University of Venda

THE RELATIONSHIP BETWEEN EMPLOYMENT STATUS OF THE MOTHER, HOUSEHOLD HUNGER AND NUTRITIONAL STATUS OF CHILDREN IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE

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DECLARATION

I, PHOOKO DITOPE ANNAH, hereby declare that the work on which this dissertation is based is original (except where acknowledgement indicates otherwise) and that neither the whole work nor any part of it has been, or shall be submitted for another degree at this or any other institution for tertiary education or examining body.

…….

PHOOKO DITOPE ANNAH

DEDICATION

In loving memory of my mother, Mmalehu Elizabeth Mathipa

Sa pele pele ke rata go iša ditebogo go Modimo, wa go se bebe sefahlego, ge a ile a sepela le nna leetong le la dithuto tša ka. Ditumišo le letago ka moka ke di iša go wena ra maatla ohle.

Ke leboge mma montedi, Mmalehu, le ge o re šiile mono lefaseng, motheo wa thuto ke filwe ke wena. Ka baka la potego le dikudumela tša gago. Ke tla dula ke go rorela kefa ka seo.

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ABSTRACT

Introduction: In the year 2012, South Africa had a prevalence rate of stunting in children aged 1- 3, 4 - 6 and 7 – 9 years at 26.5%, 11.9% and 9.4%, respectively (Shisana *et al*. (2013). The Greater Sekhukhune District Municipality (GSDM) also showed a high rate of stunting (36%) in children aged 13 to 215 months of age (FIVIMS, 2006). The GSDM had a high unemployment rate of 69% to 82.4% (Statistics SA, 2006; Department of Social Development, 2008).). South Africa has adequate food supplies to feed the entire population at the national level (Labadarios *et al*., 2011; du Toit *et al*., 2011); however, there is evidence of under-nutrition caused by lack of purchasing power, and not a shortage of food (Rose and Charlton, 2001).

Aim: The aim of the study was to determine the relationship between the employment status of the mother, household hunger and the nutritional status of children aged one to twelve years (1-12 years) in households of Sekhukhune District in Limpopo Province.

Objectives : The objectives of the study were to determine the socio-economic status of the household; to assess the nutritional status of children using anthropometric measurements; to assess dietary patterns of children in households; to determine household food security using food inventories; to determine the prevalence of household hunger using the standardized hunger scale; to determine the coping strategies to food deprivation used in each household and to determine the association between employment status of the mother, nutritional status of children and household hunger.

Methodology: The study design was a cross sectional, exploratory and correlational study. The study used both quantitative and qualitative methods of data collection. A simple random sampling method was used to select nine villages from Makhuduthamaga local municipality and twenty households per village were selected using the systematic random sampling. Data was collected in households and a sample size of 180 children was selected based on the availability of a child within the selected age group. If there were more than one child within the 1-12 years, each child was then allocated a number and the one with the least number was selected. Biological mothers were the preferred participants, however if the mother was unavailable, the primary caregiver was selected and180 mothers or caregivers

Results: The majority (92.2%) of mothers were unemployed and 91% of them had an income of less than R500.00 per month, whereas 33.9% of households had total income of less than R1000.00 About 64.4% and 28.4% borrowed food from neighbours/family/friends and bought food on credit from the local shop. The anthropometric status of children indicated a high prevalence of stunting, a medium prevalence of underweight and a low prevalence of wasting. Most caregivers were overweight or obese. About 66% of children ate three meals per day. Almost 44% of households were food insecure, whereas 33.9% were at risk of hunger and only 21.7% were food secure. There was no association between employment status of the mother, household hunger and anthropometric status indicators.

Conclusion: Greater Sekhukhune District Municipality has a high rate of unemployment, poor household income and purchasing power and high level of food insecurity. The employment status of the mother was not associated with the level of wasting, stunting and underweight. Furthermore, employment status was also not associated with the level of hunger. Caregivers employed various strategies to cope with periods of food deprivation

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LIST OF ABBREVIATIONS

BMI	**Body Mass Index**
CHHIP	**Community Childhood Hunger Identification Project**
FAO	**Food and Agricultural Organization**
GSDM	**Greater Sekhukhune District Municipality**
HAZ	**Height-for-age Z scores**
FHH	**Female Headed Household**
FIVIMS	**Food Insecurity and Vulnerability Information Management System for South Africa**
HH/(hh)	**Household**
HHFI	**Household Food Insecurity**
HHFS	**Household Food Security**
IES	**Income and Expenditure Survey**
IFPRI	**International Food Policy Research Institute**
ISRDP	**Integrated Sustainable Rural Development Programme**
MHH	**Male Headed Household**
MUAC	**Mid Upper Arm Circumference**
NCHS	**National Centre of Health Statistics**
NGO	**Non-Governmental Organization**
PAHO	**Pan American Health Organization**
SA	**South Africa**
SAMRC	**South African Medical Research Council**
SA-NFCS	**National Food Consumption Survey**
SARP	**Southern African Regional Poverty Network**
SES	**Socio Economic Status**
SPSS	**Statistical Package for the Social Sciences**
STATS SA	**Statistics South Africa**
UNICEF	**United Nations Children Fund**
SCN	**Standing Committee on Nutrition**
WAZ	**Weight-for-age Z scores**

WHZ	**Weight-for-height Z scores**
WFP	**World Food Programme**
WHO	**World Health Organization**

DEFINITION OF OPERATIONAL TERMS

Coping strategies:	refers to all the strategically selected acts that individuals and households in a poor socio-economic position use to restrict their expenses and earn some extra income to enable them to pay for basic necessities such as food, clothing and shelter (Maxwell, 1996; Jacobs, 2009).
Expanded unemployment rate:	refers to people who were not looking for work, those unwilling to accept a suitable job if it were offered within a week, and those who have not taken active steps to find a job in the past four weeks (Statistics SA, 2014).
Food Security:	"refers to all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" FAO, 2002, P.49)
Food insecurity:	whenever the availability of nutritionally adequate and safe food, or the ability to acquire acceptable food in socially acceptable ways, is limited or uncertain (Koch, 2011).
Hunger:	the uneasy or painful sensation caused by recurrent or involuntary lack of food and is a potential although not necessary consequence of food insecurity. Over time, hunger may result in malnutrition (WHO, 2002).
Official unemployment rate:	refers to people who are seriously looking for jobs (Statistics SA, 2014).

Stunting:	height for age that is less than the WHO Child Growth Standards median value by more than two standard deviations.
Underweight:	weight for age that is less than the WHO Child Growth Standards median value by more than two standard deviations.
Wasting:	weight for height that is less than the WHO Child Growth Standards median value by more than two standard deviations.

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND AND MOTIVATION FOR THE STUDY

The United Nations Food and Agricultural organization (FAO) estimated that approximately 805 Million people worldwide suffer from chronic undernutrition (FAO, 2014). Furthermore, FAO (2015) indicated that there are about 795 million hungry people in the world and 98% of these hungry people are in developing countries. The United Nations Children Fund (UNICEF) also showed that approximately 146 million of children in developing countries are underweight as a result of acute or chronic hunger (UNICEF, 2009).

The FAO (2010) also highlighted that 925 million people are hungry and 98% live in the developing countries. Almost 10.9 million children below five years of age die each year. Malnutrition and hunger related diseases account for 60% to 92% of these child deaths in developing countries (FAO, 2005; UNICEF, 2009).

