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LINKING CHILD SURVIVAL PROGRAMS WITH MALNUTRITION  
ALLEVIATION STRATEGIES

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Maria S. Nnyepi

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Ph.D. degree in Human Nutrition

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**LINKING CHILD SURVIVAL PROGRAMS WITH MALNUTRITION  
ALLEVIATION STRATEGIES**

**By**

**Maria S. Nnyepi**

**A DISSERTATION**

**Submitted to  
Michigan State University  
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**DOCTOR OF PHILOSOPHY**

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## **ABSTRACT**

### **LINKING CHILD SURVIVAL PROGRAMS WITH MALNUTRITION ALLEVIATION STRATEGIES**

By

Maria S. Nnyepi

This study investigated the existence and utilization of linkages between Child Survival Programs (CSP) and undernutrition alleviation strategies for children (0-5 years) in Botswana. It focused on examining the use of routine dietary and nutrition screening in the curative and preventive clinics (Growth Monitoring, Supplementary Feeding and Immunization Programs) of the CSP. These components of the CSP were chosen because they were designed to address childhood illnesses and nutrition problems in children, both of which have been shown to explain 70% of the variance in the mortality of children 0-5 years worldwide. Data were obtained from personal interviews with 522 randomly selected caregivers of children who received curative or preventive care from CSP clinics. Where applicable, data from ten focus groups of caregivers and survey data from 39 non-randomly selected providers were used.

Undernutrition is a significant problem in children participating in CSP in Botswana. Nearly 14% and 11% of children in this study were stunted and underweight respectively, despite their participation in CSP. In older children (37 - 60 months), the prevalence of stunting (22.2%) was about twice that of children 0-12 months. Similarly, while only 4.7% of children 0-12 months of age were underweight, 13.1% and 19.3% of those 13-36 and 37-60 months were underweight respectively. In addition, younger children (0-12 months) in this population were at least twice and 4.4 times more

likely to attain adequate height-for-age and weight-for-age than older children respectively. Nutrition and dietary screening were seldom performed during clinic consultations. Only 18.1%, 10.8%, and 7.8% of children who sought curative care had their weight, feeding frequency or caregivers' awareness of feeding recommendations evaluated respectively.

Caregivers perceived the interpersonal communication between them and providers as being inadequate. Some caregivers did not give any particular reasons for not communicating (24.3%). Others gave reasons that imply communication challenges between providers and caregivers. Of the latter, some perceived sharing their perceptions with providers as being unnecessary (18.2%), not helpful (5.0%) or providers as being unapproachable (13.2%), not requesting feedback (10.3%) or too busy (4.4%).

This study showed minimal to no linkages between the curative and preventive programs within the CSP in Botswana. The lack of linkages between the programs may be an important factor in the persistence of undernutrition in children with access to CSP.

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**This work is dedicated to my mother Janet Kgaogano Mosasi Moalosi, my dear friend and husband Mbako, my children Mbano, Tatenda and Bubuya, and my niece Martha Moalosi.**

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## **ABBREVIATIONS**

<b>BNPC</b>	<b>Botswana National Productivity Center</b>
<b>CIS</b>	<b>Caregiver Interview Schedule</b>
<b>CSO</b>	<b>Central Statistics Office</b>
<b>CSP</b>	<b>Child Survival Programs</b>
<b>FAO</b>	<b>Food and Agricultural Organization</b>
<b>FWE</b>	<b>Family Welfare Educators</b>
<b>GOBIFF</b>	<b>Growth Monitoring, Oral Rehydration, Breastfeeding, Immunizations, Family Planning and Food and Nutrition</b>
<b>HAZ</b>	<b>Height-for-Age Z-score</b>
<b>HIV/AIDS</b>	<b>Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndromes</b>
<b>HRMM</b>	<b>Household Resource Management Model</b>
<b>IFPRI</b>	<b>International Food Policy Research Institute</b>
<b>IMCI</b>	<b>Integrated Management of Childhood Illnesses</b>
<b>NCHS</b>	<b>National Centers for Health Statistics</b>
<b>PQ</b>	<b>Provider Questionnaire</b>
<b>SADC</b>	<b>Southern African Development Community</b>
<b>UNICEF</b>	<b>United Nations Children's Fund</b>
<b>WAZ</b>	<b>Weight-for-Age Z-score</b>
<b>WHO</b>	<b>World Health Organization</b>
<b>WHZ</b>	<b>Weight-for-Height Z-score</b>

## **CHAPTER I**

### **INTRODUCTION**

#### **Nutrition Challenges for Children in Developing Countries**

Nutritional requirements for sustaining growth and development in healthy children are very high. In developing countries, these requirements are further increased by the frequency of malaria, diarrhea, pneumonia, measles, and undernutrition episodes in children 0-5 years (Martorell et al., 1975). Yet, diets for children in developing countries are often inadequate and in some instances they have been shown to provide only about two-thirds of the recommended dietary intake of calories and protein (Becker et al., 1991). Furthermore, nutrition programs in developing countries frequently lack mechanisms that target interventions to children at risk for undernutrition because of frequent illnesses. For such children, the resulting disparity between their nutritional intake and requirements aggravates undernutrition and further increases their risk for poor growth, impaired cognitive development, severe illnesses and even death (Fawzi et al., 1997; Pelletier et al., 1993 & 1994; Pelletier, 1994; Rowland et al., 1988).

Increasingly, surveys in developing countries indicate that caregivers increase the variety of foods and the frequency of feeding during illnesses in an attempt to arrest the progression of undernutrition and its negative effects (Bentley et al., 1991). These efforts are often inadequate because most households are impoverished. Consequently, the food choices caregivers make are more indicative of food access and availability rather than nutrient density and the child's increased need for specific nutrients. Furthermore, without proper nutrition education, the feeding practices of caregivers may be misguided



by their perceptions regarding the causes of illnesses, cultural preferences, and beliefs regarding the suitability of certain food items during or following ill health (Bentley, 1988; Nichter, 1988). With limited knowledge about food safety, the food introduced may also introduce harmful microbes. Given these limitations, poor households in developing countries are more likely to provide inadequate diets for their children, particularly during ill health, compared to affluent households in developed countries.

### **Child Survival Programs and Undernutrition Alleviation**

In Botswana Child Survival Programs (CSP) are modeled after the World Health Organization (WHO) and United Nations Children's Fund's (UNICEF) primary health care model (WHO, 1978). Under this model, Growth Monitoring, Breastfeeding, Immunizations, Family Planning, and Feeding (GOBIFF) programs have common physical structures and administrative center to facilitate a comprehensive response to children's health and nutritional needs.

Very often available programs, although they may be physically adjacent, are run independently from each other. Therefore, individual programs may fail to identify pockets of children whose needs can best be met by the programs joint efforts. When the programs are run independently, curative clinics may focus only on treating medical conditions. The nutrition programs, on the other hand, may continue to use the child's chronological age as the primary determinant of the type and amount of food supplements as it has been the practice in Botswana (Mpofu et al., 1988). This approach ignores the other key determinants of well being such as the child's illness history and household's food security. For a more effective intervention, however, the nutrition and

health challenges of special pockets of children within the 0-5 year age group may be best addressed through the coordinated efforts of the curative and preventive services of the CSP.

Observations from Poskitt and Whitehead's (1998) study suggest that in developing countries, the negative effects of childhood illnesses on the growth of children cannot be reversed by the reduction in the frequency of illnesses alone because of the high prevalence of sub-clinical undernutrition. However, when dietary intakes are increased to levels recommended by the World Health Organization, positive weight gain is realizable even during illness episodes (Becker et al., 1991). These observations suggest that the role of nutrition in health might be even more critical in the management of childhood illnesses in poorer countries compared to the management of the same illnesses in affluent environments (in developed countries). Hence, CSP in developing countries may need to strengthen their nutrition component.

These observations further suggest that undernutrition alleviation programs in developing countries might be more effective than the current set up if the intervention strategies were sensitive to the child's degree of undernutrition risk. Also, the recognition that undernutrition risk is greater in children with any of the top five childhood illnesses in developing countries or a proxy indicator for them is central to effective child survival programming. Hence, in keeping with the guidelines embodied by the Integrated Management of Childhood Illnesses initiative (WHO, 1997), children presenting at health clinics for illnesses should be concurrently screened for both illnesses and undernutrition risk.

Additionally when medical treatment and nutrition intervention are deemed necessary, it should be relevant to both the established degree of illness and undernutrition risk. This comprehensive approach requires that the functional “boundary” between medical clinics and nutrition services in the CSP be less rigid. If medical clinics and nutrition services are operationally linked as proposed, then children coming in through the medical clinics can be 1) treated for their illnesses and 2) “funneled” through to nutrition services (or other services that the practitioner deems relevant). Furthermore, when clinic consultation focuses on both nutrition and medical concerns at each visit, the prescribed intervention is likely to be more comprehensive. Thus, the need for children to make multiple visits or wait at home for the next scheduled clinic service will be lessened or eliminated.

#### Child Survival Programs in Botswana

In Botswana, the Child Survival Programs are accessed through the government health facilities, which could include mobile stops, health posts, clinics, or hospitals (Lesetedi et al., 1989). Excluding mobile posts, there were over 556 health facilities in the country in 1996 (Central Statistics Office, 1996). Within the health facilities, Child Survival Programs are operationally divided into clinics. The Immunizations, Growth Monitoring, Food and Nutrition and Family Planning components of the CSP are accessed through the Maternal and Child Health Clinics (commonly referred to as Child Welfare Clinics (Lesetedi, et al., 1989). The Oral Rehydration component is accessed through the curative (medical) clinic.

## **Undernutrition and Childhood Illnesses in Botswana**

Undernutrition in children 0-5 years in Botswana continues to be a significant problem. In 1996, for example, government clinic records showed that children 0-4 years made 64 percent of the 3,883 undernutrition-related clinic visits (Central Statistic Office, 1996a). In addition, a more recent government survey found 28.9%, 17% and 11.3% of children under the age of 5 years to be stunted, underweight and wasted respectively (Central Statistics Office, 1999). The prevalence of stunting and underweight reported by the Central Statistics Office (1999) was similar to that reported by Ubomba-Jaswa and Belbase (1996) in which 27.6% and 16.9% of study children were found to be stunted and underweight respectively. However, the prevalence of wasting, a more comprehensive indicator of undernutrition, reported by the Central Statistics Office of 11.3% (1999) was almost double the 6.6 % reported in 1996 by Ubomba-Jaswa and Belbase.

Although multiple contributory factors for undernutrition are known, recent studies indicate that a large number of children in Botswana receive less nutrient dense complementary foods (Aplogan et al., 1996; Nnyepi, In-press; Ubomba-Jaswa and Belbase, 1996). More specifically, thin sorghum porridges, which were the child's primary complementary food in 53-72% of rural households, were associated with high rates of growth faltering in children 3-36 months of age (Nnyepi, 2000; Ubomba-Jaswa and Belbase, 1996).

In addition to inadequate dietary intakes, undernutrition in Botswana is also precipitated by frequent illness episodes in children. The most prevalent childhood illnesses include diarrhea, measles, undernutrition, and malaria. Though reported for children 0-4 years only, diarrhea is particularly prevalent in children 0-5 years in

Botswana. Nearly sixty percent (58.5%) of 151,001 diarrhea-related clinic visits in 1996 were made by children 0-4 years (Central Statistic Office, 1996). Between 1991 and 1997, the number of children 0-4 years who were seen for diarrheal illnesses at government clinics rose from 34,243 to 66,905 (Central Statistics Office, 2000). In standardized indicators, these figures translate to incidence rates of 1768.2 and 3009.0 per 10,000 children in 1991 and 1997 respectively. Diarrhea is thought to precipitate undernutrition by promoting weight loss and reduced food intake. Weight loss is inevitable in diarrhea because the frequent bowel movements that are characteristic of diarrheal illnesses expel macronutrients faster than they can be absorbed. In addition, micronutrients (vitamins and minerals) are lost as the body dumps fluids into the gastrointestinal lumen to facilitate the elimination of microbials (Rowland et al., 1988; Schroeder and Brown, 1994).

### **Problem Statement**

The prevalence of undernutrition and childhood illnesses in Botswana is very high. The combined effects of both undernutrition and childhood illness predispose children to a higher risk of severe undernutrition and even death than their individual effects (Becker et al., 1991). Yet, Child Survival Programs in Botswana lack a coordinated undernutrition alleviation strategy that targets children at risk of severe undernutrition. If implemented, this strategy is expected to arrest the development and progression of severe undernutrition through early detection of children at risk and provision of preventive interventions. Such a system requires the development of close linkages between the curative clinics, where children's medical and undernutrition

consultations can be sought ad libitum, and preventive nutrition supplementary feeding programs that operate on fixed monthly schedules.

Although the government of Botswana provides specific complementary foods to all children 0- 5 years, the supplements provided are based solely on the child's chronological age. Thus, this practice disregards the influence of the child's current nutrition and health on nutritional needs. Similarly, curative clinics appear to disregard underlying undernutrition in the treatment plan. Consequently, an ill or malnourished child gets the same kind and amount of supplements (energy and protein) as a healthy well-nourished child of the same age. Clearly, this is a flaw.

Further, the extent to which the current CSP in Botswana meet the perceived needs of caregivers (nutritional needs of children) has not been evaluated. Therefore, in addition to examining the existence and utilization of linkages within CSP in undernutrition alleviation, this study also examines the extent to which program services are aligned with caregivers needs.

This exploratory study has two major purposes. The first purpose is to explore the extent to which linkages in CSP in Botswana are utilized to alleviate undernutrition in children under five year of age. Specific linkages of interest are those between curative clinics and supplementary feeding programs. Furthermore, the degree to which specific (routine) nutrition/diet screening are integrated into curative services for nutritionally at risk children will be determined. The second major purpose is to determine the extent to which caregivers' needs (child's needs) are met by both the medical (curative) and nutritional services that their children receive.

## **Justification**

In the late 1990s, the World Health Organization and the United Nations Children's Fund (UNICEF) introduced a strategy that integrates the prevention and management of the top five childhood illnesses currently responsible for 70% of mortality in children 0-5 years worldwide. The rationale for this integrated management of childhood illnesses (IMCI) is that children in developing countries often present at health facilities with multiple illnesses. It is therefore inappropriate and costly for practitioners to ignore other underlying or confounding factors and focus only on the caregivers' reasons for seeking medical care. In addition, the underlying/confounding factors may be more serious than concerns that prompted caregivers to seek consultation. Therefore, the IMCI strategy argues that children presenting at clinics should be examined, and if necessary be treated for multiple illnesses/ conditions as well as underlying factors such as undernutrition and immunization status. The IMCI strategy relies heavily on the utilization of linkages between the curative and preventive programs and argues that at each visit a child's access to and use of all other CSP should be evaluated.

In the late 1970s, UNICEF introduced a primary health care model called the GOBIFF (Growth Monitoring, Oral Re-hydration, Breastfeeding, Family Planning, and Feeding). The GOBIFF model, on which CSP in Botswana were founded, advocates for the integration of CSP (WHO, 1978). Evaluated against the expected decrease in the prevalence of undernutrition in children 0-5 years, in integrated Child Survival Programs, it can be argued that very few advances in the integration of CSP in Botswana have been

made. A step toward this end in Botswana was the relocation of all CSP into one physical location and under common administrative center both at the national and local levels in the country. The amount and type of work that still need to be done to develop functional linkages between medical and nutrition programs to levels necessary for implementation of IMCI is still not clearly defined. Evaluative research projects conducted in Botswana by child survival program managers to date were program specific and did not focus on the collective effectiveness of both the medical and preventive programs.

We consider this study essential because it attempts to bridge the gaps in previous research. It is also timely because it takes place when the implementation of IMCI in Botswana is in progress. Thus, the study has the potential to provide information that will guide the implementation of IMCI in country, by identifying gaps that need to be filled as the CSP transition from GOBIFF to IMCI. The study also ties the exploration of the existence and utility of CSP linkages to childhood illnesses and undernutrition, both of which are significant problems in Botswana and sub-Saharan Africa. The recent International Food Policy and Research Institute (IFPRI) projections, for example, suggest that undernutrition prevalence rates for children under five years in sub-Saharan Africa are projected to rise by at least 20% (6.6 billion) in the next 20 years (Rosegrant et al., 2000). This rise is unique to sub-Saharan Africa. In fact, global undernutrition prevalence rates for children under five years worldwide are expected to decline by 20% during the same period (Rosegrant et al., 2000).

The existence and utilization of linkages in programs is crucial in undernutrition alleviation programs and has the potential to enhance the management of all other



illnesses that require multidisciplinary interventions. One such condition is HIV/AIDS, which is very prevalent in Botswana. Just like the negative effects of childhood illnesses, HIV/AIDS has been shown to accelerate the deterioration of the victim's nutritional status and immunocompetence. Thus, we hoped that the findings of this study would guide us in developing protocols that nurture program linkages and thus facilitate the multidisciplinary approaches such as those required in illness that are currently prevalent in Botswana such as HIV/AIDS management.

This study also attempts to measure caregivers' satisfaction with the intervention services that children receive. The Household Resource Management Model (Figure 1), which guides this study, postulates that caregivers process all inputs to produce the desired outcomes. Important components of these inputs include the nutritional and medical services that children receive at the clinic. When such services are perceived as inadequate, the family's realization of the desired outputs may be impaired. Thus, caregivers' satisfaction with the services is important in promoting collaborative working relationship with the clinic administrators. Furthermore, in examining the caregivers' satisfaction with services provided, this study will also provide some indications of the public's satisfaction with Child Survival Program services and suggest areas of possible improvement. It is for this reason that we assume that caregivers are more likely to work harmoniously with clinic, village, or government authorities if open channels of communication are maintained between the two parties.

The other premise of the Household Resources Management model is that caregivers' perceptions about the disparity between the observed and desired outputs can be useful feedback into the system. Similarly, negative feedback, if any, due to

caregivers' dissatisfaction with clinic/village/government programs can help the government to target programs to the felt needs of caregivers, or to educate consumers about the goals of the government programs. However, the program's lack of response to caregivers' needs can potentially destabilize the communities within which the clinics are run because the issues addressed are basic needs for life.

Finally, in addition to satisfying the requirements for a doctoral program, the proposed study is of immediate practical importance with regard to nutrition policies in Botswana. The problems outlined above are real and confront households and health professionals in Botswana continually.

### **Conceptual Frameworks**

Two theoretical frameworks were chosen to guide this study. The two are the Household Resource Management Model by Deacon and Firebaugh (1988) (Figure 1) and the UNICEF Conceptual Framework of Child Survival, Growth and Development (Figure 2) (UNICEF, 1996). The Household Resource Management Model (HRM) was chosen because it describes the processes involved in the management and utilization of household resources. The model argues that households balance the spending of the household resources with the attainment of desired outcomes. As postulated in the model, household resources (or inputs) are translated to meet household demands, which are also called outputs. The process through which the inputs are translated into the desired goals is called the throughputs, while the desired goals are referred to as outputs or outcomes.

The inputs are defined as available resources in the households. Deacon and Firebaugh (1988) characterize inputs as basic physiological needs (water, air and food),

human and non-human resources such as income, skills, healthcare and information. In the context of this study, the inputs have been defined at three levels; the household, the individual study child and the Child Survival Programs (Figure 1). The inputs at the household level are household demographic factors that have been shown to influence household child survival goals. These include household size, maternal income and education and feeding and caring practices. At the child level, the inputs are the child's birth weight, age, gender and feeding. At the Child Survival Program level, the services of the child survival programs have been defined as inputs. The CSP are regarded as external resources that households can use in promoting the growth of children.

Deacon and Firebaugh (1988) characterized the throughputs as the processes associated with the transformation of inputs into outputs. These processes require households to identify and prioritize their desired goals, develop and implement plans for accomplishing the set goals and evaluate the attained outcomes. Therefore, the essential processes in the throughputs phase include planning, implementation and evaluation. Akin to Deacon and Firebaugh's (1988) description of the throughputs, this author has defined the throughputs as decision-making processes that encompass households' health seeking behaviors. Specific health seeking behaviors include households' compliance with prescribed care. The throughputs also include households' decisions leading to the request for care for childhood illnesses, and the use of household resources in infant and young child feeding.

Consistent with the objectives of this study, the outputs have been defined as the children's anthropometric measurements and caregivers' satisfaction with care. Adequate growth, as indicated by the height-for-age, weight-for-age and weight-for-age

z- scores above -2 standard deviations of the median of the reference population, suggest that the inputs are adequately transformed into the outputs. The reverse is true if the growth indicators of children fall below -2 standard deviations of the median of the reference populations. Caregivers' satisfaction with care has also been identified as another output in this study. Caregivers' satisfaction with care is a logical outcome for evaluating the input of the Child Survival Programs.

The Household Resources Management model (HRM) model will be helpful particularly in guiding the researcher's examination of the use of resources (both household and external) and the transformations of these resources into behaviors that promote adequate growth (anthropometric indicators) in children.

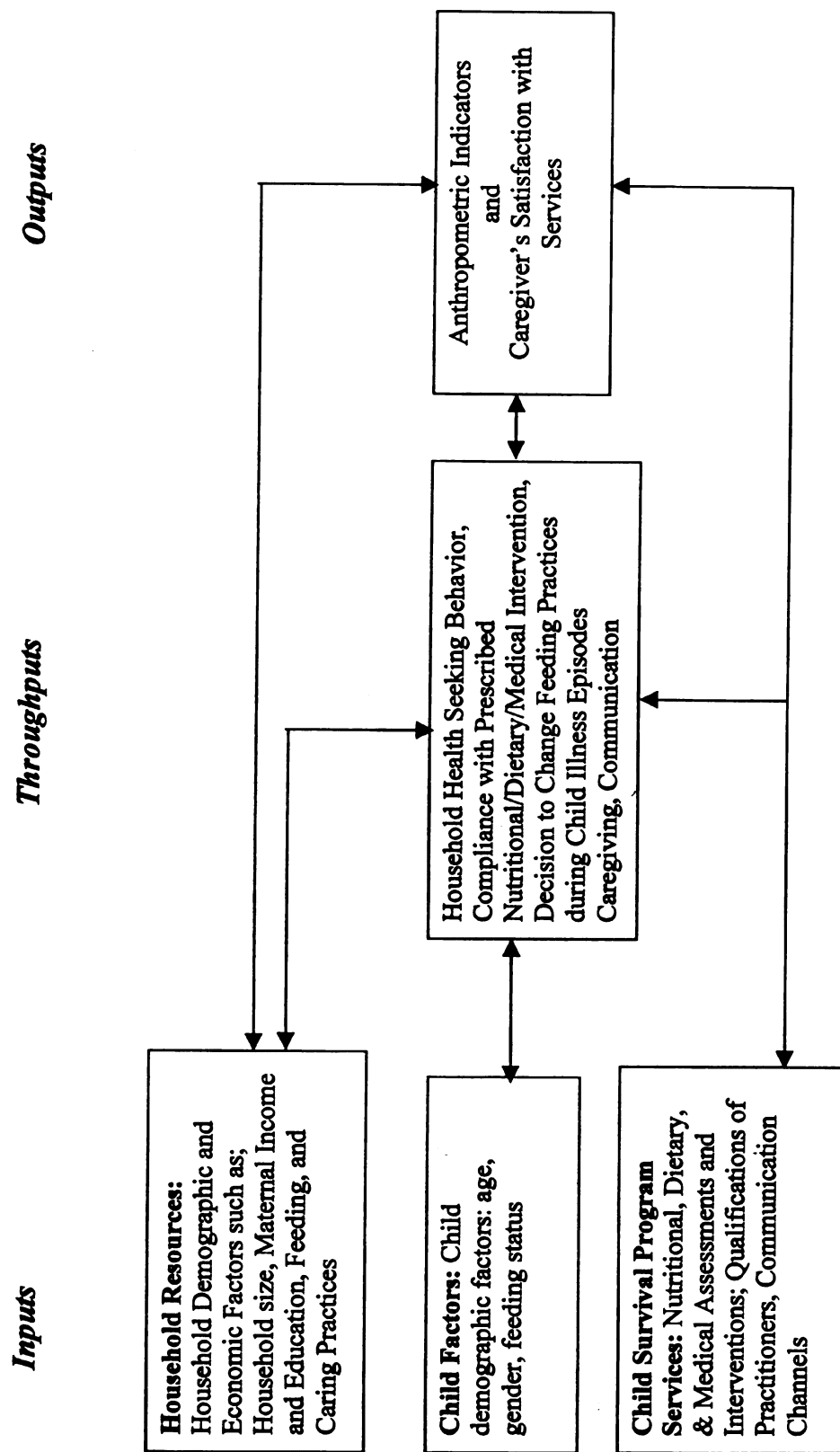
The second theoretical framework used in this study is the UNICEF Conceptual Framework of Child Survival, Growth and Development. The UNICEF model was chosen because it outlines established predictors of Child Survival, Growth and Development. While the HRM model emphasizes the processes through which households manage resources, the UNICEF model emphasizes factors that have been shown to influence nutritional status of children. Therefore with the combined use of both models, both the processes involved in the management of resources within households and the correlates of adequate nutrition in children can be studied.

The UNICEF framework classifies the determinants of child survival, growth and development into three tiers. These tiers are the immediate, underlying, or basic determinants of child survival, growth and development. The immediate causes, which include inadequate dietary intake and diseases, directly influence the nutritional status of children. At this level, the model underscores the importance of children's "access to

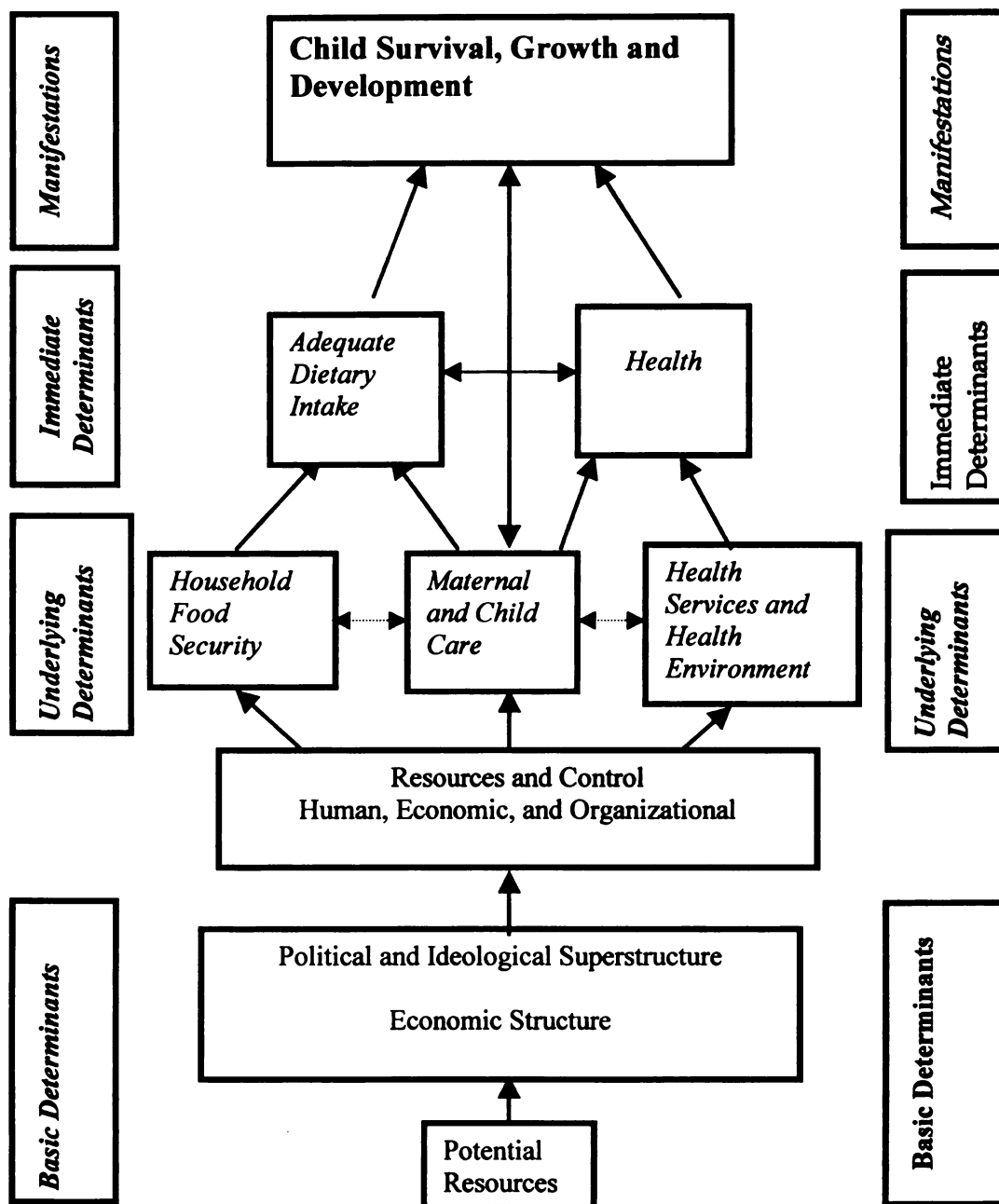
food” and “basic health services” in the survival and development of children. These factors are very relevant to this study because the study attempts to evaluate the linkages between the preventive programs (which in this study include the supplementary feeding programs) and the curative programs. Thus linkages of interest in this study are those between programs that have the potential to influence children’s access to food and basic health care.

The second tier of the UNICEF framework (the underlying determinants), encompasses factors that influence the “household food security, maternal care, child care, health services, and the environment”. These factors have been shown to influence the nutritional status of children by modifying the immediate factors (access to food and healthcare). Therefore, the underlying factors are important only to the extent that they modulate the immediate causes of child survival, growth and development in this study.

The third tier in the UNICEF framework defines the basic determinants of child survival, growth and development. These global factors include the economic resources and political systems of a given country. As depicted in the model (Figure 2), the basic determinants influence child survival, growth and development through their impact on the household’s food security, maternal and child care systems and the adequacy of health systems in the country. Although a logical connection can be argued between the basic factors and the immediate factors, the basic factors are largely beyond the scope of this study.



**Figure 1 Household Resource Management Model. Adapted from Deacon and Firebaugh, 1988**



**Figure 2 Conceptual Framework of the Determinants of Child Survival, Growth, and Development (UNICEF, 1996).**

## CHAPTER II

### LITERATURE REVIEW

#### Undernutrition Trends

The World Health Organization (WHO) has a comprehensive database on the prevalence of undernutrition in children 0-5 years. Data are available for the three forms of undernutrition; wasting underweight, and stunting (de Onis, et al., 1993). WHO observed that between the mid 1980s and the mid 1990s 80%, 15% and 5% of stunted children lived in Asia, Africa and Latin America respectively (de Onis et al., 1993). This distribution has not changed much despite the fact that the global prevalence of all forms of undernutrition has declined since the 1970s. Between 1980 and 2000 the number of moderately underweight children decreased by about 26 million worldwide, a 37% decrease (de Onis et al., 2000). More recently, IFPRI predicted that in the next 20 years (i.e. by 2020) the prevalence of undernutrition will **decline** by 20 percent in all regions except sub-Saharan Africa (Rosegrant, et al., 2001). Therefore, with the exception of sub-Saharan Africa there has been an overall decrease in the number of undernourished children since the mid 1970s worldwide.

For sub-Saharan Africa, the International Food Policy Research Institute's (IFPRI) optimistic predictions suggest that there will be an 18 % (6 million) **increase** in the prevalence of undernourished children (0-5 years) compared to the 1997 prevalence rates (Rosegrant et al., 2001). These optimistic predictions were based on the assumptions that crop production and local economies will grow steadily and governments will remain stable. If these basic assumptions are not met, sub-Saharan Africa could experience a 50% increase in the number of malnourished children



(Rosegrant et al., 2001). Given these predictions, we expect that Botswana, which has the most unpredictable rainfalls, frequent drought conditions, and very high numbers of HIV/AIDS cases as well as the highest HIV/AIDS-related costs in the region, is likely to experience much higher rates of undernutrition in children 0-5 years than other countries in the region.

The rates of undernutrition observed in developing countries are particularly devastating because undernutrition is the leading cause of death in children under five years of age worldwide. In 1995, for example, undernutrition explained about 54% of the variance in childhood mortality worldwide (Murray & Lopez, 1996). Already studies have established the negative influence of undernutrition on infant mortality, cognitive development in school age children, reproductive outcomes in females, physical performances and productivity in adults and political instability (Allen, 1995; Alvarez et al., 1988; Calloway et al., 1993; Fawzi et al., 1997; Fernald and Grantham-McGregor, 1998; Hennerberg et al., 1998; Martorell, 1995; Neumann and Harrison, 1994; Pelletier and Frongillo, 2003; Pollitt et al., 2000; Smith and Haddad, 2000).

### **Childhood Illnesses**

The World Health Organization estimates that about 12 million children die every year before their fifth birthday. About 70% of these deaths are attributed to acute respiratory illnesses, diarrhea, measles, malaria and undernutrition. These illnesses, which are collectively referred to as the top five childhood illnesses, are predicted to continue to be the major causes of deaths in children through to year 2020 (Murray and Lopez, 1996).

## **Reciprocity of Undernutrition and Childhood Illnesses**

Illnesses and inadequate nutrition have a reciprocal (and possibly causal) relationship (Rowland et al., 1988; Schroeder and Brown, 1994). Illnesses increase the child's nutritional requirements and thus widen the gap between dietary intake and need. This disparity may result from low dietary intake due to depressed appetite, increased metabolic rates due to feverish conditions, increased nutrient loss through fecal matter as in diarrheal illnesses or several combinations of these factors depending on the illnesses.

Undernutrition, on the other hand, may precede or aggravate illnesses in children. Once established, undernutrition has been shown to promote rapid deterioration of the host's immunocompetence and thus jeopardize their survival (Santos, et al., 1983; Schroeder and Brown, 1994). Undernutrition has also been shown to be the primary underlying factor in childhood illnesses and mortality. Observations drawn from the other studies suggest that nearly 54% of the variation in childhood deaths worldwide can be explained by undernutrition (Murray and Lopez, 1996, Pelletier, et al., 1993). Similarly, other researchers have observed that moderately malnourished children were 50% more likely to succumb to infections compared to well-nourished children (Fawzi et al., 1997).

The combined effects of undernutrition and infection place children at even greater risk of mortality than each of them individually. Pelletier (1994) found that the combined effects of infection and undernutrition on children were multiplicative and not simply additive. All these observations suggest that intervention programs in developing countries should not stand-alone and efforts to stage multifaceted intervention programs should be promoted.

## **Food Security Issues**

In the problem statement section, we argued that undernutrition is a serious problem in children 0-5 years in part because of the poor coordination between programs addressing childhood illnesses and those dealing with inadequate complementary feeding. The strength of this argument, as shown in earlier parts of this dissertation, lies on the understanding that health and nutrition acutely affect the well being of children (see Figure 2). Additionally, over 11 million children under 5 years of age die annually worldwide due to factors related to the inadequate management of childhood illnesses, poor nutrition or both (Murray and Lopez, 1996). However, while inadequate nutrition and health services are important problems that must be addressed, it is also important that they be addressed in the context of the basic and underlying causes of undernutrition as depicted in Figure 2.

Food insecurity, one of the underlying determinants of undernutrition, is a standing problem in Botswana. Based on the Food and Agricultural Organization's (FAO) household food security index, an aggregate measure of the difference between food consumed by undernourished people and the national average requirements, Botswana's situation is rated as critical (FAO, 1995). Furthermore, the Southern African Development Community (SADC) predictions indicate that locally produced cereals (maize, sorghum, and millet) in Botswana will continually fail to meet the local needs (SADC, 2001). This situation is troubling because the staple diet is mainly comprised of these three grains. In fact, 56% of kilocalories in the staple diet are obtained from these cereals (SADC, 2001).

Botswana relies on imports to supplement locally produced cereals. The amount of cereal that is imported into the country varies tremendously from year to year. Prior to the 1990s, the primary determining factor in the amount of imported cereals has been the amount of rainfall that the country received, but with a high proportion of people currently infected with HIV, availability of farm labor might be another factor in the future. Consequently, there is a growing dependence on cereal imports to Botswana. In fact, the 2000/2001 aggregate estimates of locally produced cereals were 45% lower (11,000 tons) than the previous year's (21,000 tons) (SADC, 2001). Worse still, SADC predictions of cereal production for Botswana are continually lower than the requirements.

Prior to the 1990s, poor and unpredictable rainfalls, infertile soils, lack of technologically advanced crop production methods and higher fertility rates were the commonly stated reasons for the high prevalence of food insecurity in Botswana. While these factors are probably still valid determinants of food insecurity in the country, their combined impact is compounded by the high prevalence of HIV seropositivity in Botswana. The prevalence of HIV/AIDS in Botswana is estimated at 33 percent. Among pregnant women, the prevalence rates are much higher, ranging from 24.67 to 42.96% depending on the region of the country (AIDS/STD, 1998).

