

**AN ASSESSMENT OF THE IMPACT OF FOOD ACCESS ON CHILDREN ON THE  
NUTRITION SUPPLEMENTATION PROGRAMME TO COMBAT PROTEIN-  
ENERGY MALNUTRITION**

**ZANELE PRUDENCE TSHABALALA**

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Master of Agriculture (Food Security),  
African Centre for Food Security,  
School of Agricultural, Earth and Environmental Sciences  
University of KwaZulu-Natal  
Pietermaritzburg**



## **ABSTRACT**

There is an increasing prevalence of food insecurity in South African households, especially in poverty stricken communities. Evidence suggests that children living in households that are food insecure will be subject to undesirable consequences, including poor quality diets and poor health outcomes, resulting in protein-energy malnutrition. Food insecurity, which is often perceived to be the same as food insufficiency, is one of the many underlying causes of malnutrition. Nevertheless, food and nutritional security seem to be a challenge not only in South Africa but in the world at large. The challenge is further exacerbated by the absence of proper tools to measure food insecurity and food insufficiency. In trying to address the two situations, the government developed a Nutrition Supplementation Programme (NSP). The impact of food access (food security) on children registered in the NSP was investigated together with the relationship between nutrition and food security. A mixed methodology was used to collect data including a questionnaire, focus group discussions, anthropometry and key informant interviews. The questionnaire included demographic information, child food insecurity access scale (CFIAS), household food insecurity access scale (HFIAS), household dietary diversity score (HDDS), months of adequate household food provisioning (MAHFP) and a 24-hour recall.

The majority (71%) of children and households (52%) were food secure. Energy foods were the main type of food consumed by children compared to other types of food. The top five most consumed food types in the households were cereals (98%), fats and oil (91%), sugar (89%), vegetables (86%) and (86%) spices. The findings showed that more children in the age group from 7-24 months were severely wasted than in any of the other age groups but this age group also contained the highest number of children that had normal weight-for-height. Sixty three percent of children had normal weight-for-height, 29% were severely wasted and 8% were overweight and/or obese. It was found that the NSP is only partially effective in that it only addresses acute malnutrition (wasting) and does not have strategies in place to prevent its recipient's from relapsing after their six month period on the programme. The programme has more threats, weaknesses, and challenges than opportunities and strengths. It managed to correct the nutritional status of 63% (n= 86) of children who were part of this study.

The findings of this study further prove that there is no association between food access (FA) and nutritional security (NS), meaning that food security does not automatically translate to nutritional security. The study also showed that using multiple tools in combination with measuring FS and NS was advantageous as it counterbalanced the deficiencies of a single tool, thereby allowing multiple perspectives to be extracted from the results. The study

therefore recommends that the drivers, risks and the interventions put in place to alleviate food and nutritional security should be carefully investigated. To gain a better understanding of food and nutritional security and their complexities will require further research. Linkages with other government departments such as; Department of Social Development, Department of Home Affairs and Department of Agriculture should be revived and strengthened since there are a variety of causes of malnutrition. Finally, there is an opportunity to develop new and improved measurements of food security. When researchers develop new or improve existing tools, they need to consider the fact that food security is complex with many factors influencing it.

Keyword: nutrition security, food security, protein-energy malnutrition, nutrition supplementation programme, food security measuring tools.

## **DECLARATION OF ORIGINALITY**

I, Zanele Prudence Tshabalala declare that:

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Date: \_\_\_\_\_

Zanele Prudence Tshabalala (candidate)

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

Dr Unathi Kolanisi (supervisor)

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

Prof Lucy Maliwichi (co-supervisor)

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## **ABBREVIATIONS AND ACRONYMS**

BMI	Body Mass Index
CCG	Community Care Giver
CFIAS	Children Food Insecurity Access Scale
DoH	Department of Health
FAO	Food and Agriculture Organization
FI	Food Insecurity
FS	Food Security
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
INP	Integrated Nutrition Programme
MAHFP	Month of Adequate Households Food Provisioning
NFCS	National Food Consumption Survey
NS	Nutrition Security
NSP	Nutrition Supplementation Programme
PEM	Protein Energy Malnutrition
SAFBDG	South African Food Based Dietary Guidelines
SANHANES	South African National Health And Nutrition Examination Survey
SAVACG	South African Vitamin A Consultative Group
SWOT	Strength Weakness Opportunity Threat
UNICEF	United Nations Children's Fund
WHO	World Health Organization

## **CHAPTER ONE: STATEMENT OF THE PROBLEM**

### **1.1 INTRODUCTION**

There is an increasing prevalence of food insecurity in the households of South Africa, especially in poverty-stricken communities. Altman, Hart and Jacobs (2010) found that approximately 80% of households were unable to afford a basic nutritionally balanced basket of food, while the National Food Consumption Survey NFCS (1999) found that 20%. Evidence suggest that there are undesirable consequences for children living in food insecure households as their diets are of poor quality resulting in poor health outcomes and malnutrition (Pilgrim, Barker, Jackson, Ntani, Crozier, Inskip, Godfrey, Cooper & Robinson 2011). According to Grover and Ee (2009) and Odigwe, Smedslund, Ejemot-Nwadiaro, Anyanechi and Krawinkel (2009), children with protein-energy malnutrition (PEM), especially in developing countries where the food supply is often inadequate, frequently lack dietary protein and energy. As a developing country, and a country that is at the stage of its development it is important that a balance must be found between economic growth and social development. The South African government has a fundamental role to play in addressing childhood malnutrition at the household level in order to correct it at the national level. In addition, Pilgrim *et al.* (2011) state that malnutrition during infancy and childhood has a profound effect on growth and development as well as on the susceptibility to infectious diseases.

In trying to address malnutrition, the government implemented a programme that aimed at alleviating child malnutrition and improving children's health. However, Faber and Wenhold (2007) state that children's health continues to deteriorate despite the introduction of free health care and nutrition programmes. Even though the Nutrition Supplementation Programme (NSP) was established in 1994 under the umbrella of the Integrated Nutrition Programme (INP), it still needs to be supported and to be evaluated to determine whether it still operates in line with its initial objectives. The programme provides supplements that are supposed to complement household food intake in order to strengthen and improve child health. Thus, the purpose of this study was to determine the impact of food access and how it affects children on the NSP.

## 1.2 IMPORTANCE OF THE STUDY

While South Africa has been declared a food secure country at the national level, it has failed to guarantee the provision of sufficient access to food at the household level (Baker 2004). Insufficiency of food is aggravated by the growth of the population, meaning that the more people there are the less food there is to go around. Food insecurity occurs when there is limited availability and accessibility to nutritionally adequate and safe foods. The absence of nutritionally adequate food in a household results in malnutrition (Baker 2004). The consistent lack of access to food in households could lead to less active and healthy lives. One of the key determinants of food insecurity is poverty, which increases the risk of food insecurity commonly found in families where the parents have low levels of education (Pilgrim *et al.* 2011 & Hendricks, le Roux, Fernandes & Irlam 2003). Moreover, health and nutrition problems during childhood result from a wide range of factors, most of which, particularly in underprivileged populations, relate to unsatisfactory food intake or severe and repeated infections, or a combination of the two (Faber & Wenhold 2007). According to the United Nations Children's Fund Conceptual Framework (UNICEF), food security has been classified as one of the underlying causes of child malnutrition related to poor socio-economic status (UNICEF 2001).

Studies conducted in the Northern Cape in 2003 and in Cape Town in 2009 on the effectiveness of the NSP showed that the nutritional status of children that were on the programme did not improve (Hendricks *et al* 2003). Furthermore, the studies found that the lack of nutritious foods in a household resulted in poor nutritional status (Cook, Frank, Levenson, Neault, Heeren, Black, Berkowitz, Casey, Meyers, Cutts & Chilton 2006). Kirkpatrick, McIntyre and Potestio (2010) stated that child malnutrition is a result of food deprivation and is the underlying cause of many childhood health problems in food insecure households. Food deprivation in children occurs when a household's access to food has been compromised and the dietary needs of the household can no longer be met. The UNICEF (2010) illustrated that the inadequate intake of food caused by poor household food security due to poor economic structure that affects food availability and accessibility, is an underlying factor in child malnutrition. Faber and Wenhold (2007) reported that South Africa had both over and under-malnutrition, with protein-energy malnutrition being classified as under-nutrition due to the inadequate intake of nutritious foods. UNICEF (2001) emphasised that in order to address malnutrition multi-sectorial (different types of interventions by different disciplines or departments, e.g. Health and Agriculture) and multi-level (directed at

immediate, underlying and basic causes) interventions are required. In addition, Faber and Wenhold (2007 citing FAO 1997) state that ‘the availability of a greater variety of nutritious foods at household level can be increased through mixed cropping/diversification of crops; the introduction of new crops; the promotion of underexploited traditional food crops; and home gardens’.

Grover and Ee (2009) mentioned that children with primary PEM are generally found in developing countries as a result of inadequate food supply caused by socioeconomic, political, and occasionally environmental factors, such as natural disasters. Furthermore, Faber and Wenhold (2007) added that stunting (reflected by low height-for-age as a measure of chronic malnutrition) and wasting (reflected by low weight-for-height as a measure of acute malnutrition) in children was more prevalent on farms or in rural areas and was associated with inadequate food intake, poor feeding practices, disease and infection. Thus these findings led Andresen *et al.* (2009); Jacobs, Black, Casey, Cook, Cutts, Chilton, Heeren, Levenson, Meyers and Frank (2008) and Cook *et al.* (2006) to conclude that child malnutrition correlates with lack of access to food.

The results of this study will help improve the existing NSP, making it more relevant to the patients so that it will add value to their health and food status. The results will also guide the programme (NSP) on the aspects that need to be revisited and revised and will monitor the programme to assess its outcomes and impact on children. There has been no study conducted in KwaZulu-Natal, with only studies conducted in the Northern Cape and Cape Town since the inception of the programme. In the long term, the findings of this study will aid in devising programmes that will address child malnutrition in relation to food access.

### **1.3 PROBLEM STATEMENT**

To assess the impact of household food access on children on the NSP in order to combat protein-energy malnutrition.

### **1.4 SUB PROBLEMS**

1.4.1 To determine access to food and food intake of children on the NSP.

1.4.2 To investigate the nutritional impact of the NSP on malnourished children.

1.4.3 To measure the anthropometric status of children on the NSP.

1.4.4 To determine the relationship between food access, the NSP and the nutritional status of children on the programme.

## **1.5 STUDY LIMITS, PARAMETERS AND GENERAL ASSUMPTIONS**

### **1.5.1 Study Limits**

1.5.1.1 Incorrect or lack of documentation (records) of children on the NSP by health centres.

1.5.1.2 The study was conducted on children registered at health centres only on the day of data collection in the health centres.

1.5.1.2 Low response rate of caregivers and parents for interviews.

### **1.5.2 Parameters**

**Inclusion:** Only children registered on the NSP for a period of three months between the ages of 6-72 months, who were present on the day of the study, were included in the study.

**Exclusion:**

1. All children that were below 6 and above 72 months.
2. Children who were not registered on the NSP.
3. Children who did not have the consent of their parents or caregivers.

### **1.5.2 General Assumptions**

1.5.2.1 The participants understood the questions and were honest with their replies.

1.5.2.2 Parents and caregivers were truthful and honest in answering the questionnaire.

1.5.2.3 Correct and sufficient materials were used to collect, capture and analyse data.

## **1.6 ORGANIZATIONAL STRUCTURE OF THE DISSERTATION**

Chapter One outlines the background of the research problem, the importance of the study, the statement of the research problem, the sub-problems, the study limitations and assumptions. Chapter Two provides a review of the literature related to the study. Chapter three describes the study area and the methodology, while the results and discussion are addressed in Chapter Four to Six in article or paper format. The conclusions and recommendations are presented in Chapter Seven. Chapter one to three has one reference list, while paper one to paper three has their own reference list at the end

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 INTRODUCTION**

Malnutrition has a negative effect on children's health, making them susceptible to illness and even death. In South Africa about 2.3 million children suffer from under-nutrition (Bourne et al. 2007). Infectious diseases, such as acute respiratory infections, diarrhoea, and other diseases such as malaria account for the greatest proportion of infant and under-five mortality (Casey, Goolsby, Berkowitz, Frank, Cook, Cutts, Black, Zaldivar, Levenson, Heeren & Meyers 2004). Among the four principal causes of mortality in young children worldwide, under-nutrition has been recognised as the cause of death in 60.7% of children with diarrheal diseases, 52.3% of those with pneumonia, 44.8% of measles cases, and 57.3% of children with malaria (Casey *et al.* 2004, citing Bartlett, Kolodner, Butz & Eggleston 2001). More than 50% of all childhood deaths are attributable to under-nutrition, with the relative risks of mortality being 8.4% for severe malnutrition, 4.6% for moderate malnutrition, and 2.5% for mild malnutrition, as estimated by analyses of 28 epidemiologic studies done across 53 countries (Young & Jaspars 2006; Cook *et al.* 2006 and Zere & McIntyre 2003). According to Young and Jaspars (2006), low birth weight, diarrhoea, lower respiratory tract infections and PEM account for 30% of the childhood deaths.

Protein-energy malnutrition refers to a condition categorised by an increased susceptibility to infection that results from the long-term consumption of insufficient energy and protein to meet the body's needs, worsened by repeated infections (Jacobs *et al.* 2008). Insufficient intake of energy results in the protein consumed not being utilised for their intended function in the body, but instead being used to supply energy needs, which results in PEM. The signs of PEM are not instantly visible and can only be determined by measuring growth parameters, such as the mid-upper arm circumference (MUAC), weight and height (Arimond & Ruel 2004).

The South African Department of Health adapted the UNICEF conceptual framework for malnutrition in order to detect the causes of malnutrition. Poor household food security, which results in inadequate food intake, was identified as one of the most important underlying causes of malnutrition (Faber & Wenhold 2007). According to the UNICEF conceptual framework, poor household food security results from the poor handling of human, economic and organisational assets. Furthermore, McIntyre (2003) states that malnutrition is directly related to food intake, diarrhoea, measles and other diseases such as



malaria. Both food intake and infectious diseases reflect underlying social and economic conditions in households, communities, and also at the national level that are supported by political, economic, and ideological structures within a country. At more severe levels, in some households the children's food intake is reduced to the extent that the children experience hunger as a result of the inadequate household resources. Adults in households with or without children may experience even more extensive reductions in food intake, possibly going whole days without food (Cook, Frank, Berkowitz, Black, Casey, Cutts, Meyers, Zaldivar, Skalicky, Levenson, Heeren & Nord 2004, citing Wehler, Scott & Anderson 1992).

Protein-energy malnutrition is one of the most widespread nutritional problems in many developing countries including South Africa (Cook *et al.* 2003, citing Olson 1999). In sub-Saharan Africa 2% of deaths and 3% of disability-adjusted life years (DALYs) in children under-five stem from malnutrition (Cook *et al.* 2003, citing Townsend, Peerson, Love, Achterberg & Murphy 2001 and Dietz 1995). It has been estimated that malnutrition underlies more than half of all infant and child mortality in sub-Saharan Africa (Bourne, Hendricks, Marais & Eley 2007, citing Bourne, Langenhoven, Steyn, Jooste, Laubscher & Bourne 1994). It is also associated with reduced future scholastic achievement and earning capacity (Bradshaw, Groenewald, Laubscher, Nannan, Nojilana & Norman (2003) & Bourne, Lambert & Steyn 2002).

Among factors that are responsible for the widespread prevalence of PEM is inadequate food intake, caused primarily by economic factors. Children with primary PEM are found in developing countries as a result of inadequate food supply caused by socioeconomic, political, and occasionally environmental factors such as natural disasters (Faber & Wenhold 2007). In malnutrition, the main clinical feature is weight loss. Subcutaneous fat tissues are decreased and children with chronic PEM show growth retardation in terms of both weight and height. The major cause of poor growth seen in such children is, therefore, food inadequacy (Faber & Wenhold 2007).

Nutritional rehabilitation programmes to control and prevent PEM in children have included supplementary feeding programmes. In trying to address the status of child malnutrition in South Africa, the Integrated Nutrition Programme (INP) was implemented. The INP is a comprehensive nutritional strategy that focuses on children under six years of age, at-risk, pregnant and lactating women, and those affected by communicable and chronic lifestyle diseases. In 2007 the INP had goals, objectives and targets in place and were to be monitored with the aim of addressing the main nutritional problems. The strategic plan for the INP

included eight interlinked focus areas with one of the areas, called the Nutrition Supplementation Programme (previously called the PEM Scheme) aimed at addressing malnutrition. The NSP stemmed from the health facility based nutritional programme, which is one of the focus areas of the INP (Faber & Wenhold).

The NSP is a rehabilitation programme intended to last for a maximum of six months and aims to help undernourished groups. The main components of the NSP are the provision of nutritional supplements according to age-specific criteria, including breast milk substitutes, infant porridge, ready-to-use-therapeutic foods (RUTFs), energy drinks and maize meal porridge, together with nutrition education and consultation on long-term solutions for the clients (Andresen *et al.* 2009). The ready-to-use-therapeutic foods have been shown to be effective in the treatment of severe and moderate wasting. These foods are energy-dense, micronutrient-enriched pastes often made of peanuts, oil, sugar and milk powder (Bourne *et al.* 2007).

The supplements are provided at primary and secondary health facilities on a monthly basis. The criteria for entry into the programme include underweight or growth faltering for at least two consecutive months for children < 6 years old; body mass index (BMI) of <18.5 kg/m<sup>2</sup> or poor weight gain for pregnant women; growth faltering in the infant; maternal BMI <18.5 kg/m<sup>2</sup> for lactating women; and underweight or poor weight gain for the chronically ill. Criteria for exiting the programme include adequate weight gain for three consecutive months for children <6 years; weight gain following delivery in pregnant women; weight gain following the discontinuation of breast-feeding in lactating women; and adequate weight gain in the chronically ill (Andresen *et al.* 2009 & Bourne *et al.* 2007 ).

This literature review aims to determine the impact of household food access on children on the Nutrition Supplementation Programme in order to combat protein-energy malnutrition. It includes a discussion on the effectiveness of the NSP in addressing child malnutrition and also reviews the nutritional status of children already on the programme.

## **2.2 DEFINING MALNUTRITION**

The World Health Organization (WHO) (2009) defines malnutrition as “the cellular imbalance between the supply of nutrients and energy and the body’s demand for them to ensure growth, maintenance, and specific functions”. Although malnutrition is a state of deficiency or excess of energy, protein, and other nutrients, this study deals with under-nutrition and specifically PEM. Malnutrition includes both under-nutrition and over-nutrition. Over-nutrition refers to the excessive intake of energy and/or macronutrients. Under-nutrition

can be divided into protein-energy malnutrition and micronutrient deficiencies. It was found that children who have a low intake of vitamin A, zinc, riboflavin, niacin, iron, vitamin B6, folate, calcium and vitamin C, suffer from micronutrient deficiency, which is referred to as hidden hunger. In malnutrition, the main clinical feature is weight loss. Subcutaneous fat tissue is decreased and children with chronic PEM show growth retardation in terms of both weight and height. Children's physical activity and energy levels are decreased and they have a reduced attention span, lack of liveliness, frequent episodes of diarrhoea and varying degrees of apathy (de Lange 2010). The WHO (2009) defines malnutrition as “the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions” (WHO 2009). Children with primary PEM are generally found in developing countries as a result of inadequate food supply caused by socioeconomic, political, and occasionally environmental factors such as natural disasters. According to Cook, Frank, Levenson, Neault, Heeren, Black, Berkowitz, Casey, Meyers, Cutts and Chilton (2006), access to adequate food is especially important for children as it has potential consequences both for their development as well as for their current health status.

## **2.3 MALNUTRITION IN CHILDREN**

### **2.3.1 Global malnutrition**

Globally there is sufficient food for everyone but unequal access is a challenge that needs to be met since food security is a basic human right. Over the last decade some scientists have shown that social, demographic, economic, and health factors affect child malnutrition and the child mortality rate for children under five years of age (El-Ghannam 2003). Available information on child health shows that millions of infants and young children in third world countries die every year due to malnutrition World Health Organization (WHO) (2009). For those children that manage to survive to age six, the world is a threatening place UNICEF (2010) as their intake of nutritionally balanced food is often compromised. Over one-third of all child deaths are due to malnutrition, mostly as a result of the increased severity of disease. With underlying malnutrition, acute respiratory infection (ARI), fever, and dehydration from diarrhoea become important contributing causes of childhood morbidity and mortality in developing countries (Chopra 2003). Despite the availability of relatively simple and extremely cost-effective interventions to address malnutrition, few countries effectively implement these proven interventions on a meaningful scale. Malnutrition in its various

forms is considered globally to be one of the most common problems today. As mentioned above, malnutrition in the form of PEM is the fifth most common of the top 20 causes of child mortality in South Africa. Thus, it is considered to be one of the most long-standing public health problems in the world (UNICEF 2010) since it still affects children under five years of age today. According to Chopra (2003), an estimated 40% of sub-Saharan African children are severely or moderately stunted, 28% are underweight, while 14% are born with low birth weight. The decline in stunting in Africa has been modest, from 38% around 1990 to 34 % around 2008. Moreover, due to population growth, the overall number of African children under five years old that are stunted has increased from an estimated 43 million in 1990 to 52 million in 2008. In addition, Bradshaw, Bourne and Nannan (2003) found that 4.3% of children in South Africa die due to PEM while El-Ghannam (2003), citing Puffer and Serrano (1973), found that 35% of all deaths in children under five years of age, involved malnutrition as an underlying or contributing cause. El-Ghannam(2003), citing Millman (1990), estimated that already in 1988, 455 million people in developing countries were too poor to obtain sufficient energy for minimal activity for adults and healthy growth for children. Furthermore, Bradshaw *et al.* (2003) state that other causes of child death, especially PEM, are associated with poor socio-economic status. This could mean that household food security status plays an important role in determining child health and development. The results of correlation coefficients reveal that there are positive associations between the rate of illiteracy, unemployment, and poverty, the fertility rate, family size, food consumption, maternal mortality rate, population per physician, and child malnutrition. Mortality having stronger and more significant associations in some regions, especially in sub-Saharan Africa (El-Ghannam 2003).

## **2.4 MALNUTRITION IN SOUTH AFRICA**

According to Bradshaw *et al.* (2003), persistent under-nutrition in children still exists in developing countries. South Africa has been listed by the World Health Organization as being one of 36 countries with the highest burden of malnutrition (Faber, Witten & Drimie 2011). Low birth weight, diarrhoea, lower respiratory infections and protein-energy malnutrition account for a further 30% of childhood deaths (Bradshaw *et al.* 2003). A large number of these deaths are preventable through the delivery of the standard conventional primary health care package approach. According to Bradshaw *et al.* (2003), protein-energy malnutrition began to show in the 1-4 year old age group of children in 1990. Furthermore,

Faber and Wenhold (2007) state that findings regarding over and under-nutrition have shown that the rate of both child and adult malnutrition has increased despite the numerous national nutrition and primary health care interventions.

Young children are generally protected to a greater extent from disrupted eating patterns and reduced food intake. Cook *et al.* (2006) found that child health correlated with household food security and that children living in food insecure households reportedly have poor health status and probabilities of being hospitalized from birth. Among the four principal causes (diarrhoea, measles, malaria and acute respiratory infections) of mortality in young children worldwide, under-nutrition has been recognized as the cause of death in 60.7% of children with diarrheal diseases, 52.3% of those with pneumonia, 44.8% of measles cases, and 57.3% of children with malaria (Young & Jaspars 2006 and Cook *et al.* 2006). In South Africa, more than 80% occur among those with mild or moderate malnutrition (weight-for-age) since there is also the double burden of disease (de Lange 2010 and Faber & Wenhold 2007).

