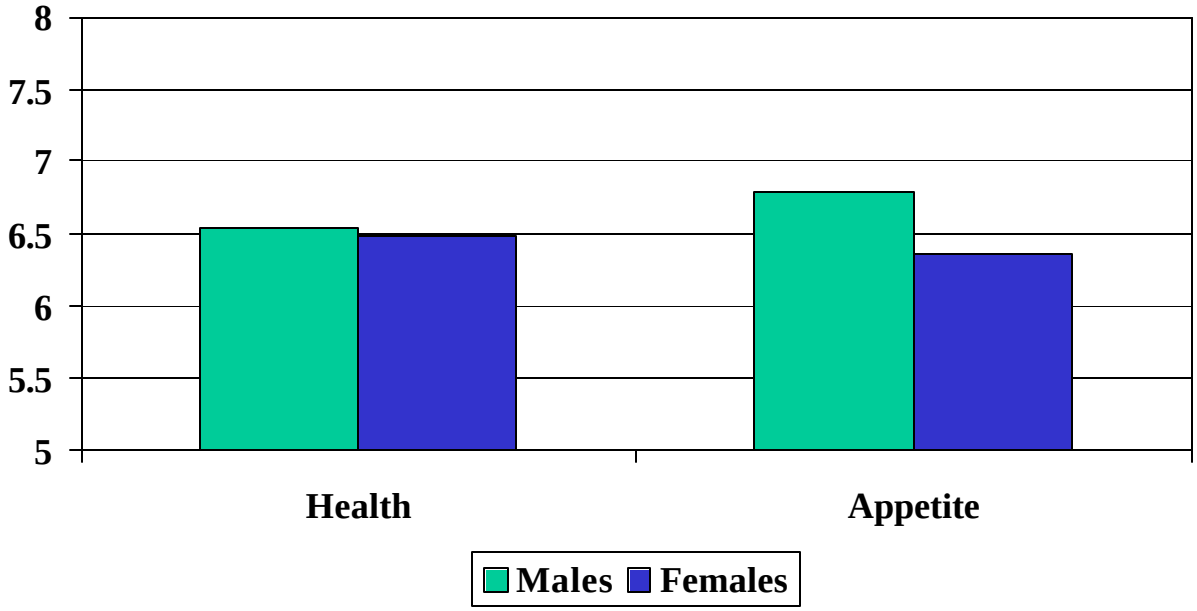
Note: scales ranges from 1-10

APPENDIX 4.16. Health and appetite visual analogue scales (mean values), by program group (children 18-47 months)



Note: scales range from 1-10

APPENDIX 4.17. Health and appetite visual analogue scales (mean values), by gender (children 18-47 months)



Note: scales range from 1-10

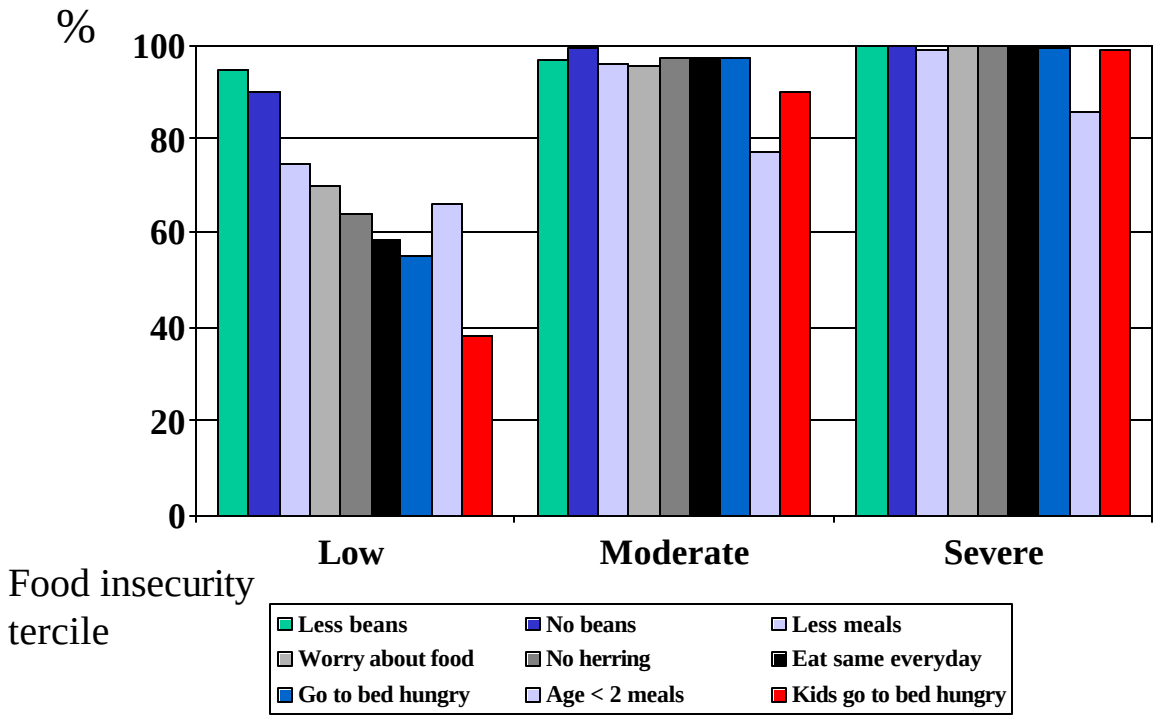
APPENDIX 6.1. Variables included in the assets indices

No.	Type of asset index	Assets included
1.	- Durable goods count - Total number of durable goods - Total value of durable goods	Bucket Little stove Pan Plates Mortar and pestle (large) Cup/mug Bed Mattress Mat Table Chair Small lamp Lamp with glass cover Radio Television Refrigerator Cupboard for plates, etc.
2.	- Productive assets count - Total number of productive assets - Total value of productive assets	Hoe Machete Axe Pick-axe Shovel/Spade Pruning knife Wheelbarrow Plow Granary
3.	- Livestock count - Total number of livestock - Tropical livestock unit (TLU) weighted number of livestock	Mule Horse Beef/cow Pig Goat Chicken/duck

APPENDIX 6.2. Scoring of variables for the food insecurity scale

No.	Food insecurity-related experience	*Variable name*	Scoring
1.	Bought a cereal that was less preferred due to lack of money	*Q704rec*	Yes=1 No=0 Like all cereals=0
2.	Extent of gap between number of meals consumed during the day and ideal number of meals	*Mealgapr*	No difference=0 Gap of 1 meal=0.5 Gap of 2 or more meals=1
3.	Ate less frequently due to lack of food	*Q706rec*	Yes=1 No=0
4.	Ate less frequently due to lack of fuel (or money to buy fuel)	*Q707rec*	Yes=1 No=0
5.	Cooked with less beans than usual	*Q710rec*	Yes=1 No=0
6.	Cooked with no beans	*Q709rec*	Yes=1 No=0
7.	Cooking without even adding the head of a herring for flavor	*Q711rec*	Yes=1 No=0
8.	Cooked same food day after day	*Q712rec*	Yes=1 No=0
9.	Frequency of going to bed hungry in past 30 days	*Q714rec*	Never=0 1-7 times=0.5 More than 7 times=1
10.	Children ever went to bed hungry in past 30 days	*Q715rec*	Yes=1 No=0
11.	Frequency of having worried about not having enough food in past 30 days	*Q716rec*	Never=0 1-2 times=0.25 At least once a week=0.5 Almost everyday=1
	Total possible score	*fdinsec*	Maximum possible score=11
	Terciles of food insecurity (based on distribution of *fdinsec*)	*nfdinsec*	1=low food insecurity 2=moderate food insecurity 3=severe food insecurity

APPENDIX 6.3. Type of food insecurity experience, by food insecurity tercile



APPENDIX 7.1. Scoring of variables for empowerment scales

No.	Measured behavior/attitude	Variable name	Scoring
A.	***Couple communication*** ***Cronbach's alpha=0.77***		
4.	Frequency of communication with spouse about *work*	*Q602a*	Never=0 Sometimes=1 Often=2
5.	Frequency of communication with spouse about *home*	*Q602b*	Never=0 Sometimes=1 Often=2
6.	Frequency of communication with spouse about *expenses*	*Q602c*	Never=0 Sometimes=1 Often=2
7.	Frequency of communication with spouse about *community happenings/issues*	*Q602d*	Never=0 Sometimes=1 Often=2
	Total possible score	***Q602comm***	***Minimum=0*** ***Maximum=8***
B.	***Gender identity (***agreement/disagreement with statements) ***Cronbach's alpha=0.23***		
1.	Only men should take important decisions	*Q603a*	Agree=0 Disagree=1
2.	Husband/partner should not let woman work outside home	*Q603c*	
3.	A woman should accept being beaten to maintain the peace in her home	*Q603d*	
4.	It is better to send a boy to school than a girl	*Q603f*	
5.	Husband/partner should help at home if woman works outside home	*Q603b*	Agree=1 Disagree=0
6.	Woman has right to express her opinion, even if she disagrees	*Q603d*	
	Total possible score	***Q603attd***	***Minimum=0*** ***Maximum=6***
C	***Ownership of assets*** ***Cronbach's alpha=0.58***		
1.	Land	*Q604a*	Possess alone=1 Possess together with someone else=1 Do not possess=0
2.	House respondent lives in	*Q604b*	
3.	Another house, apartment or room	*Q604c*	
4.	Animals, like cows, horses, pigs, etc.	*Q604d*	
	Total possible score	***Q604poss***	***Minimum=0*** ***Maximum=4***

No.	Measured behavior/attitude	Variable name	Scoring
D	**Control over purchases** **Cronbach's alpha=0.85**		
1.	Small amount of foods	*Q606a*	Yes=1 No=0 Do not buy=Missing
2.	Clothes for herself	*Q606c*	
3.	Medicines for herself	*Q606d*	
4.	Toilet articles for herself	*Q606e*	
5.	Clothes for the children	*Q606f*	
6.	Medicine for the children	*Q606g*	
	Total possible score	***Q606purc***	***Minimum=0*** ***Maximum=6***
F	***Involvement in household decision making*** ***Cronbach's alpha=0.81***		
1.	Buying important things for the family	*Q615a*	Respondent involved at all in decision (i.e., if decision is by self or joint)=1 Respondent not involved at all in decision (i.e., decision made by spouse or someone else)=0
2.	What food is prepared everyday	*Q615b*	
3.	Working to earn money	*Q615c*	
4.	Visiting relatives & friends	*Q615d*	
5.	Clinic visits when pregnant	*Q615e*	
6.	Sending children to school	*Q615g*	
7.	Care when a child is ill	*Q615h*	
8.	Raising and disciplining children	*Q615i*	
9.	Having another child	*Q615j*	
10.	Breastfeeding and weaning a child	*Q615k*	
11.	How to feed an infant in the first year of life	*Q615l*	
	Total possible score	***Q615invl***	***Minimum=0*** ***Maximum=11***