Southern Africa is experiencing ongoing problems with food shortage and projections in the long term suggest the likelihood of diminishing food production per capita in the future (Misselhorn, 2005). According to 1998-2000 FAO assessments, the highest prevalence of malnutrition in the developing world is in Southern Africa (FAO, 2003). The prevalence of food poverty was 43% in South Africa (SA) in 1995 (Statistics SA, 2001; Shisana *et al.*, 2013). Limpopo Province had the highest rate (83%) of child poverty in 2006 and only 28% of children live with employed parent/s, while in 2011 they reported a decline to 78.9% (Statistics SA, 2006; 2011). This is a reduction from the 2006 levels, but still higher than the national level of 56.8% and still the highest in the country. The prevalence of food insecurity in South Africa

seems to have declined from 52.3% in 1999 to 24.9% in 2008 (Labadarios et al., 2011). However, some studies indicate some pockets of food insecurity in rural areas (du Toit *et al*., 2011; De Cock et al., 2013). SANHANES 1 reported 26.0% people who were food insecure. Furthermore, Eastern Cape and Limpopo were the only provinces with prevalence of hunger above 30% (Shisana *et al.*, 2013).

Hunger is defined by the International Food Policy Research Institute (IFPRI) as "the uneasy and painful sensation caused by the lack of food. The recurrent and involuntary lack of access to food" (IFPRI, 2012). It is one of the ambiguous concepts that cannot be easily measured in a meaningful way. It can either be defined by its causes or consequences or both. Kathyl *et al.* (2003) further define it as the inability to acquire or consume an adequate quality or sufficient quantity of food in a socially acceptable way. Hunger is caused by a combination of factors such as unemployment, chronic poverty, political factors / poor governance, large family sizes and economic failure (Eldrigde, 2002; Lambrechts; Berry, 2003; FAO 2014).

The FAO (2010) further classifies hunger into two categories based on their causal factors as acute hunger or starvation caused by insufficient food intake due to war or natural disasters that affect food production and/or availability. Chronic hunger is caused by long-term insufficient dietary intake leading to malnutrition overtime. Hunger is a social disease linked to poverty where people are denied the opportunity to improve their lives due to poverty. They are weakened physically, psychologically and physiologically because of hunger. This causes people to be trapped in a vicious cycle between poverty and hunger (Jacobs, 2009). Fighting hunger is a question of eliminating or reducing poverty. Hunger is caused by poverty because

people that are food insecure are too poor and have no financial resources to afford food. Hunger and malnutrition produce more poverty because without adequate food people cannot be productive in school and at work (FAO, 2010; Misselhorn, 2005). Additionally, malnourished children are at risk of poor educational outcomes and consequently lose 5-10% of lifetime earnings, high fertility rate and inadequate care for their children (Saha *et al.*, 2009). All this will ultimately contribute to the intergenerational transfer of poverty (FAO, 2010; World Bank, 2006; Victoria *et al.,* 2008).

South Africa has adequate food supplies to feed the entire population at the national level (Labadarios *et al.,* 2011; du Toit *et al*., 2011). However, several studies have revealed evidence of under-nutrition among certain parts of the population due to lack of access (Rose and Charlton, 2001; Vogel and Smith, 2002; Shisana *et al.*, 2013). This evidence clearly indicates the lack of purchasing power and not a shortage of food.

The Limpopo Province is about 90% rural and accounts for 10.3% of the South African population. It has a population growth rate of 0.8% per annum, which is high in comparison with the national average (Statistics SA, 2011). Furthermore, about 95% of the population is African with 53% female and 34.0% of the population younger than 15 years (Statistics SA, 2011) The unemployment rate, which is the number of people actively looking for jobs in the past four weeks, in Limpopo Province is 18.8% which is high compared to other provinces in South Africa (Statistics SA, 2015). The high rate of unemployment and poverty in the province has prompted the researcher to investigate how they relate with hunger and impact on nutritional status.

1.2 PROBLEM STATEMENT

The 1999 South Africa National Food Consumption Survey of children aged between one and nine years showed a high rate of stunting in Limpopo Province (40%); the national stunting level is 23% (Labadarious *et al.*, 2001; Buso, 2002). More recently, Shisana *et al.* (2013) reported 26.5%, 11.9% and 9.4% stunting at the national level of children aged 1- 3, 4 - 6 and 7 - 9 respectively, showing some decline from the 1996 study. Sekhukhune District indicated a high rate of stunting (36%) in children aged 13 to 215 months of age (Food Insecurity and Vulnerability Information Management System for South Africa Sekhukhune, 2006). Additionally, the Food and Agricultural Organization (FAO) (2010) indicates that in developing countries, women, children and people living in rural areas or shanty settlements are the ones worst affected by hunger. Greater Sekhukhune District Municipality (GSDM) is also an underprivileged area and was identified as a nodal site by Integrated Sustainable Rural Development Programme (ISRDP) due to its high unemployment rate of 69% to 82.4% (Statistics SA, 2006; Department of Social Development, 2008).

Although the national food consumption survey was conducted in South Africa, there is a need for representative district data on the consequences of hunger. FIVIMS also identified Sekhukhune as being vulnerable, neglected and needing immediate attention. Therefore, the study aims to determine the relationship between employment status of the mother, household hunger and nutritional status of children in an area known to have a very high unemployment rate and malnutrition in Limpopo Province. It is also necessary to establish if the employment status of the mother can readily be linked with malnutrition. Mothers are the principal provider of the primary care that children need. The nutritional needs of children are usually dependent

on the mother. Mothers usually allocate budget, choose foods that the household can eat on a daily basis. Additionally, In developing countries, the educational level, health and nutritional status of the mother is central to the quality of life and it is also a major factor of her children's health, nutritional status, behavioral and other aspects of child welfare. It is generally accepted that not all poor people are hungry. The study also aims to determine the coping strategies that mothers use to adapt to periods of food deprivation in their households.

1.3 AIM OF THE STUDY

The purpose of the study was to determine the relationship between the employment status of the mother, household hunger and the nutritional status of children from one to twelve years in households of Sekhukhune District in Limpopo Province.

1.4 RESEARCH QUESTIONS

The following research questions were answered:

1.4.1 What is the relationship between the employment status of the mother and household hunger?

1.4.2 What is the relationship between the employment status of the mother and the nutritional status of her children?

1.4.3 What is the relationship between household hunger and the nutritional status of the children?

The above questions are illustrated in Figure 1.2 below, based on the conceptual framework by UNICEF (1990). According to this framework, a measure of food security would be associated with related factors such as maternal and child care, dietary intake and nutritional status

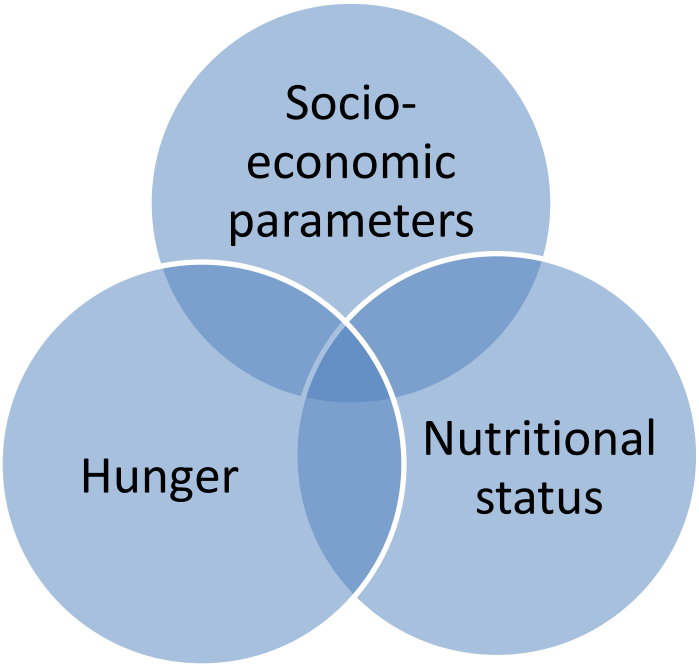

Figure 1.1: The possible interaction between socio-economic parameters, hunger and nutritional status.