A study conducted in 1995 in South Africa estimated that 2.3–2.5 million of the subjects of the study were undernourished; most especially black African children aged 0–15 years (The Community Agency for Social Enquiry (CASE) (1995). The South African Vitamin A Consultative Group-1995 (Labadarios & Van Middelkoop 1996) and the National Food Consumption Survey (NFCS 1999) are the two nationally representative studies done in South Africa on children (Kirkpatrick, McIntyre & Potestio 2010). The SAVACG study included children aged 6–71 months while the NFCS included children aged 1–9 years (Kirkpatrick *et al.* 2010; Arimond & Ruel 2004, citing Labadarios *et al.* 2000). Both studies showed comparable overall results. The SAVACG study showed that there was a 9.3% prevalence for underweight (weight-for-age <-2SD), 22.9% for stunting (height for- age <-2SD) and 2.6% for wasting (weight-for height <-2SD). The NFCS (1999) found that there was 10.3% underweight, 21.6% stunting and 3.7% wasting (Kirkpatrick *et al.* 2010). Commercial farms and informal settlements had the highest prevalence of under-nutrition compared with the urban areas (Kirkpatrick *et al.* 2010).

In 2012, there was a major study done on both children and adults, called the South African National Health And Nutrition Examination Survey (SANHANES-1). One of the objectives of the survey was to investigate the nutritional status of South African children in relation to food security, dietary intake/behaviour including the consumption of alcohol, and body weight management. The results of the survey were compared with those of the NFCS which was carried out in 2005. Table 2.1 illustrates the findings of both studies with regard to

children's nutritional status. These studies were conducted in SA at different times in order to investigate malnutrition in children.

**Table 2.1: Prevalence of undernutrition**

Age group	Stunting		Wasting		Underweight	
	NFCS- 2005	SANHANES- 1 2012	NFCS- 2005	SANHANES- 1 2012	NFCS- 2005	SANHANES- 1 2012
1-3 years	29.8%	36%	6%	3.3%	12.2%	7.8%
2-6 years	21.5%	14.1	6.5%	2.8%	9.4%	5.1%

*Sources: Shisana, Labadarios, Rehle, Simbayi, Zuma, Dhansay, Reddy, Parker, Hoosain, Naidoo, Hongoro, Mchiza, Steyn, Dwane, Makoe, Maluleke, Ramlagan, Zungu, Evans, Jacobs & Faber (2013) & Labadarios, Steyn, Maunier, McIntyre, Swart, Gericke, Huskisson, Dannhauser, Vorster & Nesamvuni (2000)*

### 2.4.1 Nutritional status

Nutritional status can be assessed through dietary, anthropometric, biochemical and clinical criteria (Cook *et al.* 2004). A study conducted in Cote d' Ivoire found that income was an important determinant of long-term nutritional status both in urban and rural areas (Bonti-Ankomah 2001). Hence, raising the expenditure levels of households could be the key element in reducing chronic malnutrition. According to Oh and Hong (2003), the nutritional status of under-five children is one of the indicators of household well-being and one of the determinants of child survival. Child malnutrition is one of the most important causes of infant and child mortality (Jacobs *et al.* 2008). In sub-Saharan Africa, it accounts for about 2% of deaths and about 3% of disability-adjusted life years (DALYs) in under-five children. Malnutrition may adversely affect the child's intellectual development and additionally their health and productivity in later life (Cook *et al.* 2006). This is likely to prolong inequities and inequalities in health and other dimensions of household welfare. Child malnutrition is also one of the measures of health status that the WHO recommends for assessing equity in health (Zere & McIntyre 2003). Hence, in countries like South Africa that have high degrees of socioeconomic inequality, the existence of morbidity and mortality gaps related to socioeconomic status is not unexpected.

### **2.4.2 Anthropometry**

PEM has been found to be the most important nutritional problem in the world. It contributes to 4.3% of deaths in children under five years of age in South Africa. Weight and height are the anthropometric indices that were chosen to evaluate the nutritional impact of the NSP. Height-for-age (stunting) portrays performance in terms of linear growth and essentially measures long-term growth faltering. Weight-for-height (wasting) reflects body proportion, or the harmony of growth, and is particularly sensitive to acute growth disturbances. Weight-for-age (underweight/overweight) represents a convenient combination of both linear growth and body proportion (Casey *et al.* 2004). The National Health Centre for Health Statistics (NHCHS) and the WHO has determined the international standards for children under five years and these are used as reference standards for comparison. The standard used is Standard Deviation (SD) from the median and the results are referred to as Z-scores.

### **2.4.3 Causes of malnutrition**

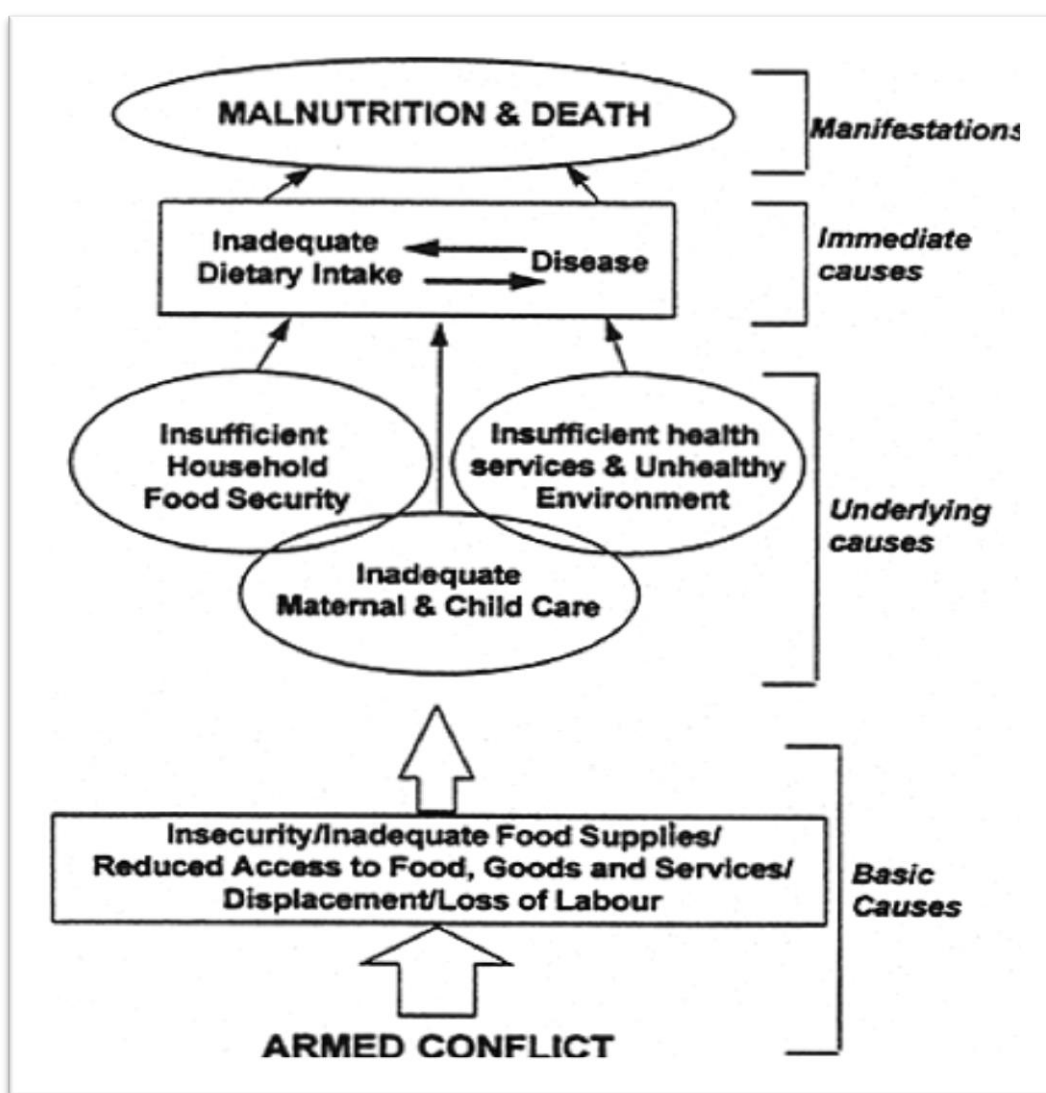
Bonti-Ankomah (2001) identified inadequate dietary intake and disease as the most significant immediate determinants of malnutrition. Inadequate dietary intake may include insufficient total energy, protein, vitamin and/or mineral intake. Malnutrition might be caused by not having enough food at home. Poverty is an indisputably significant factor in child malnutrition, but in many high-burden countries, malnutrition rates are much higher than in other countries with similar national incomes (Oh & Hong 2003).

It is a recognised fact that household food insecurity is one of the three underlying causes of malnutrition (Faber & Wenhold 2007). Food insecurity “exists when people lack access to sufficient amounts of safe and nutritious food and are therefore not consuming the food required for normal growth and development, and for an active and healthy life” (WHO 2009, citing Nishida, Webb and Nantel 2001). This may be due to the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate utilization at household level (WHO 2009).

Food insecurity influences health and development through its impacts on nutrition and as a component of overall family stress. The condition of food insecurity includes both inadequate quantities and the inadequate quality of the nutrients available. At less severe levels of food insecurity, household food managers (usually mothers) trade off food quality for quantity to prevent household members, especially children, from feeling persistently hungry (Jacobs *et*

al. 2008). Several kinds of social infrastructure have influenced the relationship between food insecurity and child health, growth and development by helping to prevent food insecurity from occurring, or by moderating its effects once it occurs (WHO 2009 & Jacobs *et al.* 2008).

Nutrition is directly related to food intake and infectious diseases such as diarrhoea, acute respiratory infections, measles and other diseases such as malaria. Both food intake and infectious diseases reflect underlying social and economic conditions at the household, community, and national levels that are supported by political, economic, and ideological structures within a country. The conceptual framework for nutrition adapted from UNICEF illustrates relationships among factors and their influences on children's nutritional status (UNICEF 2006)).



**Figure 2.1: UNICEF conceptual framework of the causes of malnutrition and death in children** (Source: UNICEF 2006).



Political, socioeconomic, environmental, and cultural factors (at the national and community levels) and poverty (at the household level) affect the nutritional status of women and children. Improper feeding practices, in addition to diarrheal disease, are important determinants of malnutrition. WHO and UNICEF recommend that all infants be breastfed exclusively from birth to six months of age. In other words, infants should be fed only breast milk during the first six months of life (UNICEF 2006).

The above conceptual framework showed that insufficient food intake is one of the underlying causes of malnutrition. Hence, the next section unravels the fundamentals of food intake with respect to food insecurity.

## **2.5 FOOD INSECURITY IN CHILDREN**

Food insecurity and food insufficiency are commonly perceived to be one and the same and the terms are often used interchangeably. Whereas food insecurity is defined as limited or uncertain availability of nutritionally adequate and safe foods, or the inability to acquire acceptable foods in socially acceptable ways, food insufficiency is defined as the inadequacy of food intake due to a lack of money or resources that provide access to sufficient food (Casey, Szeto, Lensing, Bogle & Weber 2005). According to Bonti-Ankomah (2001), food insecurity is highest among the African population and rural households. The problem of household food insecurity is aggravated by numerous factors such as domestic electricity supply constraints, rising food prices and rising oil prices (Altman *et al.* 2010). In trying to cope with these problems, poor households resort to allocating a greater proportion of their expenditure to food, which results in compromised dietary diversity, quality and energy intake (Altman *et al.* 2010). Households adopt different strategies to obtain food to feed the household members. The strategies include own production, food purchases from wage incomes, self-employment or social transfers (Bonti-Ankomah 2001).

Despite being a middle-income country with a high gross domestic product, household food security is an important consideration for South Africa. The NFCS (1999) showed that among children from 1–9 years of age, 52% reported experiencing hunger, 23% were at risk of hunger and 25% were food secure. A significantly higher proportion of rural children (62%) compared with urban children experienced hunger. This potentially translates to about 4.6 million children that experience hunger in South Africa (Labadarios *et al.* 2000). Children in KwaZulu-Natal, the Eastern Cape and Limpopo provinces accounted for 50% of children suffering from hunger (Labadarios, Swart, Maunder, Kruger, Gericke, Kuzwayo,

Ntsie, Steyn, Schloss, Dhansay, Jooste & Dannhauser 2008). Although the reporting of states of hunger is subjective, this data was generally supported by the anthropometric data as well as data from the household food inventory that were collected by the NFCS (Labadarios *et al.* 2000).

According to Altman *et al.* (2010) and Iversen, du Plessis, Marais, Morseth, Hoisaether & Herselman (2011), “women and children are the bearers of long-term consequences of food insecurity because of the negative impact on their learning and productivity in adult life”. The prime causes of household food insecurity in South Africa are chronic poverty and unemployment. Among poor households, especially in the rural areas, a large number of households may be classified as resource poor and therefore food insecure. The food security status of a household is very sensitive to livelihood stressors, and thus changes over time. During the year 2007-2008, there was rapid food price inflation which strained household income and expenditure and increased the number of food insecure people (Altman *et al.* 2010). According to Aliber (2009), household food security status depends on “an increase in the average number of children per household, a decline in the average number of elderly, a decrease average number of adults employed; and a moderate increase in social grant income.” At moderately severe levels of food insecurity, food intake for adults in the household is reduced below normal levels by reducing meal or serving sizes or skipping meals, sometimes leading to hunger (Bourne *et al.* 2007). At more severe levels, households with children also reduce the children’s food intake to the extent that the children experience hunger as a result of inadequate household resources. Adults in households with or without children experience even more extensive reductions in food intake, possibly going whole days without food (Cook *et al.* 2004). As these definitions imply, hunger and under-nutrition may occur as a result of food insecurity, depending on its severity and duration.

The following section further discusses food insecurity as it involves food access, (physical and financial) and food intake. Food intake involves the quality, quantity and frequency of the diet.

### **2.5.1 Food access and intake**

According to Cook and Jeng (2007), child food insecurity and hunger are especially harmful during the first three years of life, as this is the sensitive period during which the foundation is laid that will support human capital formation throughout the school years, and on into

adulthood. The South African government has made the prevention of infant and child malnutrition a priority. Traditionally, nutritional interventions in South Africa have consisted of feeding schemes based at clinics, crèches, schools or soup kitchens. However, evaluations of these programmes have been disappointing (Oh & Hong 2003). Poor nutrition results from the lack of a well-balanced or diversified diet. According to Altman *et al.* (2010), few people would be able to afford a food basket that is diverse and high in essential micro- and macronutrients due to low household income. In addition, Altman *et al.* (2010) found that approximately 80% of households were unable to afford a basic nutritionally balanced basket of food, while the NFCS (1999) found that 20% of the population was considered food insecure. “From the 80%, one in every four additional households would achieve an acceptable level of nutrition with R200 more expenditure on nutritious food per month” (Altman *et al.* 2010). According to Aliber (2009), rural households spend less on food per adult because there are more people in the average rural household and they have their own production that contributes to their diet.

The NFCS (1999) highlighted maize as the most frequently and consistently consumed food item by children aged 1-9 years old, followed by whole milk and brown bread (Labadarios *et al.* 2000). Cereals were consumed by 99% of all children. The average daily consumption of cereals was 493g for children aged 1-5 years, 559g for 6-9 year olds and 690g to 879g for children 10 years and older (Jacobs *et al.* 2008, citing Nel & Steyn 2002). According to Altman *et al.* (2010), the rural and the urban household food baskets differ in terms of the food types. Rural households purchased grain products, fruits and vegetables with a large portion of their food budget and a smaller portion was spent on meat. This is due to the fact that rural households often have their own livestock, which in some cases they sell to other rural dwellers or slaughter for their own use. In some cases rural households might not have enough money to buy meat as most of their budget is spent on staples. Fruit and vegetable consumption among South African children is low because of poor access and availability (Labadarios *et al.* 2008). Dietary diversity, which can be used as an indicator of the micronutrient adequacy of a diet, was shown to be low for South African children, and the low dietary diversity was associated with poor child growth (Steyn, Maunder & Labadarios 2006b). The South African National Department of Health (2012) revised the Food Based Dietary Guidelines for South Africans. These guidelines guide the type, quantity and the frequency of food to be eaten across all age groups. It is stated that these ten guidelines must be adhered to in order to have a nutritious balanced diet (refer figure 4.8).

In terms of infant feeding, Nord and Hopwood (2007) highlighted that in some parts of South Africa, the introduction of liquids, such as water, sugar water, juice, and formula, and solid foods, takes place earlier than the recommended age of about six months. This practice has a harmful effect on the nutritional status for a number of reasons. Firstly, the liquids and solid foods offered are nutritionally inferior to breast milk. Secondly, the consumption of liquids and solid foods decreases the infant's intake of breast milk, which in turn reduces the mother's supply of milk. Thirdly, feeding young infants liquids and solid foods increases their exposure to pathogens, thus putting them at greater risk of diarrhoeal disease (Nord & Hopwood 2007).

### **2.5.2 Factors affecting food intake and access**

A household manages its resources in order to make sure that food is readily available, utilizable and adequate. Certain factors could affect the way in which a household accumulates its resources to make food available. As a household manages its resources over the course of a year, the ability to meet the food needs of its members may vary due to a number of factors. These factors include inadequate crop production by the household due to poor soil or lack of labour, loss of or decrease in income sources caused by events such as retrenchment, unemployment, social obligations, or natural disasters (Nord & Hopwood 2007). As these factors pose a challenge to the household's food access, it leaves the household in a vulnerable state. This then forces the household to resort to other coping strategies in order for food to be accessible and available.

Households that are fully dependant on producing their own crops could suffer crop failure as a result of poor weather or soil conditions. Some households depend on the wages they earn to purchase food. This source of income may be lost due to retrenchment, disability or death, thus disrupting the household's access to food. Other households could benefit from small-scale agriculture, but the problem is that most the food insecure households lives in shanty towns where cultivating land is a challenge and some have a problem of land ownership and fencing.

All of the factors mentioned above could affect food access and thus food intake which could in turn mean that the members of the household would not reach their full potential (Nord & Hopwood 2007).

As mention above, different factors affect food access and food intake at household level. This leads to poor food intake which could also lead to poor nutritious diets. This could

further lead to malnutrition. The Integrated Nutrition Programme (INP) was developed to address malnutrition issues.

## **2.6 INTEGRATED NUTRITION PROGRAMME**

The Integrated Nutrition Programme (INP) was developed in 1994 as a multi-sectorial programme under the auspices of the Department of Health. The INP includes a number of interventions to address problems of under-nutrition, most of which function by improving household food security (Grover & Ee 2009). Food fortification programmes operate by improving the nutritional quality of the food available to households. Community gardens are designed to improve households' access to certain types of foods. Even individual food transfer programmes, such as primary school feeding, improve household food security by supplementing the total amount of food available to household members (Grover & Ee 2009). One of the health facility based interventions of the INP is the protein-energy malnutrition scheme, whereby children that fail to thrive or fall below  $-2SD$  (equivalent to the 3rd percentile) of weight-for-age, receive food supplements from a health facility. Currently, utilisation of this programme is however dominated by chronically ill adult patients (such as TB patients) and by children of mothers who are HIV positive but who are not necessarily malnourished (Bourne *et al.* 2007 and Hendricks *et al.* 2003). This programme is also overwhelmed by breakdowns in supply, criticism of the food products included in the programme, and a lack of supportive community based programmes that address the underlying causes of malnutrition. Consequently very few children are ever discharged from the programme and those that are; often need to be re-admitted (Bourne *et al.* 2007 and Hendricks *et al.* 2003).

As a comprehensive nutritional strategy, the INP also focuses on children under 6 years of age, at-risk pregnant and lactating women, and those affected by communicable and chronic lifestyle diseases. The strategic plan for the INP includes eight interlinked focus areas with goals, objectives and targets set for 2007, aimed at addressing the main nutritional problems (Arimond & Ruel 2004).

As mentioned above that the INP functions as a multi-sectoral programme that includes eight interlinked focus areas. One of these areas is NSP which functions as a community based programme in addressing malnutrition.

### 2.6.1 Nutrition Supplementation Programme

Apart from income enhancing strategies to reduce the incidence of malnutrition, other approaches have been used globally to address child malnutrition. Although there is a supplementation programme in South Africa, many households with children go hungry every day due to a lack of money to purchase food. The Nutrition Supplementation Programme (previously known as the PEM scheme) is a short-term intervention to address acute malnutrition. The utilisation of this programme has been improved, especially through the increased involvement of trained nutrition professionals in the programme. However, there are still many difficulties including failure to enrol at-risk children, incorrect enrolments which deplete resources, and failure to discharge children who no longer need to be on the programme (Hendricks *et al.* 2003). Most important is the absence of community-based interventions, which could assist food insecure households and thus prevent the movement of children in and out of this programme. Similarly, it is urgent that the coverage of the child support grant be extended to the families of malnourished children through enrolling every child that has been identified in a hospital as being malnourished and through growth monitoring in clinics and health centres (Bourne *et al.* 2007).

The NSP is a rehabilitation programme intended to last for a maximum of six months and aims to help undernourished groups. The main components of the NSP are the provision of nutritional supplements according to age-specific criteria, including breast milk substitutes, infant porridge, ready-to-use-therapeutic foods (RUTFs), energy drinks and maize meal porridge, together with nutrition education and consultation on long-term solutions for the clients (Andresen *et al.* 2009). The ready-to-use-therapeutic foods have been shown effective in the treatment of severe and moderate wasting. These foods are energy-dense, micronutrient-enriched pastes often made of peanuts, oil, sugar and milk powder (Bourne *et al.* 2007).

The supplements are provided at primary and secondary health facilities at monthly visits. The criteria for entry into the programme include underweight or growth faltering for at least two consecutive months for children < 6 years old; Z-score below -2SD; growth faltering in the infant; poor weight gain for pregnant women; maternal BMI <18.5 kg/m<sup>2</sup> for lactating women; and underweight or poor weight gain for the chronically ill. Criteria for exiting the programme include adequate weight gain for three consecutive months for children <6 years; weight gain following delivery in pregnant women; weight gain following discontinuation of

breast-feeding in lactating women; and adequate weight gain in the chronically ill (Hendricks *et al.* 2003).

## **2.7 RELATIONSHIP BETWEEN FOOD INSECURITY AND NUTRITION**

Altman *et al.* (2010) mention that while the experience of hunger in households has fallen, under-nutrition remains a serious problem: “Hunger and under-nutrition are both outcomes of inadequate food intake with different meanings... under-nutrition refers to lack of sufficient micronutrients while hunger refers to not eating enough food”. Food security cannot be understood in isolation from other factors such as health, access to land, water, education and nutrition. Despite various national nutrition and primary health care programmes being initiated in South Africa over the last decade, child health has deteriorated: “This has been seen by the rise in infant and child mortality rates, the high prevalence of preventable childhood diseases, for example, diarrhoea and lower respiratory tract infections, and the coexistence of under-nutrition along with HIV/AIDS” (Musinguzi, Maundu, Grum & Nokoe 2012).

According to Nord and Hopwood (2007), food insecurity is found more commonly in families that live in poverty. In 1999, 10.9% of all families reported food insecurity, whereas 46% of those with incomes below the poverty line reported food insecurity. A higher percentage of families that reported food insecurity receive food stamps and other nutritional assistance as compared with those that reported food security, indicating the nutritional instability of these families (Nord & Hopwood 2007). Families that live below the poverty line, who typically have no savings to rely on, have little or no discretionary money for spending when income shocks of any type occur, such as an increase in rent, or a rise in the cost of gasoline or household heating/cooling or, even worse, the loss of income or food stamps (Nord & Hopwood 2007). Purchasing of food of adequate quality and quantity may be compromised in favour of paying for other necessities. The loss of food stamps is of particular concern, because food stamps have been shown to increase the intake of nutrients in children of impoverished families (Musinguzi *et al.* 2012).