APPENDIX 7.2. Women's mental health scales

Measured symptom	Variable	Scoring
A. Mental stress scale ***Cronbach's alpha: 0.56***		
Poor appetite	*Q904a*	No=0 Yes=1
Shaking/trembling hands	*Q904b*	
Being easily excited/irritable	*Q904c*	
Difficulty in enjoying daily life	*Q904d*	
Difficulty to do daily work	*Q904e*	
Getting easily tired	*Q904f*	
Total possible score	***Q904ment***	***Minimum=0*** ***Maximum=6***
B. Frequency of stress symptoms scale ***Cronbach's alpha: 0.76***		
Headaches	*Q905a*	Never=0 Sometimes=1 Often=2
Get easily frightened	*Q905b*	
Sleep poorly	*Q905c*	
Suffer from poor digestion	*Q905d*	
Have trouble thinking clearly	*Q905e*	
Feel sad or unhappy	*Q905f*	
Lose interest in things	*Q905g*	
Feel tired all the time	*Q905h*	
Don't want to play with the children	*Q905i*	
Too tired to play with children	*Q905j*	
Total possible score	***Q905htlh***	***Minimum=0*** ***Maximum=20***
C. Time stress scale ***Cronbach's alpha: 0.80***		
Feel there is not enough time to care for house	*Q905k*	Never=0 Sometimes=1 Often=2
Feel there is not enough time to care for children	*Q905l*	
Feel there is not enough time to care for self	*Q905m*	
Feel worried there is not enough time to do daily work	*Q905n*	
Total possible score	***Q905time***	***Minimum=0*** ***Maximum=8***
D. Life satisfaction scale ***Cronbach's alpha: 0.66***		
- are satisfied with the way they live	*Q903a*	Yes=2 Neither yes or no=1 No=0
- have the important things they wanted in their life	*Q903b*	
- would change their life over if they could	*Q903c*	
- are happy with their last child	*Q903d*	
- like their daily work	*Q903e*	
- satisfied with husband/partner's help	*Q903f*	

Measured symptom	**Variable**	**Scoring**
- satisfied with help from mother-in-law	*Q903g*	
- satisfied with help from mother	*Q903h*	
- satisfied with help received from other family members	*Q903i*	
- satisfied with help from those outside their family	*Q903j*	
Total possible	***Q903lsat***	***Minimum=0*** ***Maximum=20***

APPENDIX 7.3. Social support and social capital scales

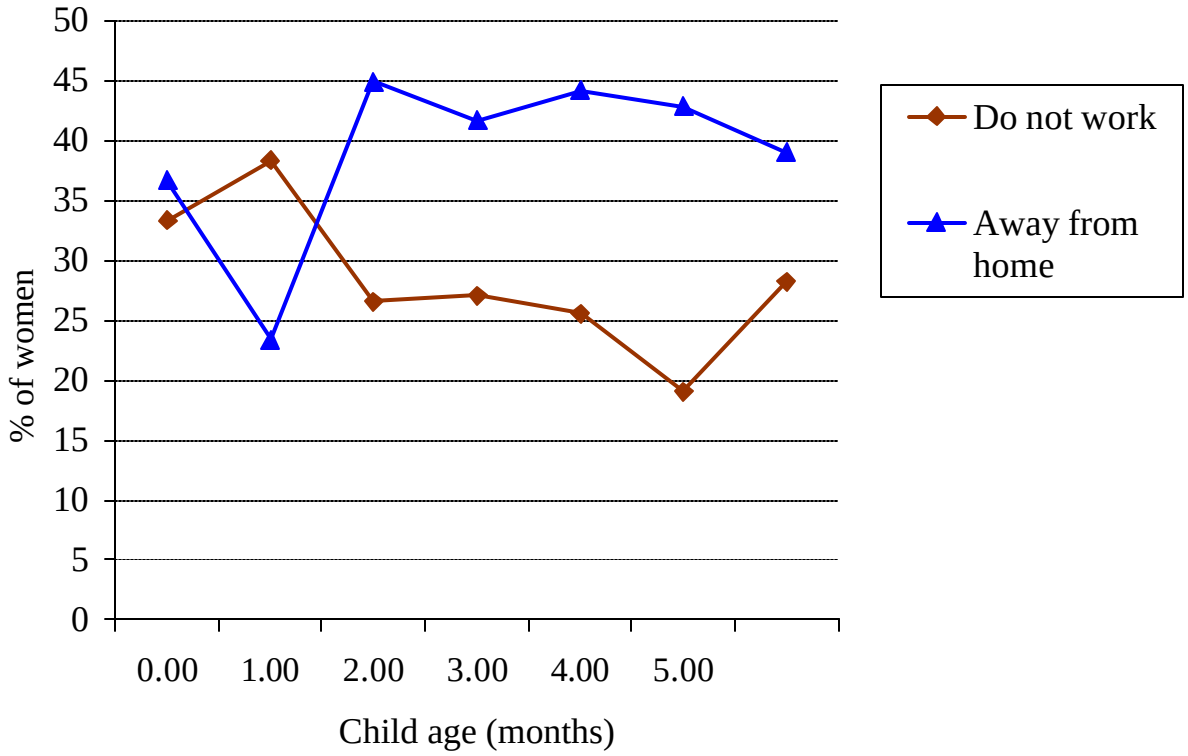
	Measured types of support	Variable	Scoring
A. Financial and material support ***Cronbach's alpha: 0.65***			
1.	A place to sleep at night	*Q611a*	No=0 Yes=1
2.	Someone to borrow money from	*Q611b*	
3.	Someone who can provide food	*Q611c*	
	Total possible score	***Q611supp***	***Minimum=0*** ***Maximum=3***
B. Help with household chores ***Cronbach's alpha: 0.84***			
1.	Cooking	*Q218a1*	No=0 Yes=1
2.	Laundry	*Q218b1*	
3.	Fetching water	*Q218c1*	
4.	Fetching fuel	*Q218d1*	
5.	Cleaning the house	*Q218e1*	
6.	Buying groceries	*Q218i1*	
7.	Caring for youngest child	*Q218f1*	
8.	Feeding youngest child	*Q218g1*	
9.	Bathing youngest child	*Q218h1*	
	Total possible score	***ntasks***	***Minimum=0*** ***Maximum=9***
C. Help with child care ***Cronbach's alpha: 0.91***			
1.	Caring for youngest child	*Q218f1*	No=0 Yes=1
2.	Feeding youngest child	*Q218g1*	
3.	Bathing youngest child	*Q218h1*	
	Total possible score	***chtasks***	***Minimum=0*** ***Maximum=3***
D. Group membership and participation in community groups ***Cronbach's alpha: 0.88***			
1.	Participation in discussions related to community	*Q612a*	Yes=1 No=0
2.	Participation in discussions related to education	*Q612b*	
3.	Participation in discussions related to health	*Q612c*	
4.	Participation in discussions related to women's issues	*Q612d*	
5.	Receive information on health and nutrition	*Q612e*	
6.	Have benefited from a loan or microcredit program	*Q609*	
7.	Respondent is a member of a co-operative	*Q613*	
	Total possible score	***Q612scap***	***Minimum=0*** ***Maximum=7***

Appendix 7.4. Scoring of child feeding knowledge scales

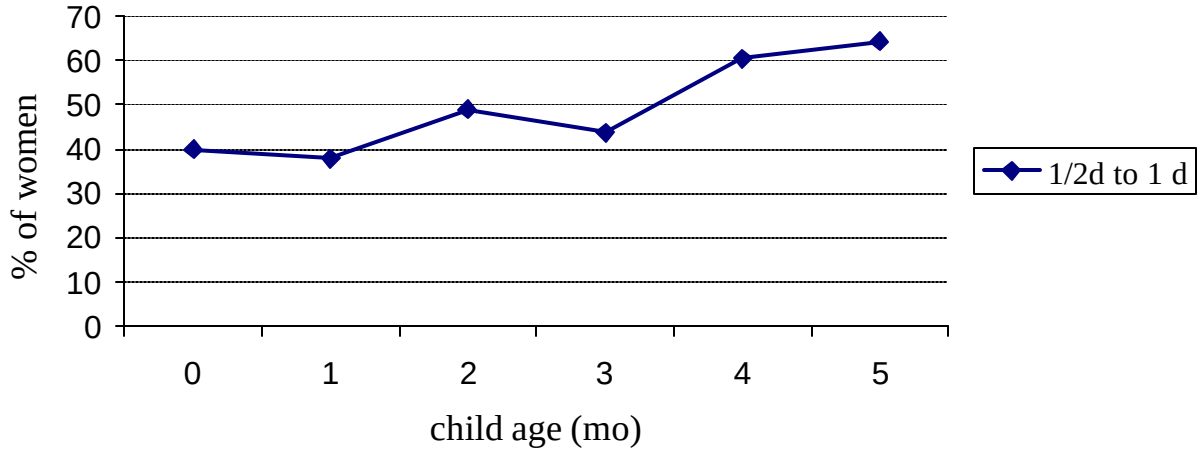
	Measured knowledge item	**Variable name**	**Scoring**
A. Appropriate age of introduction of new foods Cronbach's alpha: 0.63			
1.	Water/other liquids - water - other liquids	*Q801a* *Q801b*	<u>For each food group (liquids, semisolids, staples, vegetables, eggs, meats)</u>: Introduction of any food in the food group at 6-8 mo=+1 None of foods introduced in the appropriate period of 6-8 mo=0 (i.e., introduction was either too early or too late). <u>Food group variables created</u>: *Knowliqd, knowsemi, knowstap, knowveg, knowegg, knowmeat.* Values for each food group variable were then summed up to create an overall scale.
2.	Semi-solid foods - bread soup - gruels - bean sauce	*Q801c* *Q801d* *Q801h*	
3.	Staple foods - rice - millet - cornmeal	*Q801e* *Q801f* *Q801g*	
4.	Vegetables - vegetables added to the food - vegetables cooked on their own	*Q801i* *Q801j*	
5.	Eggs - egg yolk - whole egg	*Q801k* *Q801l*	
6.	Meats - chicken - fish - meat	*Q801m* *Q801n* *Q801o* *Q801p*	
	Total possible score	***Intrknow***	***Minimum=0*** ***Maximum=6***
B. Appropriate feeding frequency score Cronbach's alpha: 0.51			
1.	No. of meals/day for a 6-8 mo old child	*Q803*	0 to 1 meal/day = 0 2 and higher =1
2.	No. of snacks/day for a 6-8 mo old child	*Q804*	0 snacks/day = 0 1 and higher =1
3.	No. of meals/day for a 9-11 mo old child	*Q805*	0 to 2 meals/day = 0 3 and higher =1
4.	No. of snacks/day for a 9-11 mo old child	*Q806*	0 snacks/day = 0 1 and higher =1
5.	No. of meals/day for a 12-24 mo old child	*Q807*	0 to 2 meals/day = 0 3 and higher =1
6.	No. of snacks/day for a 12-24 mo old child	*Q808*	0 snacks/day = 0 1 and higher =1
	Total possible score	***apprfreq***	***Minimum=0*** ***Maximum=6***
B. Overall feeding knowledge scale, weighted			

	Measured knowledge item	**Variable name**	**Scoring**
Cronbach's alpha: 0.06			
1.	Knowledge of appropriate introduction of new foods, weighted	*Intrkno2*	*Intrknow*/3 – brings contribution of the knowledge on appropriate introduction to 2 points in total (range 0 to +2)
2.	Knowledge scale on appropriate feeding frequency, weighted	*Apprfrq2*	*Apprfreq*/3 – brings contribution of the knowledge on appropriate feeding frequency to 2 points in total (range 0 to +2)
3.	Age until when a child should be breastfed	*Q802n*	0-5 mo=-2 6 to 11 mo=0 12 to 17 mo=0.5 18 thru 23=1 24 and beyond=2
	Total possible score	***Feedknow***	***Minimum=-2*** ***Maximum=+6***

APPENDIX 7.5. Women's work patterns by child age (location of work)



APPENDIX 7.6. Women's work patterns by child age (time spent away from home)



APPENDIX 8.1. Summary of guiding principles for infant and young child feeding

1. DURATION OF EXCLUSIVE BREASTFEEDING AND AGE OF INTRODUCTION OF COMPLEMENTARY FOODS. Practice exclusive breastfeeding from birth to 6 months of age, and introduce complementary foods at 6 months of age (180 days) while continuing to breastfeed.