The potential impact of HIV on food security in Botswana is huge because unlike other illnesses, the impact of HIV/AIDS is not limited to a few sectors within the country. HIV/AIDS undermines the development advances in the country as well as the fabric of the society. The higher infection rates in women compared to men are particularly devastating because the burden of household farming activities in Botswana

falls predominantly on women. Furthermore, women's income is more likely to be used for the households food needs than men's income.

HIV/AIDS and its associated opportunistic infections such as tuberculosis also hinder victims from taking advantage of drought relief programs such as the labor-intensive public works (Teklu, 1995). The labor-intensive programs provide income to non-skilled community members in exchange for working on community development projects such as constructions of roads, teachers' quarters, or clinics. Because HIV infection has been shown to accelerate progression from tuberculosis exposure to active tuberculosis (TB) (Flores, 2001), with the combination of HIV and TB drastically curtailing victims' participation in labor-intensive programs. With nearly 33% of people battling HIV/AIDS or opportunistic infections and many more people taking care of ill relatives, only a handful of people are able to take advantage of drought relief programs. Thus, HIV/AIDS, TB, and other opportunistic infections interrupt both the development projects in drought stricken communities and the people's means of making a living.

### **Nutrition Programming in Botswana**

Prior to the late 1970s, nutrition interventions in Botswana were two-pronged. In one approach, all children under five years were given an age appropriate ration (blanket covering). Severely malnourished children (weight-for-age less or equal to 60% of the Harvard references) were also brought to the clinic for a daily meal (direct feeding)(Mpofu et al., 1988). Between 1979 and 1985 blanket nutrition coverage reduced the prevalence of moderate undernutrition (measured as weight/age) from 30 to 14 percent (WHO, 2000). Within the same period, direct feeding significantly reduced the prevalence of severe undernutrition (weight-for-age) from 6.0 to 0.2 percent in

children under five years of age. Following the cessation of direct feeding the prevalence of mild to moderate undernutrition stagnated at 14 % for nearly five years (WHO, 2000). Recent estimates indicate that both mild and moderate forms of undernutrition in children under five years in the country are increasing (Central Statistics Office, 2000). Although there may be other factors, such as the HIV/AIDS pandemic, the persistence of both moderate and severe undernutrition presence reinforce the notion that blanket coverage, particularly when these interventions are given to children with increased nutritional requirements, is inadequate. Since children 0-5 years have varying supplementation requirements due to varying developmental stages, household socioeconomic status, and the frequency of illnesses, blanket coverage will inevitably provide for unequal proportions of nutritional needs for children. Consequently, children at greater risk of undernutrition will be more disadvantaged compared to children at low risk.

### **Potential for Targeting Nutrition Intervention in Botswana**

Child Survival Programs (CSP) in Botswana are run concurrently and accessed through primary health clinics. Primary health care for children is modeled after the UNICEF GOBIFF model (WHO, 1978). Thus, in addition to medical consultations, each clinic has the capacity to provide Growth monitoring, Oral re-hydration, Breastfeeding support, Immunization services Family planning and Feeding (GOBIFF). The health clinics provide curative services daily and preventive services monthly. Due to their frequency, curative clinics can potentially work as screening points for undernutrition and as well as prompt the initiation of proportionate nutrition intervention for children with varying risks of undernutrition.

Clinics in Botswana are also staffed with Family Welfare Educators (FWE) whose responsibilities include routine home visits to vulnerable clinic clients (Gobotswang, 1994). These educators are knowledgeable in basic nutrition and can therefore provide caregivers with individualized assistance during the home visitation. During home visits, FWE can and do encourage caregivers whose children are not responding to previous interventions to return to the clinic for re-evaluation. Thus, structures for providing targeted nutrition intervention in Botswana are in place - at least in the sense that the curative clinic and nutrition services are provided within the same physical location, and the Family Welfare Educators can provide home visitation for at-risk children. However, the extent to which Family Welfare Educators are used in alleviating undernutrition is unknown.

### **Contributions of This Study**

This study contributes to the literature on child survival by examining the linkages between the Child Survival Programs that address childhood illnesses and undernutrition in Botswana. As previously argued, the management of childhood illnesses and undernutrition is important because illnesses and undernutrition have been predicted to continue to be the major threats to the survival of children (0-5 years) well into the year 2020. In this study, these factors are examined within the context of the preventive and curative services of the Child Survival Programs in Botswana. Therefore, this study will not only contribute to the understanding of issues of childhood illnesses and undernutrition, but the findings of and the recommendations from this study are practice oriented and applicable to the Child Survival Programs in Botswana.

The study is expected to highlight and relate the structural limitations and strengths of Child Survival Programs to the management of childhood illnesses and undernutrition. Previous studies in Botswana could not relate children's access to the Child Survival Programs and the children's risk of malnutrition because data were collected outside the CSP settings and thus children's access to the CSP could not be definitively ascertained (Aplogan et al., 1996; Central Statistics Office, 1999; Ubomba-Jaswa and Belbase, 1996). In this study, however, this problem has been addressed. The nutritional status of children can therefore be linked with the structural limitations or strengths of the CSP. Therefore, the findings of and recommendations from this study can contribute immensely to the targeting of program services to children at risk for either childhood illnesses and / or undernutrition.

Problems of undernutrition are widespread in children worldwide and require much study. This study contributes to the literature on child survival by examining the linkages between the Child Survival Programs that address childhood illnesses and undernutrition. By focusing on the utilization of linkages between the preventive and curative components of the Child Survival Programs, this study will provide valuable information on the basic components of the Child Survival Programs. Perhaps its greatest input relates to its potential to highlight and relate the structural limitations and strengths of Child Survival Programs to the management of childhood illnesses and undernutrition, specifically in Botswana.



## **CHAPTER III**

### **METHODS**

#### **Approval to Conduct the Study**

Approval to conduct the study was received from the Michigan State University's Committee on Research Involving Human Subjects (UCRIHS) and the Office of the President, Botswana (Appendix A). The Office of the President, Botswana, relied on the technical expertise of the Health Research Unit in the Ministry of Health in determining whether permission to conduct the study should be granted.

#### **Study Location**

Health services in Botswana are provided by the government of Botswana and centrally regulated (Ministry of Health, 2003). Thus Child Survival Programs in Botswana are similar in all health facilities and districts. Any differences that may occur may be influenced by the extent of urbanization of the villages or towns within which the clinics are located. In identifying a study location, the objective was to include an urban area and its neighbouring rural areas (villages). Gaborone and the neighbouring areas (Kweneng and South East health districts in Botswana) were chosen because of the wide range of urbanicity between they represent. Overall, data were collected from 13 clinics in Gaborone, Tlokweng, Mogoditshane, Gabane, Metsimotlhabe, and Mmopane. The furthest village from Gaborone was about 30 kilometers. Tlokweng and Mogoditshane are closest to Gaborone City and are thus considered to be peri-urban centers while the rest are still considered to be villages.

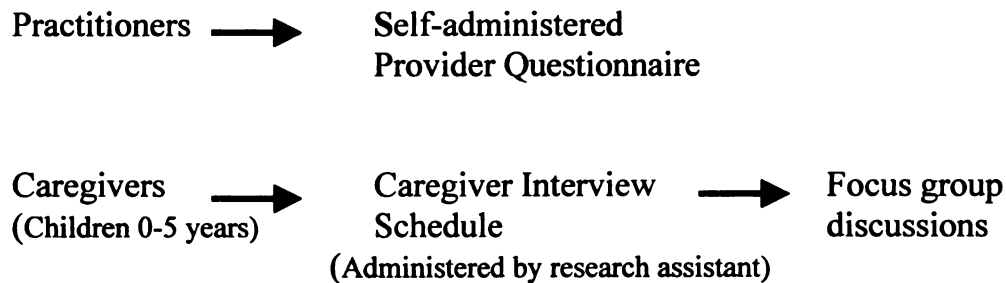
### **Study Design and Instrumentation**

A cross-sectional survey design was employed to address questions in this study. Data were collected from both caregivers and health practitioners, as shown in Figure 3, because the knowledge, perceptions and attitudes of both practitioners and caregivers influenced the perceived needs of study children and hence the care rendered. Practitioners completed a self-administered practitioners' questionnaire (PQ) while caregivers completed the caregivers' interview schedule (CIS) with the help of trained research assistants. Caregivers also participated in focus group discussions. The focus group discussions were conducted after all survey data had been collected and preliminary analysis had been performed. The objectives of the focus group discussion were to provide information that would help in explaining observations made in the caregivers survey.

Although data were collected from both practitioners and caregivers, all of the data required for addressing the hypotheses raised in this study were collected through the CIS because the CIS gathered information about the target population for the CSP. Data from practitioners was only used to describe the congruency between caregivers' and practitioners' perceptions about caregivers' satisfaction with care and the perceived channels of communication between caregivers and practitioners. The PQ also provided information on practitioners' knowledge, attitudes and perceptions about diet and nutrition assessment in children 0-5 years of age.

## **Respondents**

## **Instrumentation**



**Figure 3 Data Collection Plan**

### **Sampling- Study Children**

A systematic sampling procedure with a random start was employed to ensure that children requesting clinic services had an equal probability of being selected. The counting of the cases was begun with the first randomly selected case from the first clinic (case  $i$ ) and continued to the last case (case  $n$ ) selected from the last clinic. Every  $m^{\text{th}}$  case, where  $m$  was the interval between the randomly selected cases, was included in the sample.  $m$  was derived from the formula  $N/n$ , where  $N$  was the population of children seen for preventive services in one month and  $n$  was the desired sample size.  $N$  was estimated from the Botswana National Nutrition Surveillance System registry (Food and Nutrition Unit, 2000).

All clinic managers were informed by the copy of letter written by District Medical Chief Officers (Appendix A) to expect the study team between June 2002 and March 2003. The order in which the study team visited clinics was completely

randomized. Data collection at each clinic continued for a period of three days. The study team moved from one clinic to the other every fourth day.

#### Sample Size Estimation- Study Children

Calculations for estimating the sample size (number of study children) were based on the proportions of wasting, one of the three indicators of the child's growth, in this study. According to Henry (1990) and Lemeshow et al. (1990), estimation of the sample size (n) requires the specification of the desired precision level (tolerable error), the confidence level and the degree of variability of the dependent variables in the population of interest. The desired precision level and the confidence level are set based on the conventions in the field and the nature of the study problem. The estimates of the variability of the dependent variable can be obtained from pilot tests or previous studies of the same or similar populations (Henry, 1990; Lemeshow et al., 1990). Also, a maximum possible variance can be used. In this study, sample size estimates were calculated using both the maximum possible variance and variance obtained from an earlier study by Tharakan and Suchindran, (1999).

The desired precision level (tolerable error or E) for this study was set at 10% of the true population proportions of wasting because a sample proportion that is within a 10% of the true population proportion could be tolerated. The desired confidence level was set at 95% (i.e.  $\alpha = .05$ ). Thus, with a good estimate of the sample size (n), 95 out of 100 possible samples would return a true population proportion that would be bounded by an interval of the sample proportion (Pa) plus or minus 10%.

A previous study in Botswana found the prevalence of wasting in children (0-5 years) with diarrhea to be 12.7% (Tharakan and Suchindran, 1999). Based on this

proportion, and the desired confidence levels stated earlier, a minimum sample size of 43 was determined as shown below.

$$\begin{aligned} \text{Sample size } (n) &= (Z^2_{\alpha/2} * PaQ) / E^2 \\ &= (1.96^2 * .127 * .873) / .10^2 = 42.59 \end{aligned} \quad (1)$$

$Z_{\alpha/2}$  = Z score corresponding to 95% confidence interval

$Pa$  = Sample proportion;  $Q = (1-Pa)$ ;  $E$  = Tolerable error.

Due to the scarcity of published work in this area, the prevalence of wasting among Botswana children with diarrheal illnesses reported by Tharakan and Suchindran (1999) has not been corroborated. Therefore, further estimations of sample size were carried out using the maximum possible variations of the prevalence of wasting in the population. The calculations are shown below. The confidence level and the precision level were held constant at .95 and .10 respectively.

$$\begin{aligned} \text{Sample size } (n) &= (Z^2_{\alpha/2} * PaQ) / E^2 \\ &= (1.96^2 * .50 * .50) / .10^2 = 96.04 \end{aligned} \quad (2)$$

The two calculations indicate that sample sizes ranging from 43-100 children will facilitate precise determination of the prevalence of wasting in children 0-5 years who suffer from childhood illnesses. The minimum sample size estimate (43) was based on proportions reported by a study that used a stratified multistage design which is a more efficient design than the current study design. The largest sample size estimate (97) is

therefore the preferred estimate for the proposed study. To provide a safety margin against non-response, the sample size estimate was rounded up to 100 and increased by about 40% to give a total sample size of 140.

A sample size of 140 was deemed feasible for the study location. In 1997, for example, 66,905 children under the age of 5 years were seen for diarrheal illnesses at government facilities annually (Central Statistics Office, 1999). Assuming a steady infection rate throughout the year, about 500 children were seen in a period of 30 days in each of the 12 health districts. Although these estimations are crude because 1) the incidence rate of diarrhea depends on the season, 2) the population of health districts differ significantly, and 3) one child may have several diarrhea episodes and be counted several times, it should still be feasible to obtain 140 children because the 500 children seen per clinic per 30 days is much larger than the desired 140.

#### Sample Size Estimation- Practitioners

Theoretical considerations and the purpose of the practitioners' data were used in estimating the sample size for practitioners. Data from practitioners were required to descriptively compare the congruency of caregivers and practitioners on select study objectives. Hence no hypothesis testing was planned for the practitioners data. However, it was proposed that the sample size be large enough to allow robust descriptive analysis through an SPSS spreadsheet. Since by convention, a sample size of about 30 is considered large (Fraenkel and Wallen, 1996), the researcher proposed a sample size of 60 to allow for loss through non-response missing data.

## **Instruments Development, Recruitment of Subjects, and Data Collection Procedures**

### **Development of Practitioner Questionnaire**

A Self-administered Practitioner Questionnaire (PQ) was developed for purposes of this study. The PQ (Appendix B) was developed following guidelines on questionnaire construction discussed by Sudman and Bradburn (1982). Other helpful resources consulted during the PQ development phase include the American Statistical Association (2000) publications on survey research, and questionnaires previously used by other researchers to collect similar data in developing countries (Child Survival Technical Support, 2000; UNICEF, 1999). The draft PQ was sent to 8 reviewers with different academic and professional backgrounds to check for face validity and/or content validity depending on the educational background of the reviewer. Some reviewers were measurement specialists while others were nutrition professionals.

Following recommendations from the researcher's guidance committee members, the PQ together with the study objectives and hypotheses were also presented at a special seminar attended by community nutrition graduate students and faculty. During this seminar, community nutrition graduate students and faculty were asked to evaluate the congruency between the research objectives and the study hypotheses and questions in the PQ. The first objective of this exercise was to ensure that questions (items) asked in the PQ would provide information necessary for addressing the research objectives and questions (i.e. face validity). Secondly, human nutrition faculty and graduate students were asked to evaluate the scope of the questions to make recommendations that would ensure that the questions adequately addressed the research

objectives (i.e. content validity). The recommendations made at this seminar were also incorporated where appropriate into the PQ.

The Health Research Unit, Ministry of Health in Botswana, also reviewed the PQ for both face and content validity. In reviewing the PQ, the Health Research Unit put emphasis in improving the consistency of all questions in the instrument. Comments made by the Health Research Unit were incorporated because they were considered essential for the granting of the research permit.

#### Recruitment of Respondent, PQ

A sample size of sixty practitioners was proposed for this study (see section on sample size estimation). However, only 39 practitioners were at work in the surveyed clinics. Consequently, data were collected from 39 practitioners. Each of the 39 practitioners was contacted and requested to participate in the study by the primary investigator. At each contact, the primary investigator informed each practitioner about the objectives of the study and the processes of informed consent. Practitioners who agreed to participate in the study were given the consent form (Appendix B) to read while the researcher waited to provide any clarification that might be needed. Consenting caregivers were asked to sign the consent statement before they could be given the questionnaire. Practitioners were given one evening to complete the questionnaire. Practitioners were requested not to discuss the contents of the questionnaire with their colleagues or consult reference materials.

#### Data Collection-PQ

The collection of data from health practitioners began in November 27<sup>th</sup> 2002 and was completed by December 17<sup>th</sup> 2003. Data were collected from 39 providers from



13 clinics in Gaborone, Metsimotlhabe, Mmopane, Mogoditshane and Gabane. During the collection of data, selected practitioners were given the instrument at the end of their work shifts. Practitioners were asked to complete the questionnaire after hours and return it at the beginning of their work shift. Practitioners were requested to complete the questionnaire without consulting their colleagues or any other reference materials. Completed questionnaires were collected within 24 hours. No instruments were given to subjects on Friday to avoid possible loss of the instruments during the weekend. At instrument collection time, all questionnaires were checked for completeness and respondents were asked to complete any data that were missing. All except one subject completed and returned the instrument within 24 hours. The practitioner who declined to complete the instrument was a medical officer. All other practitioners were registered nurses or had nursing background.

Data collected by the PQ included information about the practitioner's educational background and knowledge, attitude, and practices about dietary and nutrition assessment in children 0-5 years. Information on practitioner's perceptions about the channels of communication between caregivers and practitioners, and caregivers' satisfaction with care were collected.

#### Development of Caregiver's Interview Schedule (CIS)

The CIS (Appendix B) was developed using the same procedure as the development of the PQ. The major difference between the two was that the CSI had to be translated from the English language to Setswana, which is the language spoken by respondents. The researcher translated the English questionnaire into Setswana and submitted the two versions to two independent reviewers fluent in both English and

Setswana. The reviewers were asked to independently critique the accuracy of the translation and make appropriate recommendations. The two translation reviewers were part of the eight reviewers who previously reviewed both the PQ and the CIS for face and/ or content validity so they were familiar with the research purpose. The reviewers were requested to ensure that items in the Setswana version of the interview schedule were accurate translations of the items in the English version of the interview schedule. Reviewers were also asked to pay particular attention to the conceptual meanings of items in the interview schedule. Upon receipt of the reviewers' comments, the researcher met with the two reviewers independently to discuss and consolidate the suggested revisions. The CSI was then revised to incorporate the consolidated comments of the two reviewers.

As was the case with the PQ, community nutrition graduate students and faculty and the Health Research Unit, Botswana also reviewed the CSI (English) for face and content validity. The Health Research Unit also recommended that the study be opened to all children 0-5 years regardless of illness status. In line with this recommendation and because this unit's approval was required for conducting the study, questions were either changed so that they could apply to both groups of children or preceded by contingency questions to guide respondents to their next relevant question(s).

Two days before the actual data collection was started, the CSI was pilot tested with 10 caregivers in one clinic. During the pilot testing, the researcher put check marks against items which prompted respondents to request clarification before they responded. At the end of the pilot testing items with two or more check marks were edited to

remove phrases that appeared to be difficult to understand and replaced with simpler ones.

#### Training of Research Assistants

Four University of Botswana students from the Departments of Home Economics and Social Sciences were hired to assist in data collection. Three students were in their second year and one student had completed her fourth year. The research assistants were to administer the CIS by reading the items aloud to the caregivers and recording caregivers responses directly on the CIS. The research assistants were trained by the primary researcher for three half days before the actual data collection. During the training session, the assistants were given a brief background of the study, the study objectives and data collection instruments. Next, the researcher discussed the CIS with the assistants in detail. The researcher read each item in the CIS (as the assistants followed along in their copies) and explained to them the objective of each item. Assistants were given time to familiarize themselves with the items by role-playing interviews with each other. Each assistant was also required to interview the researcher. When the assistants were comfortable with the flow of questions and could complete each CIS within 15 minutes, they were taken to clinics to practice interviewing caregivers.

Research assistants were also trained to assist the investigator in taking length and height measurements of study children. The assistants were taught to ensure that children being measured for stature were straight against the measuring board, with their body touching the board at three places, their feet, bottom and back of their head before reading the measurement.

### Recruitment of Caregivers- Respondents for CIS

Randomly selected caregivers of children who were seen for either preventive or curative care in government clinics were approached individually by the investigator or research assistant as they exited consultation rooms and asked to participate in the study. At this contact caregivers were read a consent statement in Setswana (local language) explaining the purpose of the study, the kind of information requested and known risk. Caregivers willing to participate in the study were asked to sign the consent form. Although provision was made for consenting caregivers with low writing skills to put a mark (X or +) or give verbal consent in place of their name) all caregivers signed their name on the consent forms. Five of the randomly selected caregivers declined to participate. Three of these five indicated that they were already late for work and could not spend any more time at the clinic. The other two had to leave immediately because they had been referred for further care at the hospital.

### Data Collection- CIS

The collection of data from caregivers began in July 2002 and continued to the end of February 2003. Caregivers completed the CIS with the help of research assistants. The primary researcher (Maria Nnyepi) quickly checked the completed CIS before the caregivers left the clinic. When the researcher was busy interviewing another respondent or taking height and weight measurements of another study child, the fourth year research assistant was asked to check the CIS.

Data collected by the CSI included the study child's demographic characteristics (age, sex, birth weight), feeding characteristics (breastfeeding, formula feeding, frequency of meals), illness status, weight, and height measurements. Information on caregivers perceived satisfaction with clinic services and perceptions

about channels of communication between practitioners and caregivers was also collected.

#### Anthropometric Measurements

The study child's weight was measured using UNICEF digital solar powered Seca Scales, Model 871. Weight was measured in kilograms to the nearest 0.1kg. The scale was calibrated with a standard 1kg weight at the beginning of the study. Height and length were measured using measuring boards previously used by the Demographic Health Surveillance Study Team (Central Statistic Office, 1999). Height and length measurements were read to the nearest 0.1cm.

Children were allowed to have one layer of clothing on when the height/length measurements were taken because the board was very cold during the winter months. Study children had their weight measurements taken without any clothing. The Seca digital scales used registered weight very quickly and children were not exposed to cold weather for long.

#### Development of Focus Group Discussion Questions

Focus group discussions are data collection techniques for collecting qualitative data from a group of interacting people (Barbour and Kitzinger, 1999; Morgan, 1997). Morgan (1997) and Barbour and Kitzinger (1999) describe three possible uses of focus group discussions in studies, although they use different terminology. According to these authors, focus group discussion can be used either as "a self-contained" data collection method, a supplementary data collection method or as one of the data collection methods in a "multimethod" study. Self-contained focus group studies are those in which focus group discussions are the sole source of the data in a study. When

used as supplementary data collection methods, Morgan (1997) and Barbour and Kitzinger (1999) state that the focus group discussions provide additional information necessary to guide more extensive data collection through surveys or provide in-depth information to enrich or explain observations obtained from quantitative data collection methods. In multimethod studies, these authors state that focus group discussions are used in addition to other methods to collect data. Their significance in terms of data collection is comparable to that of other methods.

In this study, focus group discussions were used as a supplementary data collection method. The purpose of the focus group discussions was to provide in-depth information to address selected study objectives. The information collected through the focus group discussions included caregivers' perceptions about the effectiveness of the Child Survival Programs in addressing nutrition and dietary problems in study children and the caregiver's perceptions about the types and utility of communications channels between caregivers and practitioners. The specific focus groups questions were not formulated until preliminary data analysis had been performed (section three in chapter 4).

The recruitment of focus group participants took place at the clinics as caregivers exited consultation rooms. Consent was implied by caregivers verbal willingness to participate in the focus group discussions. All caregivers who were approached and requested to participate in focus group discussions consented. Some but not all of the caregivers had previously completed the Caregivers Interview Schedule. Given the lack of meeting space in the clinics, the primary researcher limited the size of the focus groups to 4-6. The smaller group sizes were particularly advantageous in two

ways. First, participants at the clinics had their study children with them so that they could be assured of their care and be fully involved in the discussion. The smaller groups therefore limited the number of study children present during the discussions and therefore minimized the potential for participants to be distracted. In addition, the smaller group sizes enabled all participants to deliberate on the research questions and still have the discussion session completed within an acceptable period. On average, each focus group session took about 30 minutes to address the three focus group questions that were raised. All focus groups were videotaped. The focus group discussions were moderated by the primary researcher.

## **Research Objectives, Questions And Null Hypotheses**

### **Specific Objectives**

In line with the overall purposes of the study as outlined in Chapter I the study was designed to;

1. Characterize the nutritional status of children (0-5 years) who participate in government sponsored CSP in Botswana.
2. Identify the nutritional/dietary screenings and / or intervention that 0-5 year old children with childhood illnesses receive.
3. Determine factors that influence the intensity of nutritional /dietary screening provided by government clinics.
4. Describe the relationship between clinic care and caregivers' perceived satisfaction with the services provided by government clinics.

5. Determine caregivers' perceptions about the nutritional needs of children during ill health.
6. Determine the caregivers' feeding practices during the child's illness episodes.
7. Characterize communication channels between caregivers and practitioners.

#### Research Questions and Null Hypotheses

This study addressed the following research questions and hypotheses:

1. What is the nutritional status of children (0-5 years) participating in government sponsored CSP in Botswana?

*Null Hypothesis 1.1:* The nutritional status (i.e. based on anthropometric measurements) of children (0-5 years) participating in government sponsored CSP in Botswana is not different from that of adequately nourished children in the World Health Organizations/ Center for Disease Control reference population.

2. What dietary and nutrition screening do children presenting at clinics with childhood illnesses receive?

*Null hypothesis 2.1:* Children presenting at the curative clinics do not receive any dietary/ nutrition screening.

3. What factors influence the intensity of the nutritional/dietary screening?

*Null hypothesis 3.1:* There is no relationship between the intensity of childhood illness and the intensity of dietary/nutritional screening.

*Null hypothesis 3.2:* There is no relationship between the intensity of nutritional assessment/intervention and the education level of the caregiver.

4. What is the relationship between the caregivers' satisfaction level with clinic care and the children's illness status?



*Null hypothesis 4.1:* Caregivers are not satisfied with the services that children receive

*Null hypothesis 4.2:* The type of care being sought (curative or preventive) does not influence caregivers' satisfaction with clinic care

**5. What are the caregivers' perceived nutritional needs of children during illness episodes?**

*Null hypothesis 5.1:* There is no association between the caregivers' perception of the children's nutritional/dietary needs and children's illness status.

**6. How do the caregivers' feeding practices change during children's illnesses episodes?**

*Null hypothesis 6.1:* The number of times per day the caregiver offers the child food is not influenced by the child's illness status.

*Null hypothesis 6.2:* The amount of food the caregiver offers the child is not influenced by the child's illness status.

**7. With which clinic officers do caregivers communicate their experiences?**

*Null hypothesis: 7.1:* Caregivers do not share their clinic experiences equally with all clinic officers.

**Operationalization of Concepts, Variables and Statistical Analysis**

**Operationalization of Variables**

Two core concepts in this study were the existence or usage of linkages in CSP and caregivers' satisfaction with services that children received. To measure the existence or usage of linkages in CSP, this study examined program specific assessments

that practitioners conducted when providing curative care to children under five years of age. At each consultation, a linkage between the curative clinic and nutrition services was said to exist if in the process of assessing and attending to the child's illnesses, practitioners also evaluated the child's weight, weight loss or gain since previous growth monitoring, meal or eating frequency, breastfeeding and formula feeding history. The use of any of these indicators suggested the presence of linkages within the Child Survival Programs. The total number of indicators used determined the intensity of the nutritional assessment. If there were linkages between the programs the intensity of the assessment was expected to have increase with the increasing severity of illnesses and the severity of undernutrition.

Similarly, linkages between curative and immunization clinics were said to exist if the practitioner overtly evaluated the child's immunization records. In both situations, evidence of the existence of linkages was obtained from interviewing the caregivers. In addition, the linkages were said to have been utilized if children with poor (growth monitoring ) clinic attendance, inadequate feeding practices or missing immunizations were given appropriate education and/or referred to relevant programs. Since such counsel should have been communicated to caregivers, in this study such information was obtained through the caregivers' interview schedule.

With regard to the second core concept (perceived satisfaction with care) in this study, caregivers' responses to a selection of questions in the interview schedule were used to determine caregivers' satisfaction with services provided through the CSP. These questions required caregivers to evaluate the services they received and rate their perceived satisfaction level with these services.

## Variables

The independent and dependent variables in this study are displayed in Table 3.1.

The independent variables included the child's demographic characteristics (age, sex, birth weight), household demographic factors (maternal education and employment status and household headship), the type of nutrition assessment provided (assessment of weight, height, and dietary intake), and the child's illness status. The dependent variables were the child's anthropometric measurements (weight-for-age, height-for-age, and weight-for-height) and caregivers' satisfaction with care. The anthropometric indicators (WAZ, HAZ and WHZ) were ratio level variables because they were computed from the study child's weight and height, both of which were measured at the ratio level. The caregivers' satisfaction variable was measured at the nominal level. In estimating the prevalence of underweight, stunting and wasting, which by definition are 2 standard deviations below the mean WAZ, HAZ, and WHZ respectively, the anthropometric measurements were re-coded to ordinal variables

**Table 3. 1 Variables Studied Using the Caregivers Data**

<b>Variables</b>	<b>Child's Factors</b>	<b>Caregivers/Household Variables</b>
Dependent Variables	Weight-for-age (WAZ, Height-for-age (HAZ) and Weight-for-height (WHZ) z-scores	caregiver's satisfaction with care
Independent Variables	age, sex, birth weight, nutrition and dietary screening and the child's illnesses status	maternal age, years of education and employment status, child feeding practices, type of clinic care sought and household headship

## Statistical Analysis

Statistical Program for Social Sciences (SPSS) version 11.0 was the primary analysis program used in this study. However, weight-for-age, height-for-age and weight-for-age

z-scores for study children were generated using Epi info 2002 and then exported to the SPSS spreadsheet for further analysis. Chi-square tests, F-tests and t- tests were used to determine associations between the dependent variables and the independent variables. T-tests and F-test were employed in studying variations in continuous dependent variables such as weight-for-age, height-for-age and weight-for-height while Chi-Square tests were used in studying categorical dependent variables such as stunting, wasting, underweight and caregivers satisfaction with care. In addition, logistic regression models were built to identify predictor of adequate growth in children. In all statistical tests, alpha was set at .05.

### **Study Assumptions, Strengths and Limitations**

#### **Study Assumptions**

1. It was assumed that respondents would complete the interview schedule truthfully.
2. Study respondents who brought the children to the clinic for medical attention were assumed competent interviewees for this study.
3. The CIS and the PQ were valid instruments for the study populations.

#### **Strengths**

This study focuses on significant problems in Botswana and attempts to generate information that can guide government policies towards children 0-5 years.

Undernutrition in children 0-5 years is a problem that needs immediate attention because it increases the risk of death in children. It also increases the risk of chronic illnesses later in life.

The assessment of children's growth in this study was very comprehensive in that it included the weight at birth and current weight and height measurements. All

anthropometric measurements, with the exception of birth weights, were obtained by the researcher or trained assistants. Information that could not be reliably obtained from the caregivers such as the children's birth weight and birth dates were obtained from clinic records. In addition, the findings in this study are very reliable because the study had a large sample size and subjects were randomly selected from 13 clinics in urban, peri-urban and rural areas.

Another strength of this study is that information that was required to address some objectives was obtained from multiple sources. Information on communication between caregivers, for example, was obtained from the CIS, PQ and focus group of discussions. The researcher also had the opportunity to attend health talk sessions, which, according to this study, is one of the channels of communication between providers and caregivers.

The investigator's familiarity with the culture and language of the study population was also an added strength in this study because communication with caregivers did not require a translator. The other strength in this study was the primary investigators' professional training and prior work experience in the area of maternal and child nutrition in Botswana.

### Limitations

This study focused on children who receive care from government clinic because these services are made available to all Batswana. In fact, one of the objectives of the Ministry of Health (Botswana) is “to improve the physical, mental, and social well being of every Motswana<sup>1</sup> to fully contribute to the development of Botswana through

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<sup>1</sup> A person from Botswana is called a Motswana. <sup>2</sup> People from Botswana are called Batswana

a healthy nation”(MOH, 2003). This government health objective, among other factors, validates the sampling frame used in this study because observations drawn from government clinics can be validly used to further improve health policies in Botswana for Batswana<sup>2</sup>.

It must be recognized that there is a small segment of the population that uses private health facilities who were excluded by the sampling frame of this study. The opportunity to study this population’s experiences in private CSP has therefore been missed. Among caregivers who use government clinics regularly, there may be unequal clinic attendance and representation between children with mild illnesses and those with serious episodes as perceived by the caregiver. The study may also have missed caregivers who use home remedies or consult traditional healers for mild or some illnesses instead of clinic care. However, such groups of people are expected to be few and their perceptions could not be relied upon in the formulation of national health policies.

The relationship between the study child and the caregiver was different for each child. Although most children were taken to the clinic for by their mothers, other children were taken to the clinic by aunts, grandparents, or other adult relatives who take care of them during the day. While it is desirable that the child’s biological mother be the respondent, this is not always feasible due to employment commitments that some mothers have outside the home, illnesses of some mothers and other factors. In such situations, primary caregivers, who may be the child’s other relative, are likely to be more informative than the child’s biological mother.

The sample size for providers was smaller than desired. This may have implications on the robustness of the descriptive findings reported in this study. There was also no equal representation of all health cadres in providers' data set. Nonetheless, this exploratory study has raised important questions that can be pursued further. Based on our experience in this exploratory study, future studies with providers may need more efficient study designs and better incentives for subjects who enroll.

Exploratory studies of this nature are often difficult to conduct because there is generally not much known about the research problem to formulate survey questions. In this study, for example, questions about the nature of communication between providers were rather general, and thus did not generate information that definitely characterized the nature of the communication. The same also applies to survey questions exploring the existence of nutrition/dietary screening within the CSP. However, in both the communication issues and the nutrition and dietary screening issues, this study has generated very important questions for further research. It is now clear that communication, nutrition, and dietary issues in clinics need further study. Although the findings do not definitively characterize the nature of communication and nutrition assessments per se, they will help in the formulation of further research questions.

#### Chapter Summary

The methodology in the investigation of the existence and utilization of the linkages between the curative and the preventive programs of the Child Survival Programs in the alleviation of undernutrition in children 0-5 years is described in this chapter. The procedures for requesting the research permits, estimating the sample size, selecting the subjects, constructing survey instruments, conceptualizing the variables and

data analysis are explained in full. The research permits were sought from the University Committee Research Involving Human Subject, the Botswana Government's Office of the President, the Gaborone City council and the Kweneng District Health Team.

This study employed a cross-sectional study survey design in which data were collected cross-sectionally from a random sample of caregivers and a non-random sample of practitioners using Caregiver Interview Schedules and providers questionnaires respectively. The sample size of caregivers was estimated using a formula for proportions. In this estimation, the tolerable error, confidence level, and variation of the dependent variable (wasting) in the population was set at of 10%, 95% and 50% respectively.

Collected data were the demographic characteristic of study children, caregivers and providers, children's anthropometrics, illness status and feeding practices. The providers' knowledge, attitudes and practices regarding alleviation of undernutrition in at risk children were also collected. To facilitate the evaluation of the research hypotheses, the data were analyzed using both the Epi Info. 2000 and SPSS 11.0.1.



## **CHAPTER IV**

### **RESULTS**

The findings of this study are presented in this chapter. For ease of reference, the findings are reported in three sections. The general characteristics of the study children and the tests of hypotheses pertaining to study children are reported in section one. Additionally, observations are grouped by the study's specific objectives such that observations drawn from hypotheses that explore the same research objective are reported under the parent objective. All observations in this section are drawn from the data collected through the CIS.

The characteristics of practitioners are presented in section two. The focus of data analysis in this section differs from that of section one in that no hypotheses are tested in this section. Rather the analysis focuses on describing the congruency between caregivers and practitioners on selected study objectives. More specifically, practitioners' knowledge and perceptions about diet and nutrition assessment in children 0-5 years, caregivers' perceived satisfaction with care and perceived communication channels between practitioners and caregivers are described.

The third section contains the results of focus group discussions. Similar to section two, data from focus group discussions were not used to test any hypotheses. Rather, focus group data provided additional descriptive information on selected study objectives. The objective in the analysis of the focus groups data was to describe caregivers' perceived satisfaction with clinic care, caregivers' perceptions about the role of nutrition/ dietary care in both curative and preventive services and the nature of communication channels between caregivers and practitioners.

## **SECTION ONE: OBSERVATIONS FROM CAREGIVERS' INTERVIEW SCHEDULE**

### **General Characteristics of Study Children**

The sample characteristics are summarized in Table 4.1.1. Of the 522 children enrolled in the study, 240 (46.0%) were boys, 70 (13.4%) had low birth weight and another 70 (13.7%) were found to be stunted.

Breastfeeding was the most common method of infant feeding, with 78.9% (n = 412) of children having been breastfed at least once since birth. Replacement formula feeding was also common. One hundred and ten children (21.1%) were fed infant formula instead of breast milk since birth. After weaning, a sizeable number of children 0-5 years 80(15.6%) were not fed any type of milk as part of their diet.

Sixty percent (59.8%) and 26.8% of children were born to mothers of ages 20- 30 years and 31-40 years old respectively. Thirty-two children (6.2%) were born to teenage mothers, while 37 (7.1%) children were born to mothers over the age of 41 years.