Table 2.2 illustrates the studies done to determine the relationship between food security status and nutritional interventions (supplements) in order to improve the nutritional status of children. The first study was conducted with a sample of 319 children from the Northern Cape. Before the intervention, there was 41% low birth weight; 10% underweight and 59%

were from food insecure households. After the intervention, 10% were no longer underweight. The intervention took 8 months. Another study carried out in the Western Cape on 130 infants and 6 year- old children found that the children were from households with poor food security. This was determined by assessing the socioeconomic status (employment) of the head of each household. The study found that children became more malnourished if the caregiver or the head of the household was unemployed thus compromising the food security status of the household (Musinguzi et al. 2012 & Nord & Hopwood 2007).



**Table 2.2: Comparison of relationship between food security and nutrition in children**

<b>Author &amp; date of publication</b>	<b>Sample</b>	<b>Study design &amp; place of study</b>	<b>Food insecurity</b>	<b>Nutrition (supplements)</b>
Arimond & Ruel (2004)	<ul style="list-style-type: none"> <li>○ 11 Demographic Health Surveys</li> <li>○ 6-23 months children</li> </ul>	<ul style="list-style-type: none"> <li>○ Descriptive study</li> <li>○ 11 African, Asian and Latin American countries</li> </ul>	Children did not have diversified diets	There was an association between child dietary diversity and nutritional status.
Chopra (2003)	<ul style="list-style-type: none"> <li>○ 868 3-59 months children</li> <li>○ 516 random HHs</li> </ul>	<ul style="list-style-type: none"> <li>○ Cross-sectional survey</li> <li>○ Hlabisa (KZN)</li> </ul>	Duration of breastfeeding and birth weight were significantly related to underweight-for-age	26.3% stunted 12.0% underweight-for-age 1.3% wasted Took supplements
Cook <i>et al.</i> (2006)	<ul style="list-style-type: none"> <li>○ 130 infants and 6 years children</li> <li>○ caregivers</li> </ul>	<ul style="list-style-type: none"> <li>○ Descriptive study</li> <li>○ Western Cape (SA)</li> </ul>	465 poor household food security	Children significantly more nutritionally at risk if caregiver unemployed.
Hendricks <i>et al.</i> (2003)	<ul style="list-style-type: none"> <li>○ 319 children</li> <li>○ health personnel</li> </ul>	<ul style="list-style-type: none"> <li>○ Descriptive study</li> <li>○ Northern Cape (SA)</li> </ul>	41% with low birth weight and low weight-for-age Z-score (WAZ) 59% were from food insecure HHs	10% with low weight-for-age moved into the normal Z-score after being on PEM scheme for 8 months.
Oh & Hong (2003)	<ul style="list-style-type: none"> <li>○ 570 children</li> <li>○ 4-12 years</li> </ul>	<ul style="list-style-type: none"> <li>○ Cross-sectional</li> <li>○ Korea</li> </ul>	8.6% children were food secure 25.7% children food insecure	Food insecurity and children's dietary intake had significant association.

*Source: Arimond & Ruel (2004); Chopra (2003); Cook et al. (2006); Hendricks et al. (2003) and Oh & Hong (2003).*

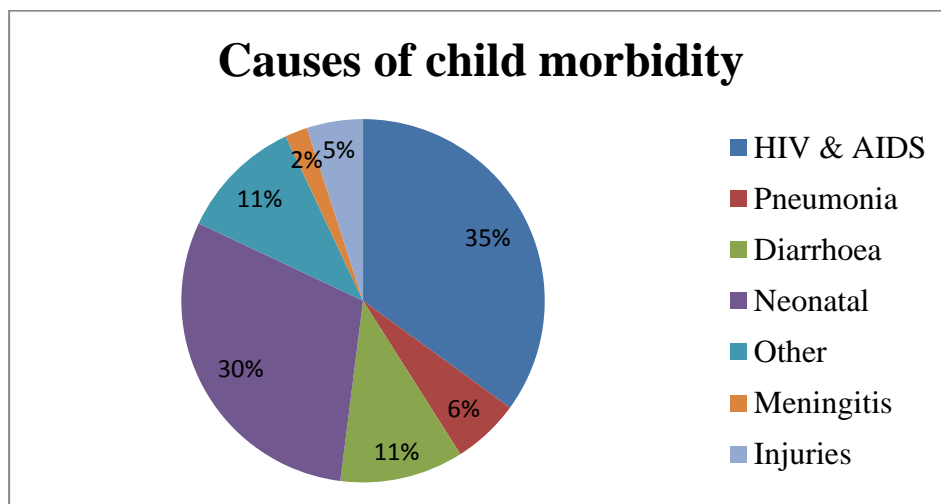
The study conducted on African, Asian and Latin American children between 6-24 months old, found that the children had good nutritional status and dietary diversity if the household food security status was good. The last study in Table 2.2 was conducted in Korea on 570 children aged 4-12 years and found that 25.7% of the children that were food insecure had poor dietary intake.

The five studies discussed above show that food security could be affected by poor household socioeconomic status which leads to inadequate food intake. Inadequate food intake results in malnutrition. Therefore, improved food security status could lead to an improvement in the nutritional status of children (Arimond & Ruel 2004; Chopra 2003; Cook *et al.* 2006; Hendricks *et al.* 2003 & Oh & Hong 2003).

## 2.8 THE HEALTH STATUS OF SOUTH AFRICAN CHILDREN

### 2.8.1 Child morbidity

It has been found that amongst the black population and in poor urban areas, there has been a shift from traditional diets to a westernised diet. This results in the coexistence of both under- and over-nutrition (double burden). Double burden occurs when the country has both under-nutrition (PEM) and over-nutrition (obesity and diseases). The major diseases that are cause of child morbidity are showed in figure 2.2 in children under five years of age.

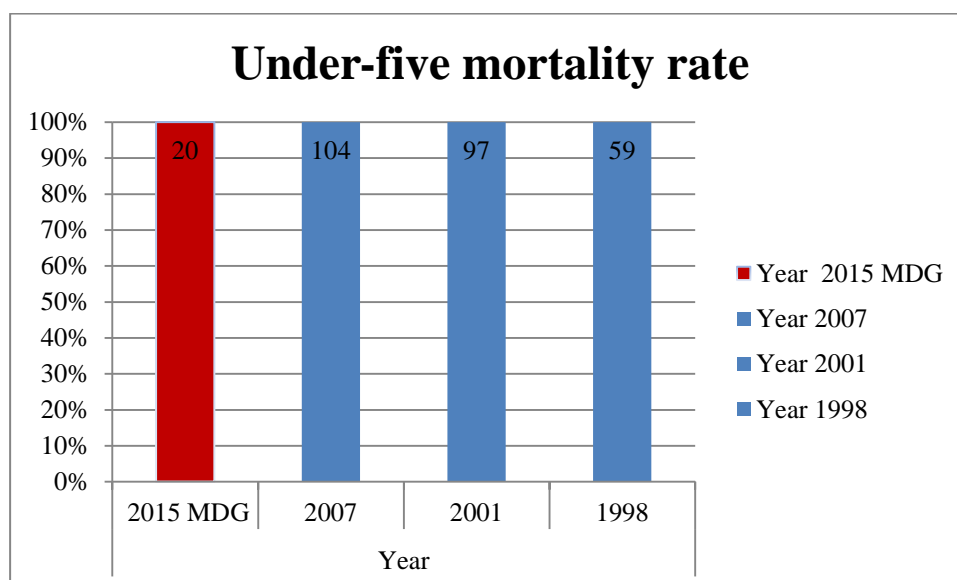


**Figure 2.2: Causes of child morbidity** (Sources: Bradshaw *et al.* 2003)

### 2.8.2 Child mortality

According to UNICEF (2008), at least 260 babies and children die each day in South Africa due to the causes mentioned in Figure 2.2. Deaths during the first month of life remain high and account for 30% of all child deaths. According to Shisana *et al.* (2013) (SANHANES-1), the rate of under-nutrition in children continues to grow when compared with the NFCS-2005.

According to the United Nations Development Plan (UNDP) (2005), Statistics SA does not have statistics available for under-five mortality and infant mortality. The ratios that are provided are computed from registered births and deaths without adjusting for under-registration. Other sources of under-five mortality and infant mortality rates were used to assess progress in reducing child mortality in South Africa. Figure 2.3 illustrates the under-five mortality rate since 1998 and the 2015 Millennium Development Goal (MDG) target to reduce child mortality.



**Figure 2.3: Under-five mortality rate in SA** (Source: 1998 SA Demographic and Health Survey, Department of Health; 2001 Census and 2007 Community Survey, Statistics SA).

According to the MDGs, the rate is supposed to be reduced by 2015, as shown in Figure 3. However, since 1998 child mortality has been on the increase. Furthermore, UNICEF (2007) reported that children aged between 0–4 years old account for 10.4% of all deaths and that 40% of deaths in children under the age of five in South Africa are caused by HIV related illnesses.

## **2.9 SUMMARY**

Nutrition is a basic human need that remains unachieved for vast numbers of children that are thus unable to achieve their full developmental potential. Although South Africa has had the NSP since 1994, the under-five mortality rate is still on the rise with one of the causes being PEM. This means that the NSP has not been effective in reducing malnutrition in children. There are other underlying causes that aggravate malnutrition, such as poverty and poor household income, which result in food insecurity. One of the interventions by the government in fighting poverty has been social grants. However, malnutrition is still on the rise. It has been suggested that there needs to be more focus on small-scale agricultural production since rural households complement their food intake in this way. It is unfortunate that a large percentage of the population resides in shanty towns where cultivating land is a challenge.

From the above it is apparent that rural households and large households are more vulnerable to poverty and subsequently food insecurity and need to be targeted for poverty alleviation strategies and nutrition programmes. The public sector together with the private sector need to explore and develop a more holistic, effective and sustainable approach to improving household food security in order to address child malnutrition.

## **CHAPTER THREE: METHODOLOGY**

### **3.1 DESCRIPTION OF THE STUDY AREA**

This study took place at three government health institutions in various areas of Pietermaritzburg. The institutions included two clinics (Imbalenhle CHC and Pata Clinic) and one Hospital (Northdale). These institutions were chosen because they were all using the Nutrition Supplementation Programme and included all the age groups (6-72 months) relevant to this study.

### **3.2 METHODOLOGY**

A mixed research method attempts to bring together methods from different paradigms and also provides a basis for triangulation, by means of which results from different methods can be extracted and justified (Thurmond 2001). This study used the mixed research method, which is subdivided into two types, namely within-stage mixed and across-stage mixed models of research (Thurmond 2001).

The across-method triangulation (mixed method) was used as it incorporates both the quantitative and qualitative data collection methods. Both of the approaches were employed in the study by combining participant interviews and focus groups. For the quantitative approach, the procedure consisted of administering a survey questionnaire, while for the qualitative approach, focus groups were employed. Hence, the study used a mixed research method to determine the impact that food access has on children with PEM who are on the NSP and to assess the effectiveness of the NSP through the use of a questionnaire that included both open and closed ended questions, together with face-to-face interviews.

#### **3.2.1 Study design**

A cross-sectional study establishes associations between variables and attempts to describe systematically a situation, problem, phenomenon, service or programme; to provide information about the living conditions of a community; or to describe attitudes towards an issue (Aagaad 2003). The use of the descriptive study determined whether there was a relationship between food access, the NSP and the nutritional status of children. This was determined by conducting face-to-face interviews with parents and health care workers using a questionnaire, and also by taking children's anthropometric measurements using suitable and calibrated equipment (scales and height sticks). A cross-sectional study also seemed more feasible for this study due to time and financial constraints and because it collects data

at one point in time, which in this case was at three health institutions (Grimes & Schulz 2002).

### **3.2.2 Sample population**

The sample comprised of 136 children who had been on the Nutrition Supplementation Programme for more than three months and who had not been discharged from the programme. The children's anthropometric measurements were taken (weight and height) to determine their nutritional status. The study surveyed approximately 136 of the participants' parents or caregivers as a sample, by means of face-to-face interviews. The focus groups comprised of six sessions and included 10 members in each group session. The participants' included the caregivers that had brought the children to the clinic. The sample was taken from the UMgungundlovu Health District health institutions and included children between 6-72 months.

The study used a probability sampling technique to select the sample from the population. This method ensures that all members of the population have an equal chance of being selected (Aagaad 2003). The probability sampling used was stratified random sampling which involves dividing the population into sections (strata) based on their characteristics and selecting participants randomly from each stratum. For the purpose of this study, this sampling technique was most suitable as the study aimed to use records from the department of health in the form of a list of all the children in different age groups that were on the NSP. Hence, the records were used to devise relevant stratifications in order to have a list of the population according to strata. The list contained age groups as strata, which facilitated the selection of children in the age group of 6-72 months. From the list of children in this age group, those that had been on the NSP for at least three months were extracted. This provided a sample of 136 children, according to the different age groups and the duration of their registration in the NSP, that was used for the study.

### **3.2.3 Sample selection**

The sample was selected from the primary (clinics) and secondary (hospital) health care facilities that had implemented the NSP for children between 6-72 months in the UMgungundlovu Health District. In addition, research has shown that children in this age group are the most vulnerable and that they have a high rate of mortality and morbidity (UNICEF 2010; 2008; 2007 & 2005).

### **3.2.4 Data collection**

Data were collected using questionnaires, face-to-face interviews and focus group discussions. Parents or caregivers of the children were interviewed individually using a questionnaire. Anthropometric measurements, which recorded weights and heights, were taken by trained fieldworkers using children's scales and height sticks and also taking dietary intake using a questionnaire (24 hour-recall).

The weight and height of the children was measured three times in order to improve data reliability by the three fieldworkers working interchangeably. Weight and height were classified according to the WHO criteria. Height was measured to the nearest 0.1cm using a stadiometer. Participant's shoes and other clothing were removed and for girls, hair clips were removed. They stood with heels touching the back of the height measure, legs straight, arms alongside the body, shoulders relaxed and looking straight ahead with their chin level with the ground (WHO 2009). Their heights were measured three times and the average determined. For children younger than 2 years, their recumbent height was measured using a length mat. The scale for taking weight was calibrated each time the child was measured with shoes and other clothes removed.

The WHO criteria used refer to Z-scores to determine the nutritional status of the children.

Table 3.1 illustrates the WHO classifications of malnutrition. These classifications were used to classify the nutritional status of children.

**Table 3.1: WHO classification of malnutrition**

Measurement	Moderate malnutrition	Severe malnutrition
Weight-for-height (wasting)	SD score > -3 and <-2	SD score < -3
Weight-for-age (underweight)	SD score > -3 and <-2	SD score < -3
Height-for-age (stunting)	SD score > -3 and <-2	SD score < -3

*Source: WHO 2009*

Moderate malnutrition is defined as weight-for-height measurement of SD score > -3 and <-2. Severe acute malnutrition is defined as weight-for-height measurement of SD score < -3; this is known as wasting (WHO 2009).

The parents or caregivers of the children were surveyed using a questionnaire in face-to-face interviews that included Household Food Insecurity Access Scale (HFIAS) (Appendix 2); Monthly Adequate Household Food Provision (MAHFP) (Appendix 2); and Household Dietary Diversity Scale (HDDS) (Appendix 2). Children Food Insecurity Access Scale (CFIAS) (Appendix 2) was used to determine children's food access. The tools were used to measure household food security status. The tools were used together in order to complement each other. The intention of using all four tools was to counterbalance any deficiencies in a single tool, thereby increasing the ability to obtain multiple perspectives from the results. The HFIAS and CFIAS measure several dimensions of household and child food access. It consists of nine questions specifically about worry and the availability of and accessibility to foods during the previous 30 days. The HDDS is an open ended model based on qualitative recall of all foods consumed during the previous 24 hours.

Questionnaires were received back from the research assistant on the same day as the interviews were conducted. The focus group discussions (Appendix 2) with parents and caregivers were conducted on separate days from the administration of the questionnaires and the weighing of children, using an unstructured questionnaire and a tape recorder to allow for flexibility for the participants. The focus group discussions were conducted on the fifth day of the week at each health institution. The purpose of the focus groups was to identify the common problems that parents and caregivers experienced in terms of the management of the health of their children, their dietary intake and also to determine factors that they perceived to be the root cause of malnutrition in children.



### **3.2.5 Variables included in the study, data capturing and analysis**

A statistical analysis was done using the Statistical Package for Social Sciences (SPSS), Version 21.0. Referenced statistical methods were used. A regression (logistic, linear and multinomial) analysis was performed to determine the association between child food intake (CFIAS) and HFIAS, HDDS and MAHFP using Wald's test, a t-test and a Chi-square test respectively. Independent-sample t-test analysis was used to determine the relationship between food access and nutritional status. An ANOVA analysis was used to analyse the differences between household incomes, CFIAS, HDDS, MAHFP and HFIAS. The level of significance was p-value <0.01. Pearson Correlation was used to determine the correlation between weight-for-height, total HDDS, MAHFP, HFIAS and CFIAS.

The focus group discussions were analysed through content analysis by identifying themes.

### **3.2.6 Participants' participation**

- Consent form

The aim of the study, as well as a detailed explanation of the procedures to be employed, was explained to the parents/caregivers of the selected children both verbally (researcher) and through a consent form. Informed consent forms were completed by all the parents and participants before the study commenced.

- Voluntary participation

Participants were informed that their participation was voluntary and that if they wished to withdraw they could do so at any time. They were informed that their participation would cost them nothing and that they would not be paid for their participation.

### **3.2.7 Ethical consideration**

Ethics approval (Appendix 3) was obtained from the University of KwaZulu-Natal (HSS/1243/012M) by the Humanities and Social Science Research Ethics Committee. Permission to work in the health institutions was obtained from the Department of Health (Ref no: HRKM 009/13) (Appendix 4) and from the UMgungundlovu Health District (Ref no: 15/16) by the Human Research and Knowledge Management sub-component. In order to retain confidentiality and anonymity, the questionnaires were coded instead of using participant's identities and only the researchers were responsible for coding the questionnaires.

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## CHAPTER FOUR: PAPER ONE

### **Household Food and Nutrition Security: *Measuring Access to Food and Food Intake of Children on the NSP in Pietermaritzburg, KwaZulu-Natal.***

#### ***Abstract***

**Background:** Malnutrition in children continues to be a major problem in South Africa despite the implementation of various policies and programmes by the government. The Nutrition Supplementation Programme (NSP) is one of the government's interventions intended to help alleviate malnutrition in children.

**Objective:** The aim of the study was to investigate food access in children on the NSP by determining the children's and households' food intake and also to examine the challenges faced by the households in trying to achieve adequate food intake.

**Methods:** A sample from three government health institutions in Pietermaritzburg, which included 136 children aged 6-72 months and their caregivers, who were registered for the NSP, was used. Focus group discussions were conducted to understand the households' perceptions and challenges concerning food access and child malnutrition. Face-to-face interviews were conducted using a questionnaire that included a 24-hour recall section, Children Food Insecurity Access Scale, Household Food Insecurity Access Scale, Monthly Adequate Household Food Provision, and Household Dietary Diversity Scale. Anthropometric measurements were conducted to assess the children's nutritional status.

**Results:** Majority (71%) of children and households (52%) were food secure. Energy foods were the main food type consumed by children compared to other types of food. The top five most consumed food items in the households were cereals (98%), fats and oil (91%), sugar (89%), vegetables (86%) and spices (86%).

**Conclusion:** Socioeconomic factors play a significant role in determining energy intake and diet quality. Inadequate food intake results in malnutrition. Therefore, improved food security status could lead to improved nutritional status of children. Caution has to be taken though, because the study found that there was no association between food access (FA) and nutritional security (NS) meaning that food security does not automatically translate to nutritional security.

**Keywords:** malnutrition, food intake, food access, nutrition security

## 4.1 Introduction and Background

Food insecurity and food insufficiency have commonly been perceived to be the same and are often used interchangeably. Food insecurity is defined as limited or uncertain availability of nutritionally adequate and safe foods, or the ability to acquire acceptable foods in socially acceptable ways, whereas food insufficiency is defined as inadequacy in the amount of food intake because of a lack of money or resources that provide access to sufficient food (Casey *et al.* 2001). Food and Nutrition Technical Assistance (FANTA) (2003) stated that “comprehensive food availability exists when sufficient quantities of appropriate, necessary types of locally produced food, commercial imports or food aid are consistently available to individuals”. Households are said to have sufficient food access when their income or other resources to purchase adequate food are not compromised. Food access “depends on the ability of households to obtain food from purchases, gathering, current production, or stocks or through food transfers from relatives, members of the community, the government, or donors” (FANTA 2003, citing USAID 1992). Food access is thus measured using different tools because it is one of the most complex elements of food security. Food intake exists when food is accessible, but it also depends on the utilization of the available food. Food could be available and accessible, but that does not necessarily mean those individuals are able to consume it. FANTA (2003) states that, sufficient utilization of food by the body is also important because it results in a nourished body, promoting growth and development.

According to the NFCS conducted in 1999, it was found that South African children most often consumed maize followed by whole milk and brown bread (Steyn *et al.* 2006a, citing Labadarios *et al.* 2000). Furthermore, Altman *et al.* (2010) stated that the food baskets of rural and urban households differed in terms of the food types they contained. Rural households spent more on staple foods and less on meat and fruits, while urban households spent more on meat products. The lack of other products affected a household’s dietary diversity. According to Steyn *et al.* (2006b), dietary diversity, which can be used as an indicator of the micronutrient adequacy of the diet, was shown to be low for South African children, and the low dietary diversity was associated with poor child growth.

Different factors could affect a household’s food access which could lead to poor food intake. Nord and Hopwood (2007) stated that inadequate crop production by a household due to poor soil or lack of labour; or the loss of or decrease in sources of income, due to events such as retrenchment, unemployment, social obligations; or natural disasters affect food availability which in turn could affect food access. As these factors pose a challenge to the household’s



food access, it leaves the household in a vulnerable state. This then forces the household to resort to other coping strategies in order for food to be accessible and available (Altman *et al.* 2010).

This paper aims to measure and determine the food access of children on the NSP. It measures this by determining the food intake of the child and the household. The paper also tries to understand the challenges faced by households in trying to achieve adequate food intake and to highlight the causes of child malnutrition. Hence, food access and food intake are measured simultaneously in this study so as to determine the food security of the children on the NSP.

### **Methodology**

In measuring the food access and food intake of the children on the NSP, a cross-sectional descriptive study was undertaken over a period of one month in the selected health institutions in Pietermaritzburg. The health institutions included one primary health care clinic, a community health centre and a public hospital, at all of which implemented the NSP. The study involved 136 children between the ages of 6-72 months who were part of the programme at one of the three facilities mentioned above. The children's caregivers were also contacted at the facilities when they brought their children for routine check-ups as required by the NSP.

Focus group discussions and face-to-face interviews were conducted with the children's caregivers and the health workers at the three facilities. The interviews with the caregivers were conducted using a questionnaire that included Children Food Insecurity Access Scale (CFIAS); Household Food Insecurity Access Scale (HFIAS); Monthly Adequate Household Food Provision (MAHFP); and Household Dietary Diversity Scale (HDDS). All four of these tools were used to measure the food access of the children and the households. To measure the food intake of the children, a 24-hour recall was undertaken.

The focus group discussions with the caregivers were conducted on separate days from the administration of the questionnaires, using a tape recorder and an unstructured questionnaire to allow for flexibility for the participants not to be limited with the questions planned for the focus group. The focus group discussions were conducted on the fifth day of the week at each health institution. The group discussions were conducted in order to identify common problems the caregivers experienced in terms of the management of the health of their children, their dietary intake and also to determine factors that they perceive to be the root causes of malnutrition in children.

Data were captured and analysed using the Statistical Package for Social Sciences (SPSS) Version 21.0. Focus group discussions were analysed using content analysis to identify themes.

## 4.2 RESULTS AND DISCUSSION

This section provides the detailed findings of this study, showing the overall characteristics of the households of the children on the NSP programme. It also presents the findings on food access and food intake to show whether the households and the children on the NSP were food and nutrition secure.