2. MAINTENANCE OF BREASTFEEDING. Continue frequent, on-demand breastfeeding until 2 years of age or beyond.

3. RESPONSIVE FEEDING. Practice responsive feeding, applying the principles of psycho-social care. Specifically: a) feed infants directly and assist older children when they feed themselves, being sensitive to their hunger and satiety cues; b) feed slowly and patiently, and encourage children to eat, but do not force them; c) if children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement; e) minimize distractions during meals if the child loses interest easily; f) remember that feeding times are periods of learning and love - talk to children during feeding, with eye to eye contact.

4. SAFE PREPARATION AND STORAGE OF COMPLEMENTARY FOODS. Practice good hygiene and proper food handling by a) washing caregivers' and children's hands before food preparation and eating, b) storing foods safely and serving foods immediately after preparation, c) using clean utensils to prepare and serve food, d) using clean cups and bowls when feeding children, and e) avoiding the use of feeding bottles, which are difficult to keep clean.

5. AMOUNT OF COMPLEMENTARY FOOD NEEDED. Start at 6 months of age with small amounts of food and increase the quantity as the child gets older, while maintaining frequent breastfeeding. The energy needs from complementary foods for infants with "average" breast milk intake in developing countries are approximately 200 kcal per day at 6-8 months of age, 300 kcal per day at 9-11 months of age, and 550 kcal per day at 12-23 months of age. In industrialized countries these estimates differ somewhat (130, 310 and 580 kcal/d at 6-8, 9-11 and 12-23 months, respectively) because of differences in average breast milk intake.

6. FOOD CONSISTENCY. Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities. Infants can eat pureed, mashed and semi-solid foods beginning at six months. By 8 months most infants can also eat "finger foods" (snacks that can be eaten by children alone). By 12 months, most children can eat the same types of foods as consumed by the rest of the family (keeping in mind the need for nutrient-dense foods, as explained in #8 below). Avoid foods that may cause choking (i.e., items that have a shape and/or consistency that may cause them to become lodged in the trachea, such as nuts, grapes, raw carrots).

7. MEAL FREQUENCY AND ENERGY DENSITY. Increase the number of times that the child is fed complementary foods as he/she gets older. The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding. For the average healthy breastfed infant, meals of complementary foods should be provided 2-3 times per day at 6-8 months of age and 3-4 times per day at 9-11 and 12-23 months of age, with additional nutritious snacks (such as a piece of fruit or bread or chapatti with nut paste) offered 1-2 times per day, as desired. Snacks are defined as foods eaten between meals-usually self-fed, convenient and easy to prepare. If energy density or amount of food per meal is low, or the child is no longer breastfed, more frequent meals may be required.

8. NUTRIENT CONTENT OF COMPLEMENTARY FOODS. Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Vegetarian diets cannot meet nutrient needs at this age unless nutrient supplements or fortified products are used (see #9 below). Vitamin A-rich fruits and vegetables should be eaten daily. Provide diets with adequate fat content. Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered so as to avoid displacing more nutrient-rich foods.

9. USE OF VITAMIN-MINERAL SUPPLEMENTS OR FORTIFIED PRODUCTS FOR INFANT AND MOTHER. Use fortified complementary foods or vitamin-mineral supplements for the infant, as needed. In some populations, breastfeeding mothers may also need vitamin-mineral supplements or fortified products, both for their own health and to ensure normal concentrations of certain nutrients (particularly vitamins) in their breast milk. [Such products may also be beneficial for pre-pregnant and pregnant women].

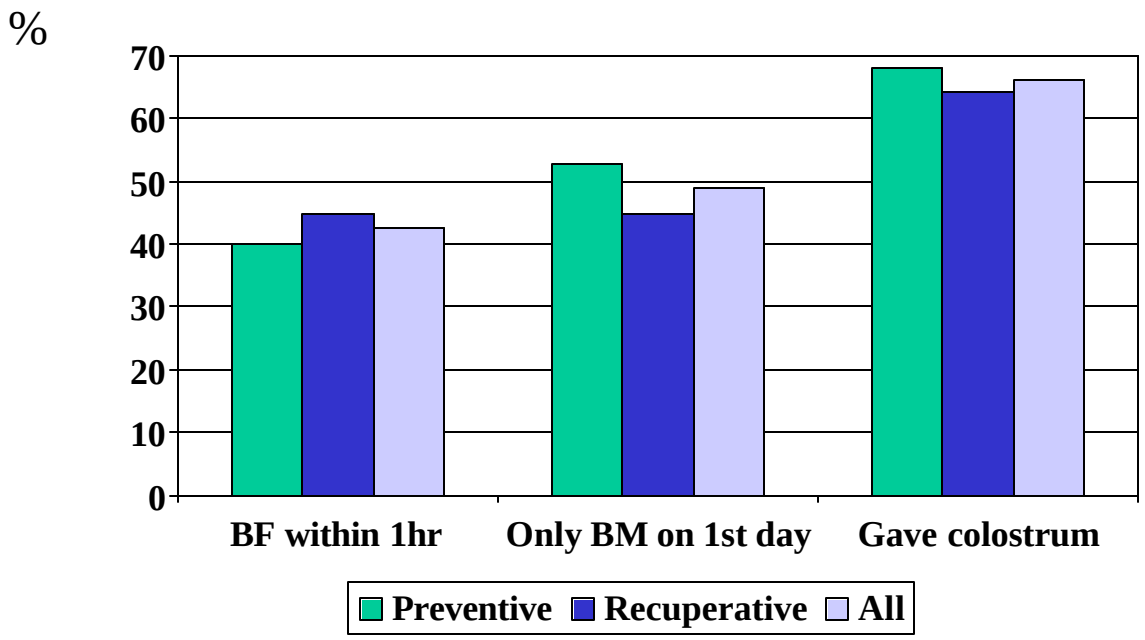
10. FEEDING DURING AND AFTER ILLNESS. Increase fluid intake during illness, including more frequent breastfeeding, and encourage the child to eat soft, varied, appetizing, favorite foods. After illness, give food more often than usual and encourage the child to eat more.

Source: PAHO/WHO, 2003

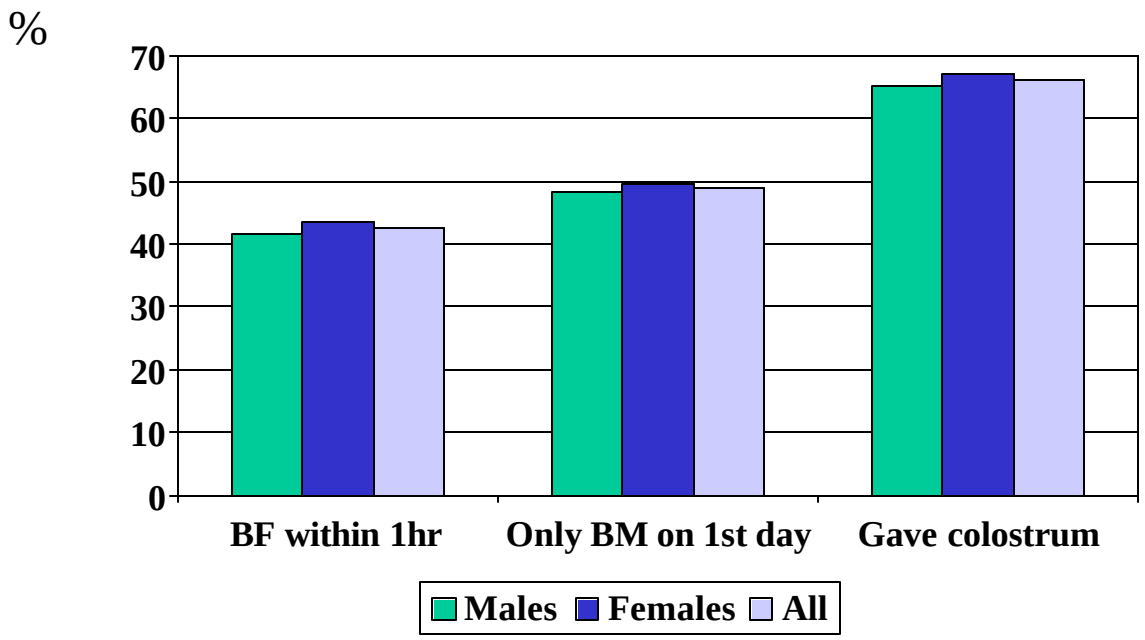
APPENDIX 8.2. Scoring table for the creation of the food group diversity index

No.	Foods/food groups included in each group	*Variables*	Food group variables and coding
Food group diversity index: Cronbach's alpha=0.54			
1.	o Cereals such as millet, maize, wheat (without beans) o Cereals with beans o Bread soup, salt cracker gruel, wheat flour gruel (without milk)	*Q325a, Q325b, Q325d, Q325e*	*Cereals*: Yes for any of the variables=1 No for all=0
2.	o Bean sauce (without cereals) o Cereals with beans	*Q325c, Q325b*	*Legumes*: Yes for any of the variables=1 No for all=0
3.	o Plantain gruel o Other starchy vegetables: (potatoes, yam, manioc, cassava, plantain)	*Q325f, Q325k*	*Roots/tubers*: Yes for any of the variables=1 No for all=0
4.	o Pumpkin, orange yam, orange/red-flesh sweet potato, carrots o Green leafy vegetables o Papaya or mango	*Q325g, Q325h, Q325i*	*Vitamin A-rich fruits and vegetables*: Yes for any of the variables=1 No for all=0
5.	o Other fruits such as oranges, banana, grapefruits o Other vegetables such as avocados, tomatoes, peas -	*Q325j, Q325l*	*Other fruits and vegetables*: Yes for any of the variables=1 No for all=0
6.	o Chicken and other birds (pintade, duck, pigeon) o Fish (dried herring) o Sea food (crab, etc.) o Eggs	*Q325m, Q325n, Q325o, Q325p, Q325q, Q325r*	*Meat/poultry/egg/fish*: Yes for any of the variables=1 No for all=0
7.	o Peanuts, groundnuts, other nuts	*Q325s*	*Nuts*: Yes for any of the variables=1 No for all=0
8.	o Milk, breast milk substitute	*Q324b, q324c*	*Dairy*: Yes for any of the variables=1 No for all=0
	TOTAL SCORE (*dietdiv8*)		**Minimum=0** **Maximum=8**