Household heads were predominately male. The child's father was considered to be the head of the household in 247(47.5%) households. The child's grandparent and mother were household heads in 195 (37.4%) and 59(11.3%) of households respectively.

At the time of the study, 385(73.8), 125(23.9%), 12(2.3%) children had been taken to the clinic primarily for preventive services, curative services or follow-up care respectively. There were some children (37) who, though primarily taken to the clinic for preventive services, also had some health complaints. Thus, 174(33.3%) of children were reported as being ill during the data collection phase.

**Table 4.1. 1 Sample Characteristics**

<b>Index Child's Profile</b>			<b>Household Profiles</b>		
	<b>N</b>	<b>%</b>		<b>N</b>	<b>%</b>
<b>Sex</b>			<b>Head of Household</b>		
Male	240	46.0	Father	247	47.5
Female	282	54.0	Mother	59	11.3
			Grandparent	195	37.4
			Other adult	19	3.7
<b>Birth Weight(kg)</b>			<b>Mother's age(yr.)</b>		
≤ 2.50	70	13.4	15-19	32	6.2
≥ 2.51	452	86.6	20-30	310	59.8
			31-40	139	26.8
			≥ 41	37	7.1
<b>Prevalence of</b>			<b>Father's age(yr.)15-19</b>		
Stunting	70	13.7	20-30	2	0.4
Underweight	58	11.3	31-40	166	31.8
Wasting	20	3.9	≥ 41	191	36.6
<b>Feeding Methods</b>			<b>Education</b>		
Ever breastfed	412	78.9	Mother		
Never breastfed <sup>1</sup>	110	21.1	None	21	4.1
			Primary	125	24.5
<b>Children Drink(any) Milk</b>			Secondary	315	61.8
Yes	433	84.4	Tertiary	59	9.6
No	80	15.6	<b>Father</b>		
<b>Children on Solids</b>			None	29	7.1
Yes	446	85.4	Primary	93	22.8
No	76	14.6	Secondary	226	55.4
			Tertiary	60	14.7
<b>Reason for Clinic Visit</b>			<b>Employment Status</b>		
Preventive services	385	73.8	Father		
Curative services	125	23.9	Employed	447	91.2
Follow-up care	12	2.3	Not employed	43	8.8
<b>Child Illness Status</b>			<b>Mother</b>		
Ill	174	33.3	Employed	230	44.5
Not ill	348	66.7	Not employed	287	55.5

<sup>1</sup> Most children in this group were fed infant formula

## Objective-Specific Findings: Hypotheses Testing

### **Objective 1. Characterize the nutritional status of children (0-5 years) who participate in government sponsored CSP.**

Birth weight and anthropometric measurements were used as indicators for nutritional status in this study. The prevalence rate of low birth weight (< 2.5 kg), a proxy indicator of intra-uterine growth retardation (undernutrition), was estimated at 13.4% in this population (Table 4.1.1). The prevalence of low birth weight did not differ by sexes (Table 4.1.2)

**Table 4.1. 2Nutritional Indicators of Children**

Anthropometric Characteristics	N <sup>1</sup>	Mean	SE	Prevalence of Undernutrition	N	%
WAZ (all)	492	-.33		Underweight (all)	58	11.3
Female		-.21	.94	Female	24	8.7
Male		-.48	.010 **	Male	34**	14.5**
HAZ (all)	492	-.53		Stunted (all)	70	13.7
Female		-.40	.10	Female	31	11.3
Male		-.68	.12 *	Male	39	16.5*
WHZ(all)	492	.04		Wasted (all)	20	3.9
Female		.09	.08	Female	9	3.2
Male		-.01	.10	Male	11	4.7
Birth Weight (all)	492	3.07	.52	Low Birth Weight (all)	70	13.4
Female		3.08	.49	Female	33	11.7
Male		3.05	.55	Male	37	15.4

\*\* P < .05      \* P < .10

<sup>1</sup> Children whose birth weight could not be verified were not included in these calculations. Some (16) children were born at home and therefore the birth weights were not measured and recorded in the clinic card, others had lost their original clinic cards.

### Hypotheses Testing

*Null Hypothesis 1.1:* The nutritional status of children participating in government sponsored CSP in Botswana is not different from that of adequately nourished children in the World Health Organizations/ Center for Disease Control reference population.

The prevalence of stunting, underweight, and wasting were estimated at 13.7%, 11.3 and 3.9% respectively in this population (Table 4.1.2). The prevalence of underweight was significantly higher ( $p < .01$ ) in boys (14.5%) than in girls (8.6%). There also appeared to be a trend for boys to have a higher ( $p < .10$ ) prevalence of stunting than girls but this association did not satisfy the 5% cut off point for significance that was set *a priori*.

The prevalence of stunting and underweight in this population increased with age (Table 4.1.2a). The prevalence of stunting in children 37-60 months was about twice as high as that of children 0-12 months. The prevalence of underweight in children 37-60 months (19.3%) was also much higher than that of children 0- 12 months of age (4.7%).

Compared to the World Health Organization/ NCHS 1977 reference population, children in this population had significantly poorer anthropometric indicators (Table 4.1.3). The mean WAZ and HAZ scores were significantly lower in the study population compared to the reference population. Thus, the null hypothesis of no difference between the nutritional status of children 0-5 years of age with access to the Child Survival Programs and the NCHS / CDC reference population was rejected.

**Table 4.1.2 a Prevalence of Undernutrition in Children of Different Age Groups**

Undernutrition	Age in Months N (%)							
	0-12		13-36		37-60		0-60	
	N	%	N	%	N	%	N	%
<b>Stunted*</b>								
Yes	22	11.6	24	11.3	24	22.2	70	13.7
No	168	88.4	188	88.7	84	77.8	440	86.3
<b>Underweight**</b>								
Yes	9	4.7	28	13.1	21	19.3	58	11.3
No	181	95.3	185	86.9	88	80.7	454	88.7
<b>Wasted</b>								
Yes	5	2.6	9	4.2	6	5.5	20	3.9
No	187	97.4	205	95.8	103	94.5	495	96.1

\* P &lt; .05

\*\* P &lt; .001

**Table 4.1. 3 Comparison of Sample Nutrition Indicators with Reference Population**

Anthropometric Characteristics	Sample Mean (SE)	Mean Difference	95% CI
WAZ	-.33 (.07)***	-.33	-.47 - .20
HAZ	-.53 (.08)***	-.53	-.68 - -.38
WHZ	.04 (.06)	.04	-.08 - .17

\*\*\* P &lt; .001

**Objective 1 Conclusion**

Children participating in government sponsored Child Survival Programs (CSP) have significantly low body weights and heights compared to children of the same age and sex in the World Health Organization reference population. Both underweight and stunting were much more common in older (37-60 months) children than in children under 12 months of age. However, these children's weights were proportional to their heights so there were no significant differences between study children's weight-for-height z-scores and the reference populations.

Boy children fared worse than girl children with respect to weight-for-age indicators. Although significant only at the 10% level, boy children also appeared to have a higher propensity of being short for their age compared to girl children.

**Objective 2. Identify nutritional/ dietary screening that children participating in CSP receive.**

To address objective two, caregivers exiting curative clinic consultation rooms were asked questions about all the services the study child received or the caregiver had received on behalf of the child during this visit. Table 4.2.1 displays all the dietary and nutritional interventions that study children received.

Overall, 174 children were reported as being ill at the time of the study, but up to 8 of these cases were excluded in the analysis because of missing data. The children with missing data did not differ from the rest of the study children with respect to the mean weight-for-age, height-for-age and weight-for-height. Therefore there is no indication that the missing cases might differ from the other children in ways that might introduce bias. Of the 166 cases, with non missing data, who were consulted at the clinics for various childhood illnesses, only 30 (18.1%) and 25 (15%) had their weight and immunization status assessed respectively. Furthermore, only a small proportion of mothers reported that practitioners discussed feeding recommendations (7.8%) and the possible impact of the children's illnesses on their growth (6.1%) with them. Yet, most caregivers expressed interest in receiving information on how they could boost the children's desire to eat (92.6%), how to increase the frequency of feeds (90.4%) and how to prepare safe foods for the study children (93.4%). These data are displayed in Table 4.2.2.

Unlike children seen for illnesses at the clinic, all children seen for preventive services were weighed and their immunization status was evaluated because these were the two major services provided by the Growth Monitoring and Immunization clinic.

**Table 4.2. 1 Dietary and Nutrition Screening of Ill Children**

Assessments Performed	N	%	$\chi^2$ <sup>1</sup>
Child weighed			
Yes	30	18.1	67 df 1 p < .001
No	136	81.9	
Practitioner overtly checked child immunization status			
Yes	25	15.0	81 df 1 p < .001
No	142	85.0	
Practitioner discussed the growth of the child with caregiver			
Yes	18	10.8	102 df 1 p < .001
No	149	89.2	
Practitioner discussed feeding recommendations with caregiver			
Yes	13	7.8	119 df 1 p < .001
No	154	9.2	
Practitioner discussed relationship of child illness with child's growth			
Yes	10	6.1	126 df 1 p < .001
No	154	93.9	
Practitioner requested follow- up visit			
Yes	55	33.9	19 df 1 p < .001
No	112	67.1	
Practitioner discussed feeding frequency			
Yes	18	10.8	101.8 df1 p < .001
No	148	89.2	

<sup>1</sup> Goodness of Fit Test. df = degrees of freedom; p = p-value

### Hypotheses Testing

*Null hypothesis 2.1:* Children presenting at the curative clinics do not receive any dietary or nutrition screening



As shown in Table 4.2.1, children seeking curative care were less likely to be weighed ( $P < .001$ ) during curative clinic consultations. While 100% of children seeking preventive care were weighed and their weight-for-age plotted in the child's growth curve during their visit, only 18.1% of ill children were weighed during their curative clinic visit. Furthermore, practitioners seldom discussed feeding recommendations with caregivers during the curative clinic visit or even explained to caregivers the possible implications of the child's illness on his or her growth. We therefore failed to reject hypothesis 2.1 as nutrition assessment was not performed for most of the children who attended the curative clinic.

**Table 4.2. 2Expectations of Caregivers Regarding Care of Ill Children**

Caregiver's Perceived Needs	N	%	$\chi^2$
Education on ways of boosting child's appetite			117; df 1 p <.001
Perceived necessary	150	92.6	
Perceived not necessary	12	7.4	
Education on safe food preparation			125; df p <.001
Perceived necessary	155	193.4	
Perceived not necessary	11	6.6	
Education on ways of increasing feeding frequency			108; df p <.001
Perceived necessary	150	190.4	
Perceived not necessary	16	9.6	

### Objective 2 Conclusion

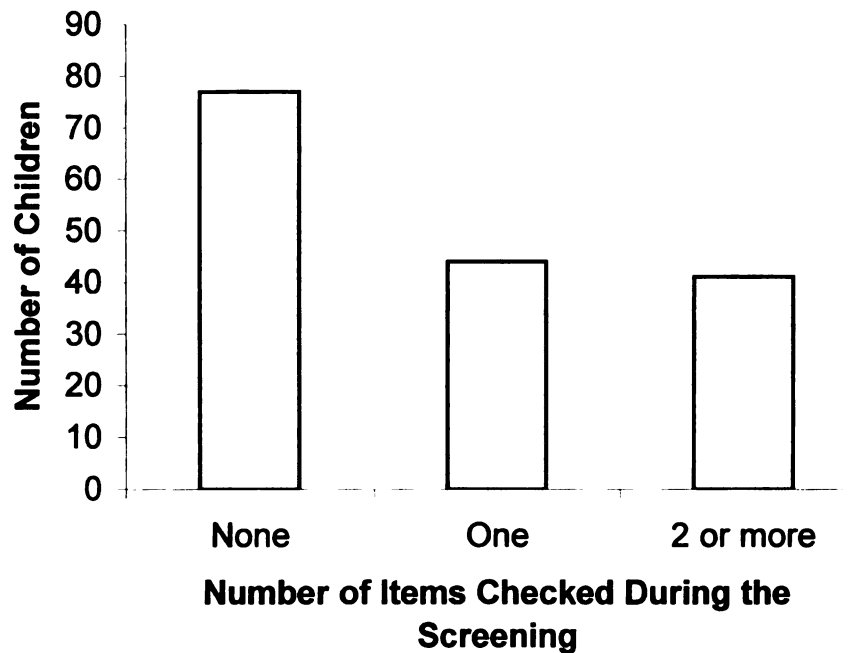
The dietary intake and nutritional status of most of the children who were seeking consultations for childhood illnesses from government sponsored CSP was not performed. Weight measurement and the evaluation of immunization status were not performed for most of the children. Also, most caregivers did not receive diet and nutrition counseling/education. These observations suggest that curative clinic care in the CSP rarely integrated nutrition assessment in the management of childhood illnesses.

**Objective 3. Determine the factors that influence the intensity of nutritional/dietary screening that 0-5 year old children with childhood illnesses receive.**

A summated assessment index that captures the intensity of nutritional and dietary screening was constructed for addressing this objective. The assessment index was constructed from caregivers' responses to the seven variables displayed in Table 4.2.1. Each child had a score of 0 or 1 on each of the seven variables depending on whether the assessment was performed. A score of 0 was assigned when the assessment was not performed. Therefore, the index score ranged from 0 to 7, with low scores representing low levels of intensity and high scores representing high levels of assessment intensity. Pearson r was used to assess the association between the index and each of the seven factors. The association between the assessment index and each of the factors was moderately strong with correlation coefficients (Pearson's r) ranging between .45 to .62. All correlations were significantly different from zero ( $p < .001$ ).

Figure 4.1 shows the number of ill children who either did not receive any assessments, or received one, or two or more assessments. The data displayed in Figure 4.1 show that there were significantly more children who did not receive any dietary and/ or nutrition assessment compared to those who received one or two or more assessments ( $p < .001$ ; df. 2;  $X^2 = 18.9$ ). Also, no significant associations were observed between the assessment index and the ill child's anthropometric measurements (WAZ, HAZ and WHZ), the number of health complaints the children presented with at the curative clinic, the number of days the child had been ill and the mothers' years of education (Table 4.3.1). Further visualization of data through scatterplot matrix plotting

the assessment index against each of the variables examined in this section did not show any pattern suggestive of curvilinear associations either (scatterplot not shown).



**Figure 4. 1Number of Ill Children Screened for the Specified Number of Nutrition/Dietary Items during Clinic Consultation <sup>1</sup>**

#### Hypotheses Testing

*Null hypothesis 3.1:* There is no relationship between the severity of childhood illness and the intensity of dietary/nutritional screening

The severity of illnesses in this study was estimated by the number of days the child had been ill, the number of the health complaints the child presented with at the

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<sup>1</sup> Includes only children who were ill

clinic and the number of conditions the caregiver suspected the child was suffering from. Hence, to evaluate this hypothesis we evaluated linear association between these indicators and the screening index in children who were ill during this study. Table 4.3.1 shows the results of Pearson's  $r$  two-tailed test of association. The results show that the number of days the child had been ill, the number of health complaints the child presented with at the clinic and number of conditions the caregiver suspected the child had were not significantly associated with the screening index. Thus, we failed to reject the null hypothesis (3.1) of no association between the severity of childhood illnesses and the intensity of dietary/ nutrition screening.

Although no associations were observed between the intensity of dietary/nutrition assessment and the severity of illness we found that illnesses were negatively associated with anthropometric measurements (WAZ and WHZ) which respond to acute changes in nutritional status (Table 4.3.1). These findings suggest that ill children also had poorer anthropometric indicators than children who were not suffering from any illnesses at the time of the study.

*Null hypothesis 3.2:* There is no relationship between the intensity of nutritional assessment and the education level of the caregiver.

Since most caregivers were mothers, the educational level of caregivers was estimated by the mother's years of formal education. To test this hypothesis, we ran bivariate Pearson's correlation statistic to test for linear association between the caregivers' years of school and the assessment index for all children who were ill. We found no significant linear correlation between the caregivers' years of school and the

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<sup>1</sup> Includes only children who were ill

assessment index. In addition, a scatterplot of mothers' years of education and the assessment index showed no discernable pattern that might be suggestive of the existence of a curvilinear association (data not shown).

Based on these observations, we failed to reject the null hypothesis of no association between caregiver's education level and the intensity of nutritional/dietary screening. Unlike the index, maternal education was positively associated with HAZ ( $p < .05$ ) and WAZ ( $p < .01$ ). This observation supports prior observations about the link between the status of women in the society and children's growth welfare (Haddad, 1999).

### Objective 3 Conclusion

Observations made in this section do not support the existence and consequently the utilization of linkages between the individual components (clinic) of the CSP. As conceptualized in this study, linkages between CSP were proposed to exist and be utilized if practitioners in curative clinics assessed ill children's dietary intake, nutritional status and immunization status in addition to providing medical care. Furthermore, the intensity of the assessment was expected to increase with the increasing severity of proxy indicators for the severity of the illnesses.

No significant associations were observed between the intensity of dietary/nutritional assessment and the severity of the child's illness in this study. Thus, children at higher risk for undernutrition due to the perceived severity of illnesses were treated in the same manner as children at lower risk of undernutrition. As a result, there was no evidence supporting the notion that curative clinics, because they provide care as

urgently as it is needed, are well poised for channeling clients to other CSP. It was not clear from the observations that the children's nutritional care increased as the child's risk (or perceived risk level) of undernutrition increased. Observations also suggest that the educational level of caregivers in this study, a measure of caregivers' self-confidence, was not associated with the intensity of dietary or nutritional assessment that practitioners performed.

**Table 4.3. 1 Correlations between Assessment Index<sup>1</sup> and Other Variables**

		Mom's years of school	No. of Health Complaints	No. of Suspected Conditions	No of Days Ill	WHZ	HAZ	WAZ	Assessment Index
Mom's years of school	Pearson's r Sig. N	1 - 171	-.057 .463 168	.046 .552 167	-.203** .009 166	.109 .160 169	.165* .033 167	.215** .005 168	-.033 .690 151
No. Health Complaints	Pearson's r Sig. N	-.057 .463 168	1 - 171	.389** .000 170	.019 .811 164	-.247** .001 169	-.028 .716 167	-.215** .005 168	.042 .603 153
No. of Suspected Conditions	Pearson's r Sig. N	.046 .552 167	.389** .000 170	1 - 170	-.178 .022 165	-.057 .466 168	.022 .783 166	.022 .775 167	.112 .169 152
No. of Days ill	Pearson's r Sig. N	-.203** .009 166	.019 .811 164	-.178 .022 165	1 - 168	-.064 .410 166	-.080 .306 165	-.084 .281 166	.097 .239 149
WHZ	Pearson's r Sig. N	.109 .160 169	-.247** .001 169	-.057 .466 168	-.064 .410 166	1 - 172	-.124 .106 170	.624 .000 170	.003 .969 152
HAZ	Pearson's r Sig. N	.165* .033 167	-.028 .716 167	.022 .783 166	-.080 .306 165	-.124 .106 170	1 - 170	.681** .000 170	.070 .395 150
WAZ	Pearson's r Sig. N	.215** .005 168	-.215** .005 168	.022 .775 167	-.084 .410 166	.624** .000 170	.681** .000 170	1 - 171	.064 .433 151
Assessment Index	Pearson's r Sig. N	-.033 .690 151	.042 .603 153	.112 .169 152	.097 .239 149	.003 .969 152	.070 .395 150	.064 .433 151	1 - 153

<sup>1</sup>Previously described under objective:3 \* Significant at the 0.05 level (2-tailed), \*\* Significant at the 0.01 level (2-tailed).

**Objective 4. Describe the relationship between clinic care and caregivers' perceived satisfaction with services provided by government clinics.**

Most caregivers in this population found clinic services satisfactory. Seventy three percent of caregivers (72.6%) felt that the services provided by government clinics were satisfactory while 12.1% felt that the services were not satisfactory (Table 4.1.1). The remaining 15% of caregivers found clinic services to be just “okay”. Excluding caregivers with neutral perceptions, our data also suggest that caregivers' perceptions about clinic care were influenced by the type of services caregivers sought (Table 4.4.2). Caregivers seeking curative care were less likely to be satisfied with clinic services compared with those who were seeking preventive care. In this population, 89.4% of caregivers seeking preventive care reported being happy with care, compared to 74.5% of caregivers of children seeking curative care (new cases and follow-up care). A similar trend was observed when tests of association were limited to new consultations (excluding follow-up care) only.

*Null hypothesis 4.1: Caregivers are not satisfied with the services that children receive.*

A high proportion of caregivers in this study found clinic services to be satisfactory (Table 4.4.1). Based on the results of the Goodness of Fit Test displayed in Table 4.4.1, the null hypothesis 4.1 was rejected.

*Null hypothesis 4.2: The type of care being sought (curative or preventive) does not influence caregivers' satisfaction level with clinic care.*



Data displayed in Table 4.4.2 suggest that the type of services caregivers sought influenced their perceptions about clinic care. Caregivers seeking curative services were less likely to be satisfied with clinic care compared to those seeking preventive care. Based on these observations, the null hypothesis of independence between caregivers' perceptions about clinic care and type of clinic care being sought was rejected.

**Table 4.4. 1 Perceived Satisfaction of Caregivers**

<b>Variables</b>	<b>N</b>	<b>%</b>	<b>Goodness of Fit Test</b>
<b>Was the service satisfactory?</b>			
Yes	373	72.6	$X^2 = 356.899$ df = 2 P < .001
No	62	12.1	
Just okay	79	15.4	
<b>Why was the service not satisfactory?</b>			
Staff not kind /poor communication skills	8	12.5	$X^2 = 158.25$ df = 2 P < .001
Not happy with treatment plan / medications	40	62.5	
Long waiting periods	16	25.0	
<b>Why was the service satisfactory?</b>			
Staff kind	271	68.1	$X^2 = 26.00$ df = 2 P < .001
Staff quick	54	13.6	
Liked treatment	73	18.3	

#### **Objective 4 Conclusion**

A large proportion of caregivers seeking care from government sponsored Children Survival Programs reported that the services rendered were satisfactory. Satisfied caregivers felt that clinic practitioners were kind (68.1%), and the treatment plans prescribed for study children were satisfactory.

However, when caregivers' perceptions about clinic care were evaluated against their reason for seeking care, caregivers seeking curative care were more likely to be unsatisfied with care compared to those seeking preventive care (Table 4.4.1). Unsatisfied caregivers complained about the long waiting periods in the clinic (25%) and the unsatisfactory treatment plans (62.5%).

Overall, most (337) caregivers did not communicate their concerns to healthcare practitioners (Table 4.4.2). Data also suggest that unsatisfied caregivers were less likely to communicate their concerns to clinic staff compared to those who found clinic services satisfactory.

**Table 4.4. 2 Association between Clinic Care and Caregiver Satisfaction**

Variable	Satisfied with Care						Chi Square (df, p-value)
	Yes		No		Total		
	N	%	N	%	N	%	
Type of Care Sought							
Preventive	294	89.4	35	10.6	329	100	14.434 (df 1; p < .001)
Curative	79	74.5	27	25.5	106	100	
Child Illness Status							
Ill	98	73.1	36	26.9	134	100	25.207 (df 1; p < .001)
Not ill	275	91.4	26	8.6	301	100	
Shared Concerns with Practitioners							
Yes	77	92.7	7	8.3	84	100	2.810 (df 1 p < .10)
No	285	84.6	52	15.4	337	100	

**Objective 5. Determine caregivers' perceptions about the nutritional needs of children during ill health.**

Data to address this objective were taken from caregivers' responses on two questions. In the first question, caregivers were asked to compare the study child's current weight (taken at the time of the study) with the weight taken during the previous

growth monitoring clinic visit and indicate whether the weight had increased, decreased or stayed the same. Secondly, caregivers were further asked to verbalize whether the change (if any) suggested that the child's nutritional needs had increased, decreased or were about the same as before the illness. While data from these questions were used to address objective 5, these questions were preceded by several other questions that gave the caregiver the opportunity to review the study child's eating pattern since this illness episode. Tables 4.5.1 to 4.5.4 display data derived from these questions.

The accuracy of the caregivers' perceptions about children's weight change were compared with the actual difference in weight between weight measurements taken during this study and those taken during the child's attendance at the Growth Monitoring program the previous month. On average, data show that caregivers' perceptions were accurate. The average weight change for children who were thought to have lost weight, maintained the same weight or had gained weight was -.26 kilograms, .14 kilograms and .57 kilograms respectively. These weight changes were significantly different from each other ( $F 33.93$ ;  $p < .001$ ). Further analysis with Tukey's test identified three different subsets at 5% alpha. The three subsets were perceived decreased in weight (mean = -.26 kg), perceived no change in weight (mean = .14 kg) and perceived increase in weight (mean = .57 kg)

Most caregivers perceived their children's weight to have changed since the last visit to the clinic. Two hundred and seventy nine (55.7%) caregivers felt that their children had gained weight while 125(25%) caregivers felt that their children had lost weight (Table 4.5.1). Additionally, 79 (15.8%) caregivers perceived no change in the children's weight while 18(3.5%) did not know if there was any change in the study

child's weight. Caregivers' perceptions about the children's nutritional needs differed from their perceptions about the children's weight changes (Table 4.5.1). More specifically, 205 caregivers did not perceive any change in the children's nutritional needs since the last clinic visit compared to only 79 who did not perceive any change in weight within the same period.

**Table 4.5. 1 Caregivers' Perceptions about Children's Weight and Nutritional Needs**

Change in Weight				Change in Nutritional needs		
Perceived Change			Actual Mean Weight Difference in Kilograms (std) <sup>1</sup>	Perceived Change		
N	%			N		
				%		
Decreased	125	25.0	-.26 (1.00)	Decreased	71	14.0
No change	79	15.8	.14 (0.57)	No change	205	40.4
Increased	279	55.7	.57 (0.99)	Increased	187	36.8
Don't know	18	3.5	<sup>2</sup>	Don't know	45	8.9

<sup>1</sup> Sample sizes are slightly smaller than those in column 1 due to casewise deletion of missing data during the calculation of the actual weight difference. N (Decreased ) = 121; N (No Change) = 78; N (Increased) = 265)

<sup>2</sup> Sample size (N = 2) of this category is too small give a good estimate of the mean difference.

**Null hypothesis 5.1:** There is no association between the caregivers' perception of the child's nutritional needs and the children's illness status.

Chi-square tests were performed to evaluate this hypothesis (Table 4.5-3). At alpha < 10%, caregivers' perceptions about the children's nutritional needs appeared to be influenced by the children's illness status, but this association failed to satisfy the alpha of 5% set a priori. The apparent trend of the association between caregivers' perceived nutritional needs of the children and the children's illness status persisted even when caregivers who reported being unclear about the link between nutritional needs and illness status were excluded from the analysis. Although the null hypothesis of independence between caregivers' perceptions about the child's nutritional needs and the child's illnesses could not be rejected, ill children in this population were more likely to have lost weight compared to children who were not ill (Table 4.5.4).

**Table 4.5. 2** Relationship between Weight Change and Perceived Nutritional Needs

Variables	Perceived change in Nutritional needs N(%)				$\chi^2$ ( df; $\alpha$ )
	Decreased	Same	Increased	Total	
<b>Perceived Change in Weight</b>					
Decreased	46 (38.6)	13 (10.9)	60 (50.4)	119 (100)	102.0 df 4; p< .001
No change	5 (6.8)	45 (60.8)	24 (32.4)	74 (100)	
Increased	19 (7.3)	143 (54.6)	100 (38.2)	262 (100)	

**Table 4.5. 3** Relationship between Illness Status and Perceived Nutritional Needs of Children

Variables	Perceived Change in Nutritional Needs N(%)					$\chi^2$ ( df; $\alpha$ )
	Decreased	Same	Increased	Don't know	Total	
<b>Illness Status</b>						
Ill	30 (17.3)	59 (34.1)	64 (37.0)	20 (11.6)	173	6.83(3; p<.078)
Not Ill	41 (12.2)	146 (43.6)	123 (36.7)	25 (7.5)	335	

**Table 4.5. 4 Relationship between Illness Status and Perceived Weight Change**

Variables	Perceived Change in Weight N(%)				X <sup>2</sup> ( df; $\alpha$ )
	Decreased	No change	Increased	Total	
<b>Illness Status</b>					
Ill	62 (39.5)	25 (15.9)	70 (44.6)	157 (100)	23.67 (2; p< .001)
Not Ill	63 (19.3)	54 (16.6)	209 (64.1)	326 (100)	

**Objective 5 Conclusion**

No significant association was observed between the caregivers perceived nutritional needs of the study children and the children's illnesses status. Although ill children were more likely to have lost weight compared to healthy children, the children's illness status did not appear to directly influence caregivers' perceptions about the children's nutritional needs. This occurred despite the significant association between the children's weight loss and caregivers' perceptions about the children's nutritional needs. Based on these observations, null hypothesis 5.1 could not be rejected in this population.

Amongst caregivers who felt that the nutritional needs of study children had increased, 50.4% had children whose weight fell while 32.4% and 38.2% had children whose weight did not change or had increased during the illness period respectively (Table 4.5.2). Additionally, amongst caregivers whose perception was that the study child's nutritional needs had not changed, very few (10.9%) had children who experienced weight loss, while 60.8% and 54.6% had children whose weight either remained the same or increased during the illness episode respectively.

**Objective 6. Determine caregivers' feeding practices during the child's illness episodes.**

Caregivers reported that study children had a decreased desire to eat. Caregivers reported that the amount of food the study children consumed at this time was also lower compared to the amount they consumed during non-illness days (Table 4.6.1). Most (47.8%) caregivers also reported that they offered study children smaller amounts of food during illness episodes compared to non-illness days. However, the frequency of feedings did not appear to change during illnesses. Over fifty-five percent (55.6%) of caregivers reported feeding study children during illness episodes as frequently as they did before the illness.

*Null hypothesis 6.1:* The number of times per day caregivers offer the child food is not influenced by the child's illness status.

Supporting data for evaluating this hypothesis are displayed in Table 4.6-1. Although thirty-eight percent of caregivers fed study children less frequently during illness days, for most caregivers, the frequency of feeding remained the same. Based on these observations, the null hypothesis of independence between caregivers feeding frequency and children illness status was retained.

*Null hypothesis 6.2:* The amount of food the caregiver offers the child is not influenced by the child's illness status.

A Chi-Square Goodness of Fit Test was performed to evaluate null hypothesis 6.2. Data displayed in Table 4.6-1 show that only a small proportion of caregivers (9.3%) offered study children an increased amount of food during illness days compared to non-illness days.

**Table 4.6. 1 Caregivers Perceptions about Children's Food Consumption During Ill Health**

<b>Variable</b>	<b>N (%)</b>	<b>Goodness of Fit Test</b>
Amount food consumed		$X^2 = 68.593$ ; Df = 2 P < .001
Increased	12 (7.4)	
Decreased	98 (60.5)	
Same as before illness	52 (32.1)	
Amount of food offered		$X^2 = 42.3$ ; df = 2 p < .001
Increased	15 (9.3)	
Decreased	77 (47.8)	
Same as before illness	69 (42.9)	
Feeding frequency since illness		$X^2 = 56.3$ ; Df = 2 P < .001
Increased	12 (7.4)	
Decreased	61 (38.1)	
Same as before illness	89 (55.6)	
Child's desire to eat		$X^2 = 100$ ; Df = 2 P < .001
Increased		
Decreased	5 (4.6)	
Same as before illnesses	108 (67.5)	
	47 (29.4)	

Most caregivers (47.8%) offered study children smaller amounts of food during illness episode compared to non illness days, while 42.9% of caregivers offered children about the same amount of food during illness and non-illness days. Based on these data, null hypothesis 6.2 was rejected because the amount of food caregivers offered was not independent from the child's illness status. Children were more likely to be offered smaller amounts of food during illness days compared to non-illness days in this population.



**Table 4.6. 2 The Feeding Characteristics of Ill children and Caregivers' Perceptions about Children's Weight**

Feeding Characteristics	Perceived Weight Changes N (%)			
	Decreased	No change	Increased	Total
Amount of food Child is offered**				
Decreased	34 (51.5)	12 (18.2)	20 (30.3)	66 (100)
No change	19 (29.7)	8 (12.5)	37 (57.8)	64 (100)
Increased	4 (28.6)	5 (35.7)	5 (35.7)	14 (100)
Amount of food child eats <sup>δ</sup>				
Decreased	42 (47.7)	13 (14.8)	33 (37.5)	88 (100)
No change	12 (26.7)	8 (17.8)	25 (55.6)	45 (100)
Increased	4 (33.3)	4 (33.3)	4 (33.3)	16 (100)
Number of times child is fed				
Decreased	26 (49.1)	10 (18.9)	17 (32.1)	53 (100)
No change	27 (50.9)	14 (58.3)	39 (48.8)	80 (100)

\* (p < .01  $X^2 = 13.9$  : df 4)     $\delta$ ( p < .10;  $X^2 = 8.1$ ; df 4)

Table 4.6.2 displays additional information about the feeding behaviors of ill children. As shown in the table in ill children, 51% those who were perceived to have lost weight were offered smaller amounts of food while 29.7% and 28.6% were either served the same amount as before the illnesses or served more food. Also, 47.7% of children who were perceived to have lost weight were also thought to be eating smaller amounts of food during illness compared to their dietary intake before the illness, while only 26.7% and 33.3% were either thought to be eating about the same amount or more food than during the illness. No differences were observed with respect to the frequency of feeding.

#### Objective 6 Conclusion.

Observations made in this study suggest that the caregivers' feeding frequency was not influenced by the children's illness status. But the amount of food offered to children differed depending on their illness status. Not only were ill children offered a

smaller amount of food, but they were also perceived to be eating smaller amounts of food. This was particularly true for children who were perceived to have lost weight. Overall, data further suggest that caregivers were more likely to offer children smaller amounts of food during illness days as frequently as they fed regular meals during non-illness days.

**Objective 7. Characterize communication channels between caregivers and practitioners**

Data for addressing this objective were obtained from 438 caregivers who had previously characterized clinic services as either satisfactory or not satisfactory (Table 4.7-1). The responses of the 79 caregivers with neutral perceptions about clinic services were set to “not applicable” and together with the 5 cases of non-response were not considered in the analysis. The 438 caregivers were asked whether they had told any of the clinic practitioners about their perceptions regarding the quality of the care they received. Only 85(19.6%) of caregivers reported having communicated their perceptions with clinic practitioners. Caregivers who shared their concerns mainly talked to nurses (54) and family welfare educators (24). The remaining 348(80%) caregivers gave various reasons for not sharing their perceptions (shown in Table 4.7-1). While most caregivers reported that they did not have specific reasons for not sharing their perceptions 83(24.3%), other caregivers had reasons suggestive of lack of collaboration between practitioners and caregivers. Taken together the number (80) of caregivers who attributed their lack of communication to perception that practitioners were difficult to approach 45(13.2%) or that practitioners did not request feedback information 35(10.3%) is high. Similarly, together the number (79) of caregivers attributing their

lack of communication to either the perceived unimportance of communicating 62(18.2%) or the perceived pointlessness 17(5.0) of communicating is also high.

*Null hypothesis: 7.1:* Caregivers do not share their clinic experiences equally with all clinic officers.

The results of the Goodness of Fit Test displayed in Table 4.7.2 suggest that caregivers were more likely to communicate their perceptions to nurses than family welfare educators. Based on these results, null hypothesis 7.1, which suggest lack of independence between caregivers' tendency to communicate their perceptions about care and health cadres, was retained.

**Table 4.7. 1 Communication between Caregivers And Practitioners**

Variables	N(%)	Variable	N(%)
Caregivers perceptions about care		Reasons for not communicating	
Satisfactory	373 (72.1)		
Not Satisfactory	65 (12.6)	No particular reason	83 (24.3)
Just okay	79 (15.3)	Not necessary	62 (18.2)
Caregivers communicated?		Staff not approachable	45 (13.2)
Yes	85 (19.6)	Staff didn't ask for feedback	35 (10.3)
Nurse	54	Not used to doing so	48 (14.1)
Family Welfare Ed.	24	Caregiver in a hurry	20 (5.9)
Others	6	Wouldn't make a difference	17 (5.0)
Missing	5	Staff seemed very busy	15 (4.4)
No	348 (80.4)	Others	16 (4.7)

**Table 4.7. 2Caregivers Preferences in Communicating with Practitioners**

Variable	N (%)	Goodness of Fit Test
Caregiver informed		
Nurse	54 (69.2)	$X^2 = 11.538$ $P < .001$
Family Welfare Educator	24 (30.8)	
Total	78 (100.0)	

### Objective 7 Conclusion

Very few of the caregivers (19.6%) communicated their perceptions about clinic care to health practitioners. In addition, those who communicated their perceptions were more likely to share their impressions about care with nurses than with family welfare educators although family welfare educators work more closely with caregivers compared to nurses. Caregivers gave many for not communicating their impressions about clinic care with practitioners. Some of these suggest that there are communication difficulties between caregivers and practitioners. Large numbers of caregivers did not communicate their perceptions with practitioners because they felt practitioners were unapproachable while others perceived communicating with practitioners to be nonessential and not helpful.