### 4.2.1 Demographic characteristics of the household representing children on the NSP

Generally the households were composed of an average family size of three members, though there were some households that had between 2 to 16 household members. Sixty-seven percent of household representatives had attained secondary level education. About 43% of household representatives were unemployed, 24% had informal employment, 17% lived on government social grants, 8% were students, 4% had other ways of acquiring income and 2% had remittances. Table 4.1 shows the demographics of the household representatives with children on the NSP.

**Table 4.1 Demographic characteristics of household representing children on the NSP (N=136)**

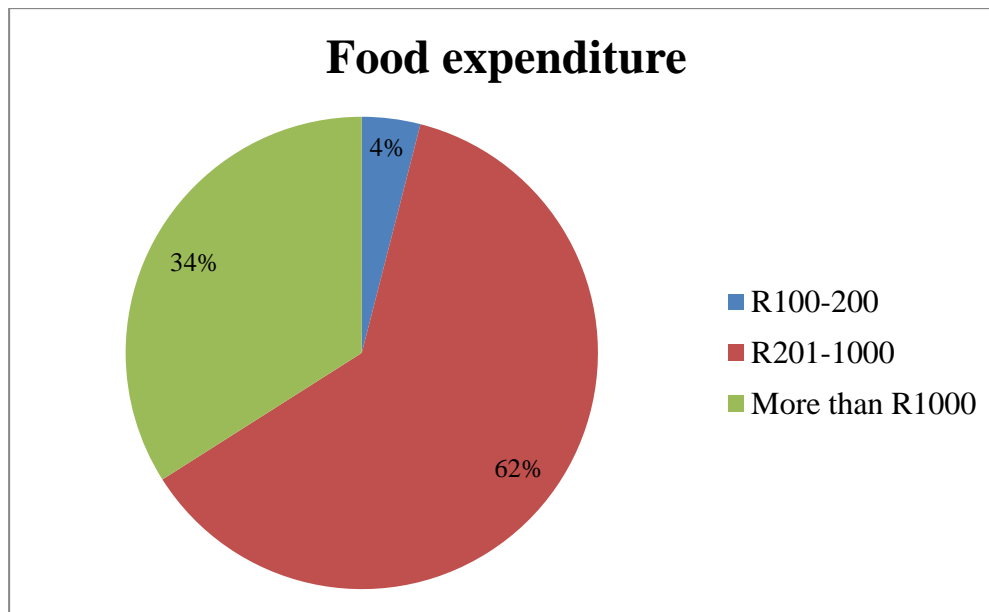
Characteristics	n	%
<b>Level of education</b>		
Uneducated	6	4
Primary	12	9
Secondary	91	67
Tertiary	27	20
<b>Employment status</b>		
Unemployed	59	43
Students	11	8
Informal employment	33	24
Self-employed	2	2
Social grants	23	17
Remittances	3	2
Other	5	4
<b>Household income (per month)</b>		
None	2	2
R1-500	7	5
R501-1000	44	32
More than R1000	83	61

As shown in Table 4.1, the majority (67%) of the caregivers had secondary education with 20% having attended or attending a tertiary educational facility. The focus group discussions also verified that in most households the breadwinner had more than one job in order to sustain and provide for the household. In this instance the literacy level of the caregivers was moderate and only 43% were employed. Only 2% of the households had no income, 5% received between R1-500 incomes, 32% received between R501-1000 income and 61% had more than R1000 combined income per month. However, it should be noted that the jobs that were mentioned were not highly paid, thus the rate of employment does not imply any significant income.

According to El-Ghannam (2003), children were more food secure if the caregivers were educated and employed. Furthermore, a study conducted in Cote d' Ivoire found that income was an important determinant of long-term nutritional status both in urban and rural areas (Bonti-Ankomah 2001). In this study the income status of the households was very sensitive to livelihood stressors and could change at any time. Thus, it can be said that the food security status of the households in the study were always at risk. Due to the limited resources which influence the food security status, the nutritional status could in turn be compromised. Therefore, caution should be taken in future studies when measuring food and nutritional security as the income status and level of education cannot be used as permanent and direct measures of food and nutritional security. This means that increased income and higher levels of education do not automatically translate into nutritional security although they can contribute significantly towards food security.

#### **4.2.2 Household Food Expenditure Trends and coping strategies**

The findings of this study corroborate the trend shown by Statistics SA (2009), that nationally 55% of households have a monthly income of between R1–R1000 (as shown in Figure 4.1). This range is referred to as the ultra-poverty line (Stats SA 2009 & Iversen, du Plessis, Marais, Morseth, Høisæther, Herselman M (2011)). The food expenditure pattern of the households in this study was as follows: R100-200 (4%); R201-1000 (63%); and only 34% of households spent more than R1000 a month on food.



**Figure 4.1: Monthly household food expenditure**

This confirms the report by Stats SA (2010/11) that for every two rand spent, one rand is spent on food, as it is one of the largest consumption expenditures. The focus group discussions further showed that the households in this study strived for food security, as the breadwinners had more than one job in order to sustain and provide for the households. This meant that the households in this study applied various coping strategies to maintain food availability and accessibility. The literature regards PEM as a deficiency disease among children of low socio-economic groups (Faber & Wenhold 2007). According to Iversen *et al.* (2011) and Sanders (2010), households living on around R800 or less a month are regarded as living in the ultra-poverty line. In this study, 61% of households earned more than R1000 per month with food expenditure at around the same amount.

#### **4.2.3 Household involvement in household vegetable gardens and livestock production**

Only 49% or 67 of the households had active vegetable gardens while 51% had no vegetable gardens. The types of vegetables planted included spinach, cabbage, carrots and maize. Fifty five active vegetable gardens were used for household consumption while 12 were used to provide a cash income (mainly spinach was sold). Table 4.2 illustrates the household garden and livestock production.

**Table 4.2: Household garden and livestock production**

Vegetable garden	n	%
<b>Yes</b>	<b>67</b>	<b>49</b>
<b>No</b>	<b>69</b>	<b>51</b>
Livestock		
<b>Yes</b>	27	20
<b>No</b>	109	80

With regard to livestock (mainly chickens), about 20% of households had livestock both for food for the family and to sell for cash. Eighty percent of the households did not have any livestock. Some of the households involved in active production were diversifying their income and were thus not only able to feed the members of the household but also to generate a certain amount of money which helped them to survive. However, the number of households which diversified their incomes as a coping strategy were in the minority (4% vegetables; 20% livestock). The focus group discussions revealed that the clinics encouraged subsistence farming as a means of ensuring a more diverse diet and also to provide a buffer when money is in short supply. The households that were not active in gardening mentioned that the challenges they faced which hindered their participation in gardening included a lack of land, seeds and fencing. The literature review conducted with regard to households' lack of involvement in agriculture also highlighted these constraints. Therefore interventions such as the NSP need to address such problems if the programme aims to improve the dietary intake of its recipients.

#### **4.2.4 Perceived causes of malnutrition**

The participants were asked to give their own perceptions of the causes of their children's malnutrition (Appendix 5). To investigate these questions two approaches were used: firstly, participants were asked what they understood to be the causes of malnutrition. Secondly, the content of their answers was analysed to find out what they regarded as the main cause of malnutrition. The focus group discussions provided an in-depth understanding of this question. Table 4.3 shows the responses given by the caregivers as being the causes of child malnutrition.

**Table 4.3 Perceived causes of child malnutrition**

Question	Theme	Concept	Quotes	Discussion
What do you think are the causes of malnutrition?	Awareness about the causes of children malnutrition	Perception	<p><i>“Nowadays teenagers get pregnant so they do not take good care of their children but they are also children”.</i></p> <p><i>“Neglect and poor care from the caregiver and the crèches. Children are not given food at the crèche or they give them one and the same food every day”.</i></p> <p><i>“Poor food intake and hygiene, for example the water might be dirty”.</i></p>	<p>Caregivers stated that children become malnourished because of poor food intake, poor hygiene, negligence and poor care from the caregivers and crèches.</p> <p>The UNICEF Framework showed that malnutrition in children could result from many factors. Amongst these factors is poor maternal and child care. The caregivers, especially the grandmothers, stated that poor child care aggravates malnutrition.</p> <p>Poor reaction from parents when the child is sick also falls under poor care. Parents tend to stop feeding the children once sick, while at the clinic they are taught that they should continue feeding even when the child is sick.</p>

Table 4.3 illustrates what the caregivers believe to be the causes of children being malnourished or ending up in hospitals. The responses given above correspond with the UNICEF Framework on the causes of child malnutrition showing that there are many underlying causes of child malnutrition (Faber & Wenhold 2007). The focus group discussions provided a better insight into the problems and causes and provided a more holistic view of the problem (refer to Table 4.4).

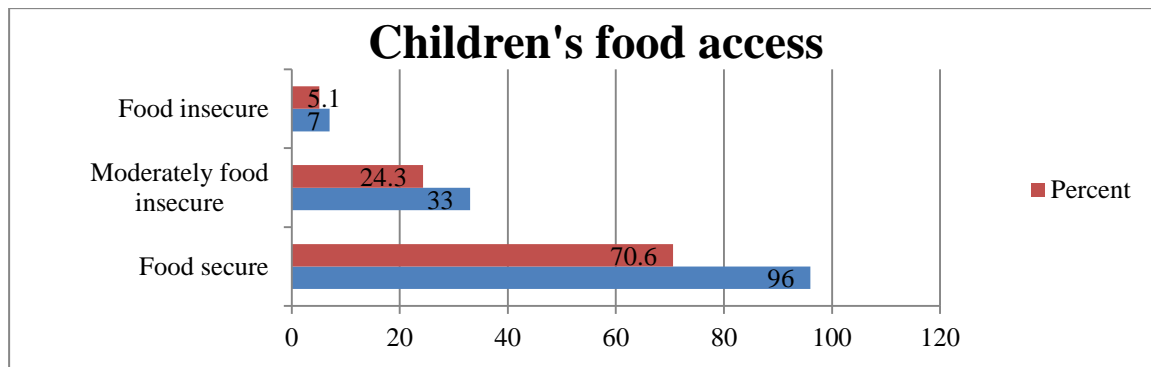
**Table 4.4: Factors contributing to child malnutrition**

<b>Problem</b>	<ul style="list-style-type: none"><li>○ Poor child care (deprivation)</li><li>○ Limited dietary diversity</li><li>○ Poor feeding practices</li><li>○ Poor hygiene (clean and safe water)</li></ul>
<b>Causes</b>	<ul style="list-style-type: none"><li>○ Teenage pregnancy</li><li>○ Child neglect</li><li>○ Lack of proper time to care for children</li><li>○ Poor support system</li></ul>
<b>Implications</b>	<ul style="list-style-type: none"><li>○ Primary<ul style="list-style-type: none"><li>▪ Inadequate access to food quantity and quality</li><li>▪ Poor health status</li></ul></li><li>○ Secondary<ul style="list-style-type: none"><li>▪ Malnutrition</li><li>▪ Illnesses</li></ul></li></ul>

As demonstrated in table 4.4, the problem of malnourished children is complex as it involves not only food and nutritional security but also social challenges that have a direct effect on the problem. These findings further confirm the UNICEF conceptual framework of malnutrition that poor household food security is the result of poor handling of human, economic and organisational assets (Faber & Wenhold 2007). This study cautions that food and nutritional security are complex and dynamic concepts requiring more than the food security dimension or just assessing food diversification and calorie intake. Therefore care should be taken to rather engage in exploring beyond these dimensions to gain better insight into the problem. There is a need for preparedness, as these issues introduce further complexities that go hand-in-hand with the modern South African lifestyle with young mothers who are either studying or looking for job opportunities.

### **4.3 CHILDREN'S AND HOUSEHOLDS' FOOD ACCESS**

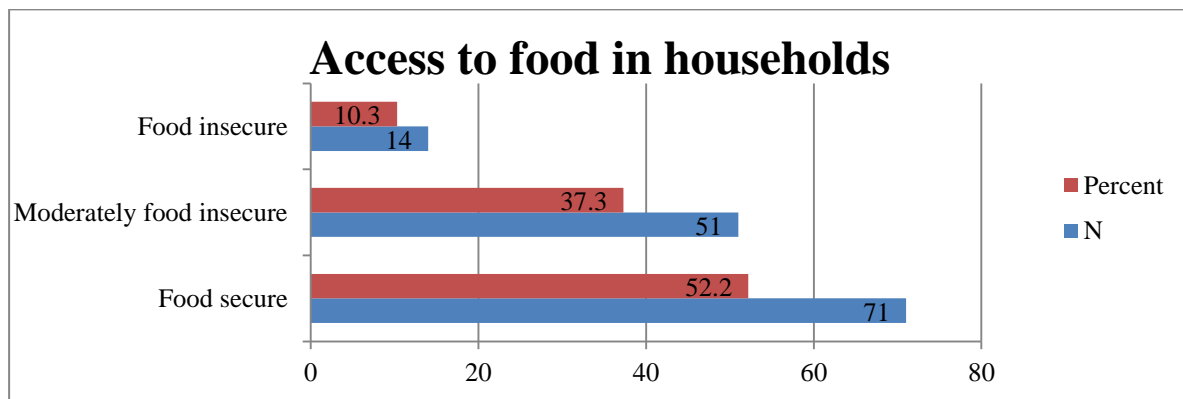
In this study the children's food access was determined using the Children Food Insecurity Access Scale (CFIAS). A total of 71% children were food secure, 24% were moderately food insecure and 5% were severely food insecure (Figure 4.5).



Key note: Scales of 0-9= food secure, 10-14= moderately food insecure, 15 or more= food insecure

**Figure 4.5: Children's Food Insecurity Access Scale**

These findings coincide with the Household Food Insecurity Access scale, which showed that 52% households were food secure, 37% were moderately food insecure and only 10% were food insecure.



Key note: Scales of 0-11= food secure, 12-16= moderately food insecure, 17 or more= food insecure

**Figure 4.6: Household Food Insecurity Access Scale**

Figure 4.6 confirms that the majority of children lived in food secure households. Although the children were food secure and the households were food secure, the literature warns that food security has more than one parameter which means that food availability, utilisation and stability should also be taken into consideration when examining the status of food security (Hendricks, Le Roux, Fernandes & Irlam 2003). Food access is one of the fundamental parameters of food security that deals with the physical and economic ability to acquire the required quantity and quality of food. A household should use socially acceptable means to ensure food access if it is economically compromised. In this study one of the coping strategies used when there were food shortages was to prioritise children and cut meals for adults, hence the household food access scale showed that only 52% of households were food secure as compared to 71% of children. In the focus group discussions the caregivers



mentioned that the household chooses to give children food if there is a shortage: *“We simply cut the size of the meal so that everyone gets an equal share”*; *“I’d rather go hungry but give my child the food”*. As stated by Jacobs *et al.* (2008), at less severe levels of food insecurity, household food managers (usually mothers) trade off food quality for quantity to prevent household members, especially children, from feeling persistently hungry.

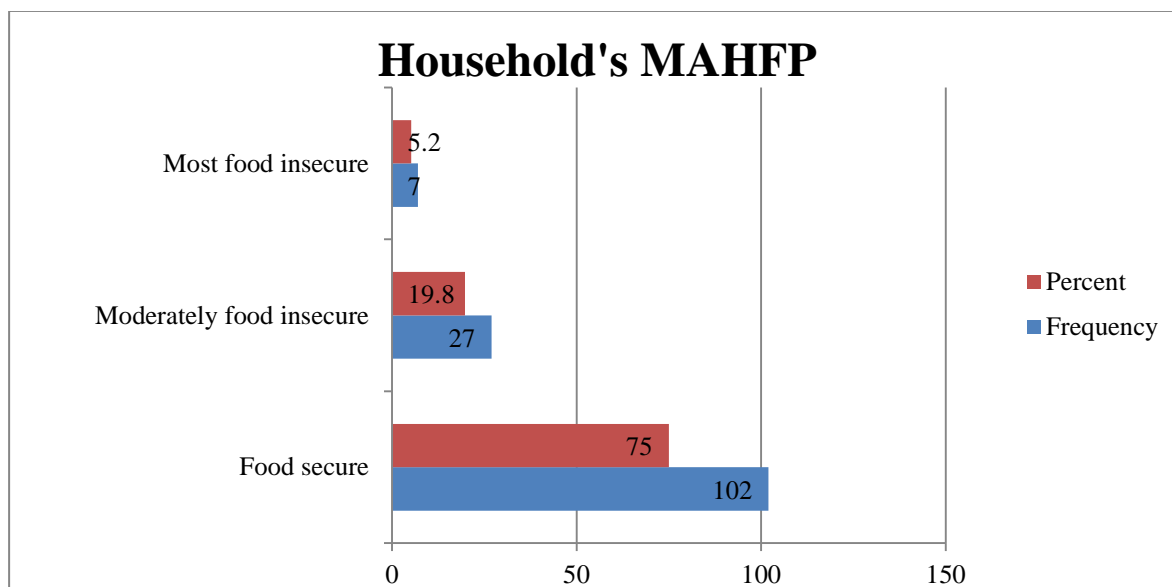
These findings also concur with the findings of several researchers that have reported on the complexities of measuring food security (Altman *et al.* 2010; Bonti-Ankomah 2001 & Casey *et al.* 2001). In the findings of this study, the food access parameter (economic and physical dimensions) has been proven not to be the fundamental problem for these households as the majority of both households and children were food secure (52%; 71% respectively).

Although the households were food secure and especially children were shown to be food secure, a number (moderately FI: 24%; FI: 5%) of children were still food insecure and were still registered in the NSP programme. The NSP programme supplies nutritional supplements to children to improve their nutritional status. Children on the programme receive treatment and support but 24% of the children were still moderately food insecure. The focus group discussions revealed that the treatment received by the children on the NSP programme was in some households shared amongst the family members of the household while in other households the supplements were not being consumed: *“Sometimes we share the supplements by giving other children in the house”*; *“He only likes the milk so I stopped giving him the other products”*.

These findings confirm that even though some of the households had more than one job, this does not always translate into better food security. Subsequently the question is what role does the generation of a stable income play in stabilising nutritional status? The household’s monthly ability to access food was explored next.

#### **4.3.1 The household’s monthly ability to access food**

The Months of Adequate Household Food Provisioning was used as a proxy measure of household food access. The findings showed that 5% of households did not have adequate food provisioning for an entire month, 20% had moderately adequate months and 75% had adequate months of food provisioning. This means that the majority of households were able to procure food for the entire period of six months without struggling. These results correlate with the household income, money spent on food, CFIAS and HFIAS, which showed that the majority of households were food secure. Figure 4.7 illustrates the households’ food provisioning over the period of six months.



Key note: Scales of 0=food secure, 1-3= moderately food insecure, 4-6= food insecure

**Figure 4.7: Households' Months of Adequate Food Provisioning**

The MAHFP tool showed that the households had adequate economic ability to purchase food over the period of six months. These findings prove that the households were food secure, as food was physically and economically accessible. This study has found that availability and access to food are not a fundamental challenge. However, the literature states clearly that limited economic power tends to be the key factor that leads to compromised dietary intake and most of the households included in this study fell within the ultra-poverty line (WHO 2009, citing Nishida, Webb & Nantel 2001). The following section reports on the findings regarding the dietary diversity of both the children and households in this study.

#### **4.3.2 Food intake of children and households**

Children's food intake was determined using the 24-hour dietary recall whereby the caregivers of the children reported on what their children had eaten during the preceding 24 hours. Statistics showed that 38% (n=52) of children ate three times a day, 32% (n=44) ate four times a day, while the rest ate once and/or twice a day. The 24-hour recall showed that children consumed more or less the same food at the various time intervals. This was complemented by the household food intake. Table 4.5 illustrates the type of food the children ate during the different time intervals within a period of 24 hours. These time intervals were reported by the caregivers that their children eat three times in a day, morning, lunch time and in the evening.

**Table 4.5: Food types most frequently consumed by children (24-hour recall)**

<b>Interval</b>	<b>Food Item</b>	<b>n</b>	<b>Percent (%)</b>
<b>First (morning)</b>	Energy food and/or cereals	54	39.7
	Vegetables	28	20.6
	Milk	13	9.6
<b>Second (lunch)</b>	Meat	31	22.8
	Milk	29	21.3
	Energy food and/or cereals	26	19.1
<b>Third (evening)</b>	Meat	39	28.7
	Energy food and/or cereals	32	23.5
	Nothing	22	16.2

Table 4.5 illustrates the typical daily food intake of children. The table shows that the majority of children ate more energy giving foods compared to other types of food. According to the Infant and Young Child Feeding Policy (IYCF) of SA, children at the age of 6 months are not satisfied with milk alone. Thus, the policy states that these children should receive supplementary feeding in the form of finger foods that are prepared according to the age of the child. In addition, the children's food intake was based on energy foods which are in accordance with the SAFBDGs that states: 'make the starchy foods part of most meals'. These are the new SAFBDG the Department of Health revised in 2012. In spite of this, children still require other types of food, such as protective foods (vitamins and minerals) and body building foods (proteins) (Labadarios *et al.* 2005).

According to the findings of this study, children consumed more-energy foods and less body building foods. A diet which is sufficiently diverse reflects nutrient adequacy. This statement is based on the fact that there is no single food which contains all the nutrients required for optimal health. Hence, the more food groups included in a daily diet the greater the likelihood of meeting the body's nutrient requirements. Monotonous diets, based mainly on starches e.g. maize and bread, are closely associated with food insecurity (Labadarios *et al.* 2008). According to the FBDGs, it is recommended that every South African should have a varied diet.

The focus group discussions revealed that the households procured more energy rich foods than other types of food because they are more affordable, have a longer shelf life and are more filling than other foods. Variety in a diet is important because variety ensures the

consumption of the various nutrients as recommended by the SAFBDGs. The children in this study showed almost no variety in their diets which were lacking in macronutrients (see table 4.5).

The findings of this study coincide with the National Food Consumption Survey (1999). Children consume higher amounts of energy foods as compared to other foods. This could have a negative impact in their growth and development since children with PEM require food rich in both energy and protein. The current findings showed that children consumed less protein rich foods, such as milk and meat, than their intake of energy foods. According to Steyn *et al.* (2006b), dietary diversity, which is an indicator for micronutrient adequacy, is low for South African children. This is associated with poor child growth. The type of energy foods consumed by children was mainly cereals, especially in the morning and porridge during the day and in the afternoon. According to the NFCS, children aged between 1-9 years consumed maize frequently and consistently, followed by whole milk and brown bread (Steyn *et al.* 2006a, citing Labadarios *et al.* 2000). The findings of this study show that protein rich foods were rarely consumed in the households included in the study.

Even though energy giving foods should be the basis of most meals, body building foods are also important in a child's life, especially as they are still growing and their bodies need to develop fully. The type of macronutrient that aids in this function is protein. As mentioned earlier, the PEM children not only lacked energy in their diets but also protein. Even though the programme provided the children with supplements that were rich in protein, it is also crucial that their daily dietary intake should also provide proteins. Supplements are not always available and of course they are there to supplement the daily diet and not to replace it. It is therefore important and to the children's benefit, that they consume food that is rich in protein such as eggs, fish, meat and legumes. Since the households complained that they neither have enough money to buy meat nor the proper storage facilities to keep it fresh, they could buy the cheapest types of protein, which are either beans or tinned fish.

#### **4.3.3 Household food intake**

The households' food intake was determined using the HDDS, which also illustrates the diversity of the diet consumed by the household. About 98% of households consumed cereals, 91% fats and oil, 89% sugar, 86% vegetables and 86% spices or condiments. These were the top five most consumed types of food in the households. The least consumed food were fish (12%) and legumes (24%).