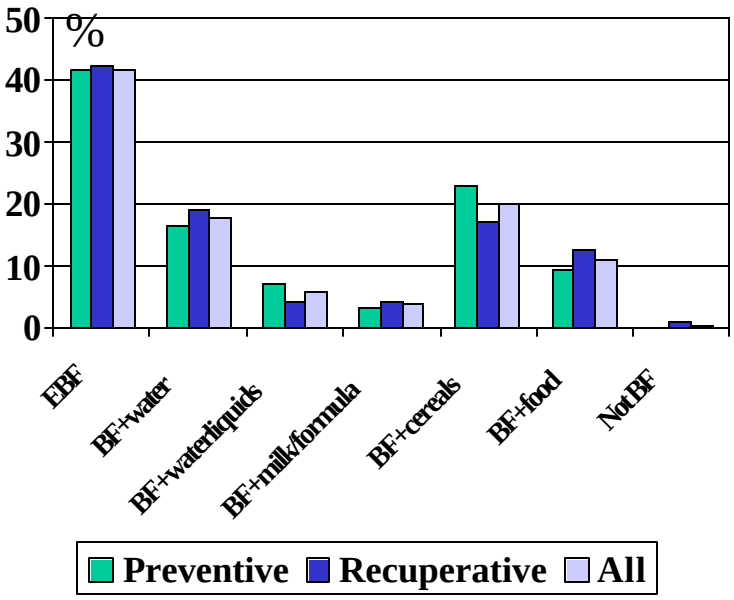
APPENDIX 8.3. Percentage of infants fed according to recommendations during early postnatal period, by program group (children ≥ 6 months)



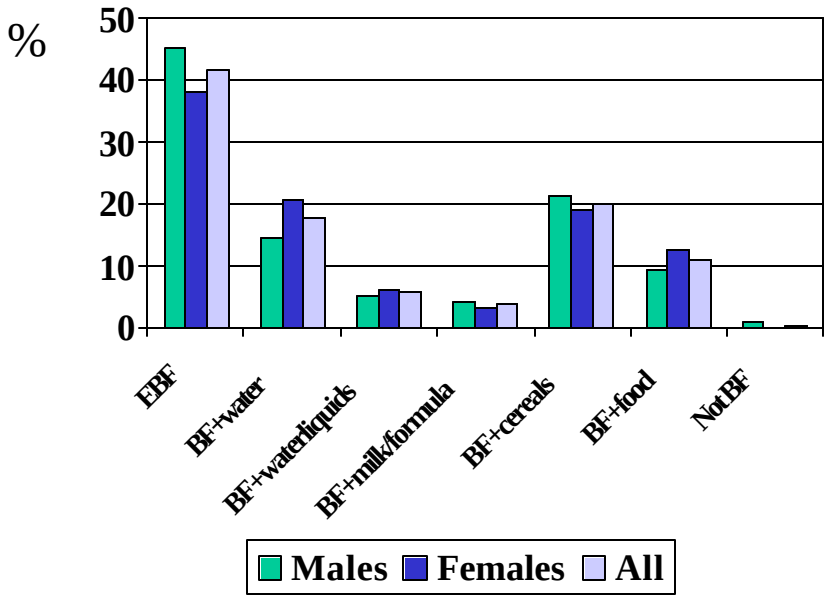
APPENDIX 8.4. Percentage of infants fed according to recommendations during early postnatal period, by gender (children ≥ 6 months)



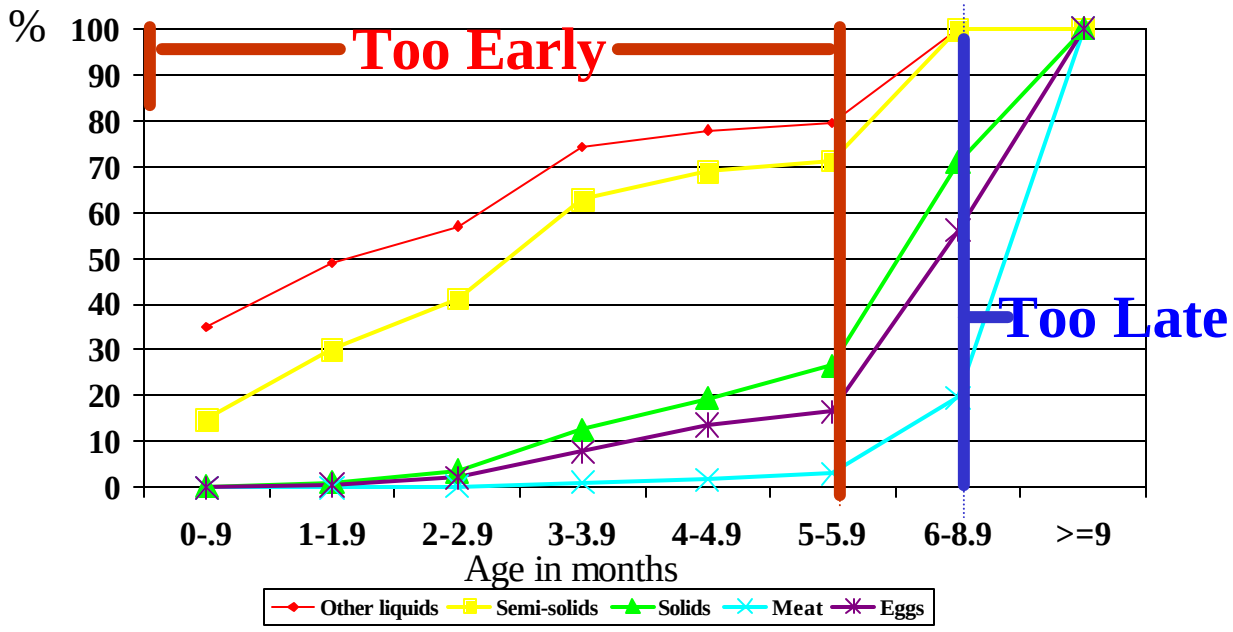
APPENDIX 8.5. Breastfeeding patterns of infants < 6 months in previous 24 hours, by program group



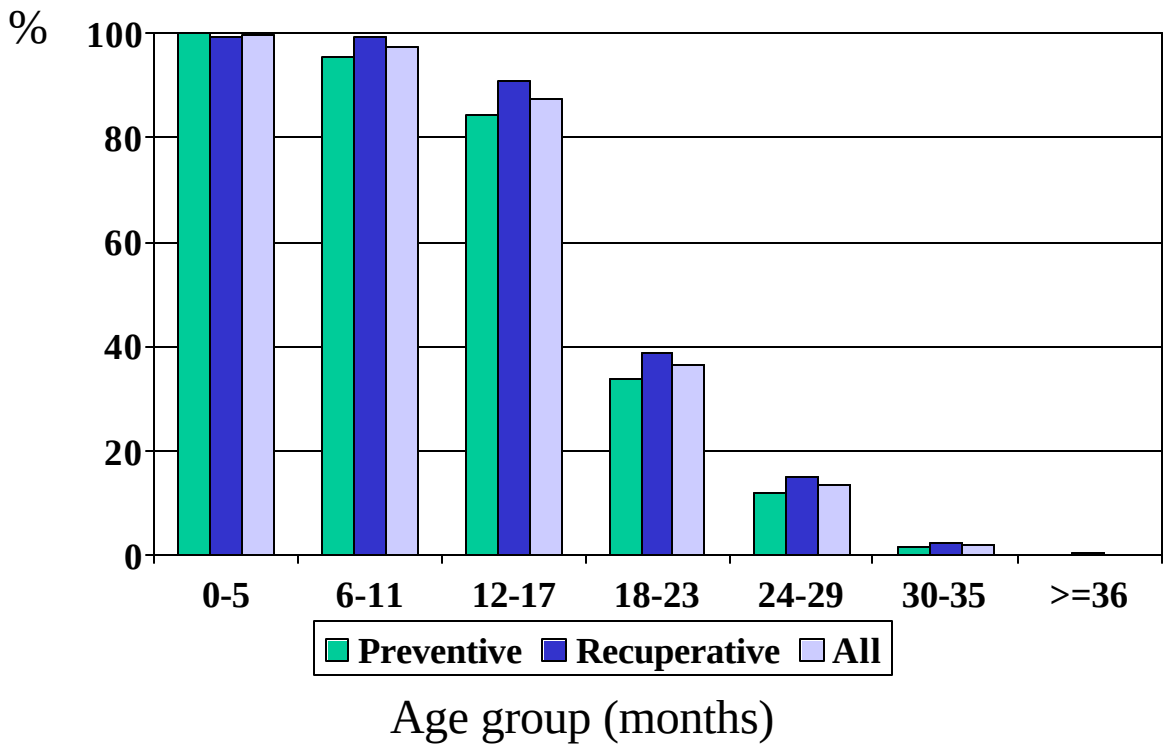
APPENDIX 8.6. Breastfeeding patterns of infants < 6 months during the past 24 hours, by gender



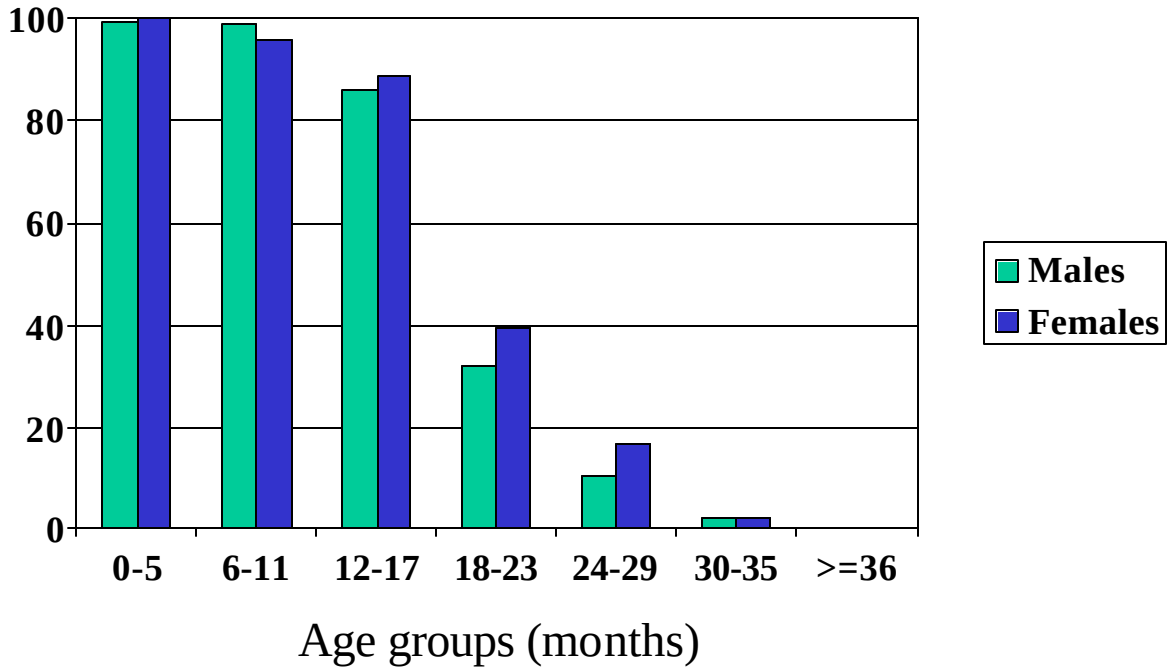
APPENDIX 8.7. Cumulative percentage of children who had started to consume selected semi-solid and solid foods at different ages (children 0-47 months)