### **Summary Of Hypothesis Testing**

A summary of the hypotheses tested in this study is displayed in Table 4.8.1. The findings suggest that children participating in government sponsored CSP have poorer weight-for-age and height-for-age anthropometric indicators than children of the same age and sex in the NCHS/WHO reference population. However study children's weight-for-height z-scores did not differ significantly from those of children in the reference population.

Children seen for illnesses at government clinics rarely received dietary or nutritional assessment. Also, when diet and or nutritional status were assessed, the assessment was not influenced by the children's anthropometric indicators (WAZ, HAZ, and WHZ), the caregivers' characteristics (maternal education), the number of days the child had been ill or the number of health concerns the child presented with at the clinic. Additionally, caregivers' perceptions about the nutritional needs of children in this study were not influenced by the study child's illness status. The feeding frequency of study children did not differ depending on the child's illness status. However, caregivers reported serving ill children smaller amounts of food compared to children who were not ill at the time of the study.

In general, caregivers perceived the services provided by the government sponsored Child Survival Programs to be satisfactory. A higher proportion of caregivers seeking preventive care reported that services were satisfactory compare to those seeking curative care.

**Table 4.8 1Summary of Hypotheses Tests**

<b>Research Objective/ Hypotheses</b>	<b>Test</b>	<b>Rejected / Retained</b>
<p><b>Characterize the nutritional status of children (0-5 years) who participate in government sponsored CSP in Botswana.</b></p> <p>Ho-1 The nutritional status (i.e. based on anthropometric measurements) of children (0-5 years) participating in government sponsored CSP in Botswana is not different from that of adequately nourished children in the World Health Organizations/ Center for Disease Control reference population.</p>	T-test	<p>Reject with respect to WAZ and HAZ</p> <p>Retain with respect to WHZ</p>
<p><b>Identify the nutritional/dietary screening that children participating in CSP receive.</b></p> <p><i>hypothesis 2.1:</i> Children presenting at the curative clinics do not receive any dietary/ nutrition screening</p>	Chi Square	Retain
<p><b>Determine factors that influence the intensity of nutritional /dietary screening and / or intervention that 0-5 year old children with childhood illnesses receive.</b></p> <p><i>Ho-3.1:</i> There is no relationship between the intensity of childhood illness and the intensity of dietary/nutritional screening.</p> <p><i>Ho 3.2:</i> There is no relationship between the intensity of nutritional assessment/intervention and the education level of the caregiver</p>	<p>Pearson' r</p> <p>Pearson's r</p>	<p>Retain</p> <p>Retain</p>

**Table 4.8. 1 (Cont'd).**

<b>Describe the relationship between clinic care (curative or preventive) and caregivers' perceived satisfaction with services provided by government clinics.</b>		
<i>Ho 4.1:</i> Caregivers are not satisfied with the services that children receive	Chi-Square	Reject
<i>Ho 4.2:</i> The type of care being sought (curative or preventive) does not influence caregivers' satisfaction with clinic care	Chi-Square	Reject
<b>Determine caregivers' perceptions about the nutritional needs of children during ill health.</b>		
<i>Ho 5.1:</i> There is no association between the caregivers' perception of the children's nutritional/dietary needs and child's illness status.	Chi-Square	Retain
<b>Determine the caregivers' feeding practices during the child's illness episodes.</b>		
<i>Ho-6.1:</i> The number of times per day the caregiver offers the child food is not influenced by the child's illness status.	Chi-Square	Retain
<i>Ho- 6.2:</i> The amount of food the caregiver offers the child is not influenced by the child's illness status.	Chi-Square	Reject
<b>Characterize communication channels between caregivers and practitioners.</b>		
<i>Ho- 7.1:</i> Caregivers do not share their clinic experiences equally with all clinic officers.	Chi-Square	Retain

## **Prediction Models for HAZ and WAZ**

The Household Resources Management Model (Figure 1) and the UNICEF conceptual model of child survival, growth and development (Figure 2) were chosen a priori to guide this study. The UNICEF model, as previously discussed (see page 16), classifies the determinants of child survival, growth and development. The Household Resource Management Model (HRM) on the other hand postulates that households process available resources to meet life's demands and achieve desired goals. In line with this HRM premise, the researcher built logistic regression models predicting desired growth outcomes of study children using the independent variables in the caregiver's data set. Two desired growth outcome indicators, adequate weight-for-age and height-for-age, were chosen for this purpose. These growth indicators were chosen because the results of the hypotheses tests in this study suggested that weight-for-age and height-for-age scores of study children differed significantly from the reference population's. It was therefore deemed important that the determinants of these growth indicators be identified.

The independent variables which were used in the prediction models were selected from the following HRM input categories: household resources, child factors and child survival programs services. These categories are displayed in Figure 1 (15). Inputs from the household's resources category are maternal education, maternal employment, head of household, paternal education and employment status and adequacy of food. From the child's characteristics input category, the child's age, sex, weight at birth and the number of children in the household were included in the models. Under the CSP input category, the types of clinic services the child sought (curative or



preventive) and caregivers' perceived satisfaction with care were used as inputs. Variables in these input categories were used to generate a binary logistic regression model predicting the occurrence of adequate (greater than  $-2$  standard deviations of the mean) HAZ and WAZ using the backward stepwise (LR) logistic regression procedure. Tables 4.8.2 and 4.8.3 display the prediction models for adequate HAZ and adequate WAZ respectively.

The decision to include the independent variables in the logistic regression was based on several factors. Some variables were chosen because univariate data analysis showed that they were associated with at least one of the dependent variables. Others were chosen based on the researcher's judgement of the variables' possible roles in influencing the dependent variables as discussed in the literature while others were intuitively selected. The later reason was justified by the exploratory nature of this study.

#### Choice of Logistic Regression Modeling over Ordinary Least Squares Regression

Both logistic regression and ordinary least square regression can be used to explain the variation in the dependent variable using the independent variables. Furthermore, both regression models can be used to rank the importance of each of the independent variables on the dependent variables based on the percent of the variation in the dependent variable that they can each explain. However, binary logistic regression was preferred over ordinary least squares regression because it facilitates the assignment of subjects into two discrete groups (cases and non cases) using the independent variables. The assignment of subjects to either category of the dependent variable is based on how likely it is (the odds) that their score on the dependent variable

can be predicted from the independent variables. Group assignment is an important functional characteristic in epidemiologic-type studies because interventions are often planned based on group membership (presence or absence of a characteristic such as stunting, wasting or underweight). This advantage of logistic regression over ordinary least squares regression has been reported as the main reason logistic regression is often preferred over ordinary least squares regression in epidemiologic studies.

Some other advantages of logistic regression are that unlike ordinary least squares regression, logistic regression makes no assumptions about linearity, normality and homoscedasticity. Therefore, the use of both discrete and continuous independent variables can be used without the risk of violating any assumptions.

#### Interpreting Odds Ratios and Log Odds

In binary logistic regression models subjects can only have a score of 0 or 1 on the dependent variable. Subjects with a score of 1 usually have a characteristic of interest and those with a score of 0 do not. In this study, for example, in the prediction models for adequate height-for-age z-score, subjects with a score of 1 are those with height-for-age z-scores  $\geq -2$  standard deviation of the mean of the reference population. These subjects have adequate linear growth for their age. Subjects with a score of 0 do not have adequate linear growth for their age.

The logistic regression procedure generates the log odds or odd ratios that describe the likelihood (probability) that subjects will be predicted to either have a score 1 or 0 on the dependent variable based on their scores on the independent variables. When odd ratios are used, an odds ratio of 2, for example, is interpreted to mean that given his or her scores on the independent variables, a subject is twice as likely to have a

score of 1 on the dependent variable (while other independent variables are held constant). Odds ratio of 1.0, or confidence intervals that include 1.0 indicate no association between the independent variables and the dependent variable. Odds ratios significantly below 1.0 indicates a decreased likelihood that subjects will have the characteristics of interest, given their scores on the independent variables, while the reverse is true for odds ratio significantly greater than 1.0.

The log odds express the relationship between the likelihood of being in one category of the dependent variable and the independent variables in terms of the natural logarithms of the odds ratio. When the relationship is expressed in terms of the log odds, then, a unit change in the independent variable is associated with a unit change in the log odds of the dependent variable. This expression is very similar to that commonly used in ordinary least squares regression, where, the slope of a regression line is interpreted to mean a unit change in the mean of the dependent variable for every unit change in the independent variable (while other variables are held constant).

#### Predictors of Adequate Height-for-Age

Table 4.8.2 summarizes the logistic regression model built to estimate the child's likelihood of having adequate height-for-age. The attainment of adequate height-for-age was more likely in children who 1) had adequate birth weights ( $< 2.5$  kg), 2) were between the ages of 0 and 36 months, 3) were raised in households with adequate food at all times and 4) were seeking preventive care at the clinic. Amongst these variables the relationship between adequate height-for-age and the adequacy of food supply, the child's age, and birth weight were very strong. Children who had adequate food at all times or were between the ages of 0-12 and 13-36 months were at least twice as likely (p

< .05) to attain adequate height-for-age as children who sometimes had inadequate food or were over 37 months of age. Low birth weight (less than 2500grams) reduced the likelihood of attaining adequate height-for-age significantly ( $p < .001$ ). Children with birth weights below 2500 grams, were only 16% as likely to attain adequate height-for-age as children with birth weight equal to or greater than 2500grams.

At 10% significance, a trend towards significance was observed between adequate height-for-age and both the number of children in the household and the type of clinic service study children sought. However the relationship between the number of children and the likelihood of attaining adequate height-for-age was complex and possibly non-linear. Compared to households with five or more children, households with four children significantly reduced the relative odds of attaining adequate height-for-age. Interestingly when the categories of the number of children in the households were coded such that being the only child was the reference category, children in households with four children still reduced the likelihood of attaining adequate height-for age. Children born in households with five or more children still did not appear to have reduced odds of attaining adequate height-for-age compared to being the only child. For children born in households with two or three children the likelihood of attaining adequate height-for-age was not statistically different from that of children born in households with only one child.

**Table 4.8 2Prediction Model for Adequate HAZ**

Characteristics (df) <sup>1</sup>	N	B(Std. Error)	Wald Statistic	P-Value	Odds	95% CI
Adequacy of food (1)						
Always adequate	359	.74 (.29)	6.29	.012	2.02	1.05 - 3.45
Sometimes inadequate(ref) <sup>2</sup>	135					
Number of children (4)			8.57	.073		
One	101	-.41 (.48)	.72	.397	.62	.24 - 1.16
Two	114	-.68 (.46)	2.27	.132	.50	.19 - 1.10
Three	96	-.45 (.48)	.90	.340	.64	.27 - 1.81
Four	80	-1.22 (.44)	7.52	.006	.30	.12 - .66
Five or more(ref)	103					
Birth Weight in kg (1)						
Low birth weight	65	-1.41 (.34)	17.46	.000	.25	.13 - .46
Normal birth weight(ref)	429					
Child Age in months (2)						
0-12	185	.72 (.35)	6.39	.041		
13-36	205	.80 (.34)	4.30	.038	2.05	1.04 - 4.05
37-60 (ref)	104		5.48	.019	2.22	1.14 - 431
Clinic service sought						
Preventive	367	-.58 (.35)	2.87	.091	.56	.28 - 1.10
Curative(ref)	127					
Model Constant		2.05 (.51)	16.27	.000	7.73	
Hosmer & Lemeshow Test <sup>3</sup> : Model Chi-Square 37.680 df 9 P-Value .860						

<sup>1</sup> df = degrees of freedom

<sup>2</sup> ref = reference category

<sup>3</sup> Hosmer & Lemeshow test evaluates the null hypothesis that “the model fits”.

### Predictors of Adequate Weight-for-Age

Predictors of adequate weight-for-age are displayed in Table 4.8.3. The child's sex and age strongly predicted the likelihood of attaining adequate weight-for-age compared to other variables. Controlling for other variables, girl children were 1.83 times more likely ( $P < .05$ ) to attain adequate weight-for-age than boy children.

With respect to age, children under 12 months were 4.4 times more likely ( $p < .001$ ) to have adequate weight-for-age compared to children over 37 months of age. No significant differences between the likelihood of attaining adequate weight-for age were observed between children of ages 13-36 months and those over 37 months of age.

There was a trend towards significance between the likelihood of attaining adequate weight-for-age and both the caregivers perceived satisfaction with clinic care and the number of children per household. At 10% significance level, children raised in households with four children were only 46 % as likely to attain adequate weight-for-age as children born in households with five or more children. Furthermore, the likelihood of attaining adequate weight-for-age was comparable for households with one, two, three, and five or more children.

Similarly at 10% significance children of caregivers who perceived clinic services to be satisfactory had reduced relative odds of attaining adequate weight-for-age compared to those with neutral perceptions about clinic care.

**Table 4.8.3 Prediction Model for Adequate WAZ.**

<b>Characteristics (df)</b>	<b>N</b>	<b>B(Std. Error)</b>	<b>Wald Statistic</b>	<b>P-Value</b>	<b>Odds</b>	<b>95% CI</b>
<b>Sex(1)</b>						
Female	362	.60 (.30)	4.15	.042	1.83	1.02 – 3.27
Boy(ref) <sup>1</sup>	134					
<b>Number of children (4)</b>			7.24	.124		
One	101	.45 (.56)	.67	.414	1.60	.54 – 4.57
Two	114	-.42 (.44)	.94	.333	.65	.28 – 1.54
Three	97	-.056 (.50)	.01	.910	.95	.36 – 2.51
Four	81	-.79 (.45)	3.08	.079	.46	.19 – 1.10
Five or more(ref)	103					
<b>Perceived satisfaction(2)</b>			4.24	.120		
Satisfied	361	-1.05 (.55)	3.71	.054	.35	.12 – 1.02
Not satisfied	59	-.60 (.72)	.70	.402	.55	.14 – 2.23
Just okay (ref)	76					
<b>Child Age in months (2)</b>			12.66	.002		
0-12	185	1.48 (.43)	11.95	.001	4.40	1.90 – 10.18
13-36	206	.26 (.33)	.60	.440	1.29	.70 – 2.47
37-60 (ref)	105					
<b>Model Constant</b>		2.32(.70)	11.69	.001	10.19	
<b>Hosmer &amp; Lemeshow Test:</b>			<b>Model Chi-Square (df) = 8.18 (8)</b>	<b>P-Value = .416</b>		

<sup>1</sup> ref = Reference category.

## SECTION TWO: OBSERVATIONS FROM PRACTITIONERS QUESTIONNAIRE

### General Observations

Data shown in Table 4.8.4 were collected from 39 out of 40 practitioners who were approached and requested to complete the PQ. One practitioner, a medical officer, declined to complete the PQ. The provider who declined to complete the questionnaire said he was too busy to participate in the study. All 39 practitioners who completed the PQ had a nursing background. Twenty- seven (69.2%) practitioners had basic general nursing training while 12(30.8%) also had additional training in midwifery, family nurse practice, nursing administration and /or community health. Only four providers were trained as Family Nurse practitioners and were therefore well qualified to provide basic curative and preventive primary health care.

**Table 4.8 4 Characteristics of Practitioners**

<b>Practitioner's Characteristics</b>	<b>N</b>	<b>%</b>	<b>Practitioner's Characteristics</b>	<b>N</b>	<b>%</b>
<b>Sex</b>			<b>Training background</b>		
Male	10	25.6	General nursing only	27	69.2
Female	29	74.4	General nursing + other <sup>1</sup>	12	30.8
<b>Years of service</b>			Nursing training		
			<b>Heard about IMCI</b>		
			Yes	33	84.6
< 5	16	41.0	No	6	15.4
5-10	11	28.2	<b>Received training in IMCI</b>		
>10	12	30.8	Yes	7	17.9
			No	32	82.1

Most practitioners 33(84.6%) had heard about the Integrated Management of Childhood Illnesses (IMCI), a UNICEF/WHO initiative that advocates for an integrated

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<sup>1</sup> Four providers were trained family nurse practitioners



approach for diagnosing and treating childhood illnesses. However, only 7(17.9%) practitioners had received in-service training in IMCI.

The practitioners' length of service ranged from less than one year to 37 years. The modal and the median number of years of practice for practitioners in this sample were 3 and 6 years respectively. Twenty-nine (74.4%) practitioners were female.

### **Practitioners' Perceptions about Dietary and Nutrition Assessment**

Practitioners in this study differed in their knowledge of and perceptions about dietary and nutrition assessment of children of ages 0-5 years (Table 4.8.5). All practitioners reported having been trained in diet and nutrition, but they differed in their perceptions about the adequacy of their didactic training and their satisfaction level with their current dietary and nutrition assessment skills. About 70% of practitioners in this sample perceived that their pre-service nursing training adequately prepared them for assessing both the nutritional status and the dietary intake of children 0-5 five years of age.

Data about practitioners perceptions regarding their satisfaction with their skills in performing dietary intake and nutritional status assessment in children 0-5 years are displayed in Table 4.8.5. About 53% of the practitioners felt satisfied with their skills in dietary intake of children 0-5 years while 57.9% of the practitioners felt satisfied with their skills in assessing the nutritional status of children. Surprisingly, when asked to list three methods that they routinely used to assess the dietary intake and the nutritional status of children, only 35.9% and 12.8% of practitioners listed three appropriate dietary and nutrition screening methods respectively. Seven (18%) practitioners could not list even one appropriate indicator of dietary screening.

**Table 4.8 5 Dietary and Nutrition Knowledge, Skills and Perceptions of Practitioners**

<b>Variable</b>	<b>N (%)</b>	<b>Variable</b>	<b>N (%)</b>
<b>Perceived adequacy of training in assessing dietary intake</b>		<b>Perceived adequacy of training in assessing nutrition risk</b>	
Adequate	27 (69.2)	Adequate	27 (71.1)
Somewhat adequate	7 (17.9)	Somewhat adequate	8 (21.1)
Not adequate	5 (12.9)	Not adequate	3 (7.9)
<b>Number of appropriate methods for assessing dietary intake</b>		<b>Number of appropriate methods for nutrition screening</b>	
None	7 (17.9)	None	3 (7.7)
One	5 (12.8)	One	16 (41.3)
Two	6 (15.4)	Two	13 (33.3)
Three	14 (35.9)	Three	5 (12.8)
Never assess dietary intake	7 (17.9)	Never assess nutritional status	2 (5.1)
<b>Satisfaction with skills for assessing dietary intake</b>		<b>Satisfied with skills for assessing nutrition risk</b>	
Satisfied	20 (52.6)	Satisfied	30 (57.9)
Somewhat satisfied	11 (28.9)	Somewhat satisfied	6 (15.8)
Not satisfied	7 (18.4)	Not satisfied	2 (5.2)

The fewer number of providers with adequate knowledge about dietary and nutrition screening indicators for children is troubling because it suggests that children at risk for undernutrition may not be receiving appropriate or any screening at all. This is certain to create a fundamental weakness in the Child Survival Programs because the programs rely on providers' competency to address the health and nutrition needs of children 0-5 years. Providers' knowledge, attitudes and practices have periodically been used to evaluate the delivery of services in different health programs (Razum, 1993; Rea et al., 1999; Salazar- Lindo et al., 1991). Although knowledge is not always

translated into practice (Rourmeliotou et al., 1992), it is often the most commonly evaluated of the three because it can be improved through education and skills training and is the easiest to measure. The underlying argument in assessing knowledge is that adequate knowledge can inform providers attitudes and practices.

### **Practitioners' Perceptions about Their Communication with Caregivers**

Practitioners fell into two groups with respect to their perceptions about communication channels between them and caregivers (Table 4.8.6). One group of practitioners 20(51.3%) thought that there were established communications systems between caregivers and clinic staff. In the other group, 15(38.5%) practitioners felt that there were no established communication channels between caregivers and practitioners, while 4 (10.3%) denied any knowledge of the presence or absence of established system of communication between practitioners and caregivers.

Among the 20 practitioners who affirmed the existence of well-established communication channels between caregivers and practitioners, nine (45%) felt that the health education sessions that are held in the clinics were one type of communication system that is currently in place. These practitioners felt that caregivers are free to communicate their ideas during the question and comments sessions following the health talk / education<sup>1</sup>. Six (30%) practitioners felt that caregivers were free to contact the sisters-in-charge<sup>2</sup> of the clinic; this free access was perceived to be the second communication channel that is in place between caregivers and practitioners.

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<sup>1</sup> While at some clinics, the primary researcher sat in with the clients as the health talks were given. The topics varied widely. Sessions were open to all in attendance, hence everyone could ask questions. Not all clinics offered health talks. Some caregivers were observed asking questions. <sup>2</sup> Sister-in-charge of clinic is the local terminology for the nurse who is the head of the clinic.

**Table 4.8 6 Perceptions, Communication Channels and Caregivers' Satisfaction**

<b>Variables</b>	<b>N (%)</b>	<b>Variables</b>	<b>N (%)</b>
<b>Communication system between caregivers and practitioners established</b>		<b>Are caregivers satisfied with clinic services</b>	
Yes	20 (51.3)	Yes	33 (84.6)
No	15 (38.5)	No	6 (15.4)
Don't know	4 (10.3)		
<b>Communication channels</b>		<b>Top 3 Concerns that caregivers told practitioners</b>	
Talk to Sister-in-Charge of clinic	6 (30.0)		
Suggestion Box	2 (10.0)		
Health talks- open forum	9 (45.0)	Long queues in clinics	23 (60.5)
Talk to any clinic staff	3 (15.0)	Shortage of supplements	8 (21.0)
		Practitioners use harsh words	7 (18.4)

**Practitioners Perceptions about Caregivers' Satisfaction with Clinic Services**

Most practitioners reported that they perceived that caregivers were satisfied with clinic services (Table 4.8.6). Practitioners also reported that caregivers had shared with them their concerns about the clinic services. Twenty-three (60.5%) practitioners reported that caregivers were dissatisfied with the long queues in the clinics. Other areas of concern that practitioners reported caregivers identified were the frequent shortages of food supplements and practitioners' use of harsh or "unkind" words when communicating with them.

**Section Two Summary**

Practitioners in government sponsored Child Survival Programs reported having been trained to assess the dietary intake and the nutritional status of children (0-5 years). There were more practitioners (70%) who perceived their pre-service training to be

adequate than those who were satisfied with their current skills in diet and nutrition screening. Some practitioners were unable to identify even one appropriate indicator for screening children under five years for poor dietary intake (n = 7) or nutritional status (n = 3).

Practitioners' perceptions about the existence of established communication channels between caregivers and practitioners were mixed. About half (n = 20) of the practitioners reported that clinics had established communication channels between caregivers and practitioners while the other half either did not know (n = 15) or reported that there were no established channels of communication between providers and caregivers (n = 4). Practitioners who affirmed the existence of communication channels reported that caregivers were generally free to talk to the sisters-in-charge of the clinic or take advantage of the morning health education sessions to share ideas or voice concerns.

With regard to clinic services, most practitioners (30) thought that caregivers were satisfied with the care rendered. However, practitioners also acknowledged that caregivers had complained to them about the long waiting period (23) in the clinics, the shortage of clinic supplies (8) and the practitioners use of harsh words (7) when communicating with them.

### **SECTION THREE: FOCUS GROUP FINDINGS**

Ten focus group discussions were conducted in this study. As described previously (see page 38 ), caregivers were approached and requested to participate in focus group discussions as soon as they had finished receiving care from the clinic. The discussions were held within the clinic premises. Due to the lack of meeting rooms in the

clinics, the meeting places for the focus groups varied from one clinic to the other. In some clinics, the focus group participants met in the clinic veranda (foyer) while in other clinics the participants met under a tree that could protect them from the heat of the sun. The benches on which the participants sat were borrowed from the clinics. Participants together with the researcher walked to the meeting place as soon as the participants had received care from the clinic. All participants brought their children along with them to the meeting place.

Given the exploratory nature of this study, the number of participants in each group was limited to 4-6. On average, most groups addressed the discussion questions in about 30 minutes. Most of the participants returned to home upon completion of the discussions. A few reported that they also had to proceed to work.

The focus group participants were asked to consider the following three questions (see Appendix B for the Setswana version);

- 1) How adequate are the clinic services in addressing the dietary and nutritional needs of our children?
- 2) How important do you perceive the dietary and nutrition intervention to be in the well being of your children?
  - a) Should nutrition and dietary services be integral components of clinic care?
- 3) Let's talk about communication channels between you (caregivers) and clinic practitioners.
  - a) Are there established channels of communication between you (caregivers) and practitioners?

- b) If you have some issues to share with clinic practitioners, would you know how to go about this process?

**Focus Group Participant's Perceptions about The Adequacy of Clinic Services in Addressing Dietary/Nutrition Programs**

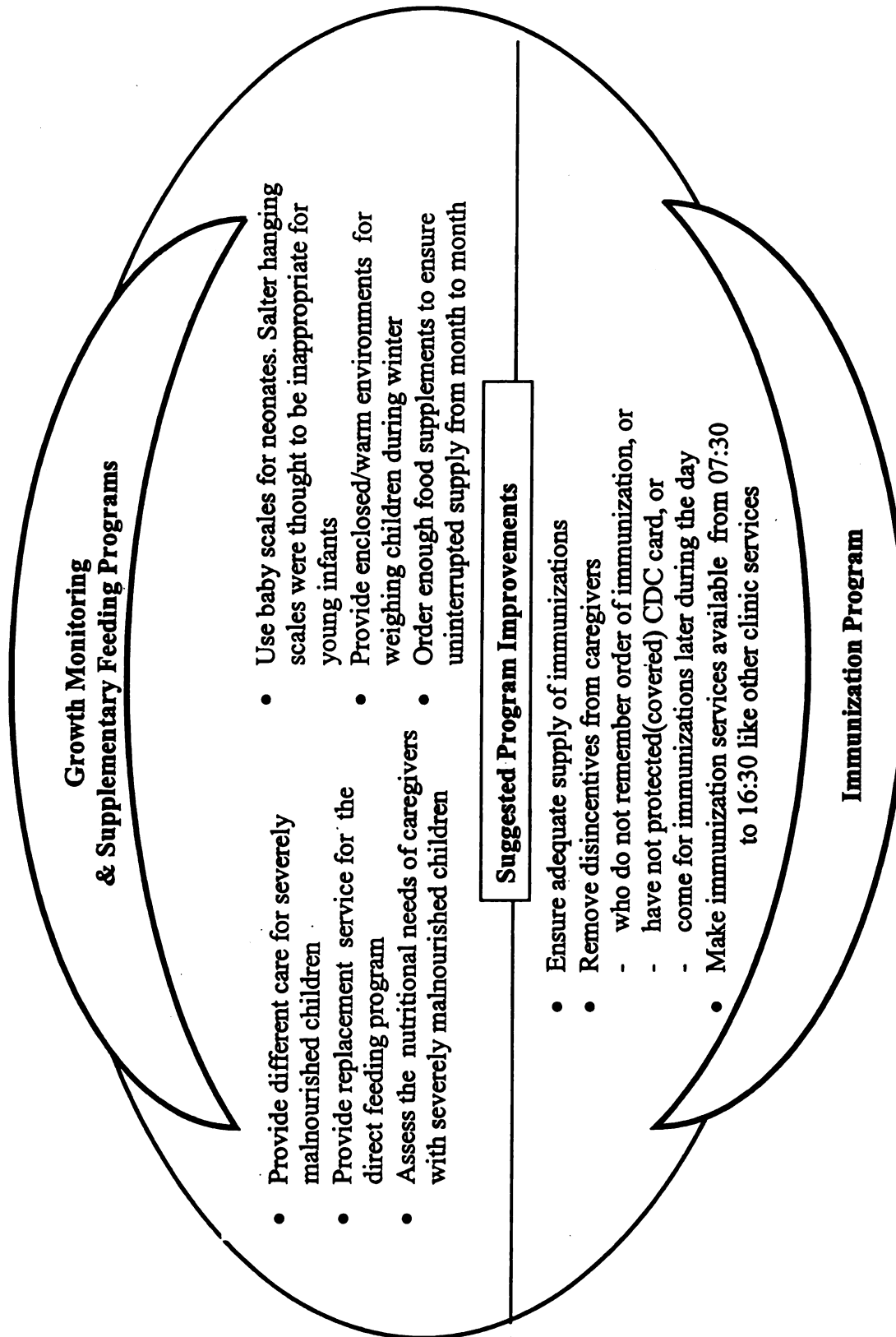
The focus group participants' perceptions about the adequacy of Child Survival Programs (CSP) in assessing dietary and nutrition needs of children differed depending on the clinic services. Preventive services, particularly the Growth Monitoring and the Supplementary Feeding Programs, were said to be better at addressing dietary and nutrition problems than the curative programs. Focus group participants gave examples (Appendix C) that suggest that they were aware that the Growth Monitoring and the Supplementary Feeding Programs were attempting to address the dietary and nutrition needs of children. The provision of food supplements and health workers' initiative in probing for possible dietary or health problems in children exhibiting growth faltering were the two most frequently cited examples of the efforts of the programs to include diet and nutrition services in routine preventive care.

Focus group participants also felt that the Growth Monitoring, Supplementary Feeding Program and Immunization Programs needed to be improved in many areas. While caregivers welcomed the food supplements, there were strong feelings that the Supplementary Feeding Program should consider varying the types of food supplements provided to children. Participants felt that alternative food supplements should be made available for children who do not tolerate tsabana, a fortified sorghum /soybean weaning food that is currently rationed to children 4-36 months.

There were also strong discussions about the care for children who were perceived to be very undernourished children. Caregivers felt that the Supplementary Feeding Program should provide a replacement service or program for the Direct Feeding Program that ceased in the mid 1980s. Through the Direct Feeding Program, very malnourished children were fed at least 2 meals per day at the clinic. There were also suggestions that the general needs of caregivers with undernourished children should also be assessed by clinic practitioners as these may be related to the children's poor nutritional status.

The major suggestion that participants made about the Immunization Programs was that the programmers need to maintain adequate supplies of vaccines at each clinic. Participants expressed frustration with the fact that they have had to travel to clinics outside their catchment areas to get their children immunized because their default clinic did not have adequate vaccines. Other propositions that participants thought might improve CSP are displayed in Figure 4.2. Detailed excerpts from the focus group discussions are recorded in Appendix C.





**Figure 4. 2 Summary of Suggestions that Focus Group Participants Thought Would Improve The Growth Monitoring, Immunization and Supplementary Feeding Programs**

### **Perceived Place of Dietary and Nutrition Screening in the Various Components of CSP**

Focus group participants expressed the desire to have the children's dietary and nutrition screening performed in both preventive and curative clinics. Participants felt that the preventive programs, particularly the Growth Monitoring Program, were already making significant progress in addressing the dietary and nutritional needs of children, while the curative clinics were perceived to be lagging behind.

Participants expressed the need to have curative clinics provide nutrition education. Offering nutrition education during curative clinic consultations was thought to be advantageous because unlike preventive services, curative services allow caregivers to meet individually with practitioners. Thus, nutrition information provided during curative services would be more specific to individual study children compared to that provided during preventive services.

In one focus group discussion, participants expressed concern regarding the apparent conflicting nutrition messages that have been disseminated to them during preventive services. In this focus group, participants gave examples of two different pieces of information that caregivers were given with regard to children with a decreased desire to eat. Some participants indicated that they were advised to force feed children who eat poorly while others were told that giving such children a multivitamin syrup would resolve the poor appetite. Interestingly, all participants were equally not pleased with both pieces of counsel. Hence, participants in this focus group strongly felt that

problems such as the one presented in this paragraph can be prevented by the provision of individualized nutrition education during curative services.

### **Perceived Communication Channels between Caregivers and Practitioners**

Data from focus groups indicate that caregivers were aware of communication channels within the clinic structure. According to the participants, it was understood that caregivers have the liberty to contact any clinic staff, practitioner or the Sister-in-Charge of the clinic and express any health related need/concern at any time during working hours. Some participants thought that the initial communication with clinic personnel commonly started with Family Welfare Educators because they work in areas that are physically more accessible to caregivers than practitioners. Once the initial contact had been initiated, participants reported that caregivers could follow up with relevant clinic cadres up to the clinic administrator or until the caregiver's needs are met. Other participants felt that the content of the communication and the caregiver's comfort level with the clinic personnel directed determined the initial contact point along the hierarchy of clinic cadres.

Focus group participants expressed concern with the lack of appropriate communication between caregivers and health practitioners. Participants stated that it generally took a lot of courage for caregivers to approach practitioners. Participants frequently stated that health workers' choice of words were often harsh. In some groups participants related specific incidents in which they witnessed caregivers who were perceived to be inappropriately spoken to by practitioners for not putting a protective covering over their child's health card or were perceived to have arrived late for the Immunization or Growth Monitoring Clinic. Figures 4.3 and 4.4 summarize caregivers'

feelings and perceptions about caregivers' communication with practitioners and factors that may have some influence on the communication respectively.

### **Participants' Perceptions and Feelings about Communicating with Practitioners**

#### **Caregivers were**

- Aware that practitioners work under pressure, so they ignored some of their harshness
- Often hesitant to applaud deserving practitioners as they would be thought to be taking sides
- Afraid that practitioners will report them to the matron
- Frustrated because practitioners never explained the cause(s) of the delay/long cues in clinic
- Not always aware of any communication channels that should be followed
- Afraid to talk to the Sisters-in-charge of clinics as they may be seen to be reporting other practitioners
- Often afraid to ask questions
- Often more comfortable changing clinics than talking to staff in their default clinics

**Figure 4. 3 Statements Summarizing Participants Feelings and Perceptions about the Nature of the Communication Between Caregivers and Practitioners**

**Participants' Perceptions about Factors that Might Influence Practitioners' Communication with them**

- Caregivers stated that they felt that practitioners;
  - Work under too much stress
  - Are too few relative to their client load
  - Need more training in communication skills that is offered at the Botswana National Productivity Center
  - Need to listen to caregivers empathetically
  - Exercise authority even in matters not under their control
  - Do not inform clients about challenges leading to long waiting times in clinics so clients cannot empathize with them
  - Need to acknowledge that caregivers may know their children's health status better than them
- Caregivers felt that they;
  - Need to be calm and persistent when communicating with practitioners
  - Need to verbally recognize practitioners who are doing a good job so that they can be encouraged

**Figure 4. 4 Statements Summarizing Participants Perceptions about Factors that Might Influence Their Communication with Practitioners**

Throughout the discussions between caregivers and practitioners, participants made reference to face-to-face communication with practitioners. There was no mention of communication over the telephone although there are telephone services in some households in all the villages in the sampling frame. In a few cases, participants reported the possibility of using written communication to communicate with providers. However this mode of communication was rare because only a small number of clinics in Gaborone encouraged their clients to use suggestion boxes. None of the participants who knew about the existence of suggestion boxes ever used one, although it is unlikely that literacy was a factor. Most caregivers have a minimum of primary school education. One concern against the use of suggestion boxes was raised in one focus group. Participants felt that the suggestion boxes may not be useful because there was no guarantee that caregivers who deposited their written concerns in the suggestion boxes will be in the clinic at the time the concerns are addressed. And thus, such caregivers may never know if and how their concerns were addressed.

### Section Three Summary

Caregivers considered nutrition and dietary screening to be an important aspect of their children's survival, growth and development. Most caregivers felt that dietary and nutrition screening should be an integral component of CSP clinic care. Compared to the curative clinic, the Immunization and the Growth Monitoring programs were perceived to be better at dietary and nutrition screening. Interpersonal communication between providers and caregivers was reported to be problematic. Caregivers raised concern about providers use of harsh words in communicating with them.

## **CHAPTER V**

### **DISCUSSION AND CONCLUSIONS**

This study investigated the existence and utilization of linkages between Child Survival Programs (CSP) and undernutrition alleviation strategies for children (0-5 years) in Botswana. It focused on examining the use of routine dietary/nutrition assessment in the curative clinics and the preventive programs (Growth Monitoring, supplementary feeding and Immunization programs). These wings of the CSP were chosen because they were designed to address childhood illnesses and nutrition problems in children, both of which have been shown to explain 70% of the variance in the mortality of children 0-5 years worldwide. Data used in this investigation were obtained from personal interviews (using the Caregivers' Interview Schedule) with caregivers of children who received curative or preventive care (growth monitoring/ supplementary feeding program services) from government clinics. Where applicable, supportive data from caregivers' focus groups and Providers' Questionnaire have been used.

The observations made in this study together with the study implications, limitations, and conclusions are discussed in this chapter. Throughout the chapter, evidence drawn from the findings of the relevant research hypotheses tested in Chapter 4 is used to address each of the study objectives. Furthermore, the similarities and/or differences between the study findings and the current understanding of the issues as reflected in the reviewed literature are highlighted. To avoid redundancy, study objectives have been collapsed into three topics that are more general. Objectives 1-3, 4 and 5, and 6 and 7 have been addressed together under the following headings:



Nutritional Status of Children Participating in Government Sponsored CSP, Nutritional/ Dietary Screening in Children Participating in CSP, and Caregivers Characteristics and Children's Survival respectively.