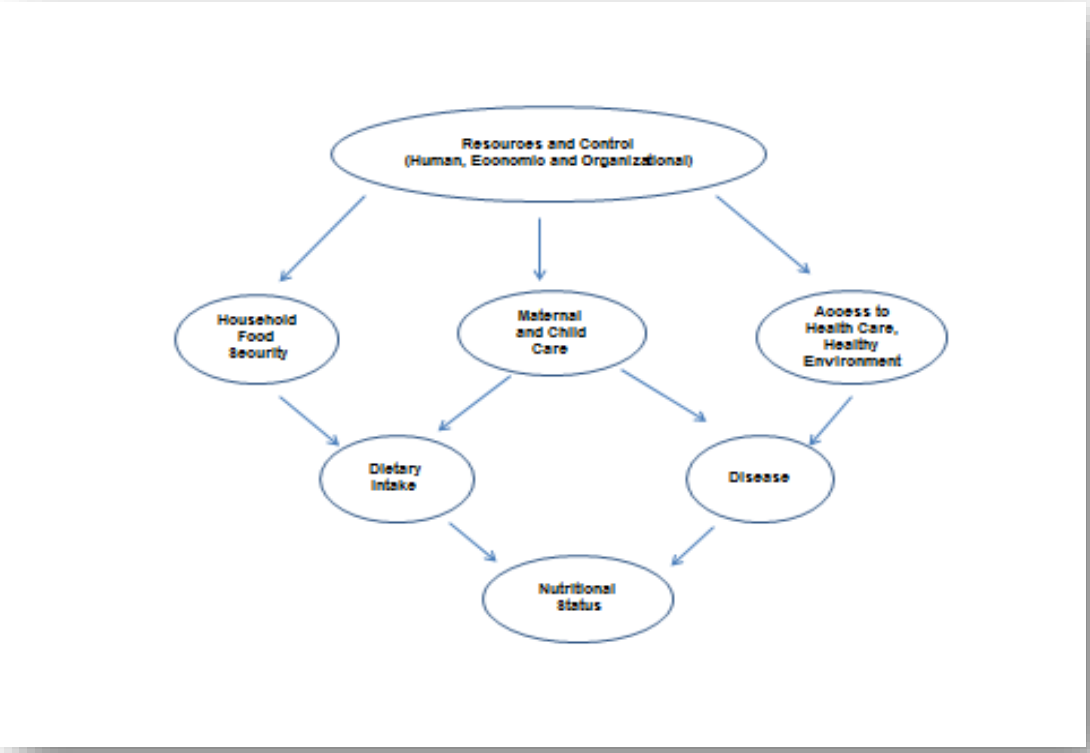

Figure 1.2. Relationship of food security, dietary intake and nutritional status (Adapted from UNICEF, 1990)

This framework shown in Figure 1.2 indicates the possible interactions that are proposed to be studied in the present research project.

1.5 OBJECTIVES

The following objectives were formulated to address the aim of the study:

1.5.1. To determine the socio-economic status of the households.

1.5.2. To assess the nutritional status of children using anthropometric measurements of height, weight, mid upper arm circumference and head circumference. .

1.5.3. To assess dietary patterns of children in households, using a food frequency questionnaire and a 24 hour recall.

1.5.4. To determine household food security and dietary diversity using food inventories.

1.5.5. To determine the prevalence of household hunger, using the adapted Community Childhood Hunger Identification project index hunger scale.

1.5.6. To determine the coping strategies to food deprivation used in each household.

1.5.7 To determine the interaction between employment status of the mother, nutritional status of children and household hunger.

1.6 SIGNIFICANCE OF THE STUDY

The study revealed the relationship between employment status of the mother, hunger and nutritional status. Determining the relationship between these aspects helped in understanding their interaction, thus helping with the formulation of multi-sectorial and concurrent strategies. Coping strategies used in households were determined and these may help in the formulation of relevant policies and programmes to alleviate poverty. It has been observed that under-nutrition in children is sometimes coupled with over-nutrition of the mothers. It is important to establish if this is happening in Sekhukhune District, so that appropriate nutrition interventions can be planned and implemented.

The findings will also serve as baseline data for the Department of Nutrition's study on women and nutrition, which aims to explore in detail response modes or coping strategies adopted by women under periods of food deprivation.

1.7 DISSERTATION STRUCTURE

Chapter One: Introduces the study, its aims and objectives and the significance of the Study.

Chapter Two: Presents the literature review with reference to food (in) security hunger, nutritional status and food coping strategies.

Chapter Three: Presents the detailed methodology, explaining the data collection methods and information gathering process from adults and children in each household.

Chapter Four: Presents research, findings and interpretation of the results.

Chapter Five: Presents a discussion of the current research results.

Chapter Six: Presents the conclusion and recommendation of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 OVERVIEW

Statistics South Africa (STATS SA) estimated a population size of 48.0 million by mid-year 2007 with a population distribution of 79.6% Blacks, 9.1% Whites, 2.5% Indians and 8.9% Coloureds (Statistics SA, 2007). In 2010, the estimated population was 50.9 million (Statistics SA, 2010). The population has since grown to 54 million by 2014 (Statistic SA, 2014). Additionally, about 2.3 million households who had children aged 7 years and older could not afford to purchase food and consequently went hungry. This represents about 22% of SA households and 26% of households in rural areas (Statistics SA, 2014). More recently, Shisana *et al.* (2013) estimated household food security in South Africa to be only 45,6% nationally.

Globally, an estimated 104 million children under the age of five years were malnourished as depicted by weight-for-age, while 171 million were stunted and 20 million had severe malnutrition (WHO, 2010). Moreover, in South African boys and girls between ages 0-3 years had the highest prevalence of stunting at 26.9% and 25.9% respectively. The boys and girls between the ages 7-9 years had a low prevalence of stunting of 10% and 8.7% (HSRC, 2013). This can be attributed to reduced dietary intake, illness or both.

2.2 HUNGER AND POVERTY

According to WHO (2002), the relationship between hunger and poverty is often misunderstood. Hunger is not only the result of poverty, but for the hungriest and poor, it is the sole cause of poverty. Poverty exists when an individual or groups are not able to satisfy their

basic needs adequately. This shows that there is lack of food security at the individual level, and ensuring access to food at the household level depends not only on secure food supplies, but also on a stable demand or purchasing power (Bonti –Ankomah, 2001, du Toit *et al.*, 2011).

The FAO (2010) projects that, globally, 925 million individuals are hungry. Furthermore, UNICEF (2009) showed that 239 million people in sub- Saharan Africa are hungry and 75% live in mainly rural areas of Africa. According to the South African 1999 National food consumption survey, 52% of households experienced hunger, 23% were at risk of hunger and 25% appeared food secure (Labadarios *et al.*,2005). More recently, Shisana *et al.* (2013) reported 45.6% to be food secure, 28.3% to be at risk of hunger and 26% to experience hunger.

The prevalence of food poverty in SA was 43% in 1995 (Rose and Charlton, 2001) and it has since dropped to a level of 32.3% in 2011 (Stats SA, 2014). The severity of poverty is the collective gap between the essential resources and the individual ability to meet basic needs (Jolly and Pinstrup-Andersen, 2000). In South Africa, poverty is more concentrated in Black Africans since 54% of Black Africans experienced food poverty which is high compared to 27% of coloured, 3.4% of Indian/Asian and 0.8% of white. According to Statistics South Africa (2007), poverty is also more concentrated in rural areas, in female-headed households (FHH), among adults with low or no level of education, the disabled, the unemployed and the underpaid (Rose and Charlton, 2001; Ferrer, 2002; Statistics SA, 2007). Resolution Number 55/2 was adopted by the United Nations (UN) general assembly in September 2000, stating that the proportion of people whose income is less than one dollar per day and the proportion of people who suffer from hunger should be halved by the year 2015.

More than 45% of the population in the Sub-Saharan African region falls below the poverty line, i.e. anyone who cannot afford a daily consumption rate of approximately one US dollar, according to World Bank (2006). The South African Millennium Development Goals report (2013) noted that only 4.0% of total population lived below one USD per day (MDG Country Report, 2013).