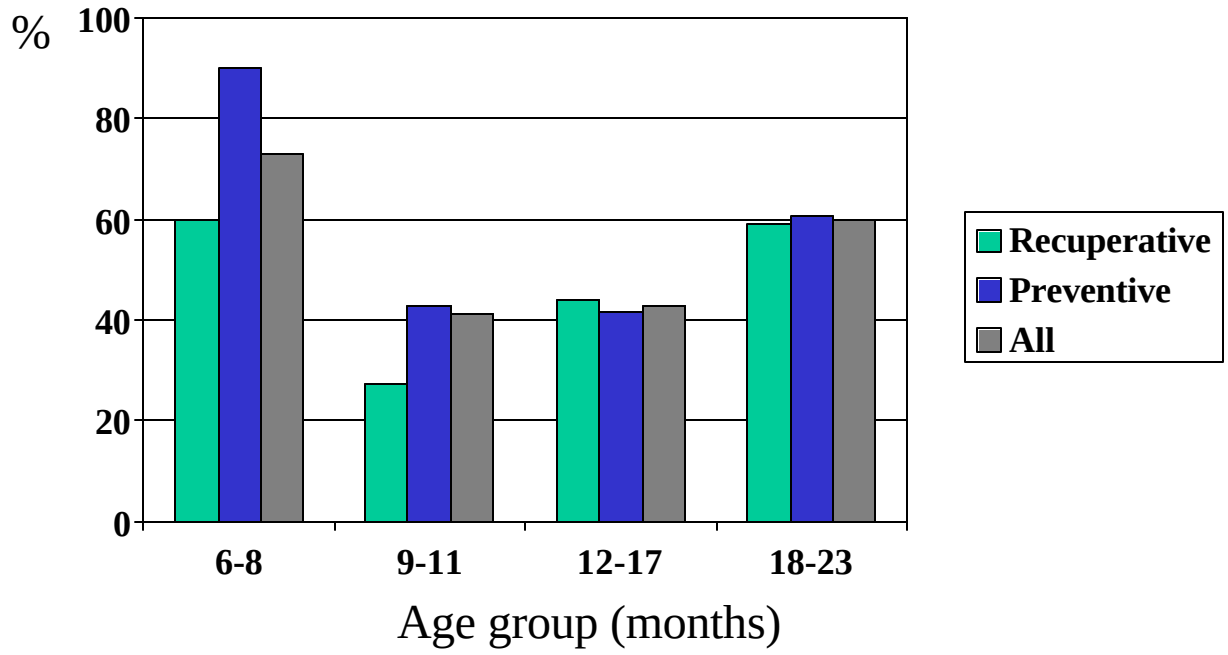
APPENDIX 8.8. Percentage of children still being breastfed, by age and program group (children 0-47months)



APPENDIX 8.9. Percentage of children still being breastfed, by age and gender (0-47 months)

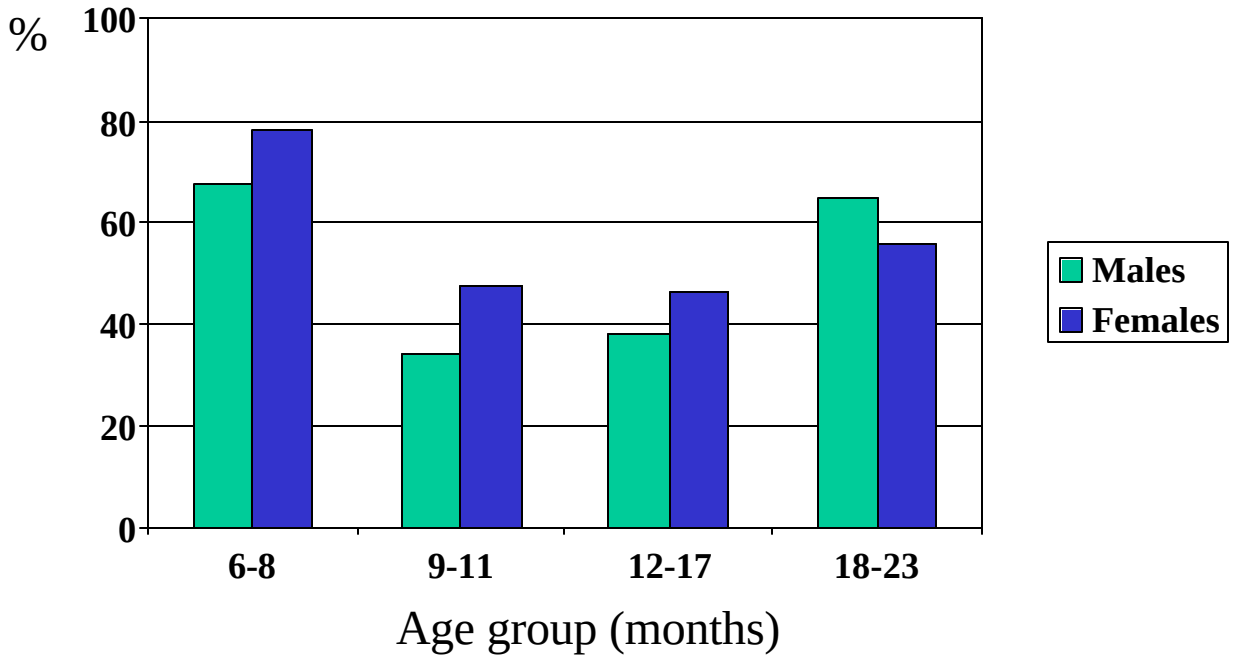


APPENDIX 8.10. Percentage of children who were fed meals at least the minimum recommended number of times for their age in the past 24 hours, by age and program group (children 6-23 months)



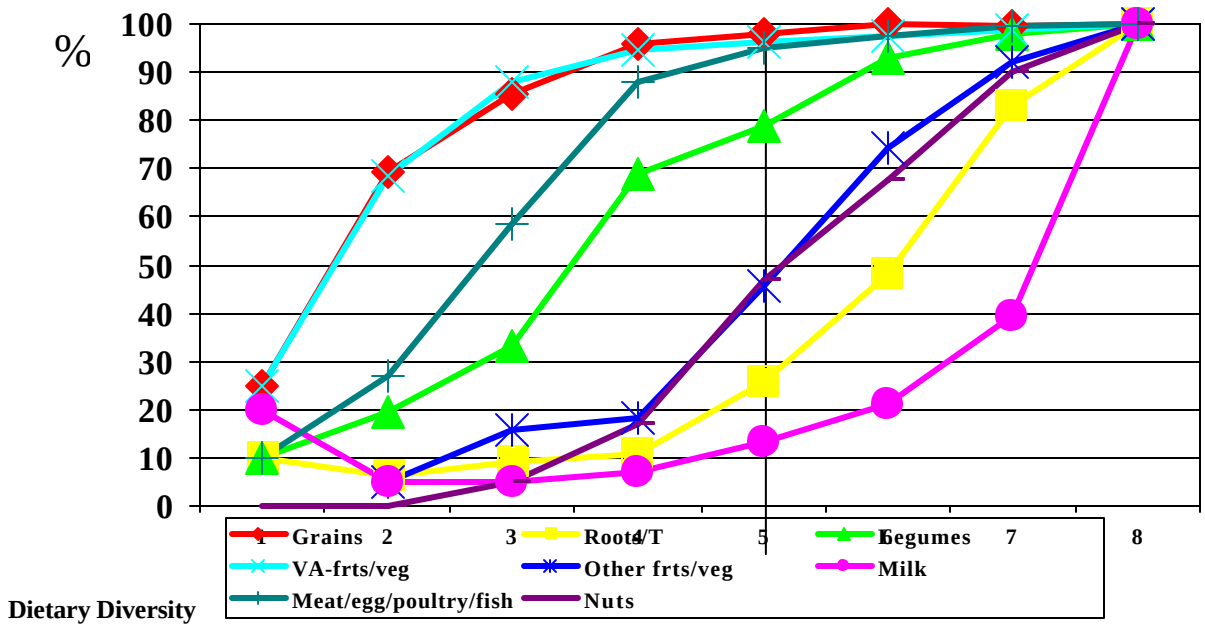
Note: sample sizes for 6-8 and 9-11 month old are < 50 per group

APPENDIX 8.11. Percentage of children who were fed meals at least the minimum recommended number of times for their age in the past 24 hours, by age and gender (children 6-23 months)