**Table 4.6: Food types consumed by households**

<b>Food Item</b>	<b>n</b>	<b>Percent (%)</b>
<b>Cereals</b>	194	98.0
<b>Roots or tubers</b>	85	62.0
<b>Vegetables (<i>mainly spinach</i>)</b>	117	86.0
<b>Fruits</b>	61	44.9
<b>Meat, poultry, offal</b>	65	47.8
<b>Eggs</b>	50	36.8
<b>Fish</b>	16	11.8
<b>Legumes, nuts, pulses</b>	32	23.5
<b>Milk and milk products</b>	80	58.8
<b>Oils or fats</b>	124	91.2
<b>Sugar or sweets</b>	121	89.0
<b>Spices, condiments or drink any beverages</b>	117	86.0

Fewer protein products were consumed compared to other food types. In the focus group discussions it was discussed that fruits, milk and meat were the least often purchased because they are expensive and because the households lack suitable storage facilities.

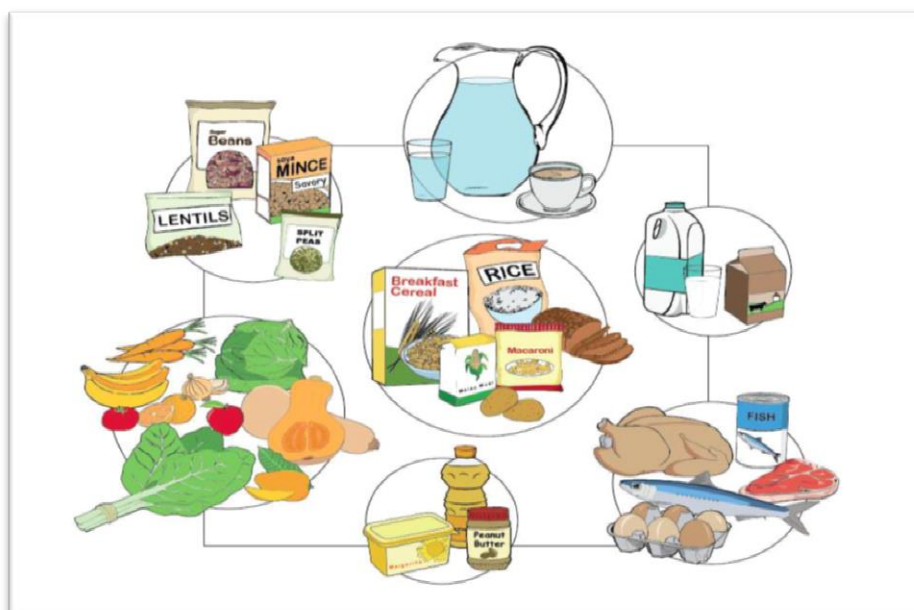
Comparing the food intake of the households and the children, it was apparent that the children consumed less vegetables compared with the other individuals in the households. This is surprising as in the focus groups it was mentioned that the children's food was not separated from that of the rest of the household and that in times of food shortages, food is given first to the children as a coping strategy. Even though these findings are surprising, they are the same as those of the NFCS (1999), which found that fruit and vegetable consumption among South African children was low because of poor access and availability (Labadarios *et al.* 2008). Table 4.7 illustrates the responses on household food baskets.

**Table 4.7: Responses on household food baskets**

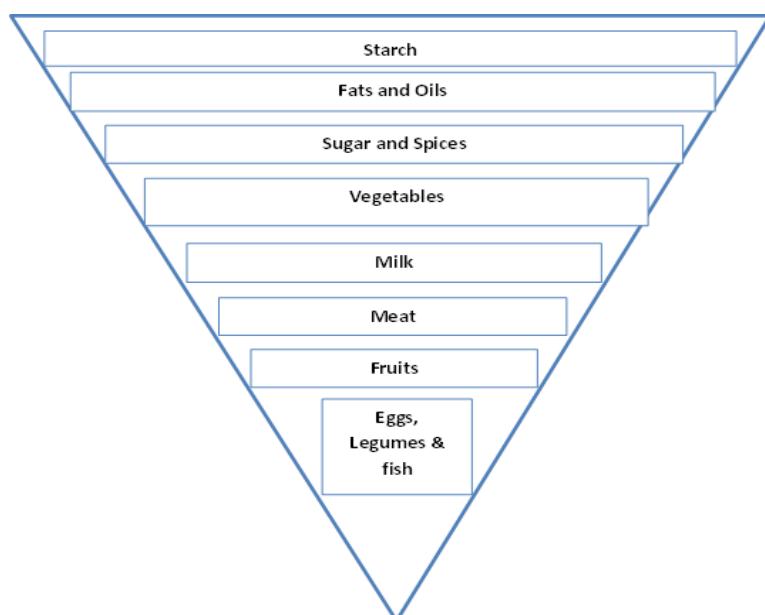
Question	Theme	Concept	Quotes	Discussion
Typical household food basket	Food basket	Food purchasing and selection decisions	<i>“We buy important foods that last longer like potatoes, maize, rice, flour and sugar”.</i>	The household purchases more of the energy giving foods compared to other food groups because they seemed less expensive compared to other foods. The household diet has more starchy foods than protective foods and body building foods.
		Preferences and decision-making influenced by shelf-life	<i>“It’s better to buy chips and cakes for children to take to school than fruits”.</i> <i>“Chicken is the better meat to buy because it’s not expensive compared to red meat or other meats”</i>	Buying monthly in bulk seems to be the easiest and most manageable way of buying. In some cases buying in bulk could result in food spoilage or loss of quality especially if there is no refrigeration.

As shown in table 4.7, households purchase staple foods such as grain products and sugar and chicken in preference to other meats. When a household food inventory was taken, it was found that the South African population particularly consumes grain products, especially in rural households (Altman *et al.* 2010, citing Labadarios *et al.* 2000). The rural food basket differed from the urban food basket in terms of nutrition content and diversity. This was due to poor household income (Altman *et al.* 2010). The rural households purchased more of the energy giving foods compared to other food groups because they seemed less expensive. Figure 4.8 illustrates the revised SAFBDGs for households and individuals in the form of

food groups and shows the proper distribution of food groups and the variety of food that should serve as a guide for South Africans (National Department of Health 2012). The circles for each food group in figure 4.8 illustrate the quantity and the order in which these foods should be consumed. The starchy food is placed in the centre which symbolises that it should part of most meals. The circle's diameter emphasizes how much that food group should be consumed. The smaller the circle, the lesser the food should be consumed. The bigger the circle, more the food group should be consumed.



**Figure 4.8: FBDGs in the form of food groups** (Source: National Dept. of Health 2012)



**Figure 4.9: Typical household food baskets**

As shown in Figure 4.9, the household diet contained more starchy foods than protective and body building foods: *“We buy important foods that last longer like potatoes, maize, rice, flour and sugar... it’s better to buy chips and cakes for children to take to school than fruits”*. The focus group discussions revealed that there was no special diet for children and the caregivers bought cakes and chips for children instead of fruits. Unfortunately, the caregivers did not realize that they were denying their children the food they need to grow and develop optimally. According to Kirkpatrick *et al.* (2010), this is a type of food deprivation as children’s access to nutritious food is compromised. It is understood from the findings that this action was not deliberate. It should be noted that the participants had genuine reasons for buying mainly energy foods rather than other types of food. The discussion revealed that the energy foods offered more benefits and suited their lifestyles. These include:

- Long shelf life requiring less cool storage facilities.
- They are more filling.
- They are affordable.

It could therefore be argued that the above reasons influenced the purchasing decisions and the contents of the household food basket. The limited economic power indirectly influences food and nutritional security as the caregivers wished to buy foods such as meat, milk and fruits but they require refrigeration, which they did not have. The participants mentioned that they bought chicken rather than red meat: *“Chicken is the better meat to buy because it’s not expensive compared to red meat or other meats”*. Even though chicken is much healthier it is clear that the decisions of these households were to some extent influenced by their limited income which in turn affected their food and nutritional status. According to UNICEF’s conceptual framework, one of the factors that affect the food security of poor households is their economic status (Faber & Wenhold 2007). Because nutritional security is directly related to food intake, this means that food intake reflects the underlying social and economic conditions of households as well as the ideological structures within a country (in this case a high rate of unemployment) (McIntyre 2003). Due to limited resources households choose to purchase cheap foods that provide energy and are more filling. This also means that their food supply will last longer than if they had bought meat and vegetables, which are regarded as food for special occasions or luxury foods.

The findings of this study do not differ from other reports that have been written on the subject of food baskets in South African households, especially for the rural poor. According to Altman *et al.* (2010), there is a marked difference in the dietary diversity of food baskets in rural areas as compared to those of urban households. Poor households, due to their limited



incomes, usually compromise their food basket and consume more grain products. However, such a food basket does not seem bad if the household has a vegetable garden to supplement its diet. This would actually be an ideal situation but it is unfortunately seldom a reality. The findings of this study show that 51% of households were not engaged in vegetable gardening regardless of the advice given to them by the clinic staff.

As indicated by the findings of this study, food quantity is not a good predictor of food security as quality is often overlooked when assessing food security.

#### 4.4 ANTHROPOMETRIC STATUS

According to Faber and Wenhold (2007), South Africa is amongst the countries with the highest incidence of malnutrition. Children's anthropometric status reflects their nutritional status. As mentioned earlier, nutritional status may be measured either by anthropometry, biochemistry, clinical conditions or by dietary history. Dietary history showed that children on the NSP do not have poor diets although their diversity is limited. Table 4.8 shows that about 63% of children had normal weight-for-height, 29% were severely wasted and 8% were overweight and/or obese.

**Table 4.8 Anthropometric status of children on the NSP**

Status	Age				Total	
	6 months	7-24 months	25-48 months	49-72 months	n	%
<b>Wasted/malnourished</b>	5	22	8	5	40	29
<b>Normal/healthy</b>	2	46	23	15	86	63
<b>Overweight/Obese</b>	1	5	2	2	10	8
<b>Total</b>	8	73	33	22	136	100

These findings show that children from 7-24 months were more severely wasted than the other age groups but they also formed the majority of those that had normal weight-for-height. These results show that the majority of children were healthy. These findings differ from those of previous studies regarding children's anthropometric status. The latest major study (SANHNES-1) performed in South Africa in 2012 found that 3.3% of 1-3 year old children showed wasting while the NFCS (2005) found that there was 6% wasting in children 1-3 years old (Kirkpatrick *et al* 2010; Arimond & Ruel 2004 citing Labadarios *et al.* 2000 &

SANHANES-1 2013). The findings of this study show that wasting has increased as compared to these two studies (refer to Table 2.1). The above findings may differ from those of studies carried out in the past due to various factors such as time, type of population and number of participants.

Even though the majority of children were healthy or had a normal weight-for-height, 8% were overweight and/or obese. Obesity could have resulted from their high intake of fat, sugar and energy foods and increased positive energy balance. According to Labadarios *et al.* (2008), there has been a major change from when the last survey was carried out in 1999 (NFCS). The SANHANES-1 showed that there was a high prevalence of overweight (36.4%) in children between 2-5 years while this study found that only 8% of children aged 6-72 months were overweight. There has been a gradual transition to a westernised diet characterised by energy-dense food. This has led to an alarming increase in overweight and obesity in children. Their diets show that they eat at least three times a day and consume high energy foods resulting in obesity.

### **Conclusions and recommendations**

Studies have shown that food security could be affected by poor household socio-economic status which leads to inadequate food intake. Socio-economic factors play a significant role in determining energy intake and diet quality. Inadequate food intake results in malnutrition. Therefore, improved food security status could lead to the improved nutritional status of children. Caution should be exercised though, as this study proved that there was no association between food access and nutritional security, thus food security does not automatically translate to nutritional security. In this study, children's state of malnutrition was not directly matched by the household's socio-economic and income status. The quantity of food was adequate but the quality of food consumed by children was poor. Enhanced food security focusing on improved and sustainable livelihoods, better socio-economic circumstances, nutrition education and improved practices, could promote better food diversification and intake. Food and nutrition security are complex concepts that require availability of food, economic means to acquire the food, physical access to ensure that food is available and adequate food that is safe and of good quality, are all equally important. Unintentional food deprivation was observed due to limited economic power compared to physical access hindering the ability to acquire nutritious food. This becomes even more crucial for children as they have special needs for their development and growth.

An emerging trend of overweight malnutrition was noticed during this research. This is a new challenge that is slowly developing amongst South African children. This condition will require new interventions and innovations. It will pose a challenge for food and nutrition experts/researchers/practitioners to come up with measurements and interventions to combat this type of malnutrition, as current measurements mainly focus on under-nutrition. Therefore, extensive and comprehensive research on food and nutrition security is imperative. Furthermore, caution should be taken to closely investigate the drivers, risks and interventions put in place to alleviate food and nutritional insecurity. To gain a better understanding of food and nutritional insecurity and its complexities will require further research.

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## CHAPTER FIVE: PAPER TWO

### **The Evaluation of the Nutrition Supplementation Programme: *The challenges and opportunities analysis***

#### **Abstract**

**Aim:** To determine the impact of the NSP and evaluate the challenges that affects its impact.

**Method:** A cross-sectional study was conducted on 136 children aged 6-72 months who were registered on the NSP and their caregivers. Focus group discussions and face-to-face interviews were conducted with the children's caregivers and the health workers at the facilities who were responsible for the operation of the NSP.

**Results:** The results of the study showed that the programme was only partially effective as it only addressed acute malnutrition and did not have strategies in place to prevent its recipient's from relapsing after their six month period on the programme had finished. The programme had more threats, weaknesses, and challenges than opportunities and strengths. It managed to correct the nutritional status of 63% (n=86) of children.

**Conclusion:** In order to address the problem of child malnutrition at a facility level, the Integrated Nutrition Programme helped establish the NSP which is a short-term programme. The NSP has been partially effective because of the well-trained nutritionists that run it and that the health facility health personnel have been trained on how to manage the programme better. However, several inadequacies remain.

## 5.1 INTRODUCTION AND BACKGROUND

The Nutrition Supplementation Programme (previously known as the PEM scheme) is a short-term intervention to address acute malnutrition. The utilisation of this programme has been improved, especially through the increased involvement of trained nutrition professionals. However, there are still many problems, such as the failure to enrol at-risk children, incorrect enrolments which deplete resources and failure to discharge children (Hendricks *et al.* 2003). Most important is the absence of community-based interventions, which could assist food insecure households and thus prevent the movement of children in and out of this programme (Andresen, Wandel, Eide, Herselman & Iversen 2009).

The NSP is a rehabilitation programme intended to last for a maximum of six months and is aimed at undernourished groups. The main components of the NSP are the provision of nutritional supplements according to age-specific criteria, including breast milk substitutes, infant porridge, ready-to-use-therapeutic foods (RUTFs), energy drinks and maize meal porridge, together with nutrition education and consultation on long-term solutions for the clients (Andresen *et al.* 2009). The ready-to-use-therapeutic foods have been shown to be effective in the treatment of severe and moderate wasting. These foods are energy-dense, micronutrient-enriched pastes often made of peanuts, oil, sugar and milk powder (Bourne *et al.* 2007).

The supplements are provided at primary and secondary health facilities on a monthly basis. The criteria for entry into the programme include underweight or growth faltering for at least two consecutive months for children < 6 years old; Z-score below -2SD; or growth faltering in the infant. Criteria for exiting the programme include adequate weight gain for three consecutive months for children <6 years (Bourne *et al.* 2007).

This paper aims to evaluate the impact of the programme on malnourished children.

### **Methodology**

In measuring the food access and food intake of the children on the NSP, a cross-sectional descriptive study was undertaken over a period of one month at the selected health institutions in Pietermaritzburg. The health institutions included one primary health care clinic, a community health centre and a public hospital, all of which implemented the NSP. The study involved 136 children between the ages of 6-72 months that were registered at one of the three facilities mentioned above. Caregivers of the children were found at the facilities when they brought their children for routine NSP check-ups. The researcher, assisted by the health

workers who were responsible for the operation of the programme, used the records of the facilities to identify children who were classified as malnourished.

Focus group discussions and face-to-face interviews were conducted with the children's caregivers and the health workers at the facilities who were responsible for the operation of the NSP. The health workers were recruited at the clinics when data was being collected on children. For each health facility, two health workers participated in the study. The focus groups were divided into three groups. Each health facility had a focus group discussion conducted. For each focus group, ten participants participated. The participants were selected when the caregivers consented on their children were being weighed. Data were captured and analysed using the Statistical Package for Social Sciences (SPSS) Version 21.0. Focus group discussions and key informant interviews were analysed using content analysis to identify themes.

## **5.2 RESULTS AND DISCUSSION**

This section provides the detailed findings of this study, showing the overall characteristics of the households of the children on the NSP as demographic information. It also presents the findings on nutrition and food security indicators, the impact of the NSP and the challenges affecting the impact of the NSP.

### **5.3 NUTRITIONAL IMPACT OF THE NSP ON MALNOURISHED CHILDREN**

The impact of the programme was measured in accordance with its objectives. The NSP is a rehabilitation programme intended to last for six months and aimed at undernourished groups. Children in this study were registered in the programme to improve their nutritional status through the provision of monthly supplements and nutrition education. Their nutritional status was monitored on a monthly basis by monitoring their growth at follow-up visits. Table 5.1 illustrates the short, medium and long-term objectives of the programme and whether they were achieved. This table assesses the overall objectives of the NSP, by including the objectives that the study focused on as well as those not focused on in this study.



**Table 5.1: Assessment of the NSP**

What was measured	Indicator/s	What was/ had to be done to achieve the objective	Results	Discussion
<b>Short term Objectives</b> - Improve acute malnutrition	Rate of wasting (weight for height/length)	Provision of nutritional supplements according to age-specific criteria on a monthly basis. Monthly monitoring of nutritional status.	Programme has managed to improve the nutritional status of 63% children. One hundred and thirty-six children were registered on the programme but only 63% were successfully rehabilitated. 8% of the children were obese while 29% were wasted.	<ul style="list-style-type: none"> <li>Even though the programme rehabilitated more than half of the children, there are concerns regarding the rest of the children who are either obese or wasted. The programme does not address over-nutrition and after six months children are discharged from the programme regardless of their current nutritional status. This needs a thorough review in order to help children both to correct over-nutrition and to prevent relapses.</li> </ul>
<b>Medium objectives</b> - Programme extending to other vulnerable groups such as pregnant and lactating women.	Rate of breastfeeding and maternal health.	Providing education and support to pregnant women during the pre- and post-natal period to encourage breastfeeding. Provision of food supplements for both the mother and the baby.	The NSP aims to improve the health of the child and the mother. According to the health care workers, the programme takes care of the nutritional needs of the mother and of the child. This study focused only on the nutritional status of the child and not the mother.	<ul style="list-style-type: none"> <li>Taking care of the mothers' health and nutritional status during pregnancy is said to have a positive effect on the babies' health when born and during their lifetimes (Bourne <i>et al</i> 2007).</li> </ul>

<p><b>Long term objectives</b></p> <ul style="list-style-type: none"> <li>- Prevent an increase in mortality due to lifestyle diseases.</li> <li>- Improving chronic malnutrition (stunting).</li> </ul>	<p>Mortality rate</p> <p>Stunting: the study did not analyse stunting as the programme's goal is to treat severe and moderate wasting rather than treating stunting.</p>	<p>Correct the causes of malnutrition by addressing poor food intake (supplements issued).</p> <p>The study did not take this objective into consideration.</p>	<p>The programme did not directly correct poor or inadequate food intake but rather gave food supplements to correct nutritional status. Correction of poor food intake should have been corrected by nutrition education.</p> <p>Stunting is a long-term indicator of nutritional deprivation. The study did not analyse stunting as it takes time to be corrected and can only be reversed in children younger than two years of age.</p>	<ul style="list-style-type: none"> <li>• The literature showed that PEM was one of the causes of child death. Hence, the programme aimed at reducing the mortality rate by addressing one of the causes of child mortality.</li> <li>• The study did not focus on assessing stunting because it is a long-term complication of malnutrition. According to the literature, it can only be reversed or corrected in children younger than two years of age. After this, stunting cannot be reversed. This study did not take stunting into consideration as it takes a long time to be corrected, while weight can be used for the short-term monitoring of malnutrition since it can be corrected more easily and rapidly. This study focused only on acute malnutrition.</li> </ul>
<p><b>Target</b></p>	<p>Programme targeted children aged from 6-72 months.</p>	<p>These were children who visited local authority clinics on a</p>	<p>According to the register that is used to administer the children on the programme, the criteria for</p>	<ul style="list-style-type: none"> <li>• The criteria for registering the children in the programme were satisfied as</li> </ul>

		monthly basis.	inclusion of the children in this study were met by assessing their nutritional status using anthropometrics.	children's growth status was assessed according to growth charts. These children were either suffering from or were at risk of malnutrition.
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The goals of the programme on which the study focused were achieved but only partially as not all children were rehabilitated, thus the new problem of obesity arose and some children suffered from wasting. The problem with the programme is that it discharges recipients after six months with no further follow-up on their nutritional status. Another issue is that there are no strategies in place to correct over-nutrition within the programme unless there is collaboration with other programmes within the government sector. Other objectives of the programme could not be assessed as this study focused only on the nutritional status of children aged 6-72 months.

The NSP objectives were further confirmed by the assessment of food and nutritional security measurements undertaken in this study. Table 5.2 demonstrates the various indicators used to show the impact of the programme at both the household and individual levels.

**Table 5.2: Indicators for assessing food and nutritional security conditions**

Category	Indicator	Example	Discussion
Food security	Food production	- Home vegetable gardens	Forty nine percent of households participated in active vegetable gardens to improve their dietary diversity and food intake. This percentage is almost half the households, which means that only half of the households used the advice given by the clinic. Although only half of them participated in vegetable gardening, the focus group discussions revealed that households had challenges as discussed earlier that hindered them from participating in vegetable gardening.
	Dietary diversity	- Number of different food/food groups eaten - Number of meals eaten per day	This indicator acts as a proxy for the quality of the diet. The households that were part of this study had a diversified diet according to the HDDS but the quality of their diet was questionable because there was a lack of balance between the food groups. The food group that dominated or that was consumed the most included energy giving foods (starch, fat and oil).The protective foods (fruits and vegetables) were consumed least often.
	Income	- Income from all possible sources (salaries, social grants, production sales).	The majority (61%) of the households in the study had a combined income of over R1000 a month although the study showed that they were informally employed.
	Household expenditure	- Food expenditure	How the household spent their money on food depended on their income and the knowledge they had regarding the nutritional value of the different foods. The majority of households (62%) in the study spent between R200-1000 per month on food.
Nutrition security	Nutritional status	- Anthropometrics (Weight-for-height)	Twenty nine percent of the children in the study were wasted, 8% were obese and 63% had their malnutrition corrected and had a normal Z-score by the end of the programme (above or below median reference value). Even though 63% of the children were well nourished, the problem of obese children who suffer from over-nutrition remains.

## **5.4 HOME VEGETABLE GARDENS**

One of the fundamental objectives of the NSP is to encourage the development of household vegetable gardens so that households continue to follow healthy eating habits even after the programme. The findings of this study show that 51% of households did not engage in vegetable gardening regardless of the advice given to them by the clinic staff. The 49% of households that had active vegetable gardens planted spinach, cabbage, carrots and maize. These vegetables showed diversity in terms of colour and nutrient content. Their nutrient content represented different vitamins and minerals with starch found in the maize. The households mentioned that they planted these vegetables because they were familiar with them and that other kinds of vegetables did not grow well. An overwhelming 80% were not involved in livestock farming. The focus group discussions revealed that the clinics encouraged households to practise subsistence agriculture to ensure a diverse diet and to act as a buffer in times of economic strain: *“We are advised to have gardens; they tell us to plant; we value the nurses advises but sometimes it is not realistic”*. The households who were not active in gardening mentioned that the challenges they faced included limited land, and a lack of seeds and fencing, which hindered their active participation in gardening. To resolve these challenges the programme coordinators could integrate with other government departments (Department of Agriculture) since the NSP is one of the focus areas of the Integrated Nutrition Programme that aims to address all the causes of malnutrition. The Department of Agriculture could help with seedlings and strategies to overcome the hindrances households’ experience.