Poverty can also be measured using calorie deprivation indicators. Thus, individuals are said to be impoverished if their daily energy intake less than 9496.2 kJ (2261 Kcal) per day (de Haen, 2011; Headey & Ecker, 2013). However, this indicator can be affected by factors such as recall errors and biases and the instrument used in the survey (Beegle et al., 2012). It is therefore regarded as poor indicator of poverty except in a famine situation (Jensen & Miller, 2010).

Monetary poverty indicators can also be used to determine poverty. It is used as an indirect indicator of people's economic access to food (Headey & Ecker, 2013; Stats SA, 2014). The use of income as a proxy for child poverty is also important as it indicates the number of children whose basic needs will not be met. In South Africa, the total income of less than R620 per person per month is regarded as living below the poverty line (Statistics SA, 2014).

Anthropometric indices in growing children have been recommended as suitable key indicators of absolute poverty in communities. In particular, height growth in young children is an appropriate indicator of poverty as it reflects the accumulation of the satisfactory basic needs during the first years of life. Therefore, height–for-age of growing preschool children (0-5 years) is recommended as the key indicator for poverty in communities and populations (Jolly

and Pinstrup-Andersen, 2000; Jones *et al*., 2013). The 2005 South African National Food Consumption Survey(SA-NFCS) and the 2012 South African National Health and Nutrition Examination Survey (SANHANES) indicated the high prevalent rate of stunting between the ages 1-3 years and 4-6 years. The prevalent rate of stunting was 23.4% in the 2005 NFCS and increased to 26.5% in the 2012 SANHANES in ages 1-3 years. Furthermore, the prevalence of stunting was 16.4% in the 2005 NFCS and 11.9% 2012 SANHANES within the age category 4-6 years.

2.3 HOUSEHOLD FOOD SECURITY

Household food security (HHFS) is defined as access by all households at all times to adequate and safe nutritious food for a healthy and productive life using socially acceptable means (FAO, 2005; Barett, 2010). It is part of section 27 (b) of the Bill of Rights of the Constitution of the Republic of South Africa which states that, "Everyone has the right to have access to sufficient food and water" (The Constitution of the Republic of South Africa, 1996 p13). Household food insecurity (HHFI) is the unavailability of nutritionally adequate and safe food, HHFI is more prevalent in developing countries (FAO, 2005). Food security incorporates availability, stability, access and utilisation (du Toit *et al*., 2011; De Kock *et al*, 2013). Food security can be measured directly or indirectly using parameters such as socio-economic measures, food consumption, anthropometry and coping strategies (Hyman *et al.*, 2005; Barett, 2010). In addition, a single indicator may not adequately describe the complexity of food security (Maxwell *et al.*, 1999). Moreover, measuring food security is complex. For example, the use of anthropometric data may reflect the state of the person's health, water quality and care practices rather than food security (Maxwell *et al.*, 2008). Hoddinott and Yohannes (2002) and Weismann

et al. (2006) reviewed and validated most proxy indicators of household food security and concluded that the 24-hour recall as a measure of food consumption at household level can be regarded as the "gold standard" by which other food security indicators can be measured. Although the 24-hour recall can accurately capture the current consumption status, it does not, reflect the other elements of the complex concept of food security; it is also time consuming.

In developing countries, the indirect measures of food insecurity are commonly used to determine the prevalence and severity of food insecurity (Piaseu, 2006; Gonzalez *et al.*, 2008). The consequences of food insecurity include hunger, malnutrition, negative effects on the quality of life and an increase in mortality (Labadarious *et al.*, 2001; Ramsey, 2012). The study conducted by Shariff and Khor (2008) in the rural community of Malaysia, reported that more than 50% of households had experienced some degree of food insecurity; there was 34.5% reported child hunger. Food insecure households are characterized by larger household sizes, more children and school-going children, and mothers who are housewives (Shariff and Khor, 2008). De Kock *et al*., (2013) indicated that the Limpopo Province had a 14.8% of households which were food secure, 5.8% mildly food insecure and 53.1% severely food insecure. More recently, Shisana *et al.* (2013) reported that in Limpopo, 41.9% of households were food secure, 27.3% were at risk of hunger and 30.8% were food insecure or experienced hunger.

Household food insecurity is an underlying determinant of inadequate dietary intakes as shown in the UNICEF causal framework of malnutrition (UNICEF, 1990). Household food insecurity arises from a combination of factors that place food systems under stress individually or

collectively. There are a number of factors such as socio-economic, political, climatology and ecological which affect food security (Bonti-Ankomah, 2001).

Food insecurity is complex as it does not only lead to under-nutrition and hunger, but also to over-nutrition and consequently overweight and obesity. Poverty and obesity are inter-related to hunger and food insecurity. Furthermore, familial over-nutrition and under-nutrition often co-exist. This co-existence has been proven by a study conducted on Mexican mothers where 6.1% of overweight mothers had growth-stunted children younger than five years of age (Tanumihardjo *et al.,* 2007). Globally, as economic improvements continue, undernourished children who had stunted growth become more susceptible to obesity as adults. Obesity can also be caused by physiologic adaptive response to episodic food insufficiency that leads to increased body fat. Households affected by food insecurity usually have higher prevalence of obesity with a BMI$\geq$ 30kg/m^2 (Scheier, 2005; FAO 2005; Townsend, 2006).

Poverty is also thought to be accompanied by diminished social contacts, because groups with lower socio-economic status frequently belong to smaller social network (relatives and friends) than groups with higher socio economic status (Snel and Staring, 2001). Consequently, they obtain inadequate assistance and strategies on how to deal with their impoverished situation. This confirms the notion that maintains that the poor will always be trapped in hunger and poverty. Food insecurity can also be caused by environmental stressors such as drought, absence of property rights and land access, poor market access, poor human health, unemployment, poor distribution networks and infrastructure (Baro and Deubel, 2006; Jacobs, 2009). Short term drivers of food insecurity such as an increase in food prices and a drop in cereal availability at

the regional level act as shocks applied on chronic drivers, which further intensify food shortages (Misselhorn, 2005).

2.4 HOUSEHOLD INCOME AND FOOD SECURITY

The real income of a household is an important determinant of its access to food, which in turn is a major determinant of the nutritional status of its members. The South African Income and Expenditure Survey (IES) of 2010/2011 indicated an uneven distribution of household income and expenditure by population group and gender and by urban and non-urban residence and by province. African-headed households (AHH) had the lowest annual income and expenditure in the country, followed by Coloured, Indian and White-headed households. African female-headed households were earning and spending less than the African male-headed households, followed by female-headed Coloureds and then male-headed Coloureds; and the most affluent were White male-headed households (Statistics SA, 2012).

In 2013, Shisana *et al.* reported that 41.9% of rural households had no income. In rural Malaysia, food insecure households spent about 90% of their income on food compared to 76% of food secure households (Shariff and Khor, 2008).

2.5 UNEMPLOYMENT AND FOOD SECURITY

Food security involves availability, accessibility and utilization. When a household has sufficient food for consumption to meet their basic nutritional needs, one can safely say that food is available. However, food availability depends on food production and supply, food stability and food access (Kendall *et al.*, 1996). Statistics South Africa reported an increase in

the official unemployment rate in South Africa over the years from 20.3% in 1996 to 23.3% in 1999 and 26% in 2004 and again dropped to 25.5% in 2015(Stats SA, 2005, 2015). This high unemployment rate affects access to proper nutrition to people in rural areas (Statistics SA, 2001 and 2006; Madhavan and Townsend, 2007). In 2013, Shisana *et al*. reported that 53% of rural formal dwellers or households were earning between R801 and R3200 per month.

Household size determines the variability in household income. The proportion of household receiving less than R2500.00 per month decreases as household size increases from one to four, but it increases with increased size in households beyond four individuals. About 40% of all households' getting income of R2500.00 per month had five or more members and 18% of all households receiving less than R2500.00 had seven or more members. This shows that larger sized households are more vulnerable to poverty and food insecurity than smaller sized households (Statistics SA, 2002).