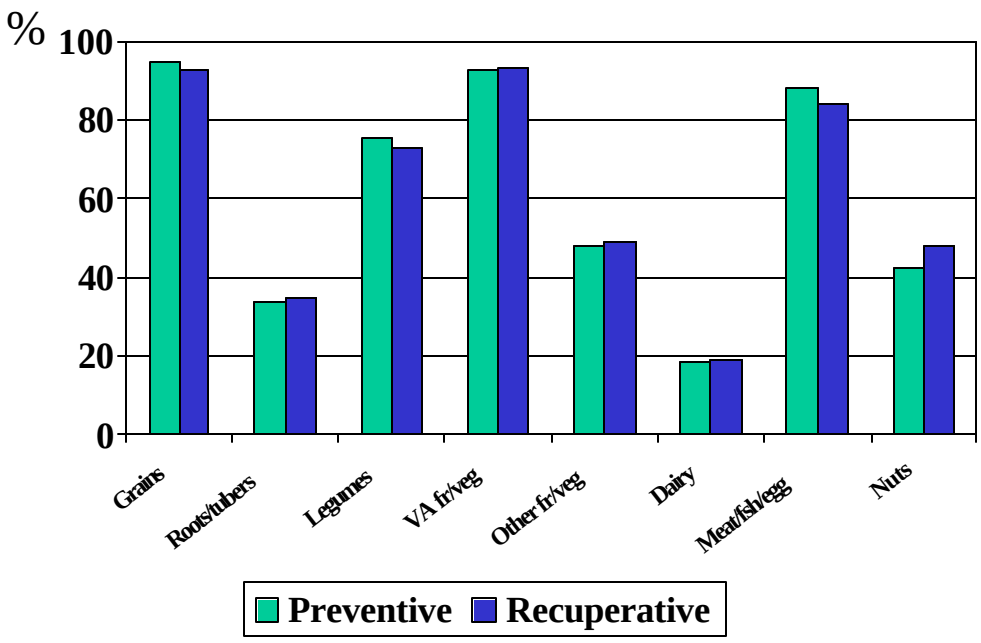


Note: sample sizes for 6-8 and 9-11 month old are < 50

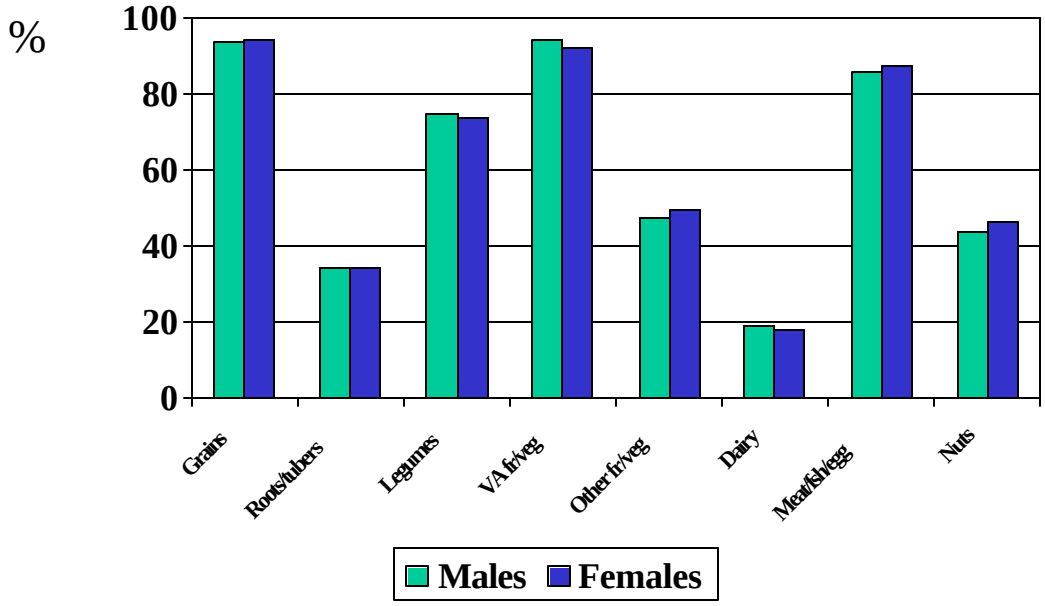
APPENDIX 8.12. Percentage of children who consumed different food groups yesterday, by dietary diversity score (children 6-47 months)



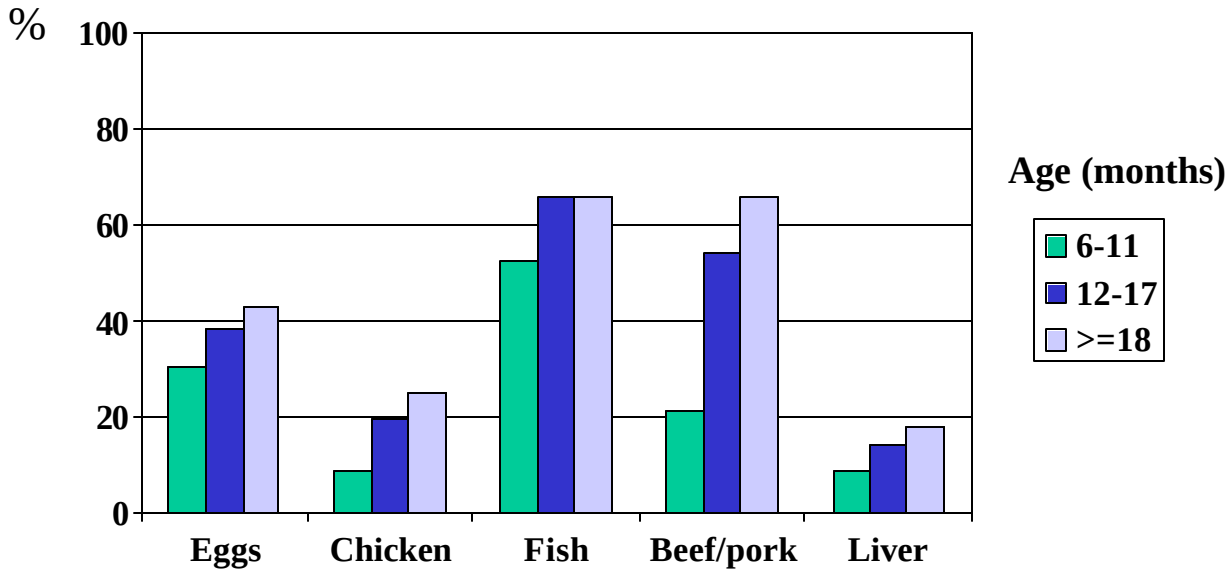
APPENDIX 8.13. Percentage of children who consumed selected food groups in the previous 24 hours, by program group (children 6-47 months)



APPENDIX 8.14. Percentage of children who consumed selected food groups in the previous 24 hours, by child gender (children 6-47 months)



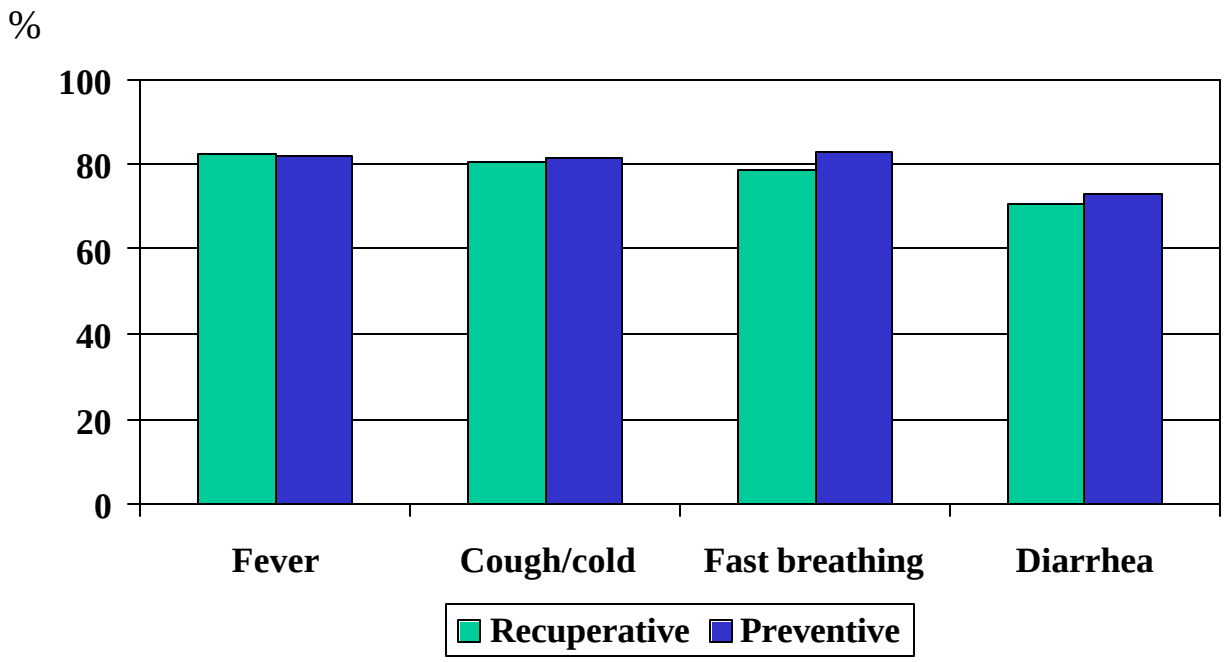
Appendix 8.15. Percentage of children who consumed selected animal products in the previous 24 hours, by age group (children 6-47 months)



APPENDIX 9.1. Scoring of variables for child, respondent and house cleanliness scales

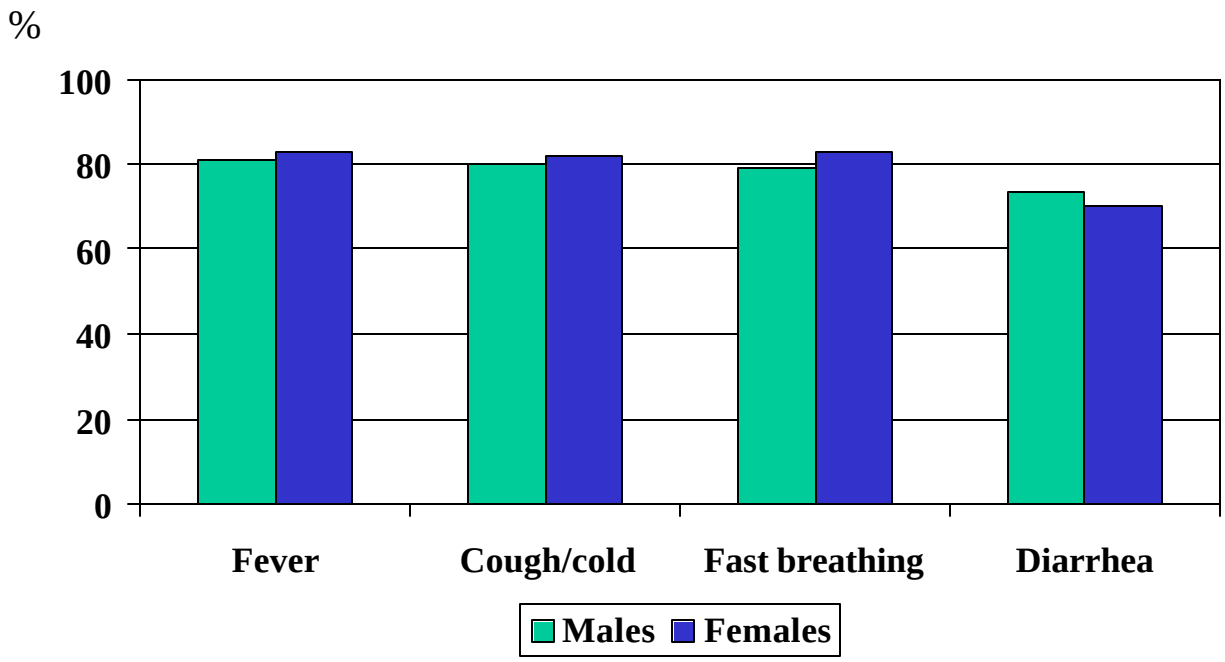
No.	Measured behavior/attitude	*Variable name*	Scoring
A.	***Child cleanliness*** ***Cronbach's alpha=0.91 (for naked children); 0.92 (for clothed children)***		
8.	State of the child's hands	*Q504a/q505a*	Dirty=1 Dusty=2 Clean=3
9.	State of the child's hair	*Q504b/q505b*	
10.	State of the child's body (or clothes for children who were clothed)	*Q504c/q505c*	
11.	State of the child's face	*Q504d/q505d*	
12.	Did the child have a runny nose that hadn't been cleaned?	*Q506*	Yes=0 No=1
	Total possible score	***chclean***	**Minimum=4 Maximum=13**
B.	***Respondent cleanliness*** ***Cronbach's alpha=0.83***		
1.	State of the mother's hands	*Q502a*	Dirty=1 Dusty=2 Clean=3
2.	State of the mother's hair	*Q502b*	
3.	State of the mother's clothes	*Q502c*	
4.	State of the mother's body/clothes	*Q502d*	
	Total possible score	***motclean***	**Minimum=4 Maximum=12**
C.	***House interior cleanliness*** ***Cronbach's alpha=0.86***		
7.	Does the interior of the house look like it needs to be swept?	*Q515*	Yes=0 No=1
8.	Is the drinking water container covered?	*Q516*	Yes=1 No=0
9.	Can piles of dirty clothes be observed inside the house?	*Q517*	Yes=0 No=1
	Total possible score	***Intclean***	**Minimum=0 Maximum=3**
C.	***House exterior (compound) cleanliness*** ***Cronbach's alpha=0.62***		
5.	Does the area around the house look like it needs to be swept?	*Q510*	Yes=0 No=1
6.	Can human feces be observed around the house?	*Q511*	Yes=0 No=1
7.	Can animal droppings be observed around the house?	*Q512*	Yes=0 No=1
8.	Can garbage be observed around the house?	*Q513*	Yes=0 No=1
	Total possible score	***extclean***	**Minimum=0 Maximum=4**