## **5.5 DIETARY DIVERSITY**

The objective of the NSP programme was to combat malnutrition among children younger than six years of age by correcting under-nutrition by means of targeted nutritional supplements as well as by providing nutrition education and counselling. Only half of the households were practising what was taught at the clinics. Thus, this poses a challenge to the programme to devise ways to address this challenge if it aims to improve dietary diversity. Earlier it was highlighted that the households in the study did not follow the dietary guidelines of the SAFBDG. They consumed more energy foods and less protein. The NSP aims to treat PEM but the households in the study consumed insufficient protein thus reducing the impact of the programme. Even though the nutrient content of the supplements was adequate to address PEM, the programme also wanted its recipients to consume a diet that

contained energy, protein and other nutrients. The households failed to meet this requirement due to the challenges that have been discussed above. Hence, protein deficiency might still be a challenge in the diets of the recipients.

## **5.6 HOUSEHOLD ECONOMY**

Even though the majority of households had more than R1000 combined income per month, this did not prove to be a sustainable resource as, according to the focus group discussions, some members of a household had more than one job to improve their income. The study showed that 24% had informal employment and only 2% were self-employed. The rest were students (8%), lived on social grants (17%) or remittances (2%). All of these sources of income bring money into the households, but they are neither sustainable nor reliable as they are not stable and are dependent on certain individuals. This affects the impact of the NSP, because unsustainable income could affect food availability for the recipients of the NSP and defeat attempts to improve nutritional status.

Household food expenditure was almost the same as their monthly income. This means that the households spend almost all of their income on food. In spite of this, the food that they procured did not meet the guidelines of the SAFBDGs. This means that they spend their money purchasing large quantities of staple foods rather than other types of food. These findings correlate with the findings of the NFCS (1999). If the households use all of their income to buy only staple foods, their dietary diversity will be affected. The impact of the NSP will not be effective if households overlook the nutrition education provided by the programme which advises them to eat a variety of foods to improve their nutritional status. The nutrition education needs to teach people how to purchase a variety of foods with a limited income.

## **5.7 NUTRITIONAL SECURITY**

With regard to the 63% of children on the programme that have been rehabilitated, it is possible that they could be re-admitted to the programme. The programme does not consider the long-term prospects of the child after discharge and the possibility that malnutrition could recur as the programme does not deal thoroughly with household food intake. The programme seems to have corrected under-nutrition, but does not focus on children that are obese. Childhood obesity and the prevalence of overweight are more common in developed countries. Recently the trend has shifted and childhood obesity also occurs in developing

countries. South Africa has been found to be one of the countries that have a high prevalence of obesity and overweight in children (Chopra 2003). Overweight and obese children could be a problem in the long-term, when they become adults (Chopra 2003). Hence it is important that the programme devises methods to address this problem.

Table 5.3, assesses the strengths, weakness, opportunities and threats (SWOT) of the NSP in order to aid in improving its impact on the lives of its current and prospective recipients.



## 5.8 SWOT ANALYSIS OF THE NSP PROGRAMME

**Table 5.3: The SWOT analysis of the NSP as a programme**

<p><b>Strengths of the NSP programme</b></p> <ul style="list-style-type: none"> <li>- Offers an opportunity to correct malnutrition within a specified period.</li> <li>- Government funded programme.</li> <li>- On-going programme.</li> </ul>	<p><b>Weaknesses of the NSP programme</b></p> <ul style="list-style-type: none"> <li>- Uses a traditional nutrition education approach that does not address the socio-economic issues contributing to malnutrition.</li> <li>- It is not a multi-focal approach but rather an educational or instructive approach.</li> <li>- Only aims to correct the manifestation rather than the causes.</li> <li>- Absence of systems in place to follow-up on children that have absconded from the programme.</li> <li>- Low coverage of malnourished children (limited to those that attend clinics).</li> <li>- Does not focus on over-nutrition.</li> </ul>
<p><b>Opportunities for the NSP programme</b></p> <ul style="list-style-type: none"> <li>- It is integrated with other primary healthcare nutrition-related interventions such as growth monitoring, case management of nutrition related disease, counselling and micronutrient supplementation.</li> </ul>	<p><b>Threats to the NSP programme</b></p> <ul style="list-style-type: none"> <li>- Products being unavailable from the producer.</li> <li>- Ineffectiveness of the products and nutrition education.</li> <li>- Patients refusing to adhere to the intervention.</li> <li>- Patient's environment not conducive to implementing the teaching or nutrition education.</li> <li>- Relapses and re-admissions.</li> </ul>

The literature has noted that interventions often overlook the involvement of the targeted population when planning, designing and implementing programmes, thus the programmes become superficial as they do not address the real issues on the ground (Grover & Ee 2006 & Hendricks *et al.* 2003). In this study, the focus group discussions verified this statement as the caregivers mentioned their challenges. There were various challenges that were mentioned as being the reasons why other children's nutritional status was not improved. The focus group discussions stipulated that some of those reasons included inconsistent supply of supplements, sharing of the supply and variable consumption of the supply. Table 5.4 provides a more detailed discussion.

**Table 5.4 Challenges affecting the impact of the NSP programme**

Question	Theme	Concept	Quotes	Discussion
Do you think the NSP made a positive impact on your child's health?	Challenges affecting the impact of the NSP.	Inconsistent supply	<i>"The supplements do help; it's just that we do not get them monthly because they get finished"</i> .	The NSP helps the children but the caregivers reported that they do not regularly bring the children to the clinic to collect supplements because of costs or sometimes the child gets well soon.
		Sharing of the supply	<i>"Sometimes we share the supplements by giving other children in the house"</i> .	Some children get well after consuming the supplements, provided they follow the instructions and they only treat them as supplements. For some there are no changes, since the supplements are shared amongst other children or sometimes even with adults.
		Not all the products supplied were consumed	<i>"He only likes the milk so I stopped giving him the other products"</i> .	Some stated that their children do not like the taste of some of the products and they have reported this to the clinic.

Table 5.4 draws attention to issues of behavior and the effect of socio-cultural factors. It could be contended that the factors mentioned above could be regarded as drawbacks in the

progression of the programme. The question was whether the programme was designed to deal with such challenges. It is imperative that such programmes, from their initiation, should infuse strategies to deal with behavioral and socio-cultural factors as they can be detrimental in achieving food and nutrition security.

The caregivers were asked if the nutrition advice they got from the nurses at the health institutions helped them in taking care of their children. They said that the advice was not realistic. Table 5.5 shows the responses on the value of nutrition education given at the clinics.

**Table 5.5 Value of nutrition education**

Question	Theme	Concept	Quotes	Discussion
Do you value the clinic's advice on children's diets for them to grow well?	Advice versus health	Negative attitude towards the advice given at clinics.	<i>"Of course we value their advice but sometimes it's not realistic". "Often they tell us to give children vegetables and fruits, not thinking that these foods are expensive and some of us are not working".</i>	In as much as the caregivers value the advice given by the health care workers, they rarely put it into practice because it is viewed as impractical, as most of the food suggested is expensive.
		Knowledge versus actual practice.	<i>"They advise us to breastfeed breast milk only for the first 6 months, but it's impossible because we need to go to work or school".</i>	Knowledge does not translate into behaviour. The circumstances of the caregivers results in negative attitudes that undermine the health knowledge given by the clinics.

Health and nutrition education are believed to play an important role in addressing malnutrition (Pilgrim, Barker, Jackson, Ntani, Crozier, Inskip, Godfrey, Cooper & Robinson 2011). In this study, the findings show that the nutrition education or messages should be designed to suit the realistic situations of the targeted population. The caregivers' criticism that the health and nutrition messages were unrealistic meant that they disregarded

them. There is an urgent need to redesign health and nutrition messages to directly address the modern societal needs and lifestyle without compromising the children's health status. Exclusive breast feeding for the first six months of the child is important. However, what should be done if the mother is a teenager who needs to go back to school and there are no proper facilities for breast milk extraction and storage? An intervention to address these growing trends and conditions is required. The intervention should be accompanied by information on nutritious weaning foods.

## 5.9 CHALLENGES FACED BY HEALTH PRACTITIONERS

There were challenges that were mentioned by the health practitioners during their interviews concerning the programme. These included:

**Table 5.6 Challenges faced by health practitioners**

Theme	Issues
Supply of supplement products	<ul style="list-style-type: none"> <li>• Inconsistent supply of products.</li> </ul>
Shortage of staff	<ul style="list-style-type: none"> <li>• Shortage of staff or high turn-over of staff, thus unable to provide quality service to the NSP clients.</li> </ul>
Training	<ul style="list-style-type: none"> <li>• Concerns about irregular and forever changing supplies without new training.</li> </ul>
Poor monitoring systems	<ul style="list-style-type: none"> <li>• Repetition of the same information and no new research on the programme to improve its operation since there are no monitoring systems in place.</li> </ul>
Clinic attendance	<ul style="list-style-type: none"> <li>• Poor follow-up of the clinic's patients and inability to track them.</li> </ul>
Poorly designed programme	<ul style="list-style-type: none"> <li>• Top bottom approach by the department. The top-down approach functions when the government does not involve the citizens for their input when planning and designing programmes for the people.</li> </ul>

## 5.10 KEY FINDINGS WITH REGARD TO THE EVALUATION OF THE NSP

Numerous problems with the NSP which could limit its impact on the nutritional status of children have been identified. The impact of the NSP on the nutritional status of the children was determined by carrying out growth assessment, since the main objective of the NSP is to improve acute malnutrition in children. In order to assess nutritional status, the appropriate

indicators need to be in place to avoid any errors. It appears that the programme has more weaknesses and threats than strengths and opportunities. Even though the programme rehabilitated more than half of the children, there are concerns about the rest of the children, some of whom are either obese or suffer from wasting. The programme does not address over-nutrition and children leave the programme after six months regardless of their current nutritional status. Hence, this needs to be thoroughly reviewed in order to help children both to correct over-nutrition and to prevent relapses.

Some of the weaknesses that were identified were due to the challenges that the health professionals face with the inflexible guidelines of the programme and the unrealistic counselling that it offers to caregivers. Numerous other factors that the study did not investigate may have limited the programme's impact on the growth of children. It is important that the programme is routinely evaluated so as to remove any errors and improve its objectives for the community it aims to serve. Underpinning the programme should be the initial and on-going training of clinic staff and a standardised monitoring system.

This study also showed that food and nutrition security are complex concepts. They both require consistent analysis, since both of these are related and affect one another. Food access symbolizes the household's ability to meet nutritional requirements. Adequate access to food promotes sufficient dietary intake and together with good health and child care, this results in food security (UNICEF Framework). Hence, it is important that whenever food security is measured it also takes nutritional security into consideration, as they could influence each other, either negatively or positively. Also in measuring the two concepts, it is necessary to determine the immediate and root causes of the problems involved, using proper indicators.

A holistic approach is essential for the NSP to be effective as it cannot operate on its own. Operating in a joint approach will mean that the programme could produce substantial outcomes. Malnutrition results from a variety of factors that affect each other, not only involving health but also other aspects (economy, policies, and social issues). Thus, it is imperative that the NSP involve other actors and stakeholders (community, government and non-governmental organisations). The department of health can tackle the health concerns, while other departments tackle other issues that hinder the full impact of the NSP (for example, the department of social development could examine social issues).

Behavioural and socio-cultural contexts are often overlooked when developing programmes. Only when challenges emerge is attention given to them. This affects the programme's impact

and effectiveness and in the process resources are misused or wasted. Government's use of top-down or hierarchical approach damages the programme's effectiveness even though the programme has good policies on paper. Failure to monitor and evaluate the programme timeously also affects its goals because the program is no longer weighed and checked to ensure that it still meets its objectives. Failure to do this means that the programme continues to operate in an unsatisfactory manner and no innovative strategies are devised to help it get back to its objectives.

It is important at the initial stage, when the government designs programmes, that the community should be involved. At least the individuals that will represent the community's views should be consulted; otherwise the government may implement a programme that will be ineffective. Another important point is that the government should first run a pilot programme to check if it will work before investing resources in something that will collapse or will not have the desired effect.

## **5.11 CONCLUSIONS AND RECOMMENDATIONS**

Despite the existence of clear guidelines for the programme on what it aims to achieve in order to address malnutrition, there still remain challenges that affect the proper implementation and impact of the programme on its recipients. To overcome these challenges, the programme should consider expanding into the community so as to achieve prevention rather than treatment. The programme should also capacitate more community caregivers (CCGs), since they are already within the community and they know and understand the community. The CCGs could be utilised to maximise community access and coverage by linking preventive and promoting child health services to the community so as to reduce the overall morbidity and mortality of under-five children. Severe cases identified by the CCGs could be referred to the health facilities, while minor cases could be addressed at community level. Also, since the department of health already has well-trained nutritionists in its employ, they could be used to provide formative and effective nutrition education that caters for all classes in the community, to promote diversified diets to improve diet quality and nutrient intake to meet the daily recommended needs. Part of the education given in health facilities should focus on how a balanced diet can still be achieved with a limited budget

Linkages with other government departments should be revived and strengthened since there are a variety of causes of malnutrition (UNICEF conceptual framework).

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## CHAPTER SIX: PAPER THREE

**The Multifaceted Nature of Food Insecurity:** *Measuring the food and nutritional security of malnourished children on the NSP programme in Pietermaritzburg, South Africa.*

### 6.1 INTRODUCTION

The internationally accepted definition of food security includes the following: “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (Barrett 2010). The Integrated Food Security Strategy (IFSS) defines food security as “the right to have access to and control over physical, social and economic means to ensure sufficient, safe and nutritious food at all times to meet the dietary food intake requirements for a healthy life by all South Africans”. Webb, Coates, Frongillo, Rogers, Swindale and Bilinsky (2006) describe food security as complex and multifaceted with a range of factors which impact on food supply, access, adequacy, utilisation and acceptability. Researchers over the years have derived indicators that are used as proxies to measure food security which include dietary diversity, food storage and nutritional assessments such as anthropometric indicators.

FAO (2002) explained that food security has dimensions that are interconnected, but they can also exist in isolation and be measured in isolation, as determining one dimension of food security does not mean that all four (availability, access, utilization and stability) have been determined. Barrett (2006) noted that the “pillars of food security are intrinsically hierarchical, with availability important but not adequate to ensure access, which is also important but not sufficient for effective utilization”. Stability involves both the availability and access dimensions of food security (Nathalie 2012, citing Webb & Rogers 2003).

It has been said that food security is complex and multifaceted and that its measurement is also complex, expensive and thus challenging. Understanding its complexity helps in developing the tools necessary to measure it. These tools are supposed to capture all its dimensions, but as FAO (2002) mentions, although the dimensions are interrelated they can be measured in isolation. Hence, measurements of food security are important because they widen the understanding of the current causes of chronic food insecurity and help in detecting early warnings and in predicting problems in relation to food insecurity.

This study hopes to explore the existing tools or indicators that have been used and are still used in SA as well as globally. It also unravels the limitations, the gaps and the strengths involved in using these tools. Present tools for measuring food and nutritional security are



studied and the ways in which they relate to one another are assessed. In order to achieve this, the paper reviews other researcher's views of the complexities of measuring food and nutritional security and then adds the experiences encountered during the collection of data for this study.

## **6.2 THE CONUNDRUM OF MEASURING FOOD SECURITY**

Food security is defined by four parameters which are food availability, access, utilisation and the stability of household food systems (FANTA 2003). None of these aspects can be measured using a single tool. Using different tools simultaneously provides valuable information and counterbalances the deficiencies of a single tool thereby increasing the researchers' ability to obtain multiple perspectives from the results. Additionally, each tool separately provides contextual information which is useful in understanding the consequences of poor access to food. However, more complete information is obtained when the tools are used together (Grimes & Schulz 2002). According to Weingartner (2010, p56), food and nutritional security exist when individuals have a satisfactory utilization of their diet that is adequate in quantity, quality, safety and socially acceptable in order for them to live a healthy life. On the other hand, nutritional security cannot be fully and accurately assessed and analysed by using only one indicator. As the current problems of food and nutritional insecurity are complex, identifying and choosing relevant indicators is crucial (Hanie, Gerber & Torero 2013).

There has been extensive research and progress in identifying relevant food and nutritional security tools, sometimes also leading to uncoordinated and overlapping information systems (Weingartner 2010, p60). Even though the existing tools may produce errors and their reliability is limited, they are still necessary to monitor progress in achieving the goals set for food and nutritional security (Fan 2012).

The dearth of proper tools to measure all the dimensions or aspects of food insecurity, results in researchers using proxies to measure food insecurity (FI). Sometimes it leads them to use more than one tool as they want to capture all four aspects that are contained in the definition of FS. In South Africa more than one tool has been used to capture FI as there is still no single tool that will measure all aspects of FI. Using so many different tools has resulted in South Africa not having a clear picture of food security (FS) (Chitiga-Mabugu, Nhemachena, Karuaihe, Motala, Tsoanamatsie, Mashile & Ngwenya 2013). According to Webb *et al.* (2006), "measuring FI itself needs direct indicators and that they are best measured by observing households over time together with in-depth interviewing of its members".

In other countries, tools such as the Household Food Insecurity Access Scale (HFIAS), Child Food Insecurity Access Scale (CFIAS), Household Dietary Diversity Score (HDDS) and Months of Adequate Household Food Provisioning (MAHFP) have been used to assess food security in different ways. The HFIAS assessed different aspects of the access component (not only enough food but also food preferences); the HDDS measures dietary quality but it is also a measure of access (more food groups reflects a better access to food); while the MAHFP only asks if households have adequate food provisioning.

The reports from other countries on the use of these tools simultaneously showed similarities to the South African experience. Rose and Charlton (2002) gave an overview of frequently used household food security measurement methods and one national food security measurement method. The researchers further stated that some of these tools need improving. Anthropometry is not frequently used as it has been observed that it is not directly related to food security. Indicators used to determine food intake are adequate to measure food security, but they mostly require time, are costly and require trained personnel. It was found that the HDDS failed to estimate foods consumed outside the household, exchanged as gifts or in payment for work (Chitiga-Mabugu *et al.* 2013; Nathalie 2012).

The literature reports on a number of tools that have been used to measure FS. Some are out-dated; others are not practical while some are used frequently (Nathalie 2012). All of them have their flaws, and none is perfect. Use of these tools in other parts of the world showed clearly that there is still a great need for them to be improved (Chitiga-Mabugu *et al.* 2013).

The general consensus is that there is no perfect tool to measure FS that is without limitations. Thus, using more than one tool seemed to be the best choice to reduce the chance of errors and to minimise the limitations of using one tool (Nathalie 2012).

Various South African researchers have used different methods of survey design and different variables to define and measure food insecurity (Jacobs 2010 and Labadarios, Davids, Mchiza & Weir-Smith 2009). The approach adopted for this study firstly reviews national surveys which used more direct measures of food insecurity (FI), namely: the October Household Survey (OHS); the National Food Consumption Survey (NFCS 1999); Income and Expenditure Survey (IES); National Food Consumption Survey: Fortification Baseline-I (NFCS-FB-I 2005); the FI and Vulnerability Information Management System (FIVIMS; regional study); Department of Agriculture (South Africa 2007); IFSS and the South African Social Attitudes Survey (SASAS) (Labadarios *et al.* 2009). These were followed by national surveys which used more indirect measures of FI, such as the General Household Survey (GHS); Income and Expenditure Survey (IES); Labour Force Survey (LFS); Community

Surveys and the national HIV/AIDS surveys (Labadarios *et al.* 2009, citing Statistics SA (2008a); Statistics SA (2008b); Statistics SA (2008c); Statistics SA (2008d) & DoH SA 2002-2007).

As mentioned above, South Africa has many instruments that are used to measure various aspects linked to food security. However, it lacks a national survey which assesses all the dimensions of food insecurity. A key weakness in using these instruments is that there were inconsistencies in the phrasing of questions which made comparisons over time difficult. A shortcoming of the NFCS is that it only assessed food procurement, anthropometric indicators and food inventories in households that had children between the ages of 1-9 years. Households without children or with children younger than one year were not assessed, so the findings were limited.

Even though the FIVIMS is an internationally developed tool, it failed to directly determine the food security status of South Africa as it only provides information about geographic areas and sectors of populations that suffer from hunger or malnutrition (Chitiga-Mabugu *et al.* 2013). The GHS also focuses on hunger over time and not on FS while the IES only collects information about sources of income and patterns of household expenditure and does not directly measure FS. The IFSS used daily energy intake and income earning capacity to determine FI. Using all of these instruments in South Africa raised the question as to whether there is a clear picture of the FS status at all levels in the country. These instruments focus on different categories, for example, those that concentrate on availability indicators ignore individual nutritional status and focus on the national food supply. Food expenditure and access indicators measure monetary values of food as a proxy for food consumption and exclude individual nutritional status (Chitiga-Mabugu *et al.* 2013 & Webb *et al.* 2006).

According to Chitiga-Mabugu *et al.* (2013), using the GHS and the NFCS to determine hunger in the population raised conflicting evidence as these tools showed different percentages, and thus it was unclear which percentage should be used to classify hunger in South Africa. This shows the difficulties of using more than one tool to measure a single dimension of FI. It is best if only one tool is used for each dimension of food insecurity in order to avoid these problems. From all of this it is clear that South Africa still has a long way to go in developing or improving a tool(s) so that it will measure FS directly without ignoring all its dimensions.

Furthermore, Nathalie (2012) states that research regarding food security status in South Africa has already been carried out by Rose and Charlton (2001), Aliber (2009) and Labadarios *et al.* (2011).

Nathalie (2012) conducted a study in the Limpopo province of South Africa, which measured the food security status of households in the province by means of six different food security indicators and five classifications. The indicators used were the HFIAS, the HDDS, the MAHFP, food over household expenditure, food poverty (FP) and Low Energy Availability (LEA), since the literature indicates that it is better to use several dimensions of food security. According to Nathalie's study, using multiple tools had a positive outcome as the tools were designed differently and captured different dimensions of FS. These tools showed different results that together formed a picture of the overall status of FS in Limpopo, even though they also had their downfalls. For example, the results of the HFIAS differed from those of the LEA. The HFIAS showed that few households in Limpopo were food insecure whereas the LEA showed a higher percentage of food insecurity. This made it difficult for the researcher to choose which tool to trust and so the report includes results from both. It was explained in the study that the LEA uses recommendations and estimations, whereas the HFIAS is based on people's perceptions (Nathalie 2012).

Nathalie (2012) explained that all five tools were chosen as a review of the literature revealed that it is better to use several tools to classify household food security. Even though Nathalie's results were not integrated into the national surveys of South Africa since it is a new study, the methods used were similar to those used by other studies done in South Africa (Nathalie 2012, citing Kirkland *et al.* 2011 & Rose & Charlton 2002). This study used tools that were to a large degree similar to those used by Nathalie. All of these tools showed associations to one another (table 6.1) and with household income, just as in Nathalie's study except that in Nathalie's study the associations were between household expenditure and the HDDS and the MAHFP.

In choosing suitable tools to measure food security, it would be advisable to take the route of other researchers (Nathalie 2012, citing Kirkland *et al.* 2011 & Rose & Charlton 2002) as they combined tools to determine FS directly as they understood the definition of food security and its complexities. If one tool were to be used, it would mean that it would have to take all four aspects into consideration. The tool would also have to be adjustable to suit all levels (national, household and individual). Since such a tool does not exist, using more than one tool is the only solution. As noted above, in examining FS, availability is determined mostly at the national level while access and utilization are determined at household and individual levels, thus it would be wise to combine tools that determine these aspects at different levels.