2.6 HUNGER AND FOOD INSECURITY

In developing countries, household food insecurity is prevalent (FAO, 2005). People living in impoverished households are likely to be malnourished and the most severe level of hunger and food insecurity in households is when it involves children (Tanumihardjo *et al.*, 2007). Poverty is related to chronic hunger, which is more prevalent than acute hunger caused by famine (Jolly and Pinstrup-Andersen, 2000). A systematic review conducted by Masset *et al.*, *(*2011) showed that stunting and to a lesser degree other anthropometric measurements, can be used as best indicators of hunger. Anthropometric measurements are easy to perform on a large scale and do not have many measurements flaws like dietary intake data.

In South Africa and Malaysia, children between one and three years are severely affected by hunger, especially those that live in rural areas and commercial farms (Labadarios *et al.,* 2001, Shariff and Khor, 2008). Additionally, Furness *et al.* (2004) indicated that in the US, people living in urban and rural areas are more likely to experience hunger than those living in suburban regions. The situation is slightly different from the South African context due to differences in demographics. Households that are severely affected by food insecurity are those that run out of food, or are uncertain about the ability to obtain sufficient food (Scheier, 2005; FAO, 2005; Townsend, 2006).

Statistics SA (2005) showed that hunger, like unemployment and poverty, are more concentrated among Black South African children than in other population groups. Evidence from the 1999 NFCS indicated that, at the national level, 52% households experienced hunger/food insecure, 23% were at risk of hunger and 25 % were food secure (Labadarios *et al.,* 2005). On the contrary, data from a recent study showed that about 35% of households in South Africa were food insecure (Kimani-Murage, 2010) and in 2013, Shisana *et al.* reported only 26% to be food insecure. These massive reductions in households that are food insecure do not match with the current rate of unemployment, which is rather high. One would have expected the prevalence of household food insecurity to be even higher since the rate of unemployment is progressively increasing. Moreover, rural areas showed a higher prevalence of hunger than urban areas with 62% of the households experiencing hunger, 24% being at risk of hunger and only 14 % were food secure. In urban areas, 42% experienced hunger, a

percentage lower than the national average. Limpopo Province had a high prevalence of household hunger at 54% compared to the national of 52% (Labadarios *et al.,* 2005).

2.7 MATERNAL UNEMPLOYMENT AND ANTHROPOMETRIC STATUS OF CHILDREN

The high unemployment rate in rural areas can also force labour migration of men and women to the cities, thereby leaving children in the inadequate care of aunts and grandparents (Madhavan and Townsend, 2007). According to the conceptual framework of malnutrition, inadequate care is one of the causal factors of malnutrition. The nutritional status of children can be assessed clinically, anthropometrically and dietary (Faber and Wenhold, 2007; Hammond in Mahan and Escott-Stump, 2013). The nutritional status of the under-fives is one of the indicators of household well-being and one determinant of child survival (Zere and McIntyre, 2003). The burden of undernutrition is particularly rooted in rural areas/populations (Parischa and Biggs, 2010). Poor anthropometric status was also found in households which were at risk of hunger or experiencing hunger (Labadarios *et al.,* 2005; Naser *et* al., 2014). Under-nutrition strongly correlates with other measures associated with hunger such as poor productivity, morbidity and mortality (Svedberg, 2000;)

A high prevalence of stunting in the community indicates long term dietary inadequacy, hunger and infections in early childhood (Zere and McIntyre, 2003). The WHO (2002) recommends stunting as a reliable measure of overall social deprivation. Stunting is more prevalent among rural than among urban children, and also in children living in traditional or informal types of houses as well as among those whose mothers were less educated (Labadarios et al., 2005;

Davoodi, *et al.,* 2015). Furthermore, the onset of stunting is usually linked with the introduction of complementary feeding (Labadarios *et al.,* 2005). According to Cogill (2003), stunting is also associated with frequent infections and micronutrient deficiencies such as iron and zinc.

Stunting affects 147 million pre-scholars in developing countries (UNICEF, 2009). The 1995 South African Vitamin A Consultative Group (SAVACG) reported the level of stunting which showed chronic/long-term malnutrition at 34% in Limpopo Province. When comparing this study results with the 1999 SA-NFCS for children 1- 9 years, which showed the prevalence of stunting and severe stunting in rural areas to be 26.5% and 8.4% respectively, this was high compared to the national average of 21.6% and 6.5% respectively. Moreover, Mamabolo *et al. (*2005) showed a 19% prevalence of stunting in three-year old children residing in the rural areas of Limpopo. In addition, the study conducted by Kumani-Murage, (2010), showed a high prevalence of stunting at 18% in 1- 4 years, 5% in 5 years of age and 7% in 10 - 14 years of age. Another study conducted in South Africa (QwaQwa) indicated that about 16% of children were stunted and 4% severely stunted (Oldewage-Theron and Egal, 2010). Shisana *et al.* (2013) reported 26.5% stunting in 1to 3 year olds, 11.9% in 4 to 6 .year olds, and 9.4% in 7 to 9 year olds in South Africa.

Wasting (weight-for-height) occurs due to acute nutritional stress and severe food shortage/hunger and is also an important predictor of mortality. The 1999 SA-NFCS further showed that in rural areas, the prevalence of wasting was 4.9% and severe wasting was 1.3% and it is high compared to the national average of 3.7% and 0.8% respectively (Labadarios *et al.,* 2005). Kimani-Murage (2010) showed the prevalence of wasting in rural South African

children to be at 7% in ages 1-4 years, 6% in 5-9 years and 0% in 10-14 years. Shisana *et al* (2013) showed wasting at 2.2% in 1- 3 years, 0.8% in 4-6 years and 0.5% in 7-9 years. This shows a reduction of wasting at the national level. Low BMI-for-age was observed in 8%, including both the thin and severely thin children (Oldewage-Theron and Egal, 2010).

An estimated 149 million of children in developing countries are underweight as a result of acute or chronic hunger (UNICEF, 2009). Underweight is associated with both acute and chronic malnutrition. However, it does not appropriately distinguish between taller but wasted and shorter children with normal weight (Parischa and Biggs, 2010). The South African NFCS, indicated that the prevalence of underweight in Limpopo was 12.8% and severe underweight at 1.8% respectively, and this was also higher than the South African national average of 10.3% and 1.4 % respectively (Labadarios *et al.*, 2005). Furthermore, the prevalence of underweight was 16% in 1- 9 years and 7% in 10-14 years (Kimani-Murage, 2010). Only 1% of the girls in the QwaQwa study were underweight (Oldewage-Theron and Egal, 2010). Shisana *et al.* (2013) reported 6.1% in 1-3 years, 4.5% in 4-6 years and 6.6% in 7-9 years, all values below the 2005 observations. A study done among rural South African children by Kimani-Murage *et al.* (2010) reported a high prevalence of underweight, although a high percentage of children received child support grant and their caregivers received old age pensions. Food insecurity and low quality complementary foods appear to be associated with underweight among children (Parischa and Biggs, 2010). Conversely, a study conducted in one of the rural villages of SA showed that the majority (79.6%) of children were of normal weight (Oldewage-Theron and Egal, 2010).

A study done among Brazilian workers as reported by WHO (2003) observed a strong correlation between height and wages received. Taller agricultural workers were found to earn higher wages than short workers. This showed that the nutritional status of a person is important for productivity and income.

2.8 MATERNAL EDUCATION AND ANTHROPOMETRIC STATUS OF CHILDREN

The 1999 SA-NFCS showed that improved maternal education was associated with a significant reduction in the prevalence of stunting, wasting and underweight in all groups of children (Labadarios *et al.*, 2005). Moreover, a study done by Shrimpton *et al.* (2001) showed that maternal education was associated with higher risk for child underweight and a lower risk for child overweight. However, maternal education was not associated with child stunting (Shrimpton *et al.*, 2001). The 1999 NFCS showed, however, that maternal education (<7years of schooling) was associated with a lower risk of child stunting and a higher risk of obesity (Labadarios *et.al.*, 2005). Chopra (2003) indicated that children were less likely to be stunted if their mothers had a minimum of five years of schooling.