APPENDIX 9.2. Percentage of caregivers who reported seeking advice for selected morbidity symptoms, by program group (children 18-47 months)



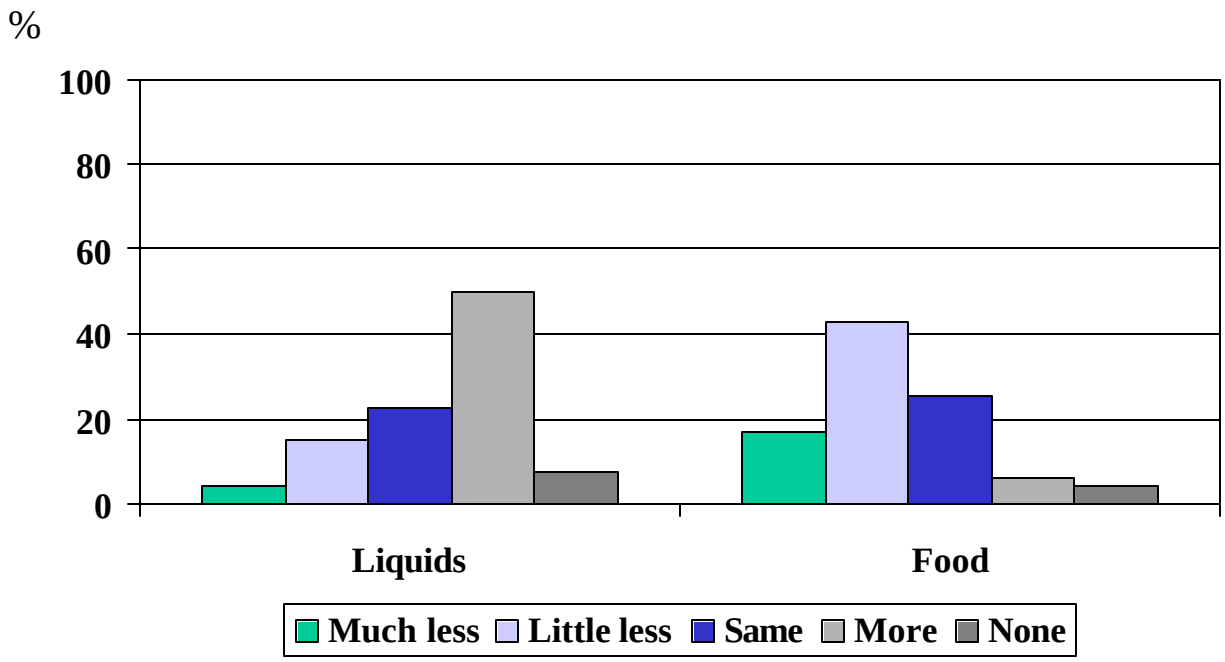
Note: sample includes only children who had reported symptoms in previous 2 weeks

APPENDIX 9.3. Percentage of caregivers who reported seeking advice for selected morbidity symptoms, by child gender (children 18-47 months)



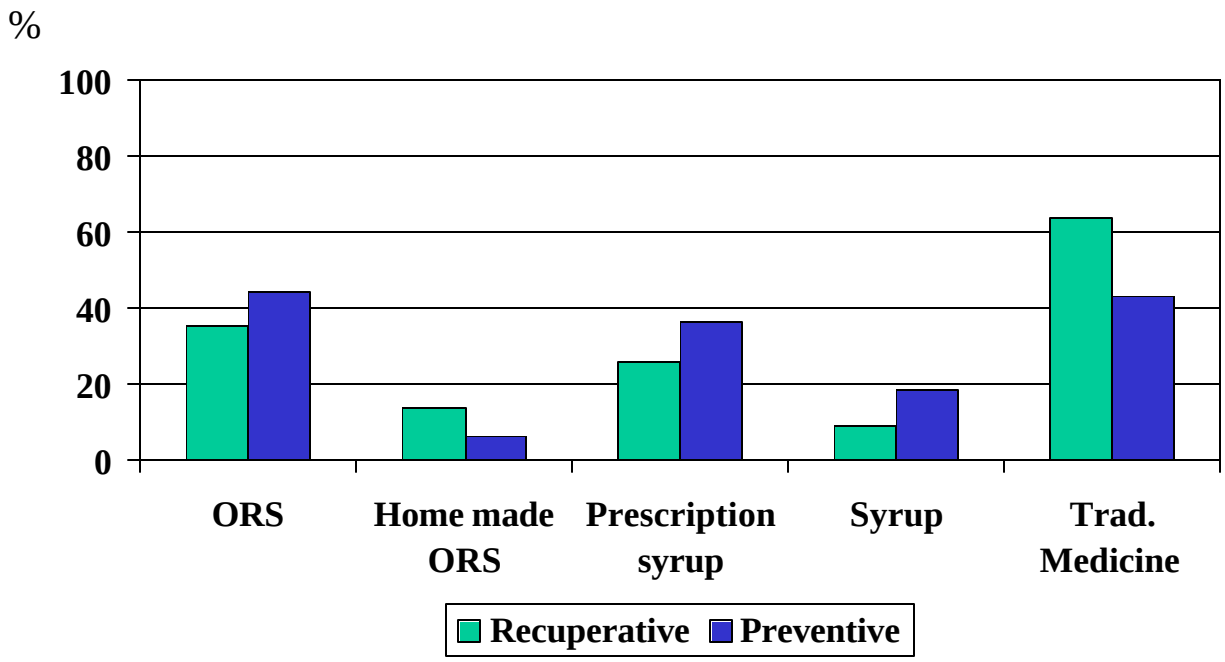
Note: sample includes only children who had reported symptoms in previous 2 weeks

APPENDIX 9.4. Reported changes in amount of liquids or food given to the child during diarrhea (children 18-47 months)



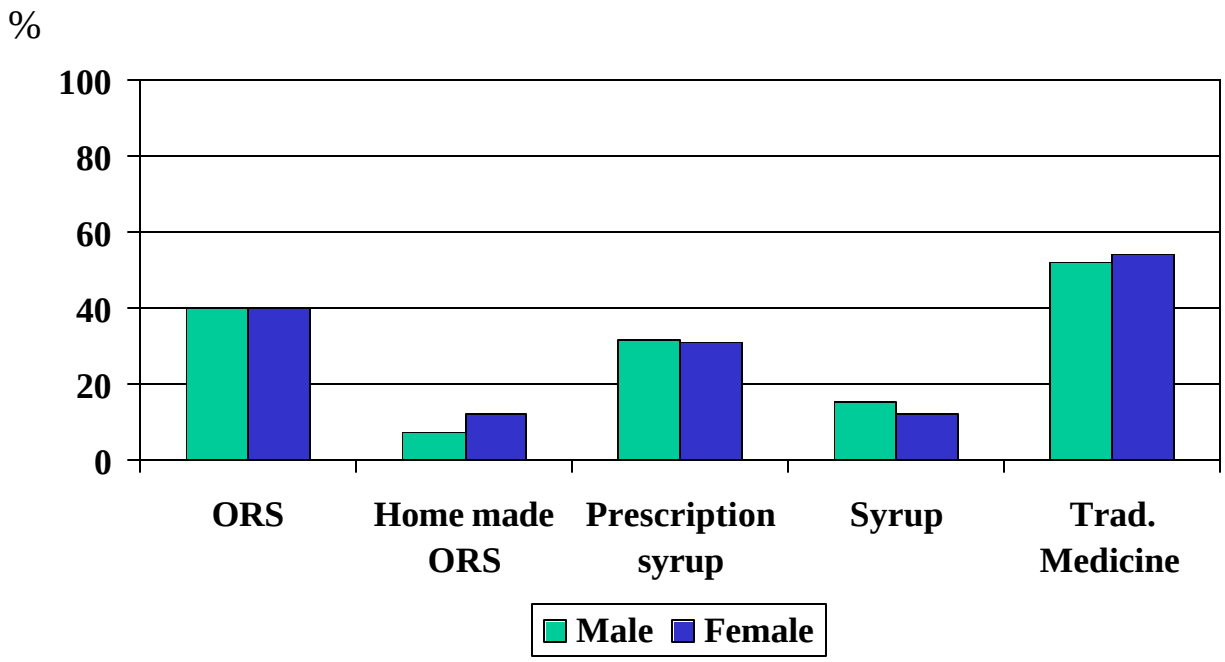
Note: sample includes only children who had reported symptoms in previous 2 weeks

APPENDIX 9.5. Percentage of caregivers who reported using oral rehydration salts or other treatments for diarrhea, by program group (children 18-47 months)