### **6.3 THE DICHOTOMY OF FOOD INSECURITY: FOOD SECURITY AND NUTRITION MEASURING TOOLS**

Food security is complex in that it entails four dimensions, namely availability, access, utilization and stability over time, as previously mentioned. In choosing the most appropriate tool to measure FS, one need to be sure that it will encompass all four of these dimensions. This study took into consideration the complexity of food security and so chose to use more than one tool to ensure that all aspects were covered. The nutritional security of the children included in this study was measured using two tools: anthropometry and 24-hour recall (dietary intake) (Saaka & Osman 2013). The other two tools used to determine nutritional status (biochemical and clinical factors) were excluded as they are expensive, intrusive and require a thoroughly trained researcher (dietician). The clinical factors require a trained dietician or physician who can assess nutritional status using clinical observations.

All of the tools used by Nathalie (2012) were used in this study together so that consensus could be reached with regard to FS. The study concentrated on FS and NS in children; hence the tools were adjusted to suit children. In adjusting them the challenge was to accurately discover the exact dietary diversity of children. These tools did not show whether the FS status found was transitory or chronic. Since the study also aimed to measure FS at two levels (individual and household), it was imperative that more than one tool be used (Saaka & Osman 2013).

Since there are various factors that affect food and nutritional security, the same factors need to be addressed to improve both FI and NS. Interventions have been developed in the past to address food insecurity and malnutrition. For these interventions to be effective, it is fundamental that the indicators used to measure FI and NS are evaluated timeously.

Research on the relationship between household food insecurity and the nutritional status of children has produced mixed results. Whereas some studies have reported a positive association between household food security and childhood growth indicators such as weight gain, others have found negative associations with weight and height gains amongst children (Saaka & Osman 2013).

A recent study carried out in Nepal reported that the level of household food insecurity was not significantly associated with stunting, underweight, or anaemia among children under two years of age after controlling the socioeconomic status, maternal height, education and infant feeding practices (Saaka & Osman 2013). However, among children under two years in rural Bangladesh, higher food security was associated with better growth outcomes, including weight and length gains (Saaka & Osman 2013). Similarly, in Colombia, stunting and

underweight among pre-school children were significantly inversely associated with household food security, implying that greater food security was associated with lower levels of stunting and underweight (Saaka & Osman 2013). It appears that the measure of food insecurity used and the study population may explain the discrepancies that exist in the literature. As noted in the present study, the HFIAS does not appear to be sensitive to changes in the nutritional status of children.

A study conducted in eight countries, including South Africa, assessed food insecurity and nutritional status in children aged 24-60 months. The study found that in South Africa over 50% of the children were stunted though none suffered from wasting, which indicated that food security was significantly associated with stunting, but not with wasting (Psaki, Bhutta, Ahmed, Ahmed, Islam, John, Kosek, Svensen, Miller, Richard, McGrath, Seidman, Caulfield & Checkley 2009). These results are contrary to those of the present study as none of the anthropometric indicators had an association with the tools used to measure food security (HDDS, HFIAS and MAHFP).

Food insecurity at the household level is one of the three main underlying causes of malnutrition. The complexity attached to FI was also explained by Webb *et al.* (2006) in that there has been a shift in thinking with regard to measuring food security over the years. Webb *et al.* (2006) highlighted four conceptual developments in measuring FI:

- Firstly, work done by Webb *et al.* (2006) citing, Sen (1981) was reviewed in which the concept of food security focused on the availability of food. However, the focus soon shifted to the physical and economic access to food. This change was due to a study that found no correlation between food availability and household FS.
- A second change occurred when FI was seen as a condition of poverty. This concept was said to be too theoretical as it did not consider the life experiences of those individuals living in poverty.
- Thirdly, there was greater stress on focussing on important measurements of FI rather than depending on proxy measures, such as children's nutritional status and agricultural productivity.
- The fourth concept that Webb *et al.* (2006) highlighted was the recognition of households' exposure to external risks such as climate change, global economic crises and unemployment.

All of these concepts clearly emphasize that FI does not have a single perfect angle from which to measure it.

According to the Summary of the FSN Forum Discussion (2009), citing Schuftan, Jonsson, & Eide 2009, NS and FS are related in that nutritional insecurity may increase the risk of food insecurity. Nutritional status can be improved even if food insecurity continues to exist, through improved ‘nutrition supportive’ decisions and behaviour. Contrary to the findings mentioned above, the present study did not find any correlation between nutrition indicators weight-for-height Z-score (WHZ) and food security indicators (HFIAS, HDDS, and MAHFP). This means that food security did not directly translate into nutritional security, since by the end of the study, there were still children suffering from wasting (29%) even though 71% of them were food secure according to the CFIAS.

Still no perfect single measure that captures all aspects of food insecurity has been found. Although the multifaceted nature of food security is generally accepted, the international community has not yet found a way to identify how, when and where the different facets of the concept are more important than others. The single item measure may be inadequate as a sole measure of food insecurity. There is widespread consensus that this question may miss many of those who are food insecure. The multiple item measure can assess a large number of aspects of food insecurity and may better recognise the complex experience of food insecurity (Serebryanikova, Donaldson, Burns, Hughes & Leveritt 2012).

Hence, using multiple tools or indicators to measure food and nutritional security would be advantageous. Even though they each have their flaws, it is beneficial to use multiple tools simultaneously and to try to further develop those that already exist (Serebryanikova *et al.* 2012).

#### **6.4 TOOLS USED TO MEASURE THE FOOD AND NUTRITIONAL SECURITY OF MALNOURISHED CHILDREN ON THE NSP PROGRAMME**

The table below shows the tools this study used to determine the food security and nutritional status of children registered on the NSP, as well as that of the households in which they reside.

**Table 6.1 Food and nutritional security tools**

<b>Food security tools</b>	<b>Nutrition security tools</b>
- <b>HFIAS</b>	- Anthropometrics
- <b>CFIAS</b>	- 24 hour-recall
- <b>HDDS</b>	
- <b>MAHFP</b>	

These food access indicators were expected to distinguish households with varying levels of vulnerability to food insecurity. Inadequate food security is one of the three underlying causes of malnutrition and one would therefore expect to see a link between indicators of food insecurity and those of malnutrition (Summary of the FSN Forum Discussion 2009). The complex nature of food security makes it difficult to measure adequately as it has different dimensions. Over the years, researchers have tried to capture as many of these different dimensions as possible.

#### **6.4.1 Measuring food access using the Household Food Insecurity Access Scale and Child Food Insecurity Access Scale**

The HFIAS was adjusted to accommodate children, resulting in the CFIAS. The HFIAS assesses food poverty (i.e., the inability to obtain healthy affordable food). This tool asks respondents about three domains of food insecurity: (1) experiencing anxiety and uncertainty about the household food supply; (2) altering the quality of the diet; (3) reducing the quantity of food consumed.

Although the HFIAS has been used by other studies to determine the relationship between food security and nutritional security, in this study it did not reveal any association between food insecurity and malnutrition. Other studies have reported similarly insignificant findings on the relationship between the HFIAS and nutritional status: “The etiology of malnutrition is very complex and it appears that food insecurity does not necessarily result in malnutrition especially among children less than 24 months” (Saaka & Osman 2013). Barrett (2010) explained that malnutrition has to do with under-nutrition, obesity and micronutrient deficiency. This shows that malnutrition is not one-sided. As discussed in this study, the NSP corrected one aspect of malnutrition but failed to correct the other aspects, such as obesity and wasting.

This study directed the CFIAS questions to the caregivers although the study aimed to probe the food security of children. This posed a challenge in that the caregivers were tempted to



respond in the same way as they did to the questions of the HFIAS. This was done because the study focused on children's food status. The CFIAS was also used to strengthen the 24-hour recall as both of these tools seek to determine the food intake and access to food of children in a 24-hour period. It would have been challenging to use the HFIAS exactly as it was without adjusting it as the questions are dense and probe the food access of the entire household rather than that of an individual. In this study this tool (HFIAS) was used on one household member as the respondent for the whole household. One of the challenges was the need to be sure that the responses given were indubitably representative of the food constraints experienced by all members of the household.

Using the HFIAS and the CFIAS in conjunction with the focus group discussions helped to clarify matters as the focus groups provided the reasons for children's eating patterns and the frequency of meals as well as the way in which food is distributed in the households. Using both tools simultaneously helped to provide solid findings that showed different angles to food access in households and for individual children. The findings can thus be compared with the findings of other studies on children's food access, whereas if only one tool (HFIAS) had been used, the children's food access would only have been surmised from the households' results.

#### **6.4.2 Measuring food access using the Household Dietary Diversity Score**

The Household Dietary Diversity Score is a measure of the total number of different food groups eaten during the previous 24 hours by any member of a household, including food prepared at home but eaten outside, such as a packed lunch (Saaka & Osman 2013). This measure is a reflection of both food availability and food access, based on the principle that households consume a variety of foods when they have the means to acquire them. The limitation of this tool is that it does not capture intra-household allocation of foods and does not measure the quality of the household diet (Barrett 2010).

According to Ballard (2012), child dietary diversity shows strong associations with nutritional status when controlling for socioeconomic status. In this study the HDDS was associated with household income. In general, all food access indicators were related to socioeconomic status (SES) and could therefore be considered as reasonable proxies for food access (Saaka & Osman 2013).

Selvester, Fidalgo, Ballard, Kennedy, Dop, Mistura and Deitchler (2008) found that in all cases, households with the lowest SES were identified by the HFIAS as being more food insecure. In these households the women frequently had had no education. Furthermore, these households were often female-headed. Performing the same analyses using the HDDS

showed similar associations as the HFIAS for SES and women's education (Razes & Dop (2011) & Selvester *et al.* 2008). This study showed that the HFIAS and the HDDS were strongly associated with each other, i.e., higher dietary diversity was associated with greater food access as measured by the HFIAS. Because the tools are both related to household income, they may both be considered as reasonable alternatives for food access. Table 6.2 illustrates the association discussed above.

**Table 6.2: Analysis of household incomes, CFIAS, HDDS, MAFHP and HFIAS**

		Sum of Squares	df	Mean Square	F	ANOVA p-value	Comment
CFIAS	Between Groups	637.752	3	212.584	10.429	.000	Significant
	Within Groups	2690.593	132	20.383			
	Total	3328.346	135				
HDDS	Between Groups	47.876	3	15.959	5.575	.001	Significant
	Within Groups	377.888	132	2.863			
	Total	425.765	135				
MAFHP	Between Groups	69.384	3	23.128	14.742	.000	Significant
	Within Groups	207.087	132	1.569			
	Total	276.471	135				
HFIAS	Between Groups	1018.490	3	339.497	8.547	.000	Significant
	Within Groups	5243.326	132	39.722			
	Total	6261.816	135				

Both the HFIAS and the HDDS are appropriate for the monitoring of populations to assess changes in food access and dietary consumption, to plan interventions for development or following shocks, and for the monitoring and evaluation of food security and nutrition policies and programmes (Selvester *et al.* 2008). It is recommended that the two tools be used together in food security and nutrition assessments, thus enriching the breadth of information available to identify food insecure groups and understand the consequences of poor food access on food consumption (Selvester *et al.* 2008).

#### **6.4.3 Measuring food access using the Months of Adequate Household Food Provisioning**

The MAHFP indicator can capture changes in the household's ability to address vulnerability in such a way as to ensure that food is available above a minimum level all year round. Measuring the MAHFP has the advantage of capturing the combined effects of a range of interventions and strategies, such as improved agricultural production, storage, and interventions that increase the household's purchasing power (Bilinsky & Swindale 2005). Data is collected using this tool (MAHFP) during the period of greatest food shortages. The focus of these questions is on the months in which there is limited access to food regardless of the source of the food (i.e., purchase, barter, or production). According to Fan (2012), food availability has been shown not to be a sufficient indicator of food security and economic productivity.

The MAHFP is a simple tool to use, but using it in this study proved not to be simple as it had to be adjusted from its original form of measuring 12 months to measuring 6 months, since memory was a challenge. If it had not been adjusted, it would have been more difficult for participants to recall the months when they did not have adequate money for food, especially the older people. Thus, if a longer time frame had been used, fewer households would have been food insecure. The recommendation for using this tool is that the participants should have good memories to recall provisioning over the desired number of months. The advantage of using this tool is that it focuses on the household as a whole and not on a single member of a household. However, there were also disadvantages in that the questions only focused on the months where there was adequate access to food without assessing the source of the food (purchase, barter or production). The information on the source of the food was acquired using the focus group discussions. Hence, this tool is valuable, but more effective when used with other tools or sources of information.

## **6.5 TOOLS USED TO MEASURE NUTRITIONAL SECURITY**

### **6.5.1 Anthropometrics**

Anthropometric indicators are based on physical body measurements, such as height and weight. “Anthropometric measurements, though challenging to apply to young children, are commonly used to determine the prevalence of Protein-Energy-Malnutrition (PEM)” (Amosu, Degun, Atulomah & Olanrewju 2011). They provide the most valid indicator of a population’s nutritional status and the most reliable indices for determining nutritional status. This technique is usually preferred because it is “non-invasive, relatively simple, cost-effective, and applicable and can be easily carried out and interpreted without requiring professional expertise” (Oyewole & Amosu 2012). It deals with techniques highly useful on a wide basis, and rests on well adapted classification. It is a readily available method of assessing nutritional status. Anthropometric indicators also provide food security information that is useful at both the individual and population level (Oyewole & Amosu 2012 & Fan 2012). Anthropometric measurements of weight-for-age have great potential for capturing short-term changes in food security (Fan 2012).

Anthropometry thus has an important advantage over other nutritional indicators, such as biochemical and clinical indicators, which are useful only at the extremes of malnutrition. “The main disadvantage of anthropometry is its lack of specificity, as changes in body measurements are also sensitive to several other factors, including intake of essential nutrients, infection, altitude, stress and genetic background” (Oyewole & Amosu 2012).

By using anthropometric indicators, this study aimed to determine the utilization of food and supplements from the NSP. This tool showed that in the majority (63%) of the children the nutrients from the food were utilized by their bodies as fewer than 29% suffered from wasting. Utilization also entails the consumption of nutritionally essential food that is safe and prepared properly. This tool does not explore all of the issues besides their health, for example whether the reason that they are gaining weight is that their bodies absorb and metabolize the essential nutrients. This is a valuable tool, but it should be used in conjunction with other tools that will examine other issues such as the utilization of essential nutrients.

### **6.5.2 Twenty Four (24) hour recall**

The 24-hour recall was used in this study to capture information about the children’s food intake. The recall was given by the caregivers of the children because the children were too young to be able to recall their dietary intake.

The advantages of using a 24-hour recall in this study were as follows:

- The dietary information is easily obtained. It is also a good way of obtaining information during the first encounter with a new patient when there is no other nutritional data yet available.
- An interviewer administers the tool and records the responses, so the respondent's level of literacy is not an issue.

#### Disadvantages

- The main weakness of the 24-hour recall approach is that individuals may not report their food consumption accurately for various reasons such as knowledge, memory, and the interview situation (Thompson & Subar 2009, p. 20).
- In this study it was a challenge to determine the quantity of food rather than the quality.
- It is very limited and may not present a true picture of a child's food intake. Data collected using this method may not represent the long-term dietary habits of the child. Estimating food quantities and food ingredients was challenging, especially for young children attending pre-school and day care.

One of the challenges was that there was no tool available to compare the food intake of the children in the study with those of the average South African child due to unavailability of the FBDG designed for children younger than seven years. Hence, it was impossible to conclude if the children in the study were meeting the South African standards in terms of their food intake. This is fundamentally important especially in view of the growing problem of obesity in children which represents another type of malnutrition.

## **6.6 THE DILEMMAS AND RESOLUTIONS**

Food insecurity at the household level is one of the underlying causes of malnutrition. However, does this mean that addressing food insecurity will correct malnutrition? This study has found that improved food security does not translate directly into nutritional security as there are still other factors that cause malnutrition that need to be considered, as stated by the UNICEF Conceptual Framework of Malnutrition. If there is a relationship between the two situations as mentioned above, does that mean that by addressing malnutrition, food insecurity will automatically have been addressed?

Food insecurity has been noted to be one of the causes of malnutrition, but not vice versa. An individual may be food secure but, due to the complexity of the definition of food security, it does not necessarily mean that nutritional security follows.

In many cases at health institutions when individuals are malnourished, the health system focuses on improving their nutritional status and ignores or does not consider the factors that may initially have caused the situation. Hence, there is still a gap that needs to be closed when treating malnourished individuals so as to avoid re-admission. This may be achieved by collaborating with other stakeholders.

As mentioned earlier there is no single perfect tool to measure FS, either in South Africa or any other country. The difference between South Africa and other countries is the tool that is used to measure FS. South Africa has used different tools from other countries that have not provided a clear picture of the country's food security status. Furthermore, no current national survey has been undertaken to capture the FS status of the country. Temporally addressing this issue would mean that South Africa could use smaller research projects that have been undertaken in different parts of the country and by combining them obtain a picture of the current FS situation. This would be a great help since these research projects have been carried out in every province in the country. Instead of showing that South Africa is food secure at the national level, there would also be information at the provincial level. This would help to identify provinces where there should be new interventions. A comprehensive measurement of household food security should not only present the quantity of food but should focus on 'quantity, distribution and quality'. Distribution refers to the procurement and ability to acquire food; quantity in this study is defined as having enough consumable food items in a household; while quality, encompasses the issue of food adequacy per category of consumers (children, women, men and the elderly), as well as nutritional value and safety.

## **6.7 CONCLUSION AND RECOMMENDATIONS**

Food security is related to socioeconomic factors and the livelihoods of households. However, there are other factors that can have either a negative or a positive impact on the household food security status at the macro or the micro level. The findings of this study show that factors such as the lack of proper time to care for children, poor feeding practices and illness play a huge role in the context of food and nutritional security. Food insecurity is one of the underlying causes of malnutrition. Other underlying factors such as inadequate child care, insufficient health services and an unhealthy environment prove that FS does not automatically translate into NS since there are still children who suffer from wasting even though the study showed that the majority of the children were food secure.

This study combined tools to measure both FS and NS. In combination these tools showed that there is no association between FS and NS, which is the reason that this study concludes that FS does not directly translate into NS. Hence, to establish the relationship between the two situations, a tool should be developed that will measure both of situations. Or should another tool be added to the combination? If so, does it mean that nutritional security is assured only by addressing food insecurity? Should the study have also explored other underlying factors that are said to cause malnutrition? Should the study also have looked at other anthropometric indicators besides wasting?

Combining the tools in this study was advantageous as each tool focused on a different dimension of FS. The combination did not cause any problems but rather resulted in associations being found. The tools thus provided a better understanding of the results than had only one tool been used. It is important to ensure each tool should measure each dimension of FS and not measure only one aspect at a time which could result in problems or difficulties.

For the future, there is an opportunity to develop new and improved measurements of FS. In developing new tools or improving existing tools, researchers need to take into consideration that food security is complex and that many factors have an influence on it. There also needs to be a reassessment of the nature of food insecurity, who it affects, how it affects them and what needs to be done to improve the situation.

There should be constant monitoring of the tools used to measure FS and NS to enable the coevolution of multiple food security indicators across the globe to be traced and to thoroughly evaluate the impacts of various policies and interventions on FS and NS.

The development of a common food security target across the globe for future research would be advantageous but the target should take into consideration household structure, time, geographical location, risks and the livelihoods of the population. In order to accomplish this, different stakeholders need to be involved.

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## **CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 FINDINGS AND CONCLUSION**

This masters dissertation looked at the impact of food access on children registered on the Nutrition Supplementation Programme and investigated the relationship between food security and nutrition security by also determining both statuses. This study also tried to clearly understand the challenges that households faced in achieving adequate food intake.

The study then looked at the impact of the NSP on malnourished children and evaluated the challenges that prevented the programme from being more effective. Lastly, the investigation then looked at the multifaceted nature of the definition and measuring tools of food insecurity and nutrition security.

This investigation was conducted by means of a questionnaire, focus group discussions, anthropometrics and key informant interviews. The questionnaire included four food security indicators namely, CFIAS, HFIAS, HDDS and MAHFP and two nutrition indicators namely anthropometrics and a 24 hour recall. CFIAS and HFIAS investigated the access aspect of food security, HDDS probed for dietary quality in the form of food intake, whereas MAHFP explored whether households had adequate food provisioning.

The children had monotonous diets that were mainly starch-based. They consumed more energy foods and less body building foods. Within the household there was less consumption of protein products as compared to other food groups. In the focus group it was discussed that fruits, milk and meat were the least bought food because they were expensive and because the households lacked cooling systems for storage. Comparing the household and children food intake, it showed clearly that children did not consume as much vegetables as compared with the other members of the household. Due to limited resources, households chose to procure cheap foods that would give them energy and be more filling. According to the anthropometrics, 63% children had normal weight-for-height, (29%) were severely wasted and (8%) were overweight and/or obese.

Food security could be affected by poor household socio-economic status which leads to inadequate food intake. The socio-economic factors play a significant role in determining the energy intake and diet quality. Inadequate food intake results in malnutrition. Therefore, improved food security status could lead to improve nutritional status of children. However, caution has to be taken though as improved food security does not automatically translate to nutrition security.

The nutrition supplementation programme was partially effective since it could only address acute malnutrition and that not all children that were registered had their nutritional status corrected because some were still wasted and others were obese. The study found that the programme had more threats and weaknesses, hence, the inability to have a full impact concerning malnutrition. To assist in these challenges, the programme should form linkages and partnerships with other stakeholders in order to strengthen the programme so as address the underlying and basic causes of malnutrition.

The findings proved that there was no association between food security (FS) and nutrition security (NS), meaning that food security did not translate to nutrition security. The study also showed that using multiple tools in combination in order to measure FS and NS was advantageous because it counterbalanced the deficiency of a single tool, thereby increasing the ability to get multiple perspectives from the results.

## **7.2 RECOMMENDATIONS**

There is an increasing trend of poor households being affected by food insecurity and the children suffering from malnutrition due to many factors. One of them is inadequate food intake or poor quality diets. Improving the food intake of children and the households would play a role in improving their nutrition status but not necessarily their food security status since it was not established that food security automatically translates to nutrition security. Hence in order, to address the issue of malnutrition and food insecurity, it would be vital to address the underlying causes of inadequate food intake and poor food diversity. This could be accomplished by promoting household gardening projects, providing interventions in day care centres and crèches. These interventions and projects need to be sustainable so as to avoid relapsing to malnutrition and strengthen the household food access at all times.

In order to address the challenges that affect the effectiveness of the nutrition programme, the programme should consider expansion to the community so as to focus more on prevention in the communities rather than treatment. Furthermore, there should be a holistic approach in addressing malnutrition because it is caused by different factors that are not only food related. Hence, linkages with other government departments should be revived and strengthened more.

Unceasing monitoring of the tools used to measure FS and NS should be done so as to enable tracing the advancement of multiple food security indicators across the globe and thoroughly evaluating the impacts of various policies and interventions.

The development of a common food security target across the globe for future research would be advantageous, but the target should take into account the household structure, time, geographical location, risks and the livelihoods of the population. In order to accomplish this, different stakeholders need to be involved.

The results of this study will also be made available to the government department, especially the Department of Health, so that appropriate and effective measures can be taken to improve and address the above mentioned challenges.

## APPENDIX 1:



### CONSENT FORM

Dear Parent/ caregiver

My name is Miss Zanele Tshabalala a Masters student in the College of Agriculture, Earth and Environmental Sciences in Food Security Department at the University of KwaZulu-Natal, Pietermaritzburg Campus. I would like you to participate in a study entitled: **An assessment of the impact of food access on children on the Nutrition Supplementation Programme to combat Protein-Energy Malnutrition.** This study is conducted in the fulfilment of my Masters of Science dissertation. Participation in this study is voluntary and should you wish to withdraw you can do so at any time. Please read the following information and ask questions if there are things that you do not understand.

#### **The purpose of the study**

South Africa has been declared food secure at a national level, whilst on the household level it is food secure. One of the aspects of Food Security that has been found to be a challenge in the household food security status is food access. Lack of food access has been found as the one of the underlying factors of child malnutrition. This study aims to determine whether there is an impact of food access on children that have protein-energy malnutrition who are administered on the NSP. Thus, improving the current NSP and also provide recommendations on the improvement of food access in relation to child health.