2.9 POVERTY AND OBESITY

A study by Armstrong *et al. (*2006) in South African primary school children, showed high levels of overweight and obesity similar to the international pattern. Moreover, a study conducted by Oldewage-Theron and Egal, (2010) showed 17% of children to be overweight and 4% obese. However, another study conducted in rural South Africa showed low prevalence of overweight and obesity at 7% and 1% respectively (Kumani-Murage *et al.*, 2010). In

addition, the SA-NFCS also showed a low prevalence of overweight and obesity in rural children (Labadarious *et al.,* 2005). This is also in agreement with a study that pointed out that poverty and under-nutrition are more prevalent in rural areas, whereas overweight and obesity predominate in urban areas (Tanumihardjo *et al.,* 2007). However, familial under-nutrition and over-nutrition often co-exist and are termed the double burden of malnutrition. This double burden of malnutrition is caused by poverty, hunger and food insecurity (Dinour *et al.,* 2007).

Stunted girls are at risk of subcutaneous fat deposition in the body, especially in the abdominal area in adulthood (Kruger *et al.,* 2004). This type of obesity predisposes them to the development of diseases of lifestyle later in life. Globally, as economic improvements continue, undernourished children who had stunted growth become more susceptible to obesity as adults. This is because they have more money and can afford more food and calories (Townsend, 2006; Tanumihardjo *et al.,* 2007). A study done by Olson (1999) showed that women between 20 and 39 years of age who were food insecure had a mean BMI of 28.2 kg/m^2 compared to 25.6 % in the food secured households (Scheier, 2005).

2.10 FOOD PROCUREMENT AND HOUSEHOLD INVENTORY

Income is the decisive factor in the consumption and procurement of foods (Labadarios *et al.,* 2005). In South Africa, the most commonly procured and consumed foods are maize (78%), sugar (76 %), whole milk (42%), brown bread (37%), tea (46%) and hard margarine/cooking fat (27%). These food items are frequently found in most households. Maize and sugar are consistently procured and consumed in all households in all the provinces irrespective of income. Furthermore, more frequent procurement and consumption of protein of animal origin

was seen in higher income households than with lower income households (Labadarios *et al.*, 2005).

The 1999 SA-NFCS further showed that the national average of the number of household food items procured was 35. At provincial level, the number varied between16 and 67. Limpopo Province procured less than 20 food items. The number of food items actually found in households was lower than the number of food items procured. The national average was nine items per household and there was little variation between the number of food items present in rural (8 per rural household and 10 per urban household). More recently, Shisana *et al* (2013) reported a dietary diversity score of 4.2 at the national level and 3.2 in Limpopo, indicating very poor food variety.

2.11 HOUSEHOLD DIETARY INTAKES AND CONSUMPTION PATTERNS

The 1999 SA-NFCS showed that about 90% of children ate breakfast regularly and 10-20% consumed breakfast occasionally in other provinces including Limpopo Province Approximately 44% of children consumed three main meals daily, whilst another 44% of children consumed in-between meals and 31% were without in-between meals (Labadarios *et al.,* (2005). According to WHO (2004), infants between 12 and 23 months of age should consume three to four meals per day, with an additional one to two snacks per day. An additional one to two cups of milk is also recommended if the child is not breastfed. The 1999 SA-NFCS further showed that maize, sugar, tea, whole milk and brown bread were the commonly consumed foods. Moreover, Maize, tea, soup (meat and vegetables), bread, fresh full cream

milk, were the first five food items consumed by children in QwaQwa, Free State Province (Oldewage-Theron and Egal, 2010).

The 1999 SA-NFCS further highlighted that only 16-30% of children in KwaZulu Natal, Mpumalanga and Limpopo Province had food specially bought and prepared for them. At the same time, 87% of children in the other provinces shared meals with the rest of the family members (Labadarios *et al.,* 2005). However, the study conducted in informal settlements of Gauteng and rural areas of Limpopo reported that milk was consumed in small amounts, whereas the intake of non-dairy creamer was high (Theron *et al.,* 2007). Cheese and yoghurt were not consumed as they are perceived to be unaffordable. The results further concurred with the SA-NFCS as they showed that the most commonly consumed foods were maize, brown bread, "*vetkoek"*, tea and sugar. Moreover, carbonated drinks and squashes were less consumed (Theron *et al.,* 2007).

The South African NFCS also indicated that apples and bananas were consumed only once a week. Cabbage and potatoes were also consumed as fresh vegetables (Labadarios *et al.,* 2005). The study conducted in Indian children reported that about 90% of children consumed food items from food group such as tomatoes, *bher* (locally grown fruit), apple, banana and onions, and almost 80% of the children consumed Vitamin A rich dark green leafy vegetable foods such as chickpea leaves and spinach (Rani *et al*., 2010). The children in a rural area of Limpopo and an informal settlement of Gauteng Province, commonly consumed eggs and chicken giblets as cheaper alternative sources of protein. However, chicken was rarely consumed and was mostly replaced with tinned fish (Pilchards in tomato sauce). Beef and tripe were consumed in minimal amounts (Theron *et al.,* 2007).

2.12 DIETARY DIVERSIFICATION

In developing countries, poor populations lack dietary diversity since most of their diets are predominantly starch based and sometimes include few or no animal products. Consumption of vegetables and fruits depends on seasonal availability (Dewey, 2003). Likewise, food variety and dietary diversification, which are associated with the nutritional status of South African children are limited, especially in poor communities of South Africa (Steyn *et al.*, 2006 and Kimani-Murage *et al.*, 2010). Similarly, the study conducted by Onyango (1998) also showed a positive association between dietary diversity and improved nutritional status. Makola *et al. (*2003) indicated that the aim of dietary diversification is to ensure sufficient consumption of foods, thereby increasing the quantity of all essential micronutrients. It is also assumed that individuals consuming more diverse diet are more likely to meet their daily energy needs and nutrient requirements.

Dietary diversification is also strongly associated with household socio-economic status (Hoddinott and Yohannes, 2002), i.e. the higher the household income, the higher the dietary diversity; the converse is also true. Moreover, dietary diversity is also used as a proxy for household socio-economic status. Arimond and Ruel (2004) reviewed the association between dietary diversity and child nutritional status from 11 countries, including some from Africa. The conclusion from their findings was that child dietary diversity is associated with a HAZ of less than 2 Standard deviations. A low dietary diversity score has also been associated with low weight and stunted growth (Rah *et al* in Shisana *et al*, 2013). The association was found to be

independent of the socio-economic factors and clearly confirmed that dietary diversity might reflect diet quality.

The study carried out by Kleyhans (2003) in Theron *et al.* (2007) pointed out that poor food quality rather than the actual lack of food was the cause of malnutrition in young South African children and can be eradicated by functional nutrition education on food processing and food preparation (Theron *et al.*, 2007). Furthermore, Faber and Wenhold (2007) suggest that nutrition education targeting mothers/caregivers and behaviour modification can promote adherence to dietary guidelines. According to Steyn *et al.*, (2006) dietary diversification is a cheaper form of nutrition intervention strategy since it requires little or no money. It also promotes intake of micronutrients that are highly sustainable, encourage community involvement, and allows individuals and families to make choices (Steyn *et al.*, 2006).

The study done in a rural area among Indian children to assess dietary diversification showed that they consumed poor quality foods and no animal products due to the vegetarian diet predominant in their population (Rani *et al.*, 2010). In addition, the absence of diversified, nutrient dense diet can lead to over nutrition and failure to meet micronutrient requirements (Tanumihardjo *et al.,* 2007). Rani *et al. (*2010) further indicated that Vitamin A rich fruits, mostly guava and papaya were consumed by only 4.3% of the children. Cabbage was consumed by only 40% of the children and a negligible amount of fresh fruits and vegetables predisposing them to micronutrient malnutrition. They further indicated that dietary diversity was also strongly associated with household economic status.