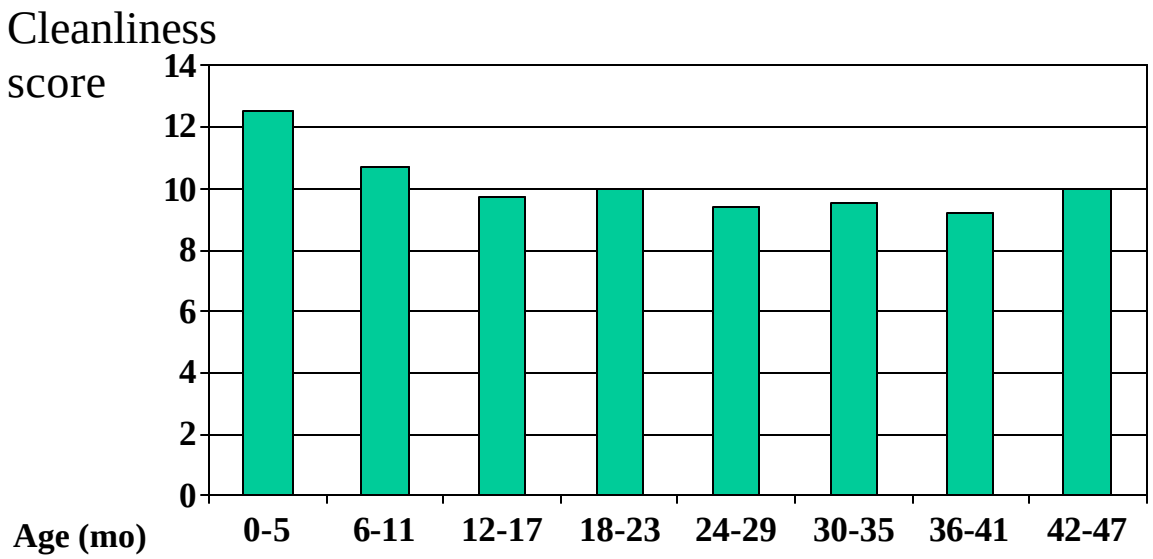
Note: sample includes only children who had reported symptoms in previous 2 weeks

APPENDIX 9.6. Percentage of caregivers who reported using oral rehydration salts or other treatments for diarrhea, by child gender (children 18-47 months)

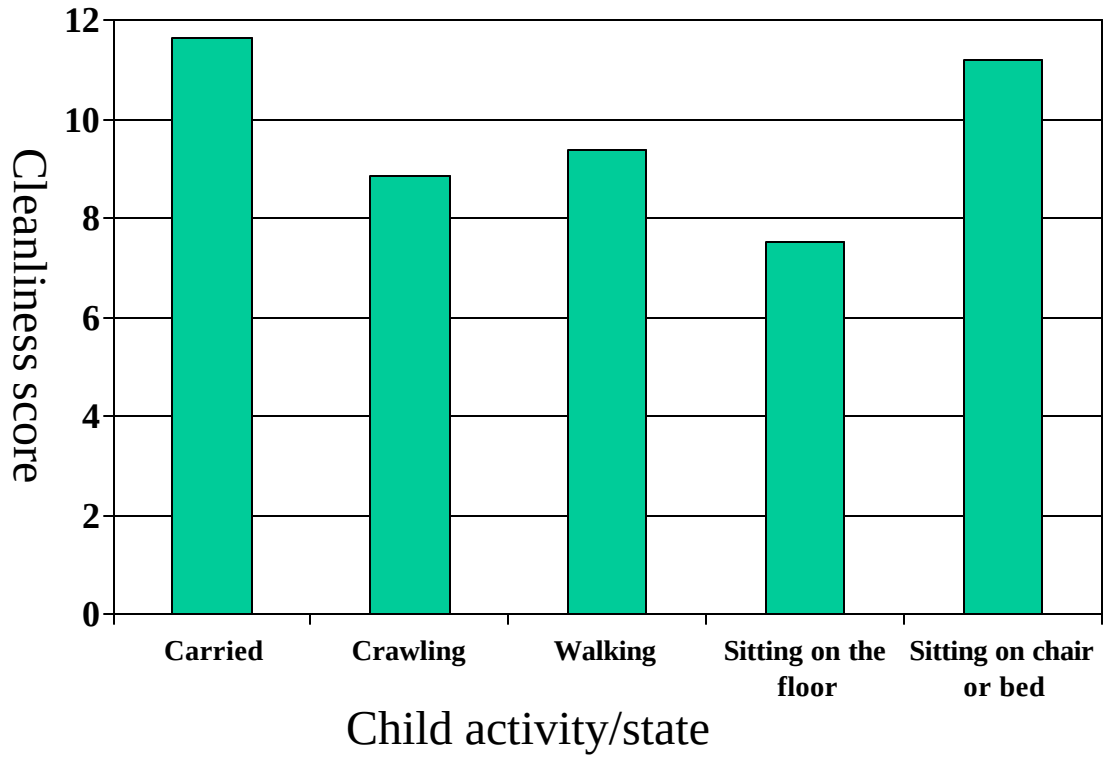


Note: sample includes only children who had reported symptoms in previous 2 weeks

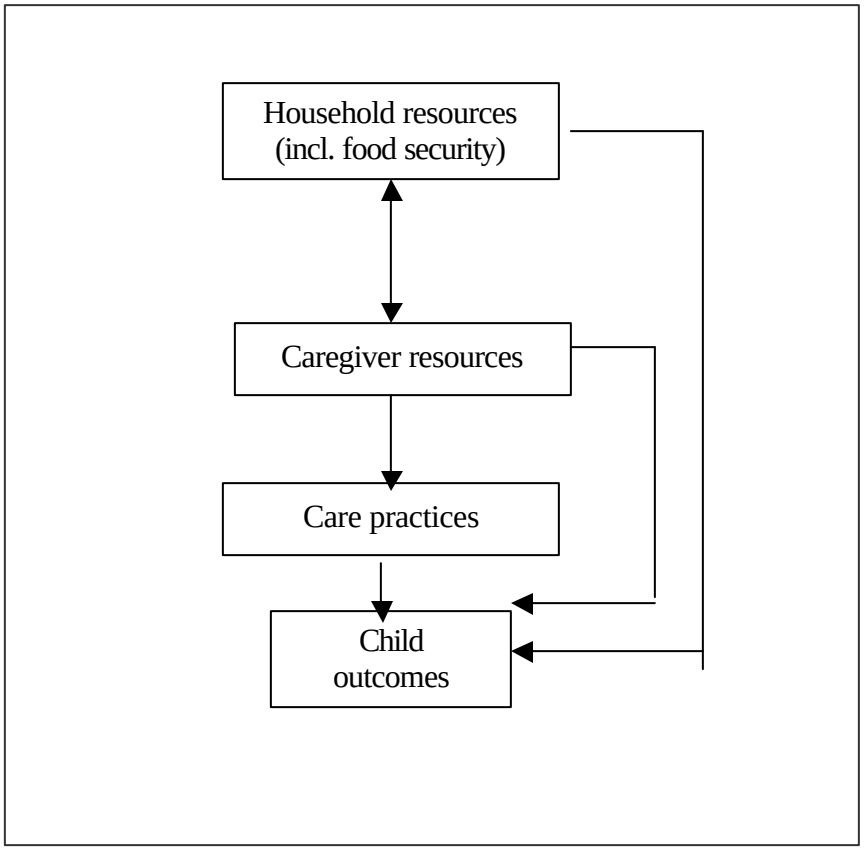
APPENDIX 9.7. Child cleanliness scores by child age group



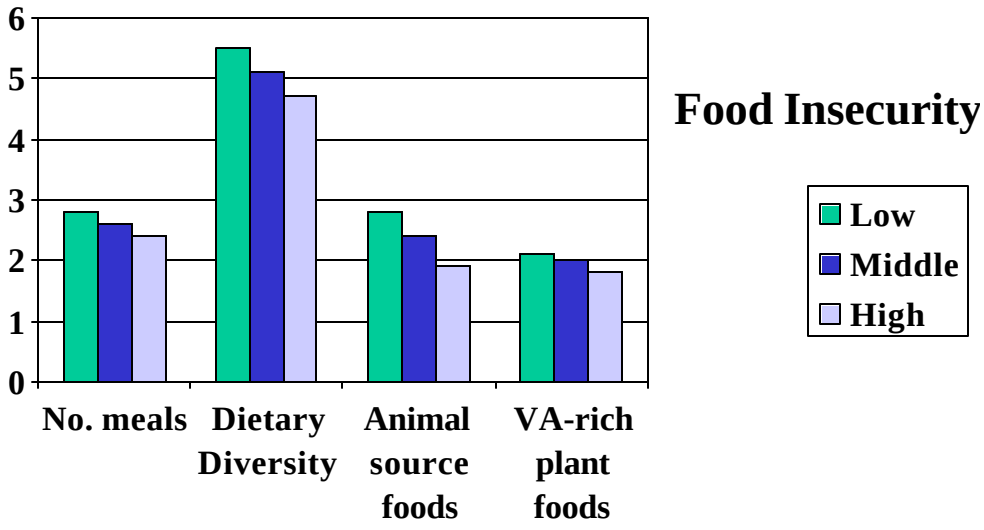
APPENDIX 9.8. Child cleanliness scores by child activity/state



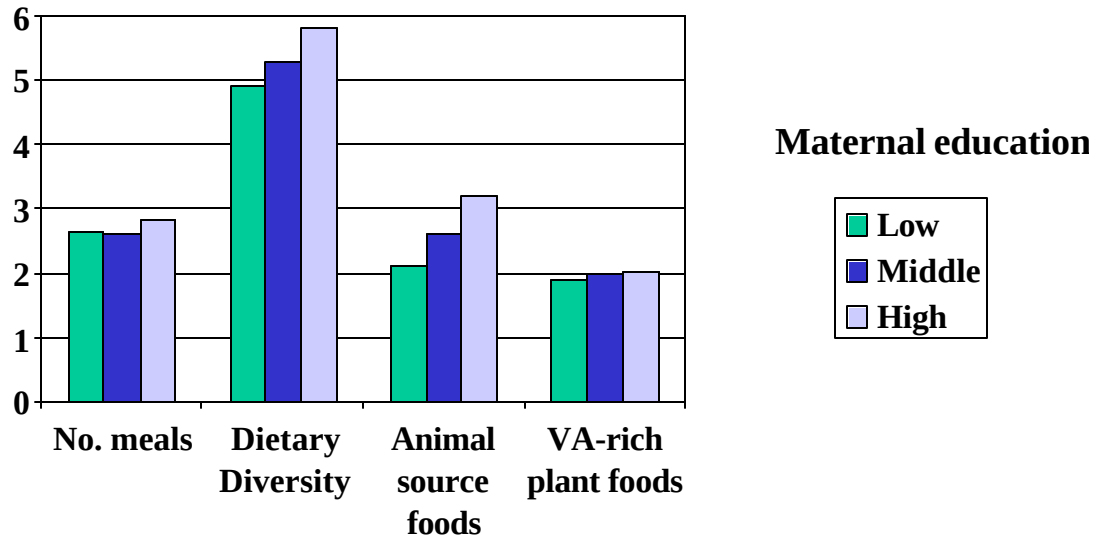
APPENDIX 10.1. Bivariate associations explored



APPENDIX 10.2. Associations between food insecurity and child feeding practices in the previous day (children 18-47 months)



APPENDIX 10.3. Associations between maternal education and child feeding practices in the previous day (children18-47 months)



APPENDIX 10.4. Prevalence of stunting and underweight by dietary diversity tercile (children 18-47 months)