### **Nutritional Status of Children (0-5 Years) Participating in Government Sponsored CSP in Botswana (Objectives 1-3)**

There is a significant undernutrition problem in children participating in government sponsored CSP in Botswana. Nearly 14% and 11% of children participating in CSP are stunted and underweight respectively. The prevalence of acute and chronic undernutrition in children of ages 0-12 months was significantly lower compared to that of children 13- 36 months and those over 37 months of age (Table 4.1.2a). The prevalence of stunting in children 37 - 60 months, for example, was about double that of children 0-12 months of age. Similarly, while only 4.7% of children 0-12 months were underweight, the prevalence of underweight in children 13-36 months and 37-60 months was 13.1% and 19.3% respectively. Overall, data show that older children are at greater risk of poor nutrition compared to younger children. In addition, predictive models built in this study suggest that older children in this population are less likely to attain adequate weight-for-age and adequate height-for-age (Tables 4.81 and 4.82). These findings suggest that undernutrition alleviation strategies are needed for children currently being reached by CSP. Additional efforts may be needed to protect older children who, according to this study, have higher prevalence of both stunting and underweight.

The increasing prevalence of acute and chronic undernutrition with age in children under five years of age is not unique to this study. Other studies, including the

demographic health surveys from many developing countries, report similar observations (ACC/SCN, 1997; Marquis et al., 1997). In many developing countries, studies show that the decline in the growth of children under five years of age became apparent during the first twelve months (ACC/SCN, 1997; Kwenya et al., 2003; Nnyepi, 2000; Ubomba-Jaswa and Belbase, 1996). However, the children's age at the onset of undernutrition and the rate of the deceleration in growth may be different for each of the growth indicators (i.e. height or weight) (Maleta et al., 2003; Schrimpton et al., 2001).

Factors predisposing older children to poorer nutrition outcomes than younger children were not explored in this study. However, findings from other studies suggest that older children's dietary intakes, prolonged exposure to nutrition insults, poor recovery rate from growth faltering, varying disease risk, and the birth order of the child in the household may play a role in their lower nutritional status. Compared to younger children, older children are more likely to have diets low in both calories and proteins because they no longer benefit from breastmilk (Ubomba-Jaswa and Belbase, 1996). Their poorer growth indicators may also be reflective of the cumulative effects of chronically insufficient diets. (ACC/SCN, 1997).

The amount of time caregivers allocate to care-giving practices has been hypothesized as a contributory factor in the poor growth indicators of older children. In the literature, poor growth outcomes in older children were reported in children whose caregivers devoted less time to care-giving practices such as breastfeeding, food preparation, and child feeding (Kamau-Thuita et al., 2002) due to other household or employment commitments. This may particularly be an important factor if older children have younger siblings whose care is more primary than theirs. In such situations, older

children may be required to feed themselves or rely on the care provided by their siblings.

#### Correlates of Nutritional Status

Factors that influenced the nutritional outcomes of children in this study are displayed in Tables 4.8.2 and 4.8.3. The adequacy of food, the number of children in the household, the children's sex, age and birth weight, and the reason for attending the clinic significantly influenced the children's likelihood of attaining adequate nutritional status in this population.

#### *Adequacy of Food in Households*

The likelihood of attaining adequate height-for-age for children in this study was negatively associated with the caregivers perceptions about the inadequacy of food in households. Children raised in households perceived to have enough food for all household members at all times were twice as likely to have adequate height-for-age compared to those whose households were sometimes without adequate food (Odds Ratio 1.1-35; 95% Confidence Interval). A similar observation has been reported by Lomperis (1991) in which children who were reared in households with adequate access to food, especially animal food, fared better than children raised in households without adequate food (Pelto et al., 1991). Our observation and Lomperis' (1991) are consistent with the WHO/UNICEF conceptual framework of child survival in which dietary intake and household food security are regarded as immediate and underlying determinants of child survival respectively (see figure 2 on page 16).

#### *Household Size*

A trend towards significance between the number of children in a household and both the height-for-age and weight-for-age z-scores of the index child was observed in

this study. The relationship between the number of children in the household and the children's nutritional status was not linear. The likelihood of attaining adequate height-for-age and weight-for-age for children raised in a household with one, two, and three was not significantly different from that of children raised in household with five or more children. However, as the number of children per household reached four, the index child became statistically less likely to attain adequate height-for-age and weight-for-age compared to children with five or more children. More specifically, when controlling for other variables, children raised in households with four children were only 30% and 46% as likely to attain adequate height-for-age and weight-for-age respectively compared to children raised in households with five or more. This relationship was stronger with respect to height-for-age than with weight-for-age z-scores. Our findings regarding the relationship between the index child nutritional status and the number of children per household suggest that while a large number (about 4) of children may be detrimental to the index child, there is a point beyond which having more (at least 5) children per household may be helpful.

In the literature, two different positions / assertions about the relationship between the number of children per household and the nutritional status of the index child have been reported. Some studies report negative effects of the increasing number of children per household on the index child's nutritional status (Lomperis, 1991; Pelto et al., 1991; Swami et al., 2000). In one position, researchers hypothesize that the increasing number of children per household over-stretch household resources and thus place more vulnerable household members at risk for poor nutrition (Pelto et al., 1991). Within this

viewpoint, children born into households with few children have been shown to fare better nutritionally than children born in households with many child (Lomperis, 1991).

In the second position, some literature reports that households with more children conferred some protection over the index child (Wolley et al., 1990). Researchers reporting this protective effect of larger households hypothesize that older children in the household help the primary caregiver in generating income, caring for the index child or in performing household chores, thereby enabling the primary caregivers to use more of their time in care-giving activities or generating income. In a study supportive of this view in Nigeria, researchers found that children born in households with seven or more children had better anthropometric outcomes than children born in households with fewer children (Wolley et al., 1990). In another study in Botswana, researchers found that older children, particularly those employed in cities, support their parents by sending them money. A similar phenomenon might explain the protective effect of a larger family size on the index child's growth indicators that observed in this study (Mazonde, 1998).

### *Gender*

Data in this study also show a trend for boys to have poorer odds of attaining adequate weight-for-age z-scores than girls (Tables 4.8.3). This observation was rather surprising because the influence of the children's sex on nutritional status is commonly reported in societies where it has important socio-cultural considerations in households such as, in some Asian countries (Basu et al., 1986; Levington, 1974). Even in these Asian countries, however, boys often fared better than girls because they were fed better (Chen et al., 1981; Levington, 1974). It is worth noting that even in Asian countries,

gender bias was not consistent across all socioeconomic groups. Girls appeared to have been greatly discriminated against in poorer socioeconomic classes than in higher socioeconomic classes (Rousham, 1996). Rousham (1996) also observed that the discrimination against girls was much worse during periods of economic stress.

The propensity for boys to have poorer nutritional outcomes than girls as observed in this study, though different from other observations in Botswana should not be dismissed as an analysis artifact because studies from other parts of African have observed better growth outcomes in girls than (Sahn and Stifel, 2001; Setswe, 1994).

#### *Low birth weight*

The prevalence of low birth weight in this study was low. As previously shown in other studies, the likelihood of attaining adequate height-for-age for children with low birth weight in this study was remote (Adair and Guilkey, 1997). Low birth weight has been definitively shown to reflect intra-uterine growth retardation and is largely a function of the mother's nutritional status as is often indicated by pre-pregnancy weight and absolute weight gain during pregnancy (ACC/SCN, 2000).

In conclusion, our study showed that undernutrition (stunting and underweight) continues to be a significant problem in children (0-5 years) who are being reached through the CSP in Botswana. Older children within this age group are at greater risk of undernutrition and may therefore require special attention. Factors that CSP may need to address in order to positively influence the nutritional status of children in this population include children's birth weight, the availability of food and the number of children in the household. CSP should also invest resources in determining factors that predispose older children and boys to higher undernutrition risk than younger and girl

children respectively. These findings may guide the provision of health and nutrition care for this population group.

#### **Nutritional/Dietary Screening in Children Participating in CSP (Objectives 4 and 5)**

In a study in India, researchers took advantage of a day set aside for reaching all children with immunizations (National Immunization Day) to evaluate the nutritional status of children 0-5 years (Swami et al., 2000). Within this day, Swami and others randomly selected and successfully screened 7413 children for undernutrition amongst children who had gathered to receive immunizations. Forty-two percent of these children were found to have varying grades of protein energy undernutrition. The researcher also identified key correlates of undernutrition for their target population.

Similar to the providers at the National Immunization Days, the providers working in the Child Survival Programs' clinics have direct contact with children under five years of age and are thus suitably placed for providing routine nutrition assessment to children 0-5 five years of age. Providers in the Child Survival Programs probably have an advantage compared to those who are at the National Immunization Days because children are seen within clinic settings where their access to other programs may be arranged if deemed necessary. However, findings in this study show that providers in the Child Survival Programs in Botswana did not always take advantage of their contact with children (0-5 years) to routinely perform nutrition and dietary screening. Simple nutrition indicators such as weighing the children before curative clinic consultations and inquiring about children's feeding frequency were seldom performed on ill children. These basic nutrition and dietary screening indicators were only performed in 20% of children who were seen for curative care. There were also no distinguishing

characteristics between ill children who received nutrition assessment and those who did not, further suggesting that nutrition screening were performed randomly and were not standard components of clinic care. Consequently, there was no indication that the extent to which children were at risk for undernutrition influenced their clinic care. These observations suggest that CSP in Botswana do not have established (or do not implement) procedures for screening children for undernutrition prior to care and may therefore be providing inadequate care to children at risk for undernutrition. The apparent lack of a risk-sensitive strategy for indentifying children at risk for undernutrition in Botswana Child Survival Programs may compromise the efficacy of programs in improving the growth, development and survival of children as intended.

Routine nutrition assessment can potentially improve children's survival because it offers practitioners the opportunity to identify children at risk for undernutrition before their health is greatly compromised. In addition, the outcomes of the nutrition assessment can guide providers in dispensing risk appropriate care (Sermet-Gaudelus et al., 2000). In one study, the use of a screening tool called a Simple Pediatric Nutritional Risk Score was shown to accurately predict subjects at high risk for poor nutrition when used as part of pre-hospital admission assessment (Sermet-Gaudelus et al., 2000). This tool, which could be adapted for health settings in developing countries, assigned subjects a nutrition risk score of 0-5 depending on the severity of illness, weight loss and problems that might affect food intake. Patients assigned a score of 0 at admission had low nutrition risk while those assigned a score of 5 were at high risk for a poor nutritional status during their hospital stay. Sermet-Gaudelus et al. (2000) found that only 2% of patients with a score of 0 experienced a weight loss of more than 2 % during their



hospital stay, while 84% of patients with a score of 5 experienced a weight loss of more than 2% during their stay. In addition, the simple pediatric screening tool was shown to accurately assign subjects with a dietary intake of less than 50% of their recommended dietary intake a high-risk score. With the risk level identified, providers were able to increase nutrition interventions relative to the subject's risk level.

Despite the helpfulness of nutrition screening, very few screening tools have been reported in the literature (Reilly et al., 1995). Of the few that are reported, some were developed and validated for the elderly population (Wolinsky et al., 1985 and 1990), while others were developed for children (Sermet-Gaudelus, et al., 2000). In general most of these tools assess weight loss, food intake, disease status and body mass index in adults and growth percentiles in children. Despite the different target populations, the tools are beneficial because they improve the selection of subjects at risk for poor nutritional status and thus enable providers to prescribe risk-appropriate care.

Efforts to include routine nutrition screening in all government CSP in Botswana, with appropriate training of staff should be considered. Routine nutrition screening and appropriate intervention may be instrumental in reducing the incidence of undernutrition in children 0-5 years of age and in guiding prescription of both nutrition and medical interventions for children seen for childhood illnesses in government clinics. Screening tools that are simple and require less administration time like the Simple Pediatric Nutrition Score (Sermet-Gaudelus et al., 2000) need to be developed for the Botswana population.

### Competency of Providers in Providing Nutrition and Dietary Screening

While routine nutrition and dietary screening is important, it is not clear from the providers' perceptions whether their training adequately prepared them for providing dietary and nutrition assessment. Although most caregivers had heard about the Integrated Management of Childhood Illnesses (IMCI), an approach that underscores the importance of addressing nutrition problems in ill children, very few providers had actually been trained to use the IMCI treatment protocol. There was also some disparity between providers' perceptions about the adequacy of their training in nutrition and dietary screening and providers' satisfaction with their skills. More providers were less satisfied with their nutrition and dietary screening skills than with the adequacy of their training programs in imparting the same skills. When asked to list three indicators for assessing dietary intake and nutritional status, very few providers listed appropriate indicators. Most providers were able to list only one appropriate indicator for assessing nutritional status. Comparatively, providers did better in listing dietary indicators than in listing nutrition indicators. Fourteen providers identified three appropriate dietary indicators while only five identified three appropriate nutrition indicators. Some providers were not able to list even one dietary or nutrition assessment indicator. Others stated that they never assessed children's dietary intake or nutritional status.

No hypotheses testing was performed with providers' data, however, the large number of caregivers who could not list three appropriate indicators for assessing dietary or nutrition status, suggests that providers could benefit from training in nutrition and dietary screening and intervention. This training could be included in the basic nursing curriculum. Periodic continuing education opportunities could also be made available for providers who continue to work with children 0-5 years. Providers were not asked to list

assessment tools that would be uniquely used by trained nutritionists and dietitians such as 24 hour recalls, plate observations or diet histories for dietary screening and muscle circumference, triceps skinfold thickness, HAZ, WAZ, or WHZ for overall nutritional status. Rather, providers were credited for recognizing simple factors that could give some clue about the diet and nutritional status of the child. With respect to dietary intake, providers were credited for recognizing factors that could influence dietary intake which include the frequency of meals, the availability of food at all times, the variety of foods, or whether the child shared a plate with others, fed itself or was fed by another sibling or an adult, or had problems in the mouth that might limit food consumption. Any three of these examples would have been acceptable indicators for dietary intake. Similarly, with respect to nutrition, providers were credited if they recognized that changes in weight, frequency of illnesses or clinical signs such as pot bellies, discolored hair and skin problems could be key indicators of a child's nutritional status.

#### Implications for Incorporating Routine Nutrition Screening in CSP clinic Services

It is clear from other studies that routine dietary and nutrition screening is an important step in identifying those at risk for undernutrition (Sermet-Gaudelus et al., 2000). In Botswana the incorporation of routine dietary and nutrition screening in the CSP clinic in Botswana is likely to improve nutrition care and bridge the linkages between the CSP clinics. However, unique structural factors need some consideration alongside the implementation of routine nutrition screening in the CSP. Other important structural issues that need to be addressed relate to the training, adequacy and diversification of providers in the CSP.

Most primary health care providers in Botswana have basic nursing training from the Botswana Institutes of Health Sciences (Ngcongco and Stark, 1986 and 1990). In 1981, a new nursing cadre, in which nurse midwives were enrolled for a year training in family nurse practice was started (Ngcongco and Stark, 1986). The objective of the program was to prepare a cadre of nurses with necessary skills for addressing basic preventive and curative primary health care. The nurse practitioners training included health assessment, therapeutic intervention, and internship placement where nurse practitioners provide primary basic care under supervision. The program, though successful, has not produced enough Family Nurse Practitioners to staff the Clinics. Thus, general nurses consult in the CSP without this necessary training. In our study, for example, 39 nurses were found providing preventive and curative care in clinics. Out of these, 27 were general nurses, 7 were midwives and only 4 were nurse practitioners. With this few qualified , the benefit of incorporating a routine nutrition and dietary screening may not be fully realized. Thus over and above introducing routine nutrition and dietary screening, CSP clinics require qualified practitioners.

Nurses have been described as the driving force behind government plans and policies in primary care. The following statement, which was made by the former Under-Secretary for Manpower and Development of the Ministry of Health, clearly describes the government's expectations of nurses in primary healthcare.

*... nurses, the most numerous as well as most skilled cadre of health workers in Botswana , were chosen as the most appropriate cadre to operationalize the government policy to take primary care services to the communities. Ngcongco and Stark (1986).*

This expectation, though logical given the structure of health services and the sheer number of nurses compared to other cadres in Botswana, places too much burden on nurses. Nurses are expected to perform in a wide range of hospital settings. It is not uncommon for nurses to provide services that are normally provided by cadres in nutrition, radiology, pharmacology, and medicine (Boosntra et al., 2002; Ngcongco and Stark 1990; Rojas, et al., 1990). Other avenues of improving primary health care such as employing health providers with diverse training background in clinics should be pursued. Of immediate importance to this study is the development of clinic level cadres in Nutrition. The employment of nutrition providers in primary health care is recommended because it promotes the provision of care by qualified nutrition professionals. Other advantages for diversifying clinic level cadres relate to the possible reduction in manpower constraints secondary to the assignment of nurses only to those duties for which they have adequate training

### **Caregivers and Child Survival (Objectives 6 and 7)**

Primary caregivers play a significant role in the growth, development and survival of children because they make decisions that impact children's overall care. UNICEF defines care as the “ the provision in the household and the community of time, attention, and support to meet the physical, mental, and social needs of the growing child and other household members” (Engle et al., 1999). Within this concept, UNICEF encapsulates the following six initiatives; care for women, breastfeeding, feeding practices, food preparation, psycho-social, hygiene practices and home health care

(ACC/SCN, 2000). All (perhaps with the exception of care for women) of these initiatives spell out caring activities that are usually performed by caregivers for children.

The ability of caregivers to provide adequate care, as reported in the literature, depends on their individual characteristics and their general access to resources (Allen et al., 1992; Begin, et al., 1997 and 1999; Lamontagne et al., 1998; Guldan, et al., 1993; Kutty, 1989; Kutty et al., 1993). Begin et al., (1999) observed that caregivers' influence on decisions related to children's feeding, health, and other socio-demographic factors together with household socio-demographic factors explained 54% of the variance in children's height-for-age. Additionally, the caregivers' influence on the children's feeding and health decisions in the household remained a significant predictor of children's height-for-age even when household socio-demographic factors were controlled.

In this study, caregivers' characteristics and perceptions that may influence caring practices and hence children's growth, development and survival were investigated. Specific caregivers' characteristics such as their perceptions about the nutritional needs of children during ill health, feeding practices during illness, awareness of communication channels between them and health providers and satisfaction with clinic services were evaluated.

#### Caregivers' Perceptions about The Nutritional Needs of Children and Feeding Practices During the Children's Illnesses

Caregivers in this study paid close attention to the weight of study children and were perceptive of weight changes that occurred between growth monitoring points or following illness episodes. These perceptions were in agreement with weight changes calculated using measurements performed by the investigator during data collection and

those taken during the previous clinic visits. The average change in weight for children who were perceived to have lost weight was below zero (-.26 kilograms) while that of children who were perceived to have gained weight was above zero (+ .57 kilograms). In fact, both the F-test and Tukey's posthoc test identified three distinct mean weight changes for children who were perceived to have lost, gained, or maintained weight.

Factors associated with and the significance of caregivers close monitoring of children's weight status was not explored in this study. The significance of caregivers' close monitoring of children's weight might be related to the advantages of growth monitoring in children. Work by other authors report different observations about the benefits of growth monitoring in children. Panpanich and others (2000) suggest that although growth monitoring has been assumed to promote early detection and administration of interventions for children at risk and studies have not consistently found it beneficial. In another study, the authors reported that caregivers' beliefs and attitudes about the child weight were correlated with better feeding practices and caregivers tendency to practice behaviors that are preventive against protein energy malnutrition (Chit et al., 2003). Chit and others observed that caregivers whose children attended growth monitoring regularly could identify whether or not their children's weights were normal. The same group of caregivers was also more likely to practice behaviors that protected their children from protein energy malnutrition, such as, feeding children during illness episodes than their counterparts.

Our findings also suggest that caregivers associated their perceptions about the children's weight (perceived change in weight) with their perceptions about the nutritional needs of children. It appears that caregivers' perceptions about weight

changes influenced their perceptions about children's nutritional needs. More specifically, children who were perceived to have lost weight were more likely to be perceived as having higher nutritional needs compared to others.

Surprisingly, however, caregivers did not appear to associate children's illness status and their perceptions about the children's nutritional needs. Although illness generally increases children's risk of undernutrition, caregivers did not perceive the nutritional needs of children during illnesses to be any different from the needs during good health. This was very surprising, particularly because caregivers had no difficulty in making a connection between children's weight loss and nutritional needs. Tests of association between children's illness status and caregivers' perception of the children's nutritional needs show only a trend towards significance (Table 4.5.2), while similar tests between weight loss and perceived nutritional needs suggest statistically significant relationships. Interestingly, weight loss was more common in children who were ill.

Caregivers' feeding practices differed depending on children's illness status. Compared to healthy children, ill children were served smaller amounts of food. It appears that caregivers did not withhold food from children, but were responding to the children's reduced desire to eat. This explanation is plausible because caregivers also reported that they observed that ill children had a depressed desire for food. There is documentation in the literature that corroborates this reduction in the amount of food offered to children during illnesses and associated decreased desire to eat. Bentley et al. (1991) observed that caregivers did not intentionally withhold food during childhood illnesses, but rather, children's depressed desire to eat or refusal to accept food limited the amount of food caregivers offered. In addition, a comparative analysis of feeding



practices amongst ill children in this study showed that most of the children who were perceived to have lost weight during the illness, ate less food (47.7%) during the illness compared to those who ate about the same (26.7%) or more food (33.3%). There was an indication that caregivers were concerned with children's reduced desire to eat because one of the comments raised by caregivers during the focus group discussions centered on children who refused to eat. There is, in fact, reported evidence indicating that in many occasions caregivers of ill children or children with failure to thrive prompted children to eat more often than caregivers of healthy and well-nourished children (Bentley et al., 1991; Drewett-Robert, 2003).

Although caregivers in this study paid close attention to children's weight and were able to notice changes in weight from one month to another or following illness episodes, this ability did not translate into corrective feeding practices. Caregivers' inability to timeously associate children's illness, weight loss, and increased nutrition needs suggest that they may fail to promptly address warning signs before growth, development and survival are greatly compromised. However, caregivers' particular attention to the children's change in weight is a facilitative trait that health and nutrition education educators can build on.

#### Communication Between Caregivers and Practitioners

Data for characterizing the communication between caregivers and providers stem from questions in the Caregivers' Interview Schedule (CIS) and the Providers' Questionnaire (PQ). Caregivers were asked to reflect on the services the children had just received and answer questions based on their perceptions about the current visit. Caregivers' relative ease in communicating with providers was assessed by determining

whether caregivers were able to communicate their clinic experiences with providers. Following the clinic visit, caregivers were asked to describe how satisfactory the visit was and whether they informed providers of their perceptions about the care by way of making appreciative comments for satisfactory service or verbalizing concerns for any services that were perceived as not satisfactory. If caregivers had not communicated their perception about clinic care to providers, they were asked to state reasons why they decided not to share their perceptions with providers. Additional data on the communication between caregivers and providers were collected through caregivers focus group discussions and the PQ.

During the completion of the CIS, caregivers were asked to respond to the communication questions based on their experiences and perceptions about the current visit. For focus group discussion, caregivers were requested to restrict their discussions to their experiences in the government clinic they visited most frequently. Overall, very few caregivers in this study communicated their clinic experiences with providers. Of the few who communicated, most talked to the nurses rather than the Family Welfare Educators. Most of those who did not share their clinic experiences cited reasons that suggest communication difficulties or less collaborative working relationships between providers and caregivers. Some caregivers reported no particular reasons for not sharing their clinic experiences with providers while others thought it was unnecessary, or did not share their perceptions because providers did not ask for feedback. Still others did not communicate because they were not accustomed to sharing their perceptions with providers, thought that providers were unapproachable, or that it would not make a

difference or for many other reasons that also suggested communication difficulties between providers and caregivers.

The nature of some of these reasons could either imply that there were communication difficulties between providers and caregivers or providers did not encourage caregivers to be more proactive. Data collected from providers also appear to support these perspectives. Providers' data also show that caregivers had routinely complained of the use of harsh words by some providers. In fact, providers use of harsh words when talking to caregivers was the third most frequent complaint that caregivers gave. Therefore both data from providers and caregivers suggest that verbal communication or interpersonal relations between caregivers and providers in this population were problematic.

The observation that most caregivers in this study did not communicate their clinic experiences with providers is difficult to explain. It is particularly difficult because a large number ( $n = 285$ ) of caregivers who did not communicate reported that clinic care was satisfactory (Table 4.4.2). Yet, intuitively, many of these should have found it easier to share their perceptions with providers because it is generally easier to show appreciation than to raise concerns.

The lack of verbal communication by caregivers who found clinic care satisfactory might suggest that caregivers are not playing active roles in Child Survival Programs. Especially because many of those who did not share their experiences had no particular reasons for not communicating or did not appear to have compelling reasons other than that they were not accustomed to or were not asked to provide feedback. However, this explanation is also difficult to accept because it fails to explain the fact

that despite the communication challenges, caregivers attend growth-monitoring clinics every month and also seek care for their children's illnesses from the clinics ad libitum.

The apparent interpersonal (more specifically verbal communication) challenges between providers and caregivers might be better explained by focusing on caregivers' level of despair as might be implied from caregivers description of communicating with providers as being unnecessary or not useful (would not make a difference), or providers as being difficult to approach, and being too busy. Although definitive explanations about the nature of the communication difficulties between caregivers and providers in this population require further study, other studies have documented similar challenges in client-provider interactions (Haddad et al., 1998; Haddad and Fournier, 1995; Kim, et al., 2003; Razum, 1993; Stein, 1996). These studies document inadequate verbal communication or unsatisfactory interpersonal relations between caregivers and practitioners in primary health care settings in developing countries (Haddad et al., 1998; Haddad and Fournier, 1995; Kim et al., 2003; 1993; Razum, 1993; Stein, 1996). Razum (1993) reported conflicts between caregivers and providers similar to those reported by caregivers in this study. In Razum's study (1993), for example, caregivers report being spoken to harshly for arriving late at the clinic or for a misplaced healthcare card.

Interpersonal relations between caregivers and providers play a major part in caregivers' perceptions about the quality of primary health care in developing countries (Haddad et al., 1998; Haddad and Fournier, 1995). In a study in Zaire, for example, caregivers perceived interpersonal qualities such as respect, patience, courtesy, attentiveness and straightforwardness as the best qualities for providers (nurses) and tended to perceive care provided by providers with these qualities as being better care

than that provided by providers who were perceived differently (Haddad and Fournier, 1998).

Correlates of interpersonal communication between caregivers and providers were not explored in this study. However, other researchers have reported several possible explanatory factors for interpersonal problems in primary health care settings (Raymundo and Cruz, 1993, Stein, 1996). Some of the possible correlates of poor client-provider interactions include providers' lack of training in communication skills for health professionals, use of a provider-centered approach as opposed to a client-centered approach for healthcare delivery (Adbel-Tawab and Roter, 2002) and an unfavorable case load (Raymundo and Cruz, 1993).

#### *Channels of Communication between Providers and Caregivers*

Caregivers in this study were generally aware of communication channels between them and providers. However, there was no indication that providers explicitly notified caregivers of the preferred communication channels within the Child Survival Programs. It appears that some caregivers became aware of these channels over time as they sought services from the clinic. As described by focus group participants, most caregivers were aware that they could initiate their communication with Family Welfare Educators and continue up the clinic administration structure depending on the nature of the communication. The failure of providers to explicitly communicate to caregivers about the preferred communication channels within the Child Survival Programs structure might explain (at least in part) the hesitancy of caregivers to give providers feedback.

Unlike caregivers, however, providers were almost evenly split as to whether there were established communication channels between caregivers and providers (Table 4.8.6). Those who perceived that communication channels were in place identified caregivers' direct contact with the Sister-in-Charge of the clinic or any clinic staff, the use of a suggestion box or open health education forums as established communication channels. Although open health education forums were the most frequently identified method of communication, their utility is questionable because they require caregivers, who may already perceive providers as being difficult to approach, to raise their view points amidst a large gathering of clinic clientele.

Caregivers' responses for not communicating with providers suggest that they were frustrated with the inadequate and often harsh communication between them and providers. Beyond these observations, however, the potential loss in health benefits that might result from inadequate communication between providers and caregivers might be inferred logically from the UNICEF Conceptual Framework of Child Survival, Growth and Development. Adequate communication between caregivers and providers is one way in which caregivers may enhance the children's survival because of the potential for caregivers to acquire knowledge and skills by interacting with providers. Also, communication between caregivers with providers may facilitate caregivers' acquisition of nutrition and health knowledge. More specifically, adequate communication between providers and caregivers can promote caregivers' participation in education programs that may be provided through these programs. With these potential benefits, therefore, uninhibited access of caregivers to providers in Child Survival Programs needs to be encouraged. The access of caregivers to providers is also important because the structure

of health services in Botswana is such that the children's access to clinics in the CSPs opens children's access to secondary and tertiary care through provider-initiated referrals. Adequate communication between providers and caregivers also has the potential to improve the care provided to children.

### Structural Barriers and Interpersonal Communication Between Providers and Caregivers

It was not within the scope of this study to delineate factors associated with the communication challenges between caregivers and providers. Nonetheless, communication challenges between caregivers and providers emerged as important findings in this study and thus warrant some discussion.

To some extent, the perceived communication challenges between caregivers and providers in this study might be a result of the structural limitations of the CSP. As structured, the environment in the CSP clinics can limit the development of better interpersonal relations between providers and caregivers. Clients neither have the opportunity to select nor schedule an appointment with a preferred provider. Rather, clients are seen by any provider on duty. Consequently, clients and providers alike are continuously forming new relationships and there is little opportunity for either to develop these further. Furthermore, the providers are under pressure to balance the amount of time they spend with each client with the amount of time that other clients wait for a consult. These time constraints may deny the caregivers and providers full opportunity to develop the interpersonal relations.

Given the potential benefits of better interpersonal relations between providers and clients on the reduction of undernutrition in children, feasibility studies for creating an enabling environment for improved communication between providers and caregivers

should be explored. Studies that focus on varying the consultation times and opportunities for caregivers to choose preferred providers should be given priority. Such studies could examine caregivers' ability to keep appointments, the nature of the interpersonal communication between providers and caregivers satisfaction with clinic care. A pilot study of a similar healthcare structure in Zimbabwe in which clients were given specific appointments with (any) providers showed that clients arrived two hours earlier than their appointed time (Murina et al., 1997). Many of them reported that they came early because they did not want to miss their appointments while waiting in line. It is unclear whether caregivers fully comprehended their scheduling instructions or they were genuinely interested in being seen as closely as possible to their appointed time. There is still a need to conduct pilot studies to explore the feasibility of assigning clients specific appointments with or without the choice of a preferred provider.

The perceived challenges in interpersonal communication between providers and clients in this study may have also been a reflection of the providers' lack of adequate training in communication skills. The general nursing program from which many of the providers graduated does not provide extensive training in communication skills. Although the program is expected to have improved in the past 20 years, in the original plan only nurses who subsequently enrolled in the Family Nurse Practice program received extensive training in communication skills for health professionals (Ngcongco and Stark, 1986). Even with possible improvements in the programs, there is still a shortage of Family Nurse Practitioners in Botswana. In this study, for example, only four of the 39 providers enrolled from 13 clinics were graduates of the Family Nurse Practitioner Program. Thus, the majority of the providers in CSP clinics still do not have



the training in communication skills that are essential for health professionals. The impact of training providers in interpersonal communication, on improved communication skills and patient centered healthcare approaches has been documented in other developing countries (Brown, et al., 2000; De Negri et al., 1997). In the Brown et al, (2000) and Roter et al (1998) studies, patients whose providers received training in interpersonal communication reported higher satisfaction scores than clients of providers who did not receive the training.

Both the training of providers in communication skills for health professionals and the re-structuring of clinic services, to cultivate environments that facilitate the development of improved interpersonal communication between providers and caregivers need to be pursued. However, the extent to which each of these is pursued should be evaluated against the health manpower planning for the country (Wheeler and Ngcongco, 1990). Additionally, both of these factors need to be considered during the periodic evaluations of the training programs for providers. Furthermore, the healthcare programs should also pursue approaches that have been shown elsewhere to improve client satisfaction, such as the shift from a provider-centered to a client-centered healthcare approach (Abdel-Tawab and Roter, 2002; Brown et al., 2000).

#### Caregivers' Satisfaction with Clinic Services

Most caregivers found clinic care satisfactory. Interestingly, more satisfied caregivers tended to be seeking preventive care as opposed to curative care and were satisfied primarily with providers' kindness. Unsatisfied caregivers on the other hand, were more likely to be seeking curative care than preventive care and were mostly unsatisfied with the long queues in the clinics and the treatment plans prescribed for

children. Taken in the context of the possible communication difficulties between caregivers and providers as discussed earlier, it appears that communication issues per se, weakly influenced caregivers' satisfaction with clinic care because many caregivers who did not communicate their perceptions with providers for any reason also tended to state that they perceived clinic services to be satisfactory. It also appears that the perceived healthcare needs of the children had more influence on caregivers' satisfaction than the nature of communication between caregivers and providers. Thus, caregivers may ignore the communication difficulties, if any, provided that their children received satisfactory care. However, this explanation may fail to explain why a higher proportion of unsatisfied caregivers did not share their experiences with providers, further suggesting more research in this area.

### **Linkages in Child Survival Programs**

The Household Resources Management (HRM) model and the UNICEF Conceptual Framework of Child Survival, Growth and Development were chosen a priori to guide this study. The UNICEF model was chosen because it comprehensively outlined the determinants of child survival, growth and development at the individual household level where a child's food consumption and general health are immediate determinants. The model also expands the determinants of child survival further to include the underlying and the basic determinants of child survival, which characterize the broader ecological environments seen in communities and countries respectively. In this study, the associations between the child's growth indicators (HAZ and WAZ) and both the immediate and the underlying determinants of child survival were observed. At the immediate determinants of child survival level, for example, the availability of food

at all times in the household, the number of children per household, and the type of care the child sought at the clinic (i.e. child's illness status) were found to be important predictors of adequate growth in children.

The link between the immediate and the underlying determinants of child survival in this study can be made logically. As shown in the model (page 16), the child's dietary intake (availability of appropriate food at all times) is dependent on both the household's food security and maternal care, both of which are underlying determinants of child survival. The same relationship can be established logically between the child's health and health services (Child Survival Programs services) and maternal care.

This study did not focus on factors at the basic determinants of child survival level. However, the government of Botswana provides programs that support the survival, growth, and development of children. In the current National Development Plan (NDP 9), the government has made budgetary allocations that will enable the continuation of primary health care programs and services for all Botswana (Goatlhe, 2002). The empirical and logical observations discussed in this section suggest that the UNICEF model clearly was appropriate for this study.

The central premise in the Household Resources Management (HRM) model is that households process resources (also known as inputs) to produce the desired outcomes (outputs). In the model, as adapted on page 15, different input categories are linked directly or indirectly through the throughputs to the outputs. Thus, the model suggests that the factors in the different input categories could individually or through interactions with others (processing) influence the outputs. The HRM model was chosen because the processing of the inputs section of the model (i.e. the throughputs) could

potentially facilitate our understanding of the interactions between and within the household resources, child factors and Child Survival Programs. More specifically the model had the potential to determine if these linkages were used in reducing the risk of undernutrition in children between 0-5 years.

The HRM model facilitated our understanding of the linkages between the different aspects of the child survival programs in Botswana. We used the input categories of the HRM to select independent variables for inclusion in the logistic regression models for predicting the children's likelihood of attaining adequate nutritional status. The Hosmer & Lemeshow test (see footnote on pages 87 & 89 ), which tests the null hypothesis that the model fits, suggest that the logistic regression model did actually fit the data.

With the help of this model, we also established that some linkages between the CSP are very weak or not utilized in undernutrition alleviation strategies. We observed that children seen for childhood illnesses in the curative clinics were less likely to be assessed for dietary and nutrition inadequacies. There was also no association between the children's illness status, the number of days the children had been ill and the intensity of dietary and nutrition screening. Since dietary and nutrition screening of children seen in the curative clinics were operationally defined to indicate the existence of linkages between nutrition services and curative services (see Appendix D), the lack of dietary and nutrition assessment for ill children in this study suggest that there are no linkages between curative and the preventive nutrition programs in the CSP in Botswana.

In exploring communication channels between caregivers and providers in the CSP, we found that there were communication difficulties between caregivers and

providers. These challenges, though not defined as problems of program linkages a priori, can potentially undermine both the community's and the Child Survival Program's effort to address undernutrition children 0-5 years.