2.13 COPING STRATEGIES TO FOOD DEPRIVATION

According to Ninno *et al.,* (2003), food coping strategy is a response that households employ when they face the predicament of food shortage due to drought, low income or high food prices. The household does not become hopeless due to food shortage; they engage in food acquiring activities or change their eating habit. Moreover, households plan coping strategies in an attempt to meet their basic needs, such as food, clothing, shelter, education and health (Hamilton, 2000; Akerele *et al.,* 2013).; Borrowing money to buy food and receiving food from relatives and neighbors are ways to lessen the food secure household from experiencing food insufficiency (Kempson *et al*, 2003; Shariff and Khor, 2008; Akerele *et al.,* 2013). Worldwide and in South Africa in particular, poor people cope with food poverty by adopting monotonous diets that do not necessarily address their nutritional needs, consequently leading to both macro and micronutrient deficiency (Maxwell *et al.,* 1999; Oldewage-Theron *et al.,* 2006). There are various types of strategies that can be applied as a response to food deprivation as described by Maxwell *et al.* (1999), (2003), Hamilton (2003), Misselhorn (2005), Senefeld and Polsky (2006) , Oldewage-Theron *et al.*(2006) and Akerele *et al,* 2013.

Consumption strategies include buying food on credit, relying on less preferred foods as substitute for staple foods and decreasing in the number and dietary variation of meals. These coping strategies were further demonstrated by a study conducted by Kruger *et al. (*2008) in households of farm workers in South Africa, which indicated that they would consume less preferred food or buy food on credit or gather food from the surrounding environment. Other studies are in agreement with the South African study and reported the use of consuming less food and inexpensive food, consumption of home prepared meals, cutting down on expenditures

perceived to be luxuries or by purchasing cheaper items. Moreover, the practice of using short term unsustainable strategies such as borrowing, purchasing on credit, begging or eating wild foods are used as prevalent coping mechanisms to promote dietary-the intakes of children (Snel and Staring, 2001; Maxwell *et al.*, 2003; Dore *et al.*, 2006; Shariff and Khor, 2008; Akerele *et al.*,2013). Furthermore, decreased frequency, quality of food, food preference and food substitution and changes in food store were some of the food coping mechanisms employed by families in Indonesia during its economic crisis in 1998 (Studdert et al., 2001).

The use of locusts as a coping strategy to food deprivation due to death of the wage earner was employed by rural children in South Africa (Kimani-Murage, 2010). An increase in coping strategies indicates a decrease in food security. About 90% of urban households in South Africa did not always have enough food to eat and 19% depend on gifts, handouts, begging or borrowing. This reflected a high level of current food insecurity in these households (Sheppard *et al.*, 2009). When food insecurity becomes severe, the households adjust by sparing food for children. Consequently, adults endure hunger to protect their children from hunger.

Expenditure strategy can also be employed, whereby families avoid spending money on health care, livestock input, agriculture or education in order to buy foods (Tarasuk, 2001). In addition, this method was employed in areas where education was not free and families had to fund the schooling of their children. The family will cope by reducing expenditure on textbook loan, reducing children's pocket money and also reducing expenditure on school needs and activities (Tarasuk, 2001; Maxwell *et al.*, 2003). In other words, this coping strategy clearly indicates that it does not value education, and these are some of the reasons why the poor will always be

trapped in poverty. However in South Africa, the expenditure strategy, especially on education and health care might not be observed, since primary health care and schooling up to secondary level are free.

An income strategy is one where families sell household assets or livestock to procure foods (Lambrechts and Barry, 2003). Shariff and Knor (2008) also showed that 81% of food secure households in rural Malaysia used this method since they had high income assets.

The migration strategy involves families sending children to relatives or friends' homes or adults migrating to find work (Misselhorn, 2005; Baro and Deubel, 2006; Senefeld and Polsky, 2006). Families can also limit the number of people living in one household by excluding the non- productive members of the household. Households can also respond by reducing the number of people, i.e. sending children to the neighbour's house to eat (Maxwell *et al.,* 2003; Misselhorn, 2005). Children from poor families might spend some time in the household of their grandmother or be given less food to eat, although most poor people sometimes prefer to be poor and independent rather than seeking any paternalistic support from third parties. This is usually done as a response to support that is accompanied by explicit or implicit conditions and also due to moral pressure (Snel and Staring, 2001)**.**

The consumption of seeds, in times of food scarcity is another strategy of combating hunger. This strategy puts a lot of pressure on subsistence farming because seeds for planting will be depleted. The households are usually so poor that they cannot afford to procure new seeds leading to increased poverty and hunger (Misselhorn, 2005). Cooking whatever food is

available at home including herbs, plant shoots, vegetables grown in the household, poultry or other domesticated animals is the strategy that was mostly employed by people in food insecure households. This coping strategy is mostly used by poor households as it does not require money to purchase the goods (Shariff and Khor, 2008).

In Third World countries, coping strategies can be in the form of intensive use of internal household resources (Baro and Deubel 2006). Earlier, Hamilton (2003) and Snel and Staring (2001) showed that this can be in the form of self-supporting household that grows and sells its own vegetables, makes its own clothes, does its own repairs or builds its own house. The poor can also enter into relations within circles of relatives, friends or neighbours as mobilisation and utilisation of external resources. Another coping strategy is to seek support of powerful external factors such as government or private organizations (NGOs). This strategy is more powerful and important in Western welfare state, because they guarantee a minimum level of living for all citizens. The poor people in these countries do not rely on coping strategies like informal labour, selling or helping each other (Snel and Staring, 2001). A study done by Edin and Lein (1997) showed that American single mothers could not survive on an aid for families with dependent children benefit or on poorly paid jobs. Their own mothers or relatives supported these single mothers and men were their second sources of support. Single mothers who could not generate extra income from their personal networks tried to earn income through formal or informal employment such as part-time jobs or from prostitution (Edin and Lein, 1997; Olielo, 2013). International migration is also another form of coping strategy because individuals or households escape poverty and insecurity in their countries (Baro and Deubel 2006).

2.14 SUMMARY OF LITERATURE REVIEW

Hunger is a social disease and it is also linked to poverty. It is further classified as acute or chronic based on its causal factors. Acute hunger is caused by war or natural disasters which affect food production and consequently food availability, whilst chronic hunger occurs as a result of insufficient dietary intake overtime. Thus, under-nutrition in children develops over time and consequently obesity sets in as an adult. Chronic hunger is caused by long term poverty and lack of purchasing power.

In South Africa, most rural households suffer from chronic hunger due to high levels of poverty and unemployment. South Africa has sufficient food nationally to feed the whole population. However, there is lack of purchasing power as evidenced by poor nutritional status in poor households, especially stunting in children. Stunting is used as a proxy to measure chronic hunger. Additionally, in South Africa, living below the poverty line occurs when the total household income ranges from R800 to R1200.00 or if the total dietary intake is less than 9496.2 kJ (2261Kcal). Using the above mentioned poverty line as a reference guide, the majority of the households live below it.

Food security can be measured directly or indirectly using socio-economic parameters, food consumption and coping strategies (Maxwell, 1996; Barret, 2010). The majority of the households in Limpopo Province were found to be food insecure using the actual dietary intake as a measurement of food security (Shisana *et al.,* 2013). Rural areas have been shown to have a high rate of unemployment (Statistics SA, 2013). This also contributes to poor dietary intake and diversification, especially in children. Complementary feeding of rural children has been

shown to be of poor quality, monotonous and mainly starch based. Again, dietary diversification has been associated with household income and anthropometric status of children (Altman *et al.*, 2010).

Poor anthropometric status has also been linked to hunger and food insecurity since stunting was found to be prevalent in households that were at risk of food insecurity or food insecure. Improved maternal education or a minimum of five years of schooling has been shown to reduce the prevalence of stunting, wasting and underweight.