I assure total confidentiality of your child's assessment of weight and height. Feedback of the findings will also be given to relevant stakeholders and relevant information will be given to the parents/guardians to improve nutritional status of the children.

I would like your child to participate in this study at the designated health institution. Your consent will be highly appreciated. The study will be conducted the second week of January 2013. I recommend that you bring the consent to the health institution together with your child.

If you have no reservation on your child participating in this study could you please sign below.

Parent Name

Signature

Date

Should you have any queries related to the study, please contact the supervisor of the study Dr Kolanisi at 033 260 6342 or at [kolanisi@ukzn.ac.za](mailto:kolanisi@ukzn.ac.za) or Ms Z Tshabalala: 0786089003/[tzanele89@yahoo.com](mailto:tzanele89@yahoo.com)



### IMVUME

#### **Mzali**

Igama lami nginguZanele Tshabalala umfundi wase Nyuvesi yaKwaZulu-Natali ofundela Iziqu zobumpetha (Masters) kwezokuvikelwa kokudla (Food Security). Ngenza ucwaningo olumayelana nokutholwa kokudla kubantwana abangaphansi kweminye yxenye yezempilo ebizwa ngokuthiwa iNutrition Supplementation Programme (ezokudla). Lolugcwaningi

luzoyenziwa emitholampilo eseduzane nasekamakhaya. Lolucwaningo luthinta abantwana kanye nomnakekeli womntwana, lapho bezobe bekalwa isisindo somzimba kanye nobude babo.

Ukuba yinxenye yalolucwaningo akuphoqelekile fithi awukho umvuzo ozotholakala emva kocwaningo.

Bengicela ukuba umntwana wakho abeyinxenye yocwaningo lwami oluzoba emtholampilo yangasekhaya. Ucwano lwezokwenziwa evikini lesibili likaJanuwari 2013, oluzothatha usuku lonke. Ngiaqinisekisa ukugcina ulwazi engilitholile luyimfihlo. Imiphumela yocwaningo izothunyelwa kulabo abathintekayo nolwazi olufanelekile lizonikezwa abazali ukuze bezokwazi ukwenza gcono izimpilo zabantwana.

Ngiyothokoza uma isicelo sami siphumelele. Bengicela umzali abuyise incwadi yemvume ngosuku locwaningo.

Uma ungivumela ukuba umntwana abambe iqhaza kulolucwaningo, ngicela usayinde ngenzansi.

Ngiyabonga.

Uma ufuna ulwazi ngalolucwaningo thintana no:

Dr Unathi Kolanisi

Obhekene nocwaningo (supervisor) for Masters Student

Inombolo yocingo: 033 260 6342

**An assessment of the impact of food access on children on the Nutrition Supplementation Programme to combat Protein-Energy Malnutrition**

I, the undersigned, \_\_\_\_\_ (Full Name) participant,  
Tel: \_\_\_\_\_,

I have been fully informed of:

- The purpose of this study,
- That my participation is voluntary,
- That I can withdraw at any time,
- That participation will cost me nothing, and
- That all information given will be kept confidential.

I agree to

Allow for my child \_\_\_\_\_ (child's full name) to be measured and I agree to answer a questionnaire and participate in a focus group discussion.

This consent form was explained to me by \_\_\_\_\_ (Full Name), in \_\_\_\_\_ (language) and I confirm that I have understood.

I \_\_\_\_\_ (full name) agree to voluntarily take part in this research project.

\_\_\_\_\_  
(Participant's signature or mark)

\_\_\_\_\_  
(Witness)

Signed at: \_\_\_\_\_ on \_\_\_\_/\_\_\_\_/2012

**APPENDIX 2**

CODE\_\_\_\_\_

**SECTION A: ANTHROPOMETRIC MEASUREMENTS**

WEIGHT (kg)	HEIGHT (m <sup>2</sup> )
1.	1.
2.	2.
3.	3.
Average:	Average:

Date of birth of the child

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**SECTION B: CHILD INFORMATION****Please make a ✓ on the chosen answer**

1. Child gender:

Girl	Boy

2. Age:

0-6 months	6-24 months	24-48 months	>48 months

3. Relationship with the child: \_\_\_\_\_

4. Does the child attend crèche or pre-school? **YES/NO**4.1 If you answered yes to Q7, does the child carry lunchbox? **YES/NO**5. Is or has the child been breastfed from birth **YES/NO**

5.1 If yes, for how long? \_\_\_\_\_

5.2 At what age was formula introduced? \_\_\_\_\_

5.3 At what age were the solids introduced? \_\_\_\_\_

5.4 Has the child had consistent diarrhoea in the past two weeks? **YES/NO**

5.4.1 If yes, what or how was the diarrhoea treated? \_\_\_\_\_

**Child Food Insecurity Access Scale**

CODE\_\_\_\_\_

**Please make an "X" in the box**

Question	No	Rarely	Sometimes	Often
1. Do your children ever eat less than you feel they should because there is not enough money?				
2. Do your children ever say they are hungry because there is not enough food in the				

house?				
3. Do you ever cut the size of your children's meals or do they ever skip meals because there is not enough money to buy food?				
4. Do any of your children ever go to bed without food because there is not enough money to buy food?				
5. Do any of your children ever ate food that you really did not want them to eat because of a lack of resources to obtain other types of food?				
6. Has the child ever had to eat a limited variety of foods due to lack of resources?				
7. In the past four weeks has the child ever went the whole day and night without eating anything because there was not enough food?				



**Child Food Security Scale**  
Please make an "X" in the box

CODE\_\_\_\_\_

Question	Often	Sometimes	Never
1. We relied on few kinds of low-cost food to feed the children because we were running out of money to buy food.			
2. We couldn't feed our children a balanced meal, because we couldn't afford that.			
3. The children were not eating enough because we just couldn't afford enough food.			
	<b>Yes</b>		<b>No</b>
4. In the last 12 months, did you cut the size of any of the children's meals because there wasn't enough money for food?			
5. In the last 12 months, were the children ever hungry but you just couldn't afford more food?			
6. In the last 12 months, did any of the children not eat for whole day because there wasn't enough money for food?			
7. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food?			
	<b>Almost every month</b>	<b>Some months</b>	<b>1-2 months</b>
7.1 How often did this happen?			

**Child's 24 Hour Recall**

CODE\_\_\_\_\_

1. How many times does your child eat in a day?

2. Did the child eat and/or drink anything yesterday?

2.1 If yes, when?

2.2 What did the child eat/drink? (Use the provided blank paper to list all the foods and drinks taken by the child during this time).

3. Did the child eat or have anything else to drink again?

3.1 If yes, when was that? \_\_\_\_\_

3.2 What did the child eat? (Use the provided blank paper to list all the foods and drinks taken by the child during this time)

4. When was the last meal eaten?

4.1 What did the child eat? (Use the provided blank paper to list all the foods and drinks taken by the child during this time)

CODE\_\_\_\_\_

**SECTION C: PARENT AND HOUSEHOLD INFORMATION****Please make a ✓ on the chosen answer**

1. How many people live in the house?

0-6 months	7 month-6 years	7-15 years	>18 years

2. In which area of Pietermaritzburg do you reside in?

3. Educational level

None	Primary	Secondary	Tertiary	Other

4. Employment status

Unemployed	Student	Employed	Self employed	Grant	Remittances	Other

5. Household income

None	R1-500	R501-1000	> R1000	Do not know

## 6. Household food expenditure per month

R0-100	R101-200	R200-R1000	> R1000	Do not know

7. Do you have a vegetable garden at home? **YES/NO**

7.1 If yes, what kinds of vegetables are planted? \_\_\_\_\_

7.2 If yes, are the vegetables planted for the whole year? **YES/NO**

### 7.3 Is the produce for

Household consumption	Selling	Both

8. Does the household have any livestock and its produce? **YES/NO**

8.1 If yes, please make a  $\surd$  on the ones the household possess

<b>LIVESTOCK</b>	<b>YES</b>	<b>NO</b>
Cows/cattle		
Goats		
Sheep		
Chickens		
Other, please specify		

8.2 If yes to Q8, is it used for?

Household consumption	Selling	Both

9. Do you receive nutrition counselling every time you visit the facility to collect the supplements for the child? **YES/NO**

9.1 If yes, please explain

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins or other markings on the paper.

**Household Food Insecurity Access Scale**

CODE\_\_\_\_\_

**Make an “X” in the relevant box**

Question	No	Rarely	Sometimes	Often
1. Did you worry that your household would not have enough food?				
2. In the past four weeks were you or any household member not able to eat the kinds of foods you preferred because of lack of resources?				
3. In the past four weeks did you or any household member have to eat a limited variety of foods due to lack of resources?				
4. In the past four weeks did you or any household member have to eat foods that you really did not want to eat because of a lack of resources to obtain other types of food?				
5. In the past four weeks did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?				
6. In the past four weeks did you or any house member have to eat fewer meals in a day because there was not enough food?				
7. In the past four weeks was there ever no food to eat in a day because there was not enough food?				
8. In the past four weeks did you or any household member go to sleep at night hungry because there was not enough food?				
9. In the past four weeks did you or any household member go a whole day and night without eating anything because there was not enough food?				

**Household Dietary Diversity Score**

CODE \_\_\_\_\_

**Did you or anyone in the household eat any of these foods yesterday during the day or at night?****(Please mark with an X on the chosen answer)**

<b>Question</b>	<b>Food Group</b>	<b>Examples for Household</b>	<b>YES</b>	<b>NO</b>
1.	Cereals	Corn/maize, rice, wheat, sorghum, bread or any other grains?		
2.	Vitamin A Rich Vegetables and Tubers	Pumpkin, carrots, squash, or sweet potatoes		
3.	White Roots and Tubers	White potatoes or other foods made from roots?		
4.	Dark Green Leafy Vegetables	Wild ones + locally available e.g. spinach?		
5.	Other Vegetables	Tomato, onion, eggplant, including wild vegetables?		
6.	Vitamin A Rich Fruits	Ripe mangoes, apricots (fresh or dried), other locally available vitamin A rich fruits?		
7.	Other Fruits	Including wild fruits?		
8.	Organ Meat	Liver, kidney, heart, liver, tripe, skaap, head & feet		
9.	Flesh Meats	Beef, pork, lamb, goat?		
10.	Eggs	Chicken and turkey?		
11.	Fish	Fresh, tinned or dried fish?		
12.	Legumes, Nuts and Seeds	Beans, peas, lentils, nuts, seeds or foods made from these?		
13.	Milk and Milk products	Milk, cheese, yogurt or other milk products?		
14.	Oils and Fats	Oil, fats or butter added to food or used for cooking?		
15.	Sweets	Sugar, honey, sweetened soda, sweetened juice or sugary foods such as chocolates, candies, cookies and cakes?		

16.	Spices, Condiments, Beverages	Spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages?		
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**Months of Adequate Household Food Provisioning**

CODE \_\_\_\_\_

	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
1.	<p>Now I would like to ask you about your household's food supply during different months of the year. When responding to these questions, please think back over the last 6 months.</p> <p>PLACE A <i>ONE</i> IN THE BOX IF THE RESPONDENT ANSWERS YES TO THE FOLLOWING QUESTION.</p> <p>PLACE A <i>ZERO</i> IN THE BOX IF THE RESPONSE IS NO.</p> <p>In the past 6 months, were there months in which you did not have enough food to meet your family's needs?</p>	<p>..... <input type="checkbox"/></p>	
2.	<p>DO NOT READ THE LIST OF MONTHS. WORKING BACKWARD FROM THE CURRENT MONTH, PLACE A ONE IN THE BOX IF THE RESPONDENT IDENTIFIES THAT MONTH AS ONE IN WHICH THE HOUSEHOLD DID NOT HAVE ENOUGH FOOD TO MEET THEIR NEEDS.</p> <p>If yes, which were the months (in the past 6 months) in which you did not have enough food to meet your family's needs?</p>		
A B C D E F	<p>October</p> <p>September</p> <p>August</p> <p>July</p> <p>June</p> <p>May</p>	<p>A..... <input type="checkbox"/></p> <p>B..... <input type="checkbox"/></p> <p>C..... <input type="checkbox"/></p> <p>D..... <input type="checkbox"/></p> <p>E..... <input type="checkbox"/></p> <p>F..... <input type="checkbox"/></p>	

**SECTION C: NUTRITION SUPPLEMENTATION PROGRAMME**

1. What kind of supplements does per child get?

- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

2. How much do you give per child?

- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

3. How are they given (e.g. monthly, daily)?

---

4. Who gives them?

---

---

5. Are there directions provided on how to use them? **YES/NO**

6. Does the child adhere to them?

---

---

7. Who often bring the child (ren) to the clinic?

---

8. Are there other things given except for supplements? **YES/NO**. If yes, please specify

---

---

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9. In the case where you are out of stock, what measures do you usually take?

---

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10. Are there any challenges that you face in terms of the whole malnutrition programme?

---



## SECTION D:

## FOCUS GROUP DISCUSSION

1. Please **describe** your typical household food basket.  
*(Probe for grocery shopping list /food items; the quantities; total expenditure on food/grocery; period: is the grocery purchased on daily basis/per week/per month or otherwise and generally what type of dishes are usually prepared with the sea food items vs. who consumes them)*
2. Do you think children should have a specific diet and if so what kind of food do you usually buy specifically for your children in grocery list? If not please explain why is that.  
*(Probe on food items meant for children and the reasons why this will also show the care giver's nutritional knowledge and practices)*
3. Do you value the clinic advice on what foods should be eaten by children in order for them to grow well? Please explain in detail **how** if valued if not valued **why not**
4. Sometimes the household runs out of money and food, can you please explain how you cope or handle the situation?  
*(Probe on coping strategies; do they put children first as priorities or what; how do children react or handle the situation; who usually get smaller portions of food)*
5. Do you think the Nutrition Supplementation Programme has made an impact on your child's well-being?

### APPENDIX 3:



25 January 2013

Ms Zanele Tshabalala 207510403  
School of Agriculture, Earth and Environmental Sciences  
Pietermaritzburg Campus

Dear Ms Tshabalala

Protocol reference number: HSS/1243/012M

Project title: An assessment of the impact of food access on children on the Nutrition Supplementation Programme to combat Protein-Energy Malnutrition.

Full approval notification – Full committee reviewed

This letter serves to notify you that your application in connection with the above has now been granted final approval.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach/Methods must be reviewed and approved through an amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

Best wishes for the successful completion of your research protocol

Yours faithfully

Professor Steven Collings (Chair)  
Humanities & Social Sciences Research Ethics Committee

cc Supervisor Dr Unathi Kolanisi  
cc Academic leader Professor D Jaganyi  
cc School/College Ms S Ntuli/Mrs M Francis

Professor S Collings (Chair)  
Humanities & Social Sc Research Ethics Committee  
Westville Campus, Govan Mbeki Building  
Postal Address: Private Bag X54001, Durban, 4000, South Africa  
Telephone: +27 (0)31 260 3587/8350 Facsimile: +27 (0)31 260 4609 Email: ximbap@ukzn.ac.za / srymanm@ukzn.ac.za  
Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

INSPIRING GREATNESS



## APPENDIX 4:



health

Department:  
Health

PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component

10 – 103 Natalia Building, 330 Langalibalele Street

Private Bag x9051

Pietermaritzburg

3200

Tel.: 033 – 3953189

Fax.: 033 – 394 3782

Email.: [hkrm@kznhealth.gov.za](mailto:hkrm@kznhealth.gov.za)

[www.kznhealth.gov.za](http://www.kznhealth.gov.za)

Reference : HRKM 009/13

Enquiries : Mr X Xaba

Tel : 033 – 395 2805

Dear Ms ZT Tshabalala

**Subject: Approval of a Research Proposal**

1. The research proposal titled '**An assessment of the impact of food access on children on the Nutrition Supplementation Programme (NSP) to combat Protein-Energy Malnutrition**' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken at Hospitals and primary health clinics that have implemented the Nutrition Supplementation Programme in UMgungundlovu District.

2. You are requested to take note of the following:
  - a. Make the necessary arrangement with the identified facility before commencing with your research project.
  - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to [hkrm@kznhealth.gov.za](mailto:hkrm@kznhealth.gov.za)

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

  
Dr E Lutge

Chairperson, Health Research Committee

Date: 06/02/2013

uMnyango Wezempilo . Departement van Gesondheid

*Fighting Disease, Fighting Poverty, Giving Hope*

Table 4.1 Overall focus group discussion on children's care givers and their perception on household and child food security and intake

## APPENDIX 5

Question	Theme/s	Concept/s	Responses	Discussion points
Describe your typical household food basket	<p>Typical Household Food basket</p> <p>Purchasing pattern</p>	<p>Food preferences and pattern</p> <p>Effects of limited purchasing power and lack of cooling storage facilities on the Household Food Basket</p> <p>Preferences and decision-making influenced by shelf-life</p> <p>Coping and purchasing strategies</p>	<p><i>"We buy important foods that last longer like potatoes, maize, rice, flour and sugar".</i></p> <p><i>"Buying vegetables and fruits its quite difficult because they are expensive and go bad easily"</i></p> <p><i>"Buying fruits it's a waste of money"</i></p> <p><i>"I make sure that when I do the groceries I exclude non-essential food like vegetables, meat; and add more on potatoes and flour to do vatkoeks and fried chips"</i></p> <p><i>"It's better to buy chips and cakes for children to take to school than fruits".</i></p> <p><i>"Chicken is the better meat to buy because it's not expensive compared to red meat or other meats".</i></p> <p><i>We buy meat (chicken) weekly because it's hard to buy in bulk".</i></p> <p><i>"Buying in bulk or in combos is much better than buying one by one"</i></p> <p><i>"We buy imperishable monthly and perishables weekly".</i></p>	<ul style="list-style-type: none"> <li>✓ The household purchases more of the energy giving foods compared to other food groups because seemed less expensive compared to other foods. The household diet has more of the starchy foods than protective foods and body building foods.</li> <li>✓ Buying power influences the household food purchase.</li> <li>✓ Buying in bulk monthly seems to be the easiest and manageably way of buying.</li> <li>✓ In some cases buying in bulk could result to food spoilage or lose of quality especially if there is no refrigeration in hot weather conditions.</li> <li>✓ It is also important that a balance, diverse diet is practiced and maintained in order to meet bodily daily requirements</li> </ul>

Table 4.1 Overall focus group discussion on children's care givers and their perception on household and child food security and intake

				<ul style="list-style-type: none"> <li>✓ Limited buying power and lack of storage facility influences the household food purchases and decisions.</li> </ul>
Do you think children should have their specific diet and preparation of food?	Food diet specificity	<p>Food for all no special food for children</p> <p>Food preparation</p>	<p><i>"I do not buy food separately; the children eat whatever we eat in the household. Money does not allow me to buy separately".</i></p> <p><i>"The only thing that is different is how we prepare their food, especially the &lt;6 months. I usually give them the homemade soft porridge at 3 months because they do not get full with milk only".</i></p>	<ul style="list-style-type: none"> <li>✓ Caregivers do not see the need to separate the grocery bucket for the household and the children because of the costs thus the children are consuming the food available to all household members.</li> <li>✓ Children may not enough energy requirements.</li> <li>✓ Their micro-and macronutrients intake may be compromised. This could lead to poor growth and development. Thus, resulting to poor nutritional status.</li> <li>✓ Most families practice this because they are unable to afford food that is sufficient, safe and nutrient dense.</li> <li>✓ Hence, they opt to temper with the diet by procuring more energy-giving foods than body building and protective foods.</li> </ul>
Do you value the clinics advice on children's diets for them to grow well?	Advice versus health	Negative attitude towards the advice given at clinics	<p><i>"Of course we value their advice but sometimes it's not realistic".</i></p> <p><i>"Often they tell us to give children vegetables and fruits, not thinking that these foods are expensive and</i></p>	<ul style="list-style-type: none"> <li>✓ In as much as the caregivers value the advice given by the health care workers, they rarely put it into practice because it is viewed as impractical as most</li> </ul>

Table 4.1 Overall focus group discussion on children's care givers and their perception on household and child food security and intake

		Knowledge versus actual practice	<p><i>some of us are not working".</i></p> <p><i>"They advise us to breastfeed breast milk only for the first 6 months, but it's impossible because we need to go to work or school".</i></p>	<p>of the food advised upon is expensive.</p> <ul style="list-style-type: none"> <li>✓ Households choose to procure cheap foods that will give them energy and more filling. This is done so that they will still have food for more days than to buy meat and vegetables which are regarded as 'food for special occasions'.</li> <li>✓ Knowledge does not equate to behaviour. The circumstances surrounding the caregivers lead to negative attitudes that deflect the health knowledge given by the clinics.</li> </ul>
How does the household cope when there is not enough food?	Coping strategies	<p>Borrowing</p> <p>Get extra job</p> <p>Saving</p> <p>Kinship</p> <p>Cutting down of meals</p>	<p><i>"I always get money from the loan shark/money lenders"</i></p> <p><i>"My husband takes piece jobs apart from the job he has".</i></p> <p><i>"Stockvel helps me a lot"</i></p> <p><i>"I always get help from my sister".</i></p> <p><i>"We simply cut the size of the meal so that everyone gets an equal share"</i></p> <p><i>"I'd rather go hungry but give my</i></p>	<ul style="list-style-type: none"> <li>✓ Most participants stated that the household cuts the size of meals and number of meals in order to survive. Some of them depend on loans from friends and family.</li> <li>✓ Households in vulnerable situations respond by reducing their food intake and buying cheaper foods. Those that grow their own vegetables consume them.</li> <li>✓ Other households decide to give children the food first</li> </ul>

Table 4.1 Overall focus group discussion on children's care givers and their perception on household and child food security and intake

			<i>child the food</i> ".	before the rest of the household members.
Do you think the Nutrition Supplementation Programme made a positive impact on your child's health?	Effects affecting the impact of the Nutrition Supplementation Programme	<p>Inconsistent supply</p> <p>Sharing of the supply</p> <p>Not all the products supplied are consumed</p>	<p><i>"The supplements do help; it's just that we do not get them monthly because they get finished"</i>.</p> <p><i>"Sometimes we share the supplements by giving other children in the house"</i>.</p> <p><i>"He only likes the milk so I stopped giving him the other products"</i>.</p>	<p>✓ The NSP helps the children but the caregivers reported that they do not regularly bring the children to the clinic to get the supplements because of costs or sometimes the child gets well soon.</p> <p>✓ Some children get well after consuming the supplements provided they follow the instructions and they only treat them as supplements. To some there are no changes since the supplements are shared amongst other children or sometimes adults.</p> <p>✓ Some stated that their children do not like the taste of other products and they have reported this to the clinic.</p>
What do you think are the causes of child death?	Awareness about the causes of children death	Knowledge	<p><i>"Nowadays teenagers get pregnant so they do not take good care of their children but they are also children"</i>.</p> <p><i>"Neglect and poor care from the caregiver and the crèches. Children are not given food at the crèche or they give them one and the same food every day"</i>.</p>	<p>✓ Caregivers stated that children die because of poor food intake, poor hygiene, negligence and poor care from the caregiver and crèches.</p> <p>✓ The UNICEF Framework showed that malnutrition in children could be a result of many factors. Amongst those</p>

Table 4.1 Overall focus group discussion on children's care givers and their perception on household and child food security and intake

			<p><i>"Poor food intake and hygiene, for example the water might be dirty".</i></p> <p><i>"The parents do not take sick children early to the clinic".</i></p>	<p>factors there is poor maternal and child care. The caregivers especially the grandmothers stated that poor child care aggravates malnutrition.</p> <p>✓ Poor reaction from parents when the child is sick also falls under poor care. Parents tend to stop feeding the children once sick, while at the clinic they are taught that they should continue feeding even when the child is sick.</p>
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