In conclusion, this exploratory study showed that there are minimal to no linkages between the curative and the nutrition programs within the Child Survival Programs in Botswana. The independence between these programs may be an important factor in the persistence of undernutrition (underweight and stunting) in children 0-5 years who are currently being reached by the CSP

## **Summary**

Nutrition and dietary screening were seldom performed during clinic consultations in the Child Survival Clinics in Botswana. Thus children at high risk for undernutrition were not identified and thus were less likely to receive risk appropriate care. The lack of distinguishing characteristics between children whose nutritional status was assessed and those who were not suggests that such service was random and could not be assumed to be an established undernutrition alleviation strategy for Child Survival Programs in Botswana. A simple nutrition and dietary screening tool, with appropriate training for health providers, should be considered for inclusion in government sponsored CSP services. Such a tool may be instrumental in the reduction of undernutrition in children 0-5 years of age because it has the potential to guide both nutrition and dietary interventions for children who seek care from government clinics. Such a tool can be introduced as one of the steps towards improving the linkages between the CSP. More specifically, it could aid providers in introducing a nutrition component into other CSP. Initially, the screening tool could help providers in identifying dietary and nutrition needs

of children seen in the different CSP clinics. With proper modifications, the tool could eventually be improved to the level where it could prompt providers to refer children at risk for poor nutrition or dietary intake to the relevant CSP services.

Undernutrition (stunting and underweight) continues to be a significant problem in children (0-5 years) in Botswana. The risk for poor nutrition is higher in older children, children with low birth weight and male children. These children may therefore require special attention. Given the strong association between low birth weight and poor growth outcomes in children, Child Survival Programs in Botswana would benefit from implementing programs that will target women of childbearing age as a way of reducing the risk of low birth weight. Other areas of possible improvement are those that relate to household food security and a healthy household's size.

The role of caregivers in Child Survival Programs can not be overemphasized. Caregivers in this study paid close attention to children's weight and were able to notice changes in weight from one month to another or following illness episodes. In addition, caregivers perceptions about children's nutritional needs were correctly associated with children's weight change. Children who had lost weight between consecutive growth monitoring periods were correctly perceived to have increased nutritional needs. However, caregivers failed to translate their perceptions about weight loss and nutritional needs into corrective feeding practices for children at risk. Caregivers may benefit from health and nutrition education that will enable them to recognize risk factors for poor nutrition such as illnesses and weight loss and provide them with feeding recommendations for ill children.

Caregivers seldom communicated their perceptions about clinic care to providers. Many of the reasons caregivers gave for not communicating could suggest various communication difficulties between providers and caregivers. It may be that caregivers were uncommitted to Child Survival Programs, did not expect communicating with providers to be helpful, or providers did not encourage caregivers to communicate freely. Further research is needed to definitively characterize the nature of communication between caregivers and providers.

Most caregivers tended to perceive clinic services as being satisfactory. Satisfied caregivers reported being satisfied with providers' kindness and were more likely to have children who were seeking preventive care. Unsatisfied caregivers on the other hand were more likely to have children who were seeking curative care and reported being unsatisfied with the waiting period in the clinic and the prescribed treatment plans. It is probable that caregivers with ill children found clinic care unsatisfactory because they perceived their children to have pressing medical needs and were therefore anxious to have them addressed. This view is very consistent with the fact that the two reasons that unsatisfied caregivers gave (long waiting and poor treatment plans) also suggest that these caregivers were probably more anxious than caregivers who were seeking routine preventive care.

### **Recommendations for Future Research**

Several areas that require further research are highlighted in this section. First, the prevalence of undernutrition in children (0-5 years) is still relatively high even though these children have access to the Child Survival Programs. Undernutrition persists

despite the continuation of the monthly growth monitoring programs and the supplementary feeding programs. Undernutrition in children of this age group is perpetuated, among other factors, by the combination of frequent childhood illnesses and inadequate dietary intake. Consequently, these factors need to be addressed at both the household level and with the support of the child survival programs. To this end therefore, further research is needed first, to establish household factors that are associated with the risk of malnutrition in children in Botswana. Secondly, to determine the nature of the support that the programs can provide to children at risk for undernutrition. Without this information, it will be difficult to refine Child Survival Program services so that they best meet the needs of children.

Furthermore, prospective research that will examine the growth of children throughout their use of Child Survival Programs in Botswana is recommended. It is only through prospective studies that it will be easier to determine specific periods during the 0-5 year span when children are at high risk for undernutrition. This information will be valuable in determining appropriate Child Survival Program' response to these high-risk periods. The effect of routine nutrition screening in identifying children at risk and triggering integrated care for at risk can also be pilot tested within these prospective studies

Further research is needed to establish the role of caregivers in Child Survival Programs. In this study, it was evident that caregivers rarely gave providers feedback or shared their perceptions about the care that their children received. Even caregivers who perceived clinic services as satisfactory could not verbalize their perception to providers, yet, theoretically, they had less risk of over-stepping their boundaries, if any such existed.



Similarly, the role of providers in establishing communication channels between caregivers and providers needs to be clarified. Issues that may have given caregivers the impression that providers were unapproachable also need further study, because the concept of providers being unapproachable does not fit with the multi-disciplinary nature of Child Survival Program in general and undernutrition alleviation strategies in particular. Additional studies may be required to establish the need for providers to undergo training in communication for health professionals. If deemed necessary, such modules can be included in the providers' pre-service training curriculum. In-service training workshops could also be organized for providers who are already in the field.

It is also recommended that didactic and in-service training of health providers in diet and nutrition be improved. The study found disparity between providers' perceptions about the adequacy of their training in imparting diet and nutrition screening skills and their actual preparedness to address diet and nutrition problems in clinics. It should also be noted that training nurses to address nutrition and dietary problems is a temporary measure. In the long term, the government should consider staffing clinics with nutrition professionals. This approach will relieve nurses while also ensuring that clients get adequate nutrition and dietary care from qualified nutrition professionals. This is particularly important because once in the clinic, the dietitian and nutritionists will provide care not only to children but also to all other clients who currently use the clinic services. The creation of positions for nutrition professionals in clinics is yet another opportunity for the government to integrate primary healthcare services. This move will very much be in keeping with the Primary Health Care goal of ensuring that

the “ majority of Batswana have access to preventive, promotive, curative and rehabilitative services by the year 2016” (Ministry of Health, 2003).

## **APPENDIX A**

**Letters of Approval from The University Committee on Research Involving Human Subjects**

**MICHIGAN STATE  
UNIVERSITY**

May 13, 2002

TO: Jenny BOND  
2100 South Anthony Hall

RE: **IRB# 02-210 CATEGORY: EXEMPT 1-2, 1-4**

**APPROVAL DATE: May 13, 2002**

**TITLE: LINKING CHILD SURVIVAL PROGRAMS WITH MALNUTRITION  
ALLEVIATION STRATEGIES**

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project.


**RENEWALS:** UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

**REVISIONS:** UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

**PROBLEMS/CHANGES:** Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: [UCRIHS@msu.edu](mailto:UCRIHS@msu.edu). Please note that all UCRIHS forms are located on the web: <http://www.msu.edu/user/ucrihs>

Sincerely,

  
Ashir Kumar, M.D.  
UCRIHS Chair

AK: kj

cc: Maria Nnyepi  
2100 Anthony Hall



OFFICE OF  
**RESEARCH  
ETHICS AND  
STANDARDS**

University Committee on  
Research Involving  
Human Subjects

Michigan State University  
202 Olds Hall  
East Lansing, MI  
48824

517/355-2180  
FAX: 517/432-4503  
[www.msu.edu/user/ucrihs](http://www.msu.edu/user/ucrihs)  
E-Mail: [ucrihs@msu.edu](mailto:ucrihs@msu.edu)

**MICHIGAN STATE  
UNIVERSITY**

April 4, 2003

TO: Jenny BOND  
2100 South Anthony Hall

RE: IRB # 02-210 CATEGORY: 1-2, 1-4 EXEMPT

RENEWAL APPROVAL DATE: April 4, 2003

EXPIRATION DATE: March 4, 2004

TITLE: LINKING CHILD SURVIVAL PROGRAMS WITH MALNUTRITION ALLEVIATION  
STRATEGIES

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS APPROVED THIS PROJECT'S RENEWAL.**

**RENEWALS:** UCRIHS approval is valid until the expiration date listed above. Projects continuing beyond this date must be renewed with the renewal form. A maximum of four such expedited renewals are possible. Investigators wishing to continue a project beyond that time need to submit a 5-year renewal application for complete review.

**REVISIONS:** UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please include a revision form with the renewal. To revise an approved protocol at any other time during the year, send your written request with an attached revision cover sheet to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.



**PROBLEMS/CHANGES:** Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

OFFICE OF If we can be of further assistance, please contact us at 517 355-2180 or via email:

**RESEARCH** UCRIHS@msu.edu.

**ETHICS AND  
STANDARDS**

Sincerely,

University Committee on  
Research Involving  
Human Subjects

A handwritten signature in black ink, likely belonging to Ashir Kumar, M.D., is written over the typed name and title.

Michigan State University  
202 Olds Hall  
East Lansing, MI  
48824

Ashir Kumar, M.D.  
UCRIHS Chair

517/355-2180

FAX: 517/432-4503 AK kb

www.msu.edu/user/ucrihs

E-Mail: ucrihs@msu.edu CC:

Maria Nnyepi  
2100 Anthony Hall

**Letter of Approval from Office of The President**

TELEGRAMS: PULA  
TELEPHONE: 350800  
TELEX: 2655 BD



OFFICE OF THE PRESIDENT  
PRIVATE BAG 001  
GABORONE

OP 46/1 XCVII (32)

27th June, 2002

Ms. Maria S. Nnyepi  
Department of Home Economics  
University of Botswana  
P/Bag 0022  
Gaborone

Dear Madam,

**RE: GRANT OF A RESEARCH PERMIT: MS. M. S. NNYEPI**

Your application for a permit refers.

We are pleased to inform you that you have been granted permission to conduct a study entitled "Linking Botswana's Child Survival Programs with Malnutrition Alleviation Strategies ". The research will be carried in Gaborone, Gabane, Metsimothabe, Mmopane, Mogoditshane and Tlokweng.

The permit is valid for a period not exceeding eight (8) months effective June 27, 2002.

The permit is granted subject to the following conditions:

1. Copies of any report/papers written as a result of the study are directly deposited with the Office of the President, National Assembly, Ministry of Health, Health Research Unit, National Library Service, Research and Development Office, National Conservation Strategy Agency and University of Botswana Library.
2. You conduct the study according to the particulars furnished in the application.
3. The permit does not give authority to enter any premises, private establishment or protected area. Permission for such entry should be negotiated with those concerned.

4. Failure to comply with any of the above-stipulated conditions will result in the immediate cancellation of the permit.

Yours faithfully



J. Mosweu

**for / PERMANENT SECRETARY TO THE PRESIDENT**

- cc: Permanent Secretary, Ministry of Health  
Clerk of the National Assembly  
Head, Health Research Unit  
Executive Secretary, National Conservation Strategy Agency  
Director, National Archives  
Director, National Library Service  
Director, National Institute for Research  
Librarian, University of Botswana Library  
District Commissioner/Town Clerk/Council Secretary
- Gaborone
  - Kweneng District
  - South East District
- Land Board Secretary
- Kweneng Land Board
  - Maletle Land Board



**Letter Of Approval from Gaborone City Council**



**GABORONE CITY COUNCIL**

All correspondence should be addressed to the

**CITY CLERK**  
**Private Bag 0089**  
**Telephones: 3657400**  
**Tel. Add.: 'CIVIC'**  
**GABORONE**  
**BOTSWANA**  
**Fax: 300141**

**Reference:** .....

**4<sup>th</sup> July 2002**

**Date:** .....

Maria S. Nnyepi M.S., R.D.  
Department of Home Economics  
University of Botswana  
Private Bag 00702  
Gaborone  
Botswana

Dear Sir/Madam

**REQUEST TO CONDUCT SURVEY ON LINKING BOTSWANA'S CHILD SURVIVAL  
PROGRAMS WITH MALNUTRITION**

This serves to inform you that your request has been accepted.

You are further informed that:-

1. You are only given permission to enter GCC health facilities and have access to our facility records.
2. For the caretaker and the CWC card you get permission from the parents.
3. You are also requested to provide the office of the Senior Matron with your permanent address.
4. At the end of the study you are requested to submit the copy of the report to the Senior Matron's office.

By copy of this letter, GCC health facilities are informed.

Thank you.

Yours faithfully,

M.J. Keatimilwe  
For Town Clerk

**Letter Of Approval from Kweneng District Council**

**FACSIMILE COVER SHEET**



**KWENENG DISTRICT COUNCIL  
PRIVATE BAG 005  
MOLEPOLOLE  
BOTSWANA**

**FAX NO. 320771**

TO: Mrs Maria S. Nnyepi  
Department of Home Economics Education  
University of Botswana  
Private Bag 0022, Gaborone

FOR ATTENTION: Ms. Nnyepi

FAX NUMBER: 585096 DATE: 02/08/02

NUMBER OF PAGES INCLUDING THIS COVER SHEET 2

MESSAGE:

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NAME OF SENDER: PHS TELEPHONE: (321078)

## **Savingram**

From: Council secretary  
Kweneng District Council

  
For CS/ M.K. Galakpai/PHS

To: Ms. Maria S. Nnyepi  
Department of Home Economics  
University Of Botswana  
P/Bag 0022  
Gaborone

2/08/02

Dear Ms. Nnepi

### **Re: Response to request**

Your request for permission to interview consenting caregivers of children attending Child Welfare Clinic at Gabane, Mogoditshane, Metsimotlhabe and Mmopane health facilities is hereby granted. However, you will have to negotiate consenting health facilities with regard to completing the study instrument after hours since it is not known how much time is involved. It is hoped that the district will benefit from the study by giving it at least a copy of the study.

CC:

- a) Gabane,
- b) Mogoditshane,
- c) Metsimotlhabe,
- d) Mmopane

## **APPENDIX B**

### **Instruments and Consent Forms**

#### **Practitioner's Consent Form and Questionnaire**

**Consent Form Number \_\_\_\_\_**

**Linking Child Survival Programs with Malnutrition Alleviation Strategies**

**CONSENT FORM**

**Explanatory consent statement:**

The investigator is interested in determining if and how the nutrition needs of children seeking medical attention for childhood illnesses in government clinics are addressed. The other objective is to determine caregivers perceptions about the congruency between the services provided to their child and their felt needs.

As part of this study, I am requesting information from you and other practitioners working in government clinic today. The information I am requesting includes information on how children seeking consultation for childhood illnesses are treated. Other information requested includes general characteristics of you, your training background and other information related to your role as a practitioner in this clinic. The information collected in this study will not be traced back to you individually because we do not require that you tell us your name or any other information that will reveal your identity. We therefore do not anticipate that you will incur any harm in participating in this study.

The whole data collection process is expected to take about 15 minutes of your time. However, you are free to choose not to continue with the data collection process at any time without any penalty. If you choose to participate in this study, we will give you a P10 as a one-time token of our appreciation using your time to complete the questionnaire. If you also choose to participate in the focus group discussions that we hold at a later time, you will also be served light refreshments during the course of the discussion.

**Please complete the following information**

If you feel comfortable with the objectives of this study, the information requested from you, and the known risks provided in the consent statement that we have just read for you, we ask that you volunteer to participate in this study. If you would like to participate in the study, please sign your name below.

Signature \_\_\_\_\_ Date \_\_\_\_\_

If you have any questions about the research please contact Maria S. Nnyepi at the following address: University of Botswana, Private Bag 0022. Gaborone, Botswana. Tel. 267-355 2469, or Dr. Jenny Bond at Dept of Food Science and Human Nutrition. 336 FSHN Building, Michigan State University. East Lansing, MI 48823. Tel (517) 355 8474 Ext 139

If you have questions about your role and rights as a subject of research please contact Dr. Ashir Kumar, Chair of University Committee on Research Involving Human Subjects. 202 Olds Hall, Michigan State University. East Lansing, MI 48823. Tel: (517) 432 4503.

**Practitioner's Questionnaire Number \_\_\_\_\_**

Name of this health facility \_\_\_\_\_ Interviewer \_\_\_\_\_ Date \_\_\_\_\_

Thank you for agreeing to complete this questionnaire. The information collected will help us understand how you currently provide services to children under five years and meet other objectives of this study as stated in the consent statement. Use only your knowledge, thoughts and perceptions to complete this questionnaire. Please do not ask your colleagues to help you or even help them complete this questionnaire. If you have questions please ask the investigator.

**Background Information about you (the Health Provider)**

1. How long have you been practicing as a health provider? \_\_\_\_\_ years
2. What is your current job title? \_\_\_\_\_
3. What is your gender?
  - a) Female
  - b) Male
4. Do you have administrative responsibilities in this health facility?
  - a) Yes
  - b) No
5. What is your training background?
  - a) Medical Doctor
  - b) Family Nurse Practitioner
  - c) Midwife
  - d) Registered Nurse
  - e) Other (please specify) \_\_\_\_\_

**For questions 6 and 7, please complete the statement provided by circling only one of the options a-e. The completed statement should accurately reflect your perception about your background training.**

6. My pre-service training was \_\_\_\_\_ in preparing me for assessing a sick child's **dietary intake**?
  - a) Very adequate
  - b) Adequate
  - c) Somewhat adequate
  - d) Inadequate
  - e) Very inadequate



7. My pre-service training was \_\_\_\_\_ in preparing me for assessing the **nutritional status** of a sick child?
- Very adequate
  - Adequate
  - Somewhat adequate
  - Inadequate
  - Very inadequate
8. Have you heard about the Integrated Management of childhood Illnesses?
- Yes
  - No
9. If yes have you attended a workshop/ seminar of the Integrated Management of Childhood Illnesses?
- Yes            If yes, how long ago? \_\_\_\_\_ Months.
  - No

List 3 very important indicators that you currently use to evaluate a sick child's dietary intake and nutritional status. List your most important indicator first. If you do not routinely evaluate the children's dietary intake or nutritional status, write the words "I do not routinely evaluate" on the appropriate column.

I use the following to evaluate a child's <b>dietary Intake</b>	I use the following indicators to evaluate a sick child's <b>nutritional status</b>
1.	1.
2.	2.
3.	3.

10. Since you began practicing, how satisfied have you been with your skills in assessing **dietary intake**?
- Very satisfied
  - Satisfied
  - Somewhat satisfied
  - Not satisfied
  - Very dissatisfied
11. Since you began practicing, how satisfied have you been with your skills in assessing **nutritional status**?
- Very satisfied
  - Satisfied
  - Somewhat satisfied
  - Not satisfied
  - Very dissatisfied

12. How frequently do you attend to sick children of age's 0-5 years?
- Daily
  - At least 3 times per week
  - Once a week
  - Rarely
  - Never
13. Do you **routinely** assess the growth of the children you see at the clinic for illnesses?
- Yes
  - No→ skip to question 15
14. If yes, how do you evaluate a sick child's growth?
- |  | Yes   | No    |
|--|-------|-------|
| a) Measure the child's weight during each consultation visit     | _____ | _____ |
| b) Ask the caregiver questions about the child's growth progress | _____ | _____ |
| c) Look at the child's growth curve prior to the illness         | _____ | _____ |
| d) Other (specify) _____   | _____ | _____ |
15. Do you **routinely** assess the dietary intake of the children you see at the clinic for diarrhea or other illness?
- Yes
  - No→ skip to question 17
16. If yes, how do you **routinely** assess the child's dietary intake?
- |   | Yes   | No    |
|---|-------|-------|
| a) Ask the caregiver about the child's appetite   | _____ | _____ |
| b) Inquire about the types of food the child ate in the past 24 hours                             | _____ | _____ |
| c) Inquire about the amount of food the child ate in the past 24 hours                            | _____ | _____ |
| d) If the child is breastfeeding, find out how often the child was breastfed in the last 24 hours | _____ | _____ |
| e) Other (specify) _____  | _____ | _____ |
17. When children come to the clinic for consultation, do you **always** (without fail) evaluate their attendance of
- |  | Yes   | No    |
|--|-------|-------|
| a) Growth Monitoring Clinic                                      | _____ | _____ |
| b) Immunization Clinic   | _____ | _____ |
| c) Supplementary Feeding Clinic ( reception of food supplements) | _____ | _____ |
| d) Other ( specify) _____  | _____ | _____ |
18. What is the current practice if a child seen a childhood illness at the clinic is also found to have incomplete immunizations, how is their lack of up to date immunizations addressed?
- Ensure the child's is immunized during this current visit
  - No action is taken other than treat the child for diarrhea
  - The caregiver is advised to bring the child for immunizations following recovery

d) Other (please specify) \_\_\_\_\_

19. What is the current practice regarding children who during consultation for illnesses are also found to be **moderately malnourished** (below the 80<sup>th</sup> percentile line), how is the child's moderate undernutrition addressed?

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20. What is the current practice regarding children who during consultation for illnesses are also found to be **severely malnourished** (below the 60<sup>th</sup> percentile line in the growth curve), how is the child's severe undernutrition addressed?

---

21. Place an **X** in a column indicating your perception regarding your health facility's capacity (with respect to staff training and equipment) to manage childhood illnesses?

	Very adequate	Adequate	Somewhat adequate	Not adequate	Very inadequate
a) Trained practitioners					
b) Equipment					
c) Trained Support staff					

22. Place an **X** in a column indicating your perception regarding your health facility's capacity (with respect to staff training and equipment) to manage **undernutrition cases**?

	Very adequate	Adequate	Somewhat adequate	Not adequate	Very inadequate
d) Trained practitioners					
e) Equipment					
f) Trained Support staff					

23. On a scale of 1 to 5, where 1 is **very important** and 5 is **least important**, how would you rate the following factors in their relation to childhood illnesses?

a) Lack of latrines	1	2	3	4	5
b) Underweight	1	2	3	4	5
c) Poor diet	1	2	3	4	5
d) Infrequent feeding times	1	2	3	4	5
e) Lack of potable water	1	2	3	4	5

24. On a scale of 1 to 5, where 1 is very important and 5 is least important, how would you rate the following factors as possible **underlying factors** in precipitating **undernutrition**?

a) Lack of latrines	1	2	3	4	5
b) Poor diet	1	2	3	4	5
c) Diarrhea	1	2	3	4	5
d) Other childhood diseases	1	2	3	4	5

For questions 25– 32 rate how well you agree/disagree with the statements provided

25. Mothers are satisfied with the services they receive from the clinic.

Strongly agree

Agree

Disagree

Strongly disagree

26. Mothers are very compliant with prescribed treatments.

a) Strongly agree

b) Agree

c) Disagree

d) Strongly disagree

**There is a strong relationship between childhood illnesses and the risk of undernutrition in children 0-5 years.**

a) Strongly agree

b) Agree

c) Disagree

d) Strongly disagree

27. Children with diarrhea can continue to gain weight despite their illnesses provided their dietary intake is adequate.

a) Strongly agree

- b) Agree
- c) Disagree
- d) Strongly disagree

28. Treating illnesses and disregarding the child's nutritional status may slow the child's recovery.

- a) Strongly agree
- b) Agree
- c) Disagree
- d) Strongly disagree

29. Treating illnesses and disregarding the child's nutritional needs may slow the child's growth.

- a) Strongly agree
- b) Agree
- c) Disagree
- d) Strongly disagree

30. Nutrition interventions should be an important component of childhood illnesses.

- a) Strongly agree
- b) Agree
- c) Disagree
- d) Strongly disagree

31. In outpatient clinics it is better (for the child) to treat illnesses and disregard nutrition needs.

- a) Strongly agree
- b) Agree
- c) Disagree
- d) Strongly disagree

***For questions 33 and 34, select an option that best represents your perception.***

32. In your health facility, which of the following functions as the children's entry point (gatekeeper) to all the Child Survival Programs?

- a) Curative/ out patient clinic
- b) Growth monitoring clinic
- c) Family planning clinic
- d) Immunization clinic
- e) All clinics (any of the above clinics) serve as entry points to the Child Survival Clinics
- f) Other (please specify) \_\_\_\_\_

33. Is the current structure of child survival programs in Botswana well suited for preventing undernutrition in ill children?

- a) Yes → How so? \_\_\_\_\_

- 
- b) No → What do you think prevents child survival programs from preventing undernutrition in sick children?
- 

*Based on your experience with sick children and their caregivers in your catchment area rate how well you agree/disagree with the following statements*

**1= Strongly agree    2 = Agree    3 =Disagree    4= Strongly disagree**

<b>Statement</b>	<b>Rate ( circle your choice)</b>
Caregivers feed their children more frequently during illness episodes	1   2   3   4
34. Caregivers increase the types of food given to their children during illness	1   2   3   4
35. Caregivers are satisfied with the nutrition support they receive from the clinic	1   2   3   4
36 Caregivers communicate concerns to the clinic staff	1   2   3   4
37. Caregivers offer their children more food during illness episodes compared to non-illness times.	1   2   3   4

- 38 If caregivers/ mothers have comments or concerns about the clinic services, is there a system set up through which those comments can be communicated to you or other health facility staff?

- a) Yes
- b) No
- c) Don't know

39. If yes, please explain how this system operates. \_\_\_\_\_
- 

40. What two issues do caregivers (Mothers) commonly raise with regard to the services or programs in this clinic?

a) \_\_\_\_\_

b) \_\_\_\_\_

*Thank you for completing this questionnaire. Please hand the completed questionnaire to the investigator.*

**Caregiver's Consent Forms and Interview Schedules (English and Setswana)**

**Linking Child Survival Programs with Malnutrition Alleviation Strategies**

**<sup>1</sup> CONSENT FORM (English version)**

**Explanatory consent statement:**

The investigator is interested in determining if and how the nutrition needs of children seeking medical attention for diarrhea in government clinics are addressed. The other objective is to determine your perceptions about the congruency between the services provided to your child and your felt needs.

As part of this study, I am requesting information from you and other mothers (caregivers) attending the government clinic today. The information I am requesting include, your household's size, household well-being, type of housing, how you normally feed your child, your formal education level, the weight and height measurements of your child and other factors related to how you care and provide for your child. The information collected in this study will not be traced back to you individually because we do not require that you tell us your name or any other information that will reveal you and your child's identity.

I will also request to weigh and measure your child's height. These measurements will be carried out in your presence. Although young children are generally not bothered by weight measurements, their weights will be taken using the clinic equipment because the children are accustomed to them. However, some children appear not to like height/length measurements because this procedure requires that they be helped to stand or lie down as straight as possible. This being the first time the children's height/length will be taken in the clinic, we intend to make the measurements less stressful as much as is possible. Length measurements will therefore not be taken from any child who appears particularly fearful of the procedure.

The whole data collection process is expected to take about 20 minutes of your time. However, you are free to choose not to continue with the data collection process at any time without any penalty. This means that you will continue to receive the clinic services as usual even if you choose not to participate in the study.

**Please complete the following information**

If you feel comfortable with the objectives of this study, the information requested from you, and the known risks provided in the consent statement that we have just read for you, we ask that you volunteer to participate in this study. If you would like to participate in the study, please sign your name below.

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<sup>1</sup> A Setswana version of the consent form (directly translated from this one) will be used in the field.



Mother's name and signature \_\_\_\_\_

Date \_\_\_\_\_

While we request that you complete the questionnaire, we also want to remind that **you can** withdraw from the study or choose not to answer some questions in this questionnaire even if you have already signed this form. You will continue to request consultation for your child whether or not you choose to participate in this study.

If you have any questions about the research please contact Maria S. Nnyepi at the following address: University of Botswana, Private Bag 0022. Gaborone, Botswana. Tel. 267-355 2469 or Dr. Jenny Bond at Dept of Food Science and Human Nutrition. 336 FSHN Building, M.S.U. East Lansing, MI 355 8474Ext 139.

If you have questions about your role and rights as a subject of research please contact Dr. Ashir Kumar, Chair, University Committee on Research Involving Human Subjects. 202 Olds Hall, Michigan State University. East Lansing, MI 48823. Tel: (517) 432-4503.

**Linking Child Survival Programs with Malnutrition Alleviation Strategies**

**Tlhaloso ya Maikaelelo a Tshekatsheko**

Motsamaisi wa patlisiso e o ikaelela go sekaseka ka fa seemo sa dikotla sa bana ba ba senkang bongaka mo dikokelwaneng tsa ga Goromente se elwang thoko ka gone. Tshekatsheko e e remelela thata mo baneng ba ba lwalang ka gore lethoko la bone la dikotla le ko godimo. Maikaelelo a bobedi a patisiso e, ke go sekaseka ka fa batsadi ba bana ba ba kgotsofadiwang ka teng ke thuso e ba e bonang mo dikokelong tsa rona.

Malebang le maikaelelo a a builweng fa godimo fa, motsamaisi wa tshekatsheko e o kopa gore o arabe dipotso tse di latelang. Dipotso tse di akaretsa ka fa o thokomelang ba lwapa la gago ka teng, bonno jwa lona mo lapeng, dijo tse di jewang mo lapeng, thuso e o e bonang mo dikokelong, le sekale sa go gola ga ngwana wa gago. Ga go ope yo o ka itseng ka fa o arabileng dipotso tse kateng, ka gore ga re kita re kwala leina la gago kana la ngwana wa gago mo dibukaneng tsa rona. Se se raya gore o ka kgona go bua le rona ka puthologo le ka boammaaruri.

Morago ga o fetsa dipotso tse, re tlaa kopa tetla ya go kala ngwana wa gago, le go mo meta boleele gore re kgone go itse gore o nonogile gole ekafe. Jaaka o itse, sekale ga se tsenye ngwana dingalo ka gore bana ba setlwaetse. Go meta boleele le gone gago tsenye ngwana dingalo, mme fa gongwe ngwana o ka gotshaba ka go bo a sa go tlwaela.

Jannong re kopa gore o re fe metsotso e e masome mabedi( 20) go araba dipotso tse di mo tshekatshekong e. Re go itsise gore le fa ele kopo ya rona gore o arabe dipotso tse, ga o patelediwe go di araba. Mo godimo ga moo, ditshwanelo tsa gago mo kekolong e, ga di kake tsa amiwa ka gope, fa o sa dumele go tsenelela tshekatsheko e.

---

**Tumalano ya go tsenelela tshekatsheko**

Fa o utlwile ebile o dumalana le maikaelelo a tshekatsheko e, le mabaka a re kopang gore o buisanye le rona ka one, jaaka ke go a baletse ( kana oa impaletse) re kopa gore o arabe dipotso tse di latelang. Re go itsisi gore ga o patelediwe go tsenelela tshekatsheko e, ebile o ka nna wa tswa mo patlisisong e pele ga e fela fa o batla.

**Monwana wa motsadi** \_\_\_\_\_ **Kgwedi** \_\_\_\_\_

Fa ona le dipotso mabapi le patlisiso e, oka leletsa Maria Nnyepi kwa University ya Botswana. Mogala ke 355 2469. Motsamaisi was patlisiso e, Maria Nnyepi, ke morutintshi kwa University ya Botswana, Kana Dr. Jenny Bond. Aterese ke Dept. Food Science and Human Nutrition, 336 FSHN Building. Michigan State University. East Lansing, MI 48823.

Fa o batla go itse ka ditshwanelo tsa gago jaaka o le moarabi was dipotso tsa patisiso leletsa Dr. Ashir Kumar, Modula setilo sa Komiti ya Ditshekatsheko tse di Amang Batho. 202 Olds Hall, Michigan State University. East Lansing, MI 48823. Mogala ke (517) 432 4503.

## Caregiver's Interview Schedule

Respondent Number \_\_\_\_\_ Interviewer's Initials \_\_\_\_\_ Date \_\_\_\_\_

Type of Facility: Health post/Clinic/ Clinic with Maternity/Other \_\_\_\_\_

Name of Study Site: \_\_\_\_\_

*Hello, Thank you for agreeing to talk with us about your child and your household. We have questions relating to your child's growth, eating behavior and general well being (household socio-demographic characteristic). Your answers to these questions will help us meet the objectives of this study, as I explained to you earlier (in the consent form). At some points during this interview we will ask to view your child's clinic card because some of the information requested in this survey can be found in the Clinic Card.*

### A. Information about the Study Child and Feeding Practices

*Interviewer, please request the CWC card and abstract information for questions 1-6.*

1. (Name's) date of birth? \_\_\_\_\_ (Copy exactly as written in the CWC card- day/month/yr)
2. (Name's) birth weight? \_\_\_\_\_ (Copy exactly as written in the child's CWC card)
3. (Name's) weight during the last growth-monitoring visit? \_\_\_\_\_ Kg (read from growth chart)
4. Date on the last growth monitoring visit \_\_\_\_\_ day/month/year
5. (Name's) sex \_\_\_\_\_
6. Reason for clinic attendance
  - a) Child Welfare Clinic (growth monitoring, immunizations) skip to question 15
  - b) Request treatment for an illness
  - c) Follow up visit
7. Is (Name) sick/ ill?
  - a) Yes
  - b) No Skip to question 15
8. If 7a, how long has this child being ill? \_\_\_\_\_ days
9. If 7a state the health concern addressed by the practitioner \_\_\_\_\_  
\_\_\_\_\_ (copy as written in the health card)
10. Practitioner's title \_\_\_\_\_ (FNP, MD, Other, if other specify)

11. What signs and symptoms convinced you that (Name) needed medical attention?

	Yes	No
a) The child looked very tired	_____	_____
b) The child did not play as usual	_____	_____
c) Child was lethargic and slept a lot	_____	_____
d) The child refused to eat.	_____	_____
e) The child was restless.	_____	_____
f) The child was feverish.	_____	_____
g) Frequent loose stools	_____	_____
h) Other (specify) _____	_____	_____

12. What illness(es) do you think (Name) is suffering from?

	Yes	No
a) Diarrhea	_____	_____
b) Undernutrition	_____	_____
c) Ear infection	_____	_____
d) Fever	_____	_____
e) Coughs/Colds	_____	_____
f) Sore throat	_____	_____
g) Acute respiratory infections	_____	_____
h) Other _____	_____	_____

13. Who decided that (Name) should be brought to the clinic?

- a) The child's mother
- b) The child's father
- c) The child's grandmother
- d) Other (specify) \_\_\_\_\_

14. Was (Name) given any other treatment for this illness prior to coming to the health facility?

- a) Yes specify \_\_\_\_\_
- b) No

15. How would you characterize (Name's) general health?

- a) The child is generally very healthy.
- b) The child is fairly healthy
- c) The child is somewhat sickly
- d) The child is generally very sickly
- e) Don't know

16. How many siblings does (Name) have? Total number of siblings \_\_\_\_\_

17. Number of children under 5 years {including (Name)} \_\_\_\_\_

18. What is the total number of children who live in the same household as (Name) but are not (Name's) siblings? \_\_\_\_\_

19. What is (Name's) current weight in (kg) \_\_\_\_\_ (*weigh the child*)

20. What is (Name's) height? \_\_\_\_\_ cm (*measure the child*)

## B. Child's Dietary Intake

21. Was (Name) ever breastfed?

- a) Yes
- b) No

22. Is (Name) taking solids

- a) Yes
- b) No

23. How often do you feed (Name) per day \_\_\_\_\_

- a) 3: morning, mid-day and evening only
- b) 6: morning, late morning, mid-day, early afternoon, evening
- c) Other, please specify \_\_\_\_\_

24. Is (Name) currently taking any of these milks?

- |                   | Yes   | No    |
|-------------------|-------|-------|
| a) Breast milk    | _____ | _____ |
| b) Infant formula | _____ | _____ |
| c) Cow's milk     | _____ | _____ |
| d) Goat's milk    | _____ | _____ |

***The following questions 25-31 apply only if (Name) is sick. If the child is not sick skip to question 32***

25. Has (Name's) intake of these milks changed (if any) since the beginning of the current illness?

- |                   | Less  | Same  | More  | Not Applicable |
|-------------------|-------|-------|-------|----------------|
| a) Breast milk    | _____ | _____ | _____ | _____          |
| b) Infant formula | _____ | _____ | _____ | _____          |
| c) Cow's milk     | _____ | _____ | _____ | _____          |
| d) Goat's milk    | _____ | _____ | _____ | _____          |

26. Is the **amount** of food (Name) is **offered** during this illness about the same, less or more than what she/he is usually offered?

- a) About the same
- b) Less
- c) More

27. Is the **amount** of food (Name) is fed/ actually **eats** during this illness about the same, less or more than what she/he usually eats

- About the same
- Less
- More

28. Is the **number of times** in a day (Name) is **offered** food during this illness about the same, less or more than what she is usually offered?

- About the same
- Less
- More

29. Is the **number of times** (Name) **eats** in a day during this illness About the same, less or more than what she/ he normally eats

- About the same
- Less
- More

30. **How has (Name's) consumption of the following types of food changed (if any) since this illness? Is it about the same, less or more than his/her usual consumption) (ask as open ended and check appropriate category for each food item)**

	Less	Same	More	Not Applicable
a) Juice	_____	_____	_____	_____
b) Meats or milk	_____	_____	_____	_____
c) Soft porridge (porridge)	_____	_____	_____	_____
d) Beans	_____	_____	_____	_____
e) Fruits or vegetables	_____	_____	_____	_____
f) Other (please specify) _____	_____	_____	_____	_____

31. Do you believe that some foods should not be given to (Name) because of his/her current illness?

a) Yes→ give examples of such foods

b) No \_\_\_\_\_

32. What types of foods do you think are particularly important for (Name) to have?

	More important	Less important
a) Body building foods (meat/beans)	_____	_____
b) Energy giving foods (paletshe/mabele/mafura)	_____	_____
c) Protective foods (merogo)	_____	_____
d) Any kind of foods	_____	_____
e) Other (Please specify) _____	_____	_____

33. Do you have adequate amounts of the following types of food at home each month?

	Yes	No
a) Body building foods	_____	_____
b) Energy giving foods	_____	_____
c) Protective foods	_____	_____
d) Any kind of foods	_____	_____
a) Other (Please specify	_____	_____

34. In general does your household members have adequate amounts of food to eat?

- a) There is **always** enough food for all members
- b) **Sometimes** we have enough food for all members
- c) There is **rarely** enough food for all members
- d) There is **never** enough food for everyone

35. Does (Name) attend the Growth Monitoring Program every month?

- a) Yes→ skip to Q 37
- b) N o→ proceed to Q36

36. If no, what limits/ hinders your family from taking (Name) to the monthly Growth Monitoring Program?

\_\_\_\_\_

\_\_\_\_\_

37. Does (Name) receive any of the following food through the supplementary feeding program?

	Yes	No
a) Tsabana	_____	_____
b) Maize meal	_____	_____
c) Vegetable oil	_____	_____
d) Beans	_____	_____
e) Dried Skim milk	_____	_____
f) Other (Please specify)	_____	

### C. Caregivers Perception about the Child' s Nutritional Risk

38. In your opinion, has (Name's) weight increased, decreased or is it about the same since the past month?

- a) About the same
- b) Decreased
- c) Increased

39. In your opinion, has (Name's) need for nutritious food increased, decreased or is about the same since last month?

- a) About the same
- b) Decreased
- c) Increased
- d) Don't know

40. What services did (Name) receive today?

	Yes	No
a) Growth monitoring	_____	_____
b) Immunization	_____	_____
c) Health education	_____	_____
d) Medications	_____	_____
e) Other(specify) _____	_____	_____

*The following questions (41-42) apply only if (Name) is sick. If (Name) is not sick please skip to question 43*

41. Which of the following do you think would be helpful if they are incorporated in (Name's) treatment plan?

	Yes	No
a) Medications (specify type) _____	_____	_____
b) Oral Rehydration Solution	_____	_____
c) Juice or other sources of fluids	_____	_____
d) Education about selection of nutrient dense food	_____	_____
e) Recommended frequency of meals per day	_____	_____
f) Education on sanitary preparation of foods	_____	_____
g) Other (specify) _____	_____	_____

42. What treatment has (Name) received? *(Ask the caregiver and check the child's CWC card to see if caregiver has correctly identified all aspects of care provided)*

a) Medications *(list all prescribed medications as written in the health card)*  
 \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

b) ORS: How many packets? \_\_\_\_\_

c) Nutrition or dietary education (Please specify) \_\_\_\_\_  
 \_\_\_\_\_

d) Other (Please specify) \_\_\_\_\_  
 \_\_\_\_\_

43. Did caregiver correctly identify all aspects of treatment provided

- a) Yes
- b) No

44. Did the health provider perform the following tasks?

	Yes	No	Don't know
a) Weigh (Name)?			_____
b) Talk to you about the growth of (Name)?			_____
c) Talk to you about what to feed (Name)?			_____
d) Talk to you about how frequently you should feed (Name)			_____
e) Ask you to return (Name) to the clinic for follow-up?			_____



- f) Explain how (Name's) illness might affect his/her growth? \_\_\_\_\_ (   
*only if Name is ill, otherwise write not applicable*)
- g) Check if (Name's) immunizations are current? \_\_\_\_\_
- h) Suggest food items that you may feed your child \_\_\_\_\_

45. How satisfied are you with the services that (Name) received?

- a) Very satisfied
- b) Fairly satisfied
- c) Uncertain
- d) Not satisfied
- e) Very dissatisfied

46. What did you like best about your clinic visit today? \_\_\_\_\_

Why? \_\_\_\_\_

47. What did you dislike most about (Name's) clinic visit today? \_\_\_\_\_

Why? \_\_\_\_\_

48. Did you communicate what you liked or disliked about your visit to any of the clinic staff?

- a) Yes→ proceed to Q 48
- b) No→ skip to Q 49
- c) Not applicable→ skip to Q 50

49. To whom did you communicate what you liked or disliked about today's visit?

- a) Nurse
- b) Family Welfare Educator
- c) Medical Officer
- d) Other \_\_\_\_\_

50. Why did you not communicate what you liked or disliked about today's visit to the clinic staff? \_\_\_\_\_

#### **D. Information about the Child's Mother/ Primary caregiver**

51. How are you related to (Name)?

- a) Mother
- b) Grandmother
- c) Aunt
- d) Other adult relative
- e) Maid
- f) Other (Please specify) \_\_\_\_\_

52. What is your highest educational level?

- a) Primary: standard 1, 2, 3, 4, 5, 6, or 7.
- b) Secondary: Form 1, 2, 3, 4, or 5.
- c) Certificate level: eg 1 year from Technical College or Teacher Training College
- d) Diploma: 2 year training programs through Technical Colleges, Nursing School or University
- e) University Degree: At least 4 years of University College.

53. If you are not (Name's) biological mother, where is the child's mother?

- a) She is at work; she is expected to come home after work.
- b) She works and lives outside town/ village.
- c) She works and lives in another country.
- d) She passed away.
- e) Other( specify) \_\_\_\_\_

*For the following questions, If the child's biological mother has passed away substitute the primary caregiver for the child's mother. The primary caregiver is the parent who provides for and raises the child.*

54. Who is the head of the household in which (Name) lives?

- a) Child's father
- b) Child's mother
- c) Child's grand parent
- d) Other (Please specify) \_\_\_\_\_

55. What is the primary caregivers/ mother's marital status?

- a) Married
- b) Divorced
- c) Single
- d) Widow
- e) Cohabiting

Ask Q56 only if the respondent is not the child's mother, otherwise this will be a repeat of question 51

56. What is the caregiver's highest level of educational achievement?

- a) Primary: Grade 1, 2, 3, 4, 5, 6, 7,
- b) Secondary: Form I, II, III, IV, or V
- c) Certificate level: e.g. 1 year training in a Technical College / Teacher Training College
- d) Diploma level: 2 years of training in a Technical college, nursing schools etc.
- e) University Degree: at least 4 years of training in a university
- f) Don't know

57. What is the caregiver's/mother's date of birth? (*Check the child's clinic card for the biological mother's date of birth. Rely on the respondent answer to determine the surrogate mother's date of birth*) \_\_\_\_\_

58. What is the mother's/caregiver's current employment status?

- a) Employed
- b) Self employed
- c) Not employed
- d) Other (specify)

59. What is the mother's/caregiver's occupation? Describe in detail the job the mother/caregiver does on routine basis and the place of employment.

---

60. Does the household in which (Name) lives own or rent the house(s) they live in?

- a) Own
- b) Rent
- c) Other (Please specify) \_\_\_\_\_

61. What's the household source of water?

- a) In-door plumbing
- b) Private stand pipe
- c) Public stand pipe

#### **E. Information about the Child's Father**

62. Does the child's father live in the same home with (Name)?

- a) Yes, he stays with the family/household.
- b) Yes, but he lives outside the town/village because of employment commitments.
- c) Yes, but he lives and works outside the country.
- d) No

63. What is the father's highest level of educational achievement? \_\_\_\_\_

- a) Primary: Grade 1, 2, 3, 4, 5, 6, 7,
- b) Secondary: Form I, II, III, IV, or V
- c) Certificate level: e.g. 1 year Technical College / Teacher Training College
- d) Diploma level: 2 year training programs through Technical colleges, nursing schools or university
- e) University Degree: at least 4 years of university education.
- f) Don't know

64. What is (Name's) father's employment status?

- a) Employed
- b) Self employed
- c) Not employed
- d) Don't know

65. What is the father's occupation? Describe in detail the job the father does to earn a living and his place of employment.

---

66. Does (Name's) father support her/him?

- a) Yes
- b) No
- c) Don't know

67. What is the father's age in years? \_\_\_\_\_

- a) Birth year \_\_\_\_\_
- b) Estimated age in years \_\_\_\_\_
- c) Don't know

## Caregiver's Interview Schedule (Setswana)

Respondent No. \_\_\_\_\_ Interviewer \_\_\_\_\_ Date \_\_\_\_\_ Facility Name & Type \_\_\_\_\_

*Dumela mma, A le a tsoga? Re lebogela go bo o dumetse go buisanya le rona ka kgolo ya ngwana wa gago. Re eletsa gore o arabe dipotsonyana tse di latelang. Maikaelelo a tsone ke go re thusa go thaloganya ka fa ngwana wa gago a jang ka gone, ga mmogo le ka botsogo jwa gagwe. Dikarabo tsa dingwe tsa dipotso tse di ka bonwa mo karateng ya ngwana ya bongaka. Jaanong re tlaa kopa go e lebelela.*

### A. Information about the Study Child and Feeding Practices

*Interviewer, kopa go bona karata ya ngwana gore o kgone go araba dipotso tse di latelang( 1-6).*

1. Matsalo a ga (Leina) \_\_\_\_\_
2. Sekale sa ga (Leina) fa a tsholwa \_\_\_\_\_
3. Sekale sa ga (Leina) sa kgwedi ee fetileng \_\_\_\_\_
4. Sekale se se tserwe leng? \_\_\_\_\_ ( letsatsi/kgwedi/ngwaga
5. (Leina) ke mong? \_\_\_\_\_
6. (Leina) o tliseditsweng mo kokelong
  - a) Sekale sa kgwedi
  - b) Go kopa kalafi, (Leina) oa lwala
  - c) Go sekaseka seemo sa gagwe gape. One a lwala maloba
7. A (Leina) oa lwala?
  - a) Ee
  - b) Nnyaa *skip to question 15*
8. Ke lobaka lo lo kafe Leina a ntse a lala? \_\_\_\_\_ malatsi
9. Mooki/Ngaka one a alafela (Leina) bolwetse bofe? \_\_\_\_\_  
(*read from the card*)
10. Maemo a motho yo o neng a tlhathoba (Leina) Ke afe \_\_\_\_\_ (Nurse, Medical Officer, Other, ask the mother)
11. O lemogile jang gore Leina o lwala mo a thokang go bonwa ke ba bongaka

	Ee	Nnya
a) A one a lebega a lapile ?	_____	_____
b) A o ne a sa tshameke jaaka gale?	_____	_____
c) A o ne a robala robala thata?	_____	_____
d) A o ne a gana dijo?	_____	_____
e) A o ne a lebega a sa iketa	_____	_____

- f) A o ne a gotetse? \_\_\_\_\_  
 g) A o ne a tsholola? \_\_\_\_\_  
 h) Dikai tse dingwe tse o di bonyeng \_\_\_\_\_

12. Fa o lebile Leina o tshwerwe ke bolwetse bofe?

- |  | Ee    | Nnyaa |
|--|-------|-------|
| a) Letshololo  | _____ | _____ |
| b) Tlhoko ya dikotla e e bakang popamo                   | _____ | _____ |
| c) Tsebe   | _____ | _____ |
| d) Mogote  | _____ | _____ |
| e) Kgotholo/Sehuba                                       | _____ | _____ |
| f) Dikodu  | _____ | _____ |
| g) Pitlaganyo ya mafatlha e e mo padisang go fema sentle | _____ | _____ |
| h) Bolwetse bongwe( tlhalosa)                            | _____ | _____ |

13. Ke mang yo o tsileng ka mogopola wa gore ngwana a tlisiwe kokelong?

- a) Mmaagwe  
 b) Rraagwe  
 c) Nkokoagwe  
 d) Mongwe mo lapeng  
 (Tlhalosa) \_\_\_\_\_

14. A (Leina) o ne a fiwa kalafi e pe ka na molemo mongwe ko lapeng pele ga a tlisiswa kokelong?

- a) Ee → Tlhalosa \_\_\_\_\_  
 b) Nnyaa

15. Gale le gale boitekanelo ja ga (Leina) bo ka kaiwa bontse jang? A ke motho yo o

- a) Itekanetseng fela thata?  
 b) Itekanetse go se e kafe?  
 c) Tshwenyegang go se e kafe?  
 d) Tshwenyegang fela thata / bokoa?  
 e) Ga ke tlhomamise botsogo jwa ga (Leina)

16. (Leina o na le bo mogolowe le bo monnawe ba le ekafe? \_\_\_\_\_

17. Mo baneng ba botlhe, ke ba kafe ba ba dingwana tse di ko tlase fa 5? \_\_\_\_\_  
 {balela (Leina) yo mo teng}

18. A gona le bana ba masika ba lo nnang le bone mo lapeng? Bakafe \_\_\_\_\_

19. (Leina) o kadile bokae gompieno? \_\_\_\_\_ kg ( Kala ngwana)

20. (Leina) o mo leele go le ekafe? \_\_\_\_\_ (meta ngwana)

## B. Child's Dietary Intake

21. A (Leina) o kile a anya mashi a lebele

- a) Ee  
 b) Nnyaa

22. A (Leina) o setse a ja dijo

- a) Ee
- b) Nnyaa

23. (Leina) o ja ga kafe mo letsatsing

- a) 3: maphakela, motshegare le maitseboa
  - b) 6: maphakela, maphakelanyane, motshegare, dithetologa, maitseboa le bosigo
  - c) Palo e nngwe ( thalosa)
- 

24. A (Leina) o nwa mangwe a mashi a a latelang?

- |                        | Ee    | Nnyaa |
|------------------------|-------|-------|
| a) A lebele?           | _____ | _____ |
| b) A dithini (a bana)? | _____ | _____ |
| c) A dikgomo?          | _____ | _____ |
| d) A dipodi?           | _____ | _____ |

*The following questions (25-31) apply only if (Name) is sick. If the child is not sick skip to question 32*

25. A selekanyo sa mashi a (Leina) a a nwang se fetogile ka gope ka ntata ya bolwetse jo ka na setshwana le ka gale?

- |                        | Se fokotsegile | ga se a fetoga | se oketsegile |
|------------------------|----------------|----------------|---------------|
| a) A lebele?           | _____          | _____          | _____         |
| b) A dithini (a bana)? | _____          | _____          | _____         |
| c) A dikgomo?          | _____          | _____          | _____         |
| d) A dipodi?           | _____          | _____          | _____         |

26. A **selekanyo** sa dijo tse (Leina) a di **tsholelwang** se oketsegile, se fokotsegile kana ga se a fetoga ka gope?

- a) Ga se a fetoga
- b) Fokotsegile
- c) Oketsegile

27. A selekanyo sa dijo tse (Leina) a di **jang** ka letsatsi di oketsegile, di fokotsegile kana ga di a fetoga?

- a) Ga di a fetoga
- b) Fokotsegile
- c) Oketsegile

28. A **dinako** tse (Leina) a **fiwang/ tsholelwang dijo** ka tsone mo letsatsing di oketsegile, difokotsegile kana ga dia fetoga ka gope?

- a) Ga di a fetoga
- b) Fokotsegile
- c) Oketsegile

29. A go ja ga ga (Leina) go o ketsegile kana go fokotsegile kana go tshwana jaaka gale ka ntata ya bolwetsi jo?

- a) Go tshwana jaaka gale
- b) Go fokotsegile
- c) Go oketsegile

30. A go nnile le phetogo mo selekanyong sa dijo tse (Leina) a di jang /nwang ka ntata ya go lwala

	Di fokotsegile	Ga go na phetogo	di o ketsegile
a) Jusi( Juice)	_____	_____	_____
b) Nama/ Mashi	_____	_____	_____
c) Motogo/Bogobe	_____	_____	_____
d) Dinawa	_____	_____	_____
e) Fruits/Merogo	_____	_____	_____
f) Di jo tse dignwe (tlhalosa)	_____	_____	_____

31. A gona le dijo tse o dumelang gore fa (Leina) a lwala ga a tshwanelwa go dija?

- a) Ee → ke dife? \_\_\_\_\_
- b) Nnyaa

32. Ke efe mofuta ya dijo e go leng botlhokwa gore (Leina) a e fiwe?

	Tlhokega thata	Ga o tlhokege thata
a) Dijo tse di agang mmele (nama/ dinawa)	_____	_____
b) Dijo tse di fang nonofo (bogobe, paletshe)	_____	_____
c) Dijo tse di sireletsang mmele (merogo)	_____	_____
d) Fa gona le o mongwe mofuta o kwale fa	_____	_____

33. A gona le selekanyo se se kgotsofatsang sa dijo tse di latelang mo lapeng mo kgwedding nngwe le nngwe?

	Ee	Nnyaa
a) Dijo tse di agang mmele	_____	_____
b) Dijo tse di fang nonofo	_____	_____
c) Dijo tse di sireletsang mmele	_____	_____
d) Fa gona le o mongwe mofuta o kwale fa	_____	_____

34. A ba lelapa la gago ba na le dijo tse di lekanyeng ka nako tsotlhe?

- a) Ee, dijo ga nke di thaela ope
- b) Ee, mme dijo di a tle di thaele, ka sewelo
- c) Nnyaa, ke gantsinyana dijo di tlhela
- d) Nnyaa, dijo di thaeletse ruri/

35. A (Leina) o tlisiwa sekaleng kgwedi ngwe le ngwe

- a) Ee → skip to question 37
- b) Nnyaa → 36



36. Ke eng fa (Leina) a sa tlišiwe sekaleng kgwedi nngwe le nngwe \_\_\_\_\_

37. A (leina) o phaka

	Ee	Nnyaa
a) Tsabana?	_____	_____
b) Phaletshe?	_____	_____
c) Mafura?	_____	_____
d) Dinawa?	_____	_____
e) Mashi a a boupi?	_____	_____
f) _____	_____	_____

### C. Caregivers Perception about the Child' s Nutritional Risk

38. Fa o bona, a gona le phetogo e pe mo sekaleng sa ga (Leina) fa o se tshwantshanya le sa kgwedi e e fetileng?

- a) sekale ga se afetoga
- b) sekale se ole
- c) sekale se oketsegile

39. Fa o bona, a (Leina) o thoka dikotla thata mokgweding eno kana ga go na phetogo epe go tsw kgweding e e fetileng?

- a) Ga go na fetoga
- b) Lethoko la dikotla le fokotsegile mo kgweding e
- c) Lethoko le o ketsegile mo kgweding eno
- d) Ga ke tlhomamisi

*The following questions (40-43) apply only if the child is sick. If the child is not sick skip to question 43*

40. A fa dintha tse di latelang di ka akarediwa mo kalafing ya ga (Leina), a di ka tokafatsa kalafi ya gagwe, kana ga di ke di thusi ka gope

Di ka tloka fatsa (1) Ga di thusa (0)

- a) Molemo (tlhalosa go re ke wa eng) \_\_\_\_\_
- b) Motswako wa metsi- ORS \_\_\_\_\_
- c) Dijo tse di nang le metsi a mantsi/Matute a maungo (Juice) \_\_\_\_\_
- d) Thuto ya go tlhopa dijo tse di nang le dikotla \_\_\_\_\_
- e) Dinako tse go rotloediwang gore ngwana a fiwe dijo ka teng \_\_\_\_\_
- f) Thuto ka mekgwa ya go sirelatsa dijo mo megareng (Hygiene) \_\_\_\_\_
- g) Tsela tsa go tokafatsa go ja ga ngwana \_\_\_\_\_

Sum all \_\_\_\_\_

- |  | Ee (1) | Nnyaa(0) |
|--|--------|----------|
| 41. Mooki/Ngaka o file (Leina) kalafi efe?                         |        |          |
| a) Molemo: ( ofe) _____, _____, _____                              |        |          |
| b) ORS: pakete di le e kafe? _____                                 |        |          |
| c) Thuto ka dikotla tsa mmele, kana dijo tse di tshwanetseng _____ |        |          |
| d) Kalafi e nngwe- thalosa _____                                   |        |          |

42. *Interviewer, check the CWC card:* A mmangwaa yo o kgonne go bolela kalafi yotlhe e ngwana a e filweng jaaka e kwadilwe mo karateng. Fa mmangwana a sa itse leina la molemo mme a itse gore molemo ke wa eng, le gone gontse go siame.

- a) Ee
- b) Nnyaa

43. A ngaka / Mooki/ mmaboitekanelo yo o neng a tthatlhoba ka na a thusa mo tthatlhobong ya ga (leina) one a

- |   | Ee (1) | Nnyaa(0) |
|---|--------|----------|
| a) Kala (Leina)   |        |          |
| b) Buisana le wena ka go gola ga ga (Leina)                                   |        |          |
| c) Buisana le wena ka fa dijo tse (Leina) a tshwanetseng go dija              |        |          |
| d) Buisana le wena ka go jesa (Leina) kgapetsa kgapetsa                       |        |          |
| e) Go kopa gore o tsise (Leina) gape ko kokelwang morago ga malatsinyana      |        |          |
| f) Go bolela ka fa bolwetse jo bo ka a mang go gola ga ga (Leina) ka teng     |        |          |
| g) Tlholo ka na a go botsa go re ngwana o tsere mekento ya tshireletso yotlhe |        |          |
| h) Go fa dikai tsa dijo tse o tshwanetseng go difa (Leina)                    |        |          |
| <b>Index</b>  |        |          |

44. A thuso e (Leina) a e filweng e go kgotsofaditse thata, gole gonnye, kana ga ea go kgotsofatsa?

- a) E nkgotsofaditse fela thata
- b) E nkgotsofaditsenyana
- c) E fa gare fela
- d) Ga ea nkgotsofatsa
- e) Ga ea nkgotsofatsa fela thata / ga kea itumelela gotlhelele

45. Fa karabo ele 44a and b. ke eng se se go itumedisitseng ka thuso e o e boneng tsatsing jeno?

---

46. Fa karabo ele 44d or e, ke eng se se sa go itumedisang fela thata ka thuso e o e boneng tsatsing jeno?

---

47. Fa go na le sepe se se go itumedisitseng, kana se se sa go itumedisang a o ne wa itsise mongwe wa ba bongaka?

a) Ee → 48

b) Nnyaa → 49

48. O boleletse mang ka maikutlo a ga go?

a) Mooki

b) Mmaboitekanelo

c) Ngaka

d) Mmeriki mongwe  
(Thalosa)

---

49. Ke kopa gore o mpolele gore ke eng o sa bolelela ope wa bongaka?

---

#### **D. Information about the Child's Mother/ Surrogate Mother**

50. A (Leina) ke ngwana wa gago? - O tsalana jang le (Leina)?

a) Mmaagwe

b) Nkokoage

c) Mmangwaneagwe

d) Mmelegi

e) Mongwe (Thalosa)

---

51. O badileng ko sekolong

f) Primary: standard 1, 2, 3, 4, 5, 6, or 7.

g) Secondary: Form 1, 2, 3, 4, or 5.

h) Certificate level: eg 1 year from Technical College or Teacher Training College

i) Diploma: 2 year training programs through Technical Colleges, Nursing School or University

j) University Degree: At least 4 years of University College.

52. Fa o se mmaagwe (Leina), mmaagwe o kae?

a) O ile tirong

b) O nna ko toropong e nngwe

c) O nna kwa ntle ga Botswana

d) O thokafetse

e) Lefelo lengwe (thalosa)

---

*Mo dipotsong tse di latelang tse, fa mmangwana a thokafetse, motsadi yo o thokomelang ngwana, ke e ne yo re batlang a lebangwe le dipotso tse di latelang.*

53. Thogo ya lapa le (Leina) a nnang mo go lone ke mang?

- a) Rraagwe (Leina)
- b) Mmaagwe (Leina)
- c) Nkokoagwe / Rraagwemogolo (Leina)
- d) Motsadi mongwe (thalosa) \_\_\_\_\_

54. A mmangwana o nyetswe?

- a) Ee
- b) O kgaone le monna
- c) Ga a e si nyalwa
- d) Ga aa nyalwa mme o nna mmogo mo lapeng

*Ask Q56 only if the respondent is not the child's mother, otherwise this will be a repeat of question 51*

55. Mmaagwe ngwana o badileng ko sekolong

- a) Primary: standard 1, 2, 3, 4, 5, 6, or 7.
- b) Secondary: Form 1, 2, 3, 4, or 5.
- c) Certificate level: e.g. 1 year from Technical College or Teacher Training College
- d) Diploma: 2 year training programs through Technical Colleges, Nursing School or University
- e) University Degree: At least 4 years of University College.

56. Mmangwana o tshotswe leng? \_\_\_\_\_ *(Check the child's clinic card for the biological mother's date of birth. Rely on the respondent's answer to determine the surrogate mother's date of birth)*

57. A mmangwana oa bereka?

- a) Oa bereka
- b) Oa ipereka
- c) Nnyaa

58. Mmaagwe ngwana o bereka kae, tthalosa ka botlalo tiro e mmangwana a e dirang le ko a berekelang teng.

59. A mmangwana o renta ntlo e le ngwana yo a nnang mo yo yone ka na ke ya gagwe?

- a) Rentisa
  - b) Ya gagwe
  - c) Mkgwa mongwe wa tiriso ya ntlo
-

60. A gona le metsi montlong?
- a) In-door plumbing
  - b) Private stand pipe
  - c) Public stand pipe
  - d) Collects water from the neighbours.

**E. Information about the Child's Father**

61. A rraagwe (Leina) o nna le lona mo lapeng?
- a) Ee
  - b) Ee, mme legale o berekela ko toropong e nngwe
  - c) Ee, mme legale o berekela ko ntle ga Botswana
  - d) Nnyaa
62. Rraagwe (Leina) o badile eng ko sekolong?
- a) Primary: standard 1, 2, 3, 4, 5, 6, or 7.
  - b) Secondary: Form 1, 2, 3, 4, or 5.
  - c) Certificate level: e.g. 1 year from Technical College or Teacher Training College
  - d) Diploma: 2 year training programs through Technical Colleges, Nursing School or University
  - e) University Degree: At least 4 years of University College.
  - f) Don't know
63. A rraagwe (Leina) oa bereka, kana o na le business?
- a) Oa bereka
  - b) O a ipereka
  - c) Ga a bereke
  - d) Ga ke tlhomamise
64. Tlhalosa ka botalo tiro e rraagwe (leina a e dirang, le ka a berekelang teng?
- 
65. A rraagwe (Leina) o tlhokomela ngwana?
- a) Ee
  - b) Nnyaa
  - c) Ga ke thomamisi
66. Rraagwe (Leina) ona le dingwaga di le ekafe?
- d) Dingwaga \_\_\_\_\_
  - e) Estimated age in years \_\_\_\_\_
  - f) Don't know

## **APPENDIX C**

### **Focus Group Summary**

## Focus Group Summary

Ten focus group discussions were held with caregivers of children between 0-5 years of age. Each group had 4 to 6 participants. The participants in the focus groups were within the sampling frame of caregivers with children (0-5 years) who were seeking care from government of Botswana's Child Survival Programs, but they need not to have completed the Caregivers' Interview Schedules. The objective of the focus group discussions was to gather data that will help explain the findings of data collected using the Caregivers' Interview Schedules. The questions provided more information about caregivers' perceptions of the effectiveness of the Child Survival Programs in addressing nutrition and dietary problems in study children and the caregivers' perceptions about the types and utility of communication channels between caregivers and practitioners. These questions were formulated after preliminary data analysis had been performed (section three in chapter 4).

In this report, a brief summary of the participants' response to the focus group questions is provided. Each summary is followed by several statements that participants made in response to the focus group questions. This presentation format was chosen because it gives readers the opportunity to read focus group participants' unedited statements. Focus groups were labeled sequentially from one to ten. Each statement has been tracked back to the specific focus group session numerically. For example, statements made by a caregiver in-group one will appear under a subheading that identifies the group numerically, (group one). In some groups, participants did not directly address the questions asked. Therefore, there are no direct quotes from such groups in this summary.

Due to their cultural backgrounds, participants phrased their statements in the third person. For example, one caregiver said, "we feel the same way" instead of "I feel I share the same feelings with other participants". All responses were made in Setswana. The English statements listed in this section were translated from Setswana to English by the researcher (Maria S. Nnyepi), a native Setswana speaker.

## Focus Group Transcripts

### Focus Group Question 1:

**How adequate are the clinic services in addressing the dietary and nutritional needs of our children?**

#### Responses from Participants

Caregivers thought that their clinics do not adequately address the dietary and nutrition needs of children. Caregivers gave varying reasons for their assertions. Some caregivers thought that their clinic failed to address the dietary and nutrition concerns of children because it lacked appropriate equipment. The most commonly cited piece of equipment that clinics lack is infant weighing scales.

Other caregivers felt that their clinic failed to meet the dietary and nutrition needs of their children because they frequently ran out of food supplements and immunization shots. Caregivers said that their children are supposed to receive beans, maize meal, dry skimmed milk, and vegetable oil or Tsabana and vegetable oil depending on their age. However, they rarely received all these supplements. Caregivers were also concerned that some children do not tolerate tsabana (a soy/sorghum blend used for preparing porridges for children) - but no alternative food supplements have been made for such children.

Group 1.

“When a child does not eat fruits, he/she loses weight. Clinics should give our children fruits.”

“ They are supposed to provide undernourished children with adequate food. Presently children only receive tsabana and vegetable oil, but not beans.”

“They never touch our children to console us.”

“ When you bring a very sick child to the clinic, they insist that you join the line like anyone else.”

“Caregivers are supposed to obtain information about appropriate feeding from practitioners.”

Group 2.

“ Our clinics do not provide adequate nutritional and dietary screening, ... when a child’s weight is not satisfactory, practitioners need to provide him/her with alternative food that would provide enough nutrients.”

Group 4

“I do not think that our clinics adequately address dietary and nutritional needs because when your child refuses food and you bring them to the clinic to request help, they never establish the cause of the problem. All they tend to say is that the caregiver does not give the child enough food.”

“ I do not have any different thoughts from this mother. If you tell them that your child does not eat well, they encourage you to force the child to eat. But when a child refuses food, forcing him food causes him to gag and throw up.”

“Sometimes they give the child a multivitamin/mineral supplement.”

“A multivitamin/mineral supplement will not address the underlying problem (refusal to eat). A multivitamin/mineral supplement can be used temporarily such as when a child has a cold infection. You cannot keep giving a child multivitamin/mineral syrup.”



**“ I agree with the previous speaker.”**

**“If a child refuses food, practitioners tend to say that the problem is that the caregiver does not give the child soft porridge. They forget that when children refuse to eat they do so vehemently.”**

**Group 6**

**“I don’t think that our clinic is capable. It is far behind. It inconveniences us greatly, because we arrive in the clinic for services at about 7 am and often do not leave until at about 10am.”**

**“All they give us are leaflets that describe the new immunization schedules, I have not seen anything about nutrients.”**

**“ I do not know anything about nutrients. We are just in the dark. They never give our children anything to help them grow, even if your child is emaciated. I wonder if there is anything lacking in our clinic. You know, years back there used to be a feeding program for severely malnourished children. Although at times bringing a child to the clinic to eat was not adequate because children eat intermittently, because they want to eat and play a little and come back to eat later. But it was better than now.”**

**Group 8**

**“Our clinic does not address dietary and nutrition concerns of children adequately. First, we don’t even have baby scales, even infants who are six weeks old are weighed using the hanging scales. Infants are also weighed outside in the open area there (pointing at the verandah) even during winter. Secondly, we have a shortage of consultation rooms. Infants and children who come for immunization shots share the same injection room with adults. We do not have adequate equipment.”**

**“ All government clinics do not adequately address children’s dietary and nutrition needs. All they do is give children tsabana. I am not saying that tsabana is not nutritious but that it is not adequate if fed alone. Children need a variety of nutritious foods. Malnourished children should be brought to the clinic to receive a variety of foods. If they appropriate funds annually for gardening projects, the government can afford to operate vegetable gardens in the clinic for malnourished children.”**

**“If a child is brought to the clinic for illnesses, providers should assess their nutritional status. They should also ask about possible problems at home. May be the child is not being fed well at home.”**

**“I do not think that children’s dietary and nutrition concerns are being adequately addressed. Before I had my child, caregivers and family welfare educators used to cook food for malnourished children in the clinic. Children**

were brought to the clinics everyday to eat this food. Now this service has stopped. If this service was continued, it might be better.”

“Food supplements are always inadequate in (name of clinic). A child can go up to 6 months without receiving supplements. When the supplements become available and the child is introduced to tsabana, the child initially develops diarrhea. When the child eventually adjusts to the food and the diarrhea stops, the food will run out and the child will stay another three months before the food becomes available again. The circle begins again the next time the food becomes available.”

#### **Group 9**

“These clinics do not adequately address dietary and nutrition problems because if you bring your child for immunizations, very often you will not find the immunizations your child needs. The immunizations will not be available for a long time. For the time that the child has not been protected, will measles not attack her?”

“It is not often that you hear practitioners in the Immunization Clinic ask about the child’s diet. Also if you tell them that your child has a depressed desire for food, they hardly pay attention to you.”

“Our clinics do not address nutrition needs of children. If you bring the child to the clinic you will find that immunization shots have run out. When you come again the next month, you will still not find any immunization shots. So it takes a long time, even months. Do you think the child’s health will not be affected by late immunization shots?”

“This woman is telling the truth. If a child is supposed to take some immunization shots at nine months and the shots have run out, is this good for the child?”

“Apart from shortage of immunization shots, they hardly mention anything about the child’s nutritional status. If you express concerns about the child’s eating habit such as the loss of desire to eat, they do not pay attention to you.”

#### **Group 10**

“I have never seen them pay attention to the child’s dietary or nutritional status. Even when my child had lost weight, I never saw them take any action.”

In (name of clinic), the assessment of children’s dietary intake and nutritional status is not adequate. My child has missed three doses of Vitamin A. She did not get a dose at 6, 12 and 18 months because the clinic did not have vitamin A. I wonder if by the time the clinic eventually has enough Vitamin A supplements, it would not be too late for my child to get one.”

There were some caregivers who felt that the government was trying hard to address the dietary and nutrition needs of children. Caregivers thought that practitioners in the Supplementary Feeding and the Growth Monitoring Programs were trying hard to address dietary and nutrition concerns of children.

**Group 2**

“The government is trying hard to address the dietary needs of children. The problems is that many children do not tolerate tsabana.”

**Group 3**

“When we bring our children to the clinic, practitioners evaluate their weight. When the weight is low, practitioners ask you if the child has been ill. If the child is not well, they ask you about the types of food you give him/her. Practitioners will also give you information on how and what to feed your child.”

“If a child has lost weight because of an illness, practitioners will often ask if the child was ever brought to the curative clinic at the time of the illness. They ask all these questions because they want to establish the cause of the weight loss.”

“ Often times practitioners ask you to tell them the types of food you give your child.”

**Group 5**

“ We think that our clinics adequately address children’s dietary and nutritional needs because they ration out maize meal, beans and tsabana to children.”

“ I don’t have anything else to add. I agree with the previous speaker.”

**Group 8**

“We can say clinics adequately address dietary and nutrition needs. It is only that often times when the child is due for immunizations, the clinic will not have them on time. We have had to go and check immunizations from several other clinics, meanwhile the child is getting older.”

**Group10**

“During the Growth Monitoring Clinic session, I have heard caregivers asking questions about children’s growth. Caregivers were free to talk to practitioners about their children’s growth. With regard to immunizations, my child has received all immunizations on schedule. In addition, providers in the clinic will tell you if your child is growing well. If the child’s weight is too high, they also tell you. These are examples of the information we receive from the Growth Monitoring and Immunization clinics.”

## **Focus Group Questions 2:**

**How important do you perceive the dietary and nutrition intervention to be in the well being of your children? Should nutrition and dietary services be integral components of clinic care?**

Caregivers' responses (all groups) to this question were very similar. In general, caregivers thought that it was very important that ill children receive care for their illnesses and undernutrition. Some caregivers felt that childhood illnesses should be addressed first and then nutrition problems could be addressed. However, most caregivers strongly felt that dietary and nutrition screening of children should be addressed by both the preventive and the curative services of the Child Survival programs. The following statements were made by caregivers in response to the questions 2

### **Group 1**

"When a sick child is also malnourished, his/her medical need should be taken care of first. After the medical problem has been taken care of, then the child's nutritional needs should be addressed."

"Dietary and nutritional assessment of children should be performed both during the preventive and curative services."

### **Group 2**

"Children's dietary and nutritional needs should be assessed both in the growth monitoring clinic and the curative clinic. These clinics should work together."

### **Group 3**

"The issue of dietary and nutritional assessment should be addressed both in the growth monitoring program and in the curative clinic."

### **Group 4**

"Dietary and nutritional assessment should be performed both in the Growth Monitoring Program and the curative clinics."

"Assessment should occur in both places. Ideally, The growth monitoring programs should refer ill children to the curative clinic and explain your child's concern to the consulting provider. If the curative provider is not able to assist you, they should refer you to another provider."

"Clinic services should assist each other in addressing the child's needs."

"When a child is being assessed, the mother or caregiver's needs should also be assessed. Some of the problems that children have may also be affecting the mother or caregiver."

**Group 5**

**“The dietary screening of children should occur both in the monthly Growth Monitoring clinic and during consultation in the Curative clinic.”**

**Group 6**

**“During consultations, practitioners pay attention to illnesses only. They do not pay attention to both the illnesses and the low weight. There are no investigations. They never investigate the real cause of the illness, or what can be done at home to help the child, even if your child is emaciated.”**

**“It is just like that! When you bring a child to the clinic. They do not look at the history of the child’s illness.”**

**“It is important to establish when the child has been ill or how the child is fed at home. If they cannot give you the kinds of food the child needs, they should at least tell you what these foods are so that you can purchase them yourself, if you are able.”**

**Group 7**

**“I do not think that our providers adequately assess children’s diet and nutrition status. You know, you can come to the clinic with a child who has lost weight, but you will not see providers taking any action. Yes, they write in the card that the child has lost weight, but they are supposed to tell the caregivers too. But, they do not do that. Since I had this child, I have never had providers talk to me about my child’s loss of weight and there are times when my child lost a lot of weight.”**

**“I think that clinics used to plant vegetables which were used in feeding children who had lost weight. I do not know when and why that service ceased.”**

**“Diet and nutrition assessment should be performed. I am not sure that providers really assess children thoroughly. Because I never hear them ask about what the child eats, what type of milk he drinks. All I hear a lot about are the immunization schedules. There is nothing about food.”**

**“I think that there should be a special education class for pregnant women that runs parallel with the one that focuses on immunization. This class could teach women what to eat and how to feed their children.”**

**Group 8**

**“When a child is ill, his/her nutritional status should also be assessed because children tend to lose weight when they are ill.”**

“Providers should assess the background of children who are ill. Sometimes the child is not ill, but may not be eating enough food at home. Sometimes the child’s illness is caused by the lack of care at home or lack of food.”

“Nutrition and dietary screening should be performed in all areas. At home, the caregiver should ensure that she provides adequate care and feeds the child enough food. When the caregiver takes the child to the clinic, she should make sure that she informs providers of all concerns she has about the child.”

#### Group 9

“The assessment of the child’s diet and nutritional status should take place in both the Growth Monitoring and the Curative clinics. The Growth Monitoring clinic starts with child being weighed, so they can use that time to also ask questions about the child’s diet. If the child needs more help then they can take the child to the Curative clinic where she/ he will be given medications.”

#### Group 10

“Normally the child’s diet and nutrition assessment is performed in the Growth Monitoring clinic. The assessment can also be done in the curative clinic, if the child’s condition has not improved or the child is ill.”

“Since attendance in the Growth Monitoring clinic is only once a month, caregivers should not wait for the next clinic date if the child had lost weight. This assessment can be done in both clinics.”

### **Focus Group Question 3:**

**Let’s talk about communication channels between you (caregivers) and clinic practitioners. Are there established channels of communication between you (caregivers) and practitioners? If you have some issues to share with clinic practitioners, would you know how to go about this process?**

Caregivers responses to this question varied somewhat. Caregivers’ comments could be classified into three categories. These three categories are 1) comments that provided information about their awareness of communication channels between them and providers, 2) caregivers perceptions about the nature of the communication between them and providers and finally 3) their feelings about the nature of the communication between them and providers. Comments in this category also characterized the relationship between caregivers and providers.

With respect to caregivers awareness of communication channels between them and providers, it appears that caregivers were uncertain about the communication channels. Some caregivers thought that there were no established communication channels between caregivers and providers (see comments from group 1 below). Some caregivers reported that there used to be early morning health talks that could be considered as a type of

communication channel. Others indicated that their clinics have suggestion boxes that could be utilized as another communication channel.

**Group 1**

“There are established communication channels between caregivers and providers. When I have come to the clinic and experience unsatisfactory situations, I should come back to the clinic and request to talk to the sister -in-charge of the clinic. The Sister-in-Charge of the clinic should be able to help resolve my problems. If it was an issue of miscommunication with another provider, the Sister-in-Charge of the clinic should help me reconcile with that provider.”

“There used to be health talks in the mornings before consultations. I have not seen them being provided lately.”

**Group 2**

“Practitioners do share with us their ideas. If the ideas are good we accept them, if not we let them know.”

“ Our clinic has a suggestion box, people can write their suggestions and drop them in the box for practitioners to see. The only problem is that one may not be in the clinic at the time when practitioners address or comment on the suggestions in the box.”

**Group 3**

“We are not certain of procedures to follow when we have difficulties with our practitioners. So when we have difficulties, we do not know which procedures to follow.”

**Group 4**

“In (name of clinic) we do not have a suggestion box. I also do not know the Sister-in-Charge of the clinic.”

“ We never voice our perceptions. We tend to resign to the situations we find ourselves in.”

**Group 6**

“ You are supposed to see the practitioner if you have a family member at home whose condition is not improving.”

“ You are supposed to see a senior practitioner not any practitioner.”

“ There is no suggestion box in our clinic, but I am not very sure because I do not come to the clinic everyday.”

**Group 7**

“Our clinic, unlike others, does not have a suggestion box. If there is one, I have never seen it.”

#### Group 8

“There is a health education session in the morning. However, they start very late so we end up spending most of our daytime in the clinic.”

“ They start the education session late. In addition, they require that we know immunization by heart before they can help us. If you do not know the immunization schedule, they do not help you or if they do, it will be after everyone else has been helped.”

#### Group 10

“We work with practitioners depending on how they deal with us. Many times when we raise our concerns, they tell us that they will report us to the matron. You government workers, your matron is very oppressive. That is why we hardly say anything.”

“One of the concerns that we have is that there is no care after working hours in (name of the clinic). Providers always tell us that there is a provider on call after hours. I have brought my child to the clinic many times after hours and I did not find any provider. Contrary to what they tell us there is no after hours care. I brought this concern to the clinic providers one time and they told me to talk to the provider who was on call directly. How can I talk to him/her directly if I do not know who he/ she is?”

“We hear that other clinics have suggestion boxes. We do not have it in (name of the clinic). I imagine that it might be helpful because we could write down our concerns and deposit them in the box.”

“ We do not have a suggestion box, so we hold in issues and return to our homes. Sometime ago, I found a woman here who had been unwell. The provider gave her paracetamol. When she complained that her condition /illness has been persisting for a long time and she would prefer medication to cure the condition and not numb pain, the provider told her to go and see what she can do for herself because she (the woman) was playing the role of a provider.”

“How can we thank them? The only person I can applaud is (name of provider). She is the only person who is interested in community projects. However, we are afraid to applaud the helpful providers like her because the others might not like it.”

I could applaud providers, but I have never experienced any deed that instilled in me a sense of gratitude. If it happens, I will have no problem telling providers.”



Regarding the nature of the communication between caregivers and providers, some caregivers thought it was difficult for them to approach providers because providers are very unkind. Another caregiver felt that providers tend to use harsh words. Despite their choice of words one caregiver said she empathizes with providers because clinics are often under staffed and this forces providers to play multiple roles within the clinic.

**Group 2**

“ Our major problems is that we do not have adequate practitioners. Many times one provider works in the injection room, the consultation room and the dispensary.”

“A practitioner’s job is very tiring. Therefore, when practitioners in their tiredness talk to us harshly we forgive them readily. They are people like us and so they make mistakes.”

**Group 3**

“It is difficult to share ideas with our practitioners. Only few people communicate with providers. Most people do not come for meetings.”

“Many people are not happy with the way things are being run in the clinics, yet you hardly hear people voicing their concerns.”

“When we are satisfied with services, we acknowledge and applaud our practitioners.”

“We show gratitude readily, what is difficult for us to do is to voice our concerns.”

**Group 4**

“Practitioners are very unkind. We are afraid of them. We fear these people.”

**Group 6.**

“We do not tell them anything. We are afraid that they will become angry at us. If you raise a concern and indicate to providers your troubles, they will respond with hurtful words. That is why we are so miserable and hardly tell them anything.”

**Group 10**

It is not easy to talk to providers. I think it is better to use a suggestion box, where we can all deposit our concerns anonymously. We should not raise our concerns face to face as that might cause friction between caregivers who speak up and providers.”

“If you talk to them face to face, they will think that you are a bad person”

“We have an idea as to which of the providers to talk to and which ones not to talk to. The problem is that often times approachable providers work in different clinic programs than the one problematic program. Hence, even if these providers are informed about caregivers concerns, they can not do anything to improve the situation.”

Caregivers used various expressions to describe their perceptions about the relationship between them and providers. Some caregivers were frustrated while others were afraid. Some caregivers used the following statements “we fear these people, we are afraid of them,” and “they treat us like children,” to describe the relationship between them and providers. Others said they were afraid to share their concerns with providers lest they become angry at them.

#### Group 4

“Practitioners are very unkind. We are afraid of them. We fear these people”

“Maybe if they put up a suggestion box somewhere in the clinic, we might drop our notes in there while they are not looking. There is no day in which they do not talk unkindly to us. We are very unhappy about their behavior. We are all women from our own homes but they talk to us like they are talking to little children. I do not like to be scolded by another woman for no apparent reason. They don’t talk to us with respect.”

“ Our clinic is wanting with regard to communication between caregivers and practitioner.”

“ I wish to know if nurses are ever sent to the Botswana National Productivity Center where they can learn how to communicate with their clients. These people lack communication skills. They don’t treat people like people. ... One is even afraid to applaud them when they have done a good job. We are all afraid of them.”

“ We are even afraid to praise them when they have done a good job because we are afraid of them.”

#### Group 5

“There is a way to communicate with practitioners. When a caregiver has a sick member of the family at home, she should come to the clinic and tell any of the practitioners. They usually send someone to your home to assess the patient and decide if the clinic vehicle should come and transport him/her to the hospital.”

#### Group 6

“Madam, we do not thank our practitioners for anything. They ill-treat us. You can come to the clinic in the morning and not be assisted while the practitioners are sitting in their offices. Eventually when they come to assist us, it would really be late. This behavior is causing us much concern. We are very concerned about

the new procedures in this clinic. Each of the clinic employees has specific duties, so clients spend a lot of time in the clinic waiting to be helped. It is not like in town where clinic staff help each other.”

“ The new procedures and employees’ work habits are responsible for the slow service. It is not that there is shortage of staff.”

“We never tell them our concerns because we are afraid they will be angry. If you complain about some aspects of care, they become angry at you. If you tell a practitioner that when you take such and such an action, you are doing us disservice, she will respond harshly. That is why we never say anything, although we are dissatisfied.”

“If it takes a long time before we are helped, we understand if providers have reasonable explanations for the slow service. However, if we see them seated in their offices while they could be serving patients then there is a problem.”

## **APPENDIX D**

### **List of Definitions**

## **List of Definitions**

Terms, variables, and concepts used in this dissertation are defined in this section

**Primary caregivers:** A primary caregiver is an adult who spends much time with the child and attends to the child's daily needs. Because of the amount of time primary caregivers spend with children, they have reliable information about their dietary practices and health status. In this study, data will be collected from primary caregivers who accompanied the study child to the clinic for consultation. In this study, primary caregivers will be treated as synonymous to caregivers.

**Child Survival Programs:** Programs whose goals are to improve the well being of children under the age of five years. In developing countries, and specifically in Botswana, these include the Growth Monitoring Program, Breastfeeding Programs, Expanded Program on Immunizations, Control of Diarrheal Diseases, Family Planning Programs, and the Supplementary Feeding Programs.

**Complementary foods/ fluids:** Any food/beverage regardless of nutritive value given to supplement breast milk or in the case of replacement formula feeding, infant formula.

**Dietary screening:** Includes all methods that practitioners use to evaluate the children's dietary intake, eating behavior and frequency of meals per day.

**Growth faltering:** A decline of anthropometric measurements, particularly in reference to weight.

**High risk for undernutrition:** This phrase is used to describe children whose nutritional requirements are heightened by the presence of the most common childhood illnesses-diarrhea, undernutrition, measles, acute respiratory illness or malaria.

These children are perceived to be at high risk because if their dietary intake is inadequate, then the disparity between dietary intake and nutritional requirements will be much higher than that of otherwise healthy children. The propensity of these children to become severely malnourished is therefore very high

**Household:** A group of people living together and sharing the same resources.

**Intervention:** Services provided to ameliorate ill health or poor nutrition status.

**Medical clinics:** Clinics where patients' medical conditions are addressed. In Botswana most clinics operate on first come first served basis and patients are seen between 0800 hours and 1700 hours Monday through Friday. Some clinics, especially in big towns, are open 24 hours everyday of the week. When a clinic is not open 24 hours on all days of the week, there is always a practitioner on call to attend to patients requiring urgent medical attention after hours. In this proposal, medical clinics are often referred to as curative clinics because the services they provide are meant to "cure" or at the very least manage a condition as opposed to prevent it. Also referred to as curative clinic.

**Moderately wasted:** Z score at two standard deviations below the mean-weight-for-height of the Center for Disease Control /National Center for Health Statistics references (CDC/NCHS) (WHO, 1978a).

**Moderately stunted:** Z score at two standard deviations below the mean height-for-age of the CDC/NCHS references (WHO, 1978a).

**Moderately underweight:** Z score at two standard deviations below the mean weight-for-age of the CDC/NCHS references (WHO, 1978a).

**Nutritional screening:** This includes all methods that practitioners use to determine the nutritional status/ risk of the sick child. Included in this definition are anthropometric and dietary screening because there is a close connection between the child's dietary intake and his/her nutritional status. These two will be used interchangeably in this study only when both are used to determine the extent to which practitioners factor the nutritional risk of children into prescribing care.

**Preventive clinics:** Preventive clinics provide services that will prevent the development of ill health or poor nutritional status. In Botswana, preventive clinics are those that provide growth monitoring, immunizations, breastfeeding promotion, family planning, and supplementary feeding services.

**Severely wasted:** Z score at three standard deviations below the mean weight for height of the CDC/NCHS references (WHO, 1978a).

**Severely stunted:** Z score at three standard deviations below the mean height for age of the CDC/NCHS references (WHO, 1978a).

**Severely underweight:** Z score at three standard deviations below the mean weight for age of the CDC/NCHS references (WHO, 1978a).

## **APPENDIX E**

### **References**



- Abdel-Tawab, N. & Roter, D. (2002). The relevance of client-centered communication to family planning settings in developing countries: Lessons from the Egyptian experience. *Social Science & Medicine* 54: 1357-1368.
- ACC/SCN (United Nations Administrative Committee on Coordination/ Sub Committee on Nutrition. (1997). Third Report on the World Situation. Geneva
- ACC/SCN (United Nations Administrative Committee on Coordination/ Sub Committee on Nutrition). (2000). The Fourth Report on the World Nutrition Situation. Geneva: ACC/SCN in Collaboration with IFPRI.
- Adair, L.S., Guilkey, D.K. (1997). Age-specific determinants of stunting in Filipino children. *Journal of Nutrition*, 127; 314-20.
- AIDS/STD Unit, Ministry of Health. (1998). HIV/AIDS Sentinel Survey, Government Printers, Gaborone, Botswana
- Allen, L.H. (1995). Undernutrition and Human Function: A comparison of conclusions from the Institute of Central America and Panama (INCAP) and the Nutrition Collaborative Research Support Program (CRSP) studies. *Journal of Nutrition*, 125:119s-26s.
- Allen, L.H., Backstrand, J.R., Stanek, E.J.<sup>3rd</sup>, Pelto, G.H., Chavez, A. Molina, E., Castillo, J.B., & Mata, A. (1992). The interactive effects of dietary quality on the growth and attained size of young Mexican children. *American Journal of Clinical Nutrition* 56:353-64.
- Alvarez, J.O. Lewis, C.A., Caman, C., Caceda J., Montalvo J., Figueroa, R.D., Izquierdo J., Caravedo, L., & Navia, J.M. (1998). Chronic undernutrition, dental caries, and tooth exfoliation in Peruvian children. *American Journal of Clinical Nutrition* 48: 368-72.
- American Statistical Association (2000). Brochures about Survey Research. <http://www.amstat.org/sections/srms/brochures/survwhat.html>
- Aplogan, M., Maruapula, S., Phegelo, M., Khulumani, P., & Belbase, K. (1996). Micronutrient undernutrition in Botswana. Ministry of Health and UNICEF-Gaborone Office, Botswana
- Barbour, R.S. and Kitzinger, J. (editors). *Developing Focus Group Research: Politics, Theory and Practice*. Sage Publications. London, Thousand Oaks, or Delhi, 1999.
- Basu, A., Roy, S.K., Mukhopadhyaya, B., Bharati, P., Gupta, R. & Majumder, P. (1986). Sex bias in intrahousehold good distribution: Roles of ethnicity and socioeconomic characteristics. *Current Anthropology*, 27(5), 536-39.

- Becker, S., Black, Robert E., & Brown, Kenneth H. (1991). Relative effects of diarrhea, fever, and dietary intake on weight gain in rural Bangladeshi Children. *American Journal of Clinical Nutrition* 53: 1499- 1503.
- Begin F., Frongillo E.A. Jr., Delisle H. (1999). Caregiver behaviors and resources influence child height-for-age in rural Chad. *Journal of Nutrition*. 129:680-6..
- Begin, F., Habicht, J., Frongillo, E.A. Jr , Delisle, H.,(1997). The deterioration in children's nutritional status in rural Chad: The effect of mothers' influence on feeding. *American Journal of Public Health* 87.1356-59.
- Bentley, M.E. (1988). The household management of childhood diarrhea in rural North India. *Social Science and Medicine* 27:75-85.
- Bentley M. E., Stallings R.Y., Fukumoto, M., & Elder, J.A. (1991). Maternal feeding behavior and child acceptance of food during diarrhea, convalescence and health in the Central Sierra of Peru. *American Journal of Public Health* 81:43-47.
- Boonstra, E., Lindbaek, M., Khulumani, P., Ngome, E., Fugelli, P. ( 2002). Adherence to treatment guidelines in primary health care facilities in Botswana. *Tropical Medicine and International Health* 7:178-186.
- Calloway, D.H., Murphy, S.P., Beaton, G.H., lein, D. (1993). Estimated vitamin intakes of toddlers: predicted prevalence of inadequacy in village populations in Egypt, Kenya and Mexico. *American Journal of Clinical Nutrition* 58: 376-84.
- Central Statistics Office. (1996). Botswana Health Statistics. Gaborone, Botswana.
- Central Statistics Office. (1999). The 1996 Botswana Family Health Survey III. Gaborone, Botswana.
- Central Statistics Office. (2000). Botswana Health Statistics. Gaborone, Botswana.
- Chen, S.T., Huq, E., & D'Souza, S. (1981). Sex bias in the family allocation of food and healthcare in rural Bangladesh. *Population and Development Review*, 7(1): 55-72.
- Chit, T.M., Kyi, H., Thwin, A. (2003). Mothers' beliefs and attitudes towards child weight, child feeding and related practices in Myanmar. *Nutrition and Health*. 17: 231-54.
- Child Survival Technical Support (2000). KPC200+ Questionnaire.  
<http://www.childsurvival.com/kpc2000/kpc2000.cfm>
- Deacon, R. E., & Firebaugh, F. M. (1988). *Family Resource Management Principles and Applications*. Boston, Allyn and Bacon.

- Dewey, K.G., Peerson, J.M., Brown, K.H., Nomsen, L.L., Lonnerdal, B, Lopez de Romana, G.L., Creed de Kanashiro, H., & Black E. R. ( 1992). Growth patterns of breast-fed infants in affluent (USA) and poor (Peru) communities: implications for timing of complementary foods. *American Journal of Clinical Nutrition* 56: 1012-18.
- de Onis, M., Monteiro, J., & Clugston, G. (1993). The worldwide magnitude of protein-energy undernutrition: an overview from the WHO Global Database on Child Growth. *Bulletin of the World Health Organization* 71: 703-12.
- de Onis, M., Frongillo, E. A., & Blossner, M. (2000). Is undernutrition declining? An analysis of changes in levels of changes of child undernutrition since 1980. *Bulletin of the World Health Organization* 78:1222-33.
- Drewett-Robert, F., Kasese-Hara, M., Wright, C. (2003). Feeding behaviour in young children who fail to thrive. *Appetite* 40:55-60.
- D'Souza, S. & Chen, L.C.(1980). Sex differentials in mortality in rural Bangladesh. *Population and Development Review*, 6(2): 257-70.
- Engle, P. L., Menon, P., Haddad, L. (1999). Care and nutrition; concepts and measurements. *World Development* 27:1309-37.
- Epidemiology Program Office, Division of Public Health Surveillance and Informatics (2002). *Epi Info 2002. Database and statistics software for public health professionals*. Centers for Disease Control and Prevention. Atlanta.
- Fawzi, W.W., Herrera, M.G., Spiegelman, D.L., El Amin, A., Nestel, P., & Mohammed, K.A. (1997). Prospective study of undernutrition in relation to child mortality in Sudan. *American Journal of Clinical Nutrition* 65: 1062-69.
- Fernald L.C., & Grantham-McGregor, S.M. (1998). Stress response in school-age children who have been growth retarded since early childhood. *American Journal of Clinic Nutrition* 68: 691-98.
- Flores, R. (2001). Health and nutrition: Emerging and reemerging issues in developing countries. *Vision 2020 Focus 5*. International Food Policy and Research Institute. Washington, DC.
- Food and Agricultural Organization. (1995). *Energy for Sustainable Development and Food Security in Africa. Future Energy Requirements for Africa's Agriculture*. FAO. Rome, Italy.
- Food and Nutrition Unit (2000). *Botswana National Nutrition Surveillance Quarterly Report*. Gaborone, Botswana.

- Fraenkel, J.R., & Wallen, N.E. (1996). *How to Design and Evaluate Research in Education*. McGraw-Hill, Inc. New York.
- Gaolatlhe, B. (2002). Presentation Speech on Draft National Development Plan 9 (2003/4 – 2008/9). [www.gov.bw](http://www.gov.bw) 12/09/03
- Garner, P., Panpanich, R., & Logan, S. (2000). Is routine growth monitoring effective? A systemic review of trials. *Archives of Disease in Childhood* 82: 197-201.
- Gobotswang, K. (1994). *The National Plan of Action of Nutrition- Draft Report*. Ministry of Health. Gaborone, Botswana.
- Guldan, G. S., Zhang, M.Y., Zhang, Y.P., Hong, J.R., Zhang, H.X., Fu, S.Y., & Fu, N.S. (1993). Weaning practices and growth in rural Sichuan infants: a positive deviance study. *Journal of Tropical Pediatrics* 39:168-75.
- Haddad, L.(1999). The income earned by women: impacts on welfare outcomes. *Agricultural Outlook* 20:135-41.
- Haddad, S., Fournier, P., Machouf, N., & Yatara (1998). What does quality mean to lay people? Community perceptions of primary health care services in Guinea. *Social Science & Medicine* 47: 381-394.
- Haddad, S. & Fournier (1995). Quality cost and utilization of health services in developing countries. A longitudinal study in Zaire. *Social Science & Medicine* 40: 743-753.
- Henry, G. T. (1990). *Practical Sampling. Applied Social Research Methods Series*. Vol. 21. Sage Publications, London.
- Harrison, G.G., Zaghlail, S.S., Galal O.M., & Gabr, A. (1993). Breastfeeding and weaning in Cairo, Egypt: maternal believes and perceptions. *Social Science and Medicine* 36: 1063-69.
- Hennerberg M., Harrison G.A., & Brush, G. (1998). The small child: anthropometric and physical performance characteristics of short-for-age children in good and in poor socioeconomic conditions. *European Journal of Clinical Nutrition* 52:286-91.
- Kamau-Thuita, F., Omwenga, A.M., & Muita, J.W.G. ( 2002). Childcare practices and nutritional status of children aged 0-2 years in Thika, Kenya. *Eastern African Medical Journal* 79: 524-29.
- Kim, Y.M., Kols, A., Putjuk, F., Heerey, M., Rinehart, W., Elwyn, G., & Edwards, A. (2003). Participation by clients and nurse midwives in family planning decision making in Indonesia. *Patient Education and Counseling* 50: 295-302.

- Kutty, V. P., Thankappan, K.R., Kannan, K.P., & Aravindan, K.P.(1989). How socioeconomic status affects birth and death rates in rural Kerala, India: Results of a health study. *International Journal of Health Services* 23:373-86.
- Kutty, V.P. (1989). Women's education and its influence on attitudes to aspects of childcare in a village community in Kerala. *Social Science & Medicine* 39: 1299-303.
- Kwena, A.M., Terlouw, D.J. De Vlas, S.J., Phillips-Howard, P.A., Hawley, W.A., Friedman, J.F.,vulule, J.M., Nahlen, B. L., Sauerwein, R.W., & Ter Kuile, F.O, (2003). Prevalence and severity of undernutrition in pre-school children in a rural area in western Kenya. *American Journal of Tropical Medicine and Hygiene* 68 (Supplement 4): 94-99.
- Lamontagne, J.F., Engle, P., & Zeitlin, M.F.(1998). Maternal employment, child care, and nutritional status of 12-18 month-old-children in Managua, Nicaragua. *Social Science and Medicine* 46:403-14.
- Lemeshow, S., Hosmer Jr, D.W., Klar, J., & Lwanga, S.K. (1990). *Adequacy of Sample Size in Health Studies*. John Wiley & Sons, New York.
- Lesetedi, L.T., Mompoti, G.D., Khulumani, P., & Rutenberg, N. (1989). Botswana Family Health Survey II 1988. Ministry of Finance and Development Planning and Ministry of Health, Botswana. Institute of Resource Development/ Macro Systems, Inc. columbia, Maryland USA.
- Levington, J.F. (1974). An economic analysis of undernutrition among young children in rural India. *International Nutrition Policy Series*. Ithaca, New York. Cornell University/Massachusetts Institute of Technology.
- Lomperis, A.M. (1991). Teaching mothers to read: evidence from Colombia on the key role of maternal education in preschool child nutritional health. *Journal of Development Areas* 26: 25-52.
- Maleta K., Virtanen, S., Espo, M., Kulamala, T., & Ashorn, P. (2003). Timing of growth faltering in rural Malawi. *Archives of Disease in Childhood* 88: 574-78.
- Marquis, G.S., Habicht, J.P., Lanata, C.F., Black, R.E., & Rasmussen, K.M.(1997). Association of breastfeeding and stunting in Peruvian toddlers: an example of reverse causality. *International Journal of Epidemiology* 26:349-56.
- Martorell, R., Habicht J.P., Yarbrough C., Lechtig, A., Klein R E., & Western, K.A, (1975). Acute morbidity and physical growth in rural Guatemalan children. *American Journal of Diseases of Childhood* 129: 1296-301.

- Mazonde, I.(1997). The Changing Supply of Women Labour: Implications for Food Security In Letlhakeng Village, Botswana. National Institute of Development Research and Documentation (NIR), University of Botswana, Gaborone.
- Ministry of Health (2003). Botswana Government site  
[http://www.gov.bw/government/ministry\\_of\\_health.html#primary\\_health\\_care](http://www.gov.bw/government/ministry_of_health.html#primary_health_care)  
12/05/2003.
- Morgan, D.L. Focus Groups as Qualitative Methods (1997). A Qualitative Research Methods Series 16. Sage Publications, Thousand Oaks, London, New Delhi.
- Motarjemi, Y. (1993). Contaminated weaning food: a major risk factor in the causation of diarrhoea and associated undernutrition. Bulletin of the World Health Organization 71: 79-92.
- Mpofu, B., Clay, B., Kgosidintsi, N., Lekalake., R, & Maruapula, S. (1988). Combating drought: food for all. World Health Forum 9:92-7.
- Murina, N., Munjanja, S.P., Zhanda, I., Nystrom, L., & Lindmark, G. ( 1997). Effect of a new antenatal care programme on the attitudes of pregnant women and midwives towards antenatal care in Harare. The Central African Medical Journal 43: 131-5.
- Murray, C.J.L., & Lopez, A. D, (1996). The global burden of disease: A comparative assessment of mortality, disability from disease, injury, and risk factors in 1990 and projected to 2020. The Global Burden of Disease and Injury Series, Vol. 1. Harvard School of Public Health, Cambridge, MA.
- Neumann, C. G., & Harrison, G.G. (1994). Onset and evolution of stunting in infants and children. Examples from Human Nutrition Collaborative Research Support. Kenya and Egypt studies. European Journal of Clinical Nutrition 48: s90-102.
- Nichter, M. (1988). From ARALU to ORS: Sinhalese perceptions of digestion, diarrhea, and dehydration. Social Science and Medicine.27: 39-52.
- Ngcongco, N., & Stark D.(1990). Family nurse practitioners in Botswana: Challenges and Implications. International Nursing Review 37: 239-243.
- Ngcongco, N., Stark D.(1986). The development of a family nurse programme in Botswana. International Nursing Review 33: 9-14.
- Nnyepi, M.S., Bond, J., Johnson, N., & Weatherspoon, L. (In press). Influence of complementary foods on the growth indicators of children in Gabane, Botswana. African Journal of Food Agriculture Nutrition and Development.
- Panpanich, R., & Garner, P. (2004). Growth monitoring in children (Cochrane Review). In: The Cochrane Library, Issue 1. Chichester, UK: John Wiley & Sons, Ltd.

- Pelletier, D.L., Frongillo, E.A.(2003). Changes in child survival are strongly associated with changes in undernutrition in developing countries. *Journal of Nutrition* 133: 107-19.
- Pelletier, D.L. (1994). The potentiating effects of undernutrition in child mortality: Epidemiological evidence and policy. *Nutrition Reviews* 52: 409-15.
- Pelletier, D.L. Frongillo, E.A.Jr., Schroeder, D.G., & Habicht, J.P. (1994). A methodology for estimating the contribution of undernutrition to child mortality in developing countries. *Journal of Nutrition* 124: 2106s-22s.
- Pelletier, D.L., Frongillo, E. A., & Habicht, J. ( 1993). Epidemiologic Evidence for a potentiating effect of undernutrition on child mortality. *American Journal of Public Health* 83:1130-33.
- Pelto, G.H., Urgello, J., Allen, L.H., Chavez, A., Martinez, H., Meneses, L., Capacchione, C., & Backstrand, J. (1991). Household size, food intake and anthropometric status of school age children in a highland Mexican area. *Social Science and Medicine*. 33(10):1135-40.
- Pollitt, E., Saco-Pollitt, C., Jahari, A., Husaini, M.A., & Huang, J. ( 2000). Effects of an energy and micronutrient supplement on mental development and behavior under natural conditions in undernourished children in Indonesia. *European Journal of Clinical Nutrition* 54(supplement 2): s80-90.
- Poskitt E. M. E., Cole T.J., & Whitehead, R.G., (1998). Less diarrhea but not change in growth: 15 years' data from three Gambian villages. *Archives of Diseases of Childhood* 80: 115-20.
- Razum, O.( 1993). Mothers voice their opinion on immunization services. *World Health Forum* 14:282-6.
- Rea M.F., Venancio, S.I., Martines, J.C., & Savage, F. (1999). Counseling on Breastfeeding: assessing knowledge and skills. *Bulletin of the World Health Organization*. 77: 492-8.
- Reilly, H.M., Martineau J.K., Moran, A., & Kennedy, H. (1995). Nutritional screening, evaluation and implementation of simple nutrition risk score. *Clinical Nutrition* 14: 269-73.
- Rojas, P., Stark, R., & Tembo, P. (1990). Nurses bring primary health care to industrial workers. *World Health Forum* 11: 108-13.
- Root, G. P. M. (1997). Evidence of undernutrition having a threshold effect on the risk of childhood diarrhoea in Zimbabwe. *Central African Journal of Medicine* 7:185-88.

- Rosegrant, M. W., Paisner, M. S., Meijer, S., & Witcover, J. (2001). *Global Food Projections to 2020: Emerging Trends and Alternative Futures*. International Food Policy and Research Institute, Washington, DC.
- Rourmeliotou, A., Komarou, E., Papaevangelou, V., Spiropoulou, P., Ktenas, E., Steirgiou, G., & Papevangelou, G. (1992). Knowledge, attitudes and practices of Greek health professionals, in relation to AIDS. *European Journal of epidemiology*. 8: 812-5.
- Rousham, E.K. (1996). Socio-economic influences on gender inequality in child health in rural Bangladesh. *European Journal of Clinical Nutrition* 50: 560-64.
- Rowland, M.G., Rowland S.G., & Cole, T.J., (1988). Impact of infection on the growth of children from 0 to 2 years in an urban West African community. *American Journal of Clinical Nutrition* 47: 134-48.
- Sahn, D.E., & Stifel, D.C. (2001). *Parental Preferences for Nutrition of Boys and Girls: Evidence from Africa*. Cornell food and Nutrition Policy Program, Ithaca, New York.
- Salazar-Lindo, E., Chea Woo, E., Kohatsu, J., & Miranda, P. T. (1991). Evaluation of clinical management training programme for diarrhoea. *Journal of Diarrhoeal Diseases Research*. 9: 227-34.
- Santos, J. I., Arrendono, J.L., & Vitale, J. J. (1983). Nutrition infection and immunity. *Pediatric Annals* 12: 184-190.
- Sermet-Gaudelus, S., Poisson-Salomon, A., Colomb, V., brusset, M., Mosser, F., Berrier, F., & Ricour, C. (2000). *American Journal of Clinical Nutrition* 72:64-70.
- Setswe, G. (1994). Prevalence and risk factors for undernutrition among children aged 5 years and less in Lefaragatlha village of Bophuthatswana. *Curationis* 17: 33-5.
- Shrimpton, R. Victora C.G., de Onis, M., Lima, C.L., Blossner, M., & Clugston, G. (2001). Worldwide timing of GF: Implications for nutritional interventions. *Pediatrics* 107(5): URL: <http://www.pediatrics.org/cgi/content/full/107/5/e75>
- Schroeder D.G., & Brown K.H. (1994) Nutritional status as a predictor of child survival: Summarizing the association and quantifying its global impact. *Bulletin of the World Health Organization* 72:569-79.
- Shavelson, R.J. (1996). *Statistical Reasoning for the Behavioral Sciences*. Simon & Schuster Company. Needham Heights, MA.



- Smith, L.C., & Haddad, L. (2000). Overcoming child undernutrition in developing countries: past achievements and future choices. 2020 brief 64. International Food Policy Research Institute. Washington.
- Southern African Development Community. (2001). SADC Food Security Quarterly Bulletin-Botswana. Harare, Zimbabwe.
- Norusis, M. (2001). SPSS for windows. Release 11.0.1. c SPSS Inc. 1989-2001.
- Sudman, S., & Bradburn, N. M. (1982) Asking Questions: A Practical Guide to Questionnaire Design. San Francisco, Jossey. Bass Publishers.
- Swami, H.M., Thakur, J.S., Bhatia, S.P.S., Singh, K., Bhan, V.K., & Bhatia, V. (2000). National Immunization Day to assess nutritional status of underfives in Chandigarh. Indian Journal of Pediatrics 67:15-17.
- Tharakan, C.T., & Suchindran, C. M. (1999). Determinants of undernutrition – An intervention model for Botswana. Nutrition Research 19: 843-60.
- Teklu T., (1995). Employment programs for food security in Sub- Saharan Africa. 2020 Vision: Brief 28. International Food Policy and Research Institute. Washington, D.C.
- Ubomba-Jaswa, M., & Belbase, K. (1996). Determinants of undernutrition in Botswana. Ministry of Health. Government Printers, Gaborone, Botswana.
- United Nations Children's Fund. (1996). Food Health and Care; The UNICEF Vision and Strategy for a World free from Hunger and Undernutrition. Pg 8. UNICEF Division of Communication, New York, NY.
- United Nations Children's Fund,(1999). End-Decade Multiple Indicator Cluster Survey: Model Questionnaire. UNICEF End-decade databases.  
<http://www.childinfo.org/MICS2/Gj99306k.htm>
- Wheeler, M., & Ngcongco, V.N. (1990). Health manpower planning in Botswana. World Health Forum 11:394-404.
- Wolinsky, F.D., Prendergast, J.M., & Coe, R. M., Chavez, M.N.(1985). Preliminary validation of a nutrition risk index. American Journal of Preventive Medicine 1:53-9.
- Wollinsky, F.D., Coe, R.M., McIntosh, A., Jubena, J., Prendergast, J., & Chavez, N.(1990). Journal of Nutrition 120:1549-53.

- Wolley, F.R., Wiender, B.L., & Novonty, R. (1990). The relationship of siblings to the size of rural Nigerian preschoolers. *Asia Pacific Journal of Public Health* 4(2-3):151-55.
- World Health Organization. (2000). The World Health Database on Child Growth and Undernutrition. [Http://www.who.int/nutgrowthdb/](http://www.who.int/nutgrowthdb/)
- World Health Organization. (1993). Contaminated food: a major cause of diarrhoea and associated undernutrition among infants and young children. Facts about Infant Feeding. Issue no.3. World Health Organization, Geneva, Switzerland.
- World Health Organization/Division of Child Health and Development (1997). IMCI Information. World Health Organization, Geneva, Switzerland.
- WHO Working Group. (1986). Use and interpretation of anthropometric indicators of nutritional status. *Bulletin of the World Health Organization* (64):929-41.
- World Health Organization. (1978). Primary Health Care: Report of the International Conference on Primary Health Care. World Health Organization, Geneva, Switzerland.
- World Health Organization. (1978a). A growth chart for international use in maternal and child health care: Guidelines for primary health care personnel. World Health Organization, Geneva, Switzerland.

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