Coping strategies are employed by households that experience food insecurity. Research also indicates that the higher the use of food coping strategies, the higher the prevalence of household food insecurity. Food coping strategies include adjusted consumption, income and expenditure, and migration. To a lesser extent wild foods are used by rural households to cope with food deprivation. Increasing the income of women can help in fighting poverty by improving household food security, which will consequently fight against malnourishment. Another study further indicated that solving the problem of poverty and household food security is complex. To resolve it, a combination of nutrition programmes and income growth will be the best strategy, and multi-sectorial collaborative action is also crucial.

CHAPTER THREE: METHODOLOGY

3.1 STUDY DESIGN

The study was an exploratory and correlational research design and it aimed at establishing a relationship between employment status of the mother, household hunger and nutritional status of children of age 1– 12 years. According to Leedy and Ormrod (2004), correlational research looks at surface relationships, but not necessarily probe the causal reasons underlying them. In correlational studies, researchers gather data about two or more characteristics for a particular group of people. These data could be numbers that reflect specific measurements of the

characteristic/s in question. It is also a cross-sectional study since data for the three characteristics are collected at the same time. The study used both quantitative and qualitative techniques for data collection.

3.2 STUDY AREA AND POPULATION

Greater Sekhukhune District Municipality (GSDM) is situated in Limpopo Province. The area measures 1 326 437 ha. It is 120 Km south of Polokwane City. It has a population size of 1 102,748 with 217,000 households and approximately 546 villages, which are sparsely populated and dispersed throughout the district (Integrated Development Plan of GSDM, 2007/8). It consists of five local municipalities, namely Elias Motsoaledi, Fetakgomo, Greater Marble Hall, Makhuduthamaga, and Tubatse. Data from GSDM indicate that 94.7 % of the total population lives in rural areas and 5.3% in urban areas. The population younger than 19 years contributes 56% of the total population, whilst 38% is the economically active group aged between 20 and 59 years, and 60 years and above contributes 6% of the total population. Furthermore, more than half of the total population (55.2%) were women. The unemployment rate in GSDM was 69%, higher than 55.7% of the Limpopo Province and the national average of 25.6% (Statistics SA, 2006).

Figure 3.1 Greater Sekhukhune District Map

The study populations were mothers/caregivers with their children aged one to twelve years living in Makhuduthamaga Local Municipality of Greater Sekhukhune District Municipality of Limpopo Province. Makhuduthamaga constitutes 27% (262921) of the total population of GSDM and 134068 (13.8%) children aged 0-17 years and about 100 villages. The municipality was purposefully selected from the five owing to accessibility to the area by the researcher. Villages were used as sampling frames.

3.3 SAMPLING

Simple random sampling was used to select nine villages, which is approximately ten percent of the total number of villages in Makhuduthamaga. All the villages in the municipality were identified using a local map, numbers were assigned and nine villages were blindly selected.

Systematic random sampling was used to select households from the selected villages. Upon entering each village, the first house from the point of entry or the chief's kraal was selected and thereafter every fifth house on the alternate sides was selected. Twenty households per village were selected until the study population of 180 was reached. Children were randomly selected per household. The number 180 is based on the fact that 100 is sufficient for this type of study (Leddy and Omrod, 2004). From each household, one child between 1 and 12 years was selected to be part of the study group. If the household had more than one child within the selected study age group, every child was then allocated a number and the one with the lowest allocated number was selected. If the household had no children in that age group, the household was skipped. In each household, the researchers requested members of the family to identify the mother or the primary care giver of the child. The total sample was thus 180 mothers/caregivers and 180 children aged between one and twelve years.

3.4 DATA COLLECTION

3.4.1 Variables measured

The following variables were measured:

a. Socio-economic status

The socio-economic status of the population was determined by using a questionnaire which focused mainly on the number of people per house and the total monthly household income. The information obtained enabled the researcher to link with the other variables such as un/employment status and nutritional status (Appendix B).

b. Employment status

Employment status was measured using a generalized demographic questionnaire focusing mainly on whether the caretaker was employed or not and also the occupation. Employment was defined as formal or self-employed.

c. Anthropometric status

Nutritional status was determined using anthropometric measurements such as weight, height and mid upper arm circumference. Anthropometric measurements were done on one representative per age group per family (i.e. one child and one adult/caretaker). This was recorded in Appendix B.

d. Dietary data

Information on dietary patterns was collected using a 24-hour recall and food frequency questionnaire. The recall period for the FFQ was as specified in the questionnaire, i.e. daily, weekly, monthly or occasionally.

e. Household food security

Household inventory on available food items was used to assess the amount of food weighed on the day of data collection.

f. Prevalence of hunger

The prevalence of hunger was determined using the hunger scale questionnaire (Labadarios *et al.,* 2001; WHO, 1995) to determine the level of hunger in each household (see Appendix B).

g. Coping strategies

Coping strategies in each household were determined using a semi- structured interview probing key strategies (see Section 3 of Appendix B).

3.4.2 Data collection procedures

The researcher and a research assistant who was a nutrition undergraduate student collected the data.

a. Socio-economic and employment status

Data on the socio-demographic were collected using a questionnaire which was administered by the researchers in a household setting.

b. Anthropometric measurements

Height and Length

The length of children less than three years who were unable to stand erect were measured using a height board with the caregiver supporting the torso and legs pressed downwards and the other family member supporting the head and the researcher took measurements twice and the mean was computed. The heights of children who were above three years were measured using an electronic height rod. The subject was standing erect, looking straight ahead without tipping the head down. The top of the ear and the outer corner of the eye were in a line parallel to the floor (Frankfort plane). It was measured with both feet without shoes touching together and heels against the wall (Mahan and Escott-Stump, 2009).

Weight

Weight was measured twice in light clothing and barefooted using a Tanita electronic scale and the mean weight was recorded. However, in cases where the child could not stand on the scale, the mother's weight was taken with and without the baby, then subtracted the latter from the former weight and the difference was recorded as the child's weight. The scale was calibrated daily and zeroed before collecting data on each participant (Mahan and Escott-Stump, 2009).

Head circumference

The head circumference was measured in children below three years of age. The measurements were taken twice at the greatest circumference to the nearest centimeter. The non-stretchable tape was placed above the eyebrows (supraorbital ridge) and pinna of the ear and around the occipital prominence at the back of the skull (Hammond in Mahan and Escott-Stump, 2013).

c. Dietary data and household food security

The 24-hour recall and food frequency questionnaire were used to assess dietary intake and patterns. The 24 hour-recall and food frequency questionnaire were informed by the instruments of the 1999 NFCS and modified by eliminating foods that are not commonly consumed by the population and adding indigenous foods. There was an option to include other foods which were not listed in the dietary intake questionnaire by including "other" as part of the response. This was done to ensure that all food items were included. The developed questionnaire was piloted in 10 households in a village in Capricorn District, which was not used in the main study. The results of the pilot were taken to a statistician, who assisted with the finalisation of the questionnaire, especially to advise on how the relationship should be analysed. The questionnaire was not translated into Sepedi, the local language. However, during training it

was agreed that the local language would be used for the conversation. The researcher, a nutrition lecturer and a field worker, a second year nutrition student, are both Sepedi first language speakers. All interviews were conducted in Sepedi, but recorded on English questionnaire.

The food models and the South African Medical Research Council (MRC) dietary assessment and education kit (DAEK) developed by Steyn and Senekal (2004) were used to estimate the portion size and to quantify the dietary intake data. The DAEK consists of: Food Flash Cards; a Food Photo Manual; generic and specific sketches of foods. The DAEK uses weight of household measures and portion sizes as reflected in the 1991 South African MRC Food Quantities Manual (Langenhoven et al., 1991).

The information on food procurement and household inventory was collected using a questionnaire in each household. The information was used to determine household purchasing power and household food security. The information on all dietary data was collected once.

d. Prevalence of Hunger

The prevalence of hunger was measured using a hunger scale. It is an eight-question-based questionnaire referred to as The Community Childhood Hunger Identification Project - CHHIP (WHO, 1995). It is used to measure household and individual level of hunger. It is regarded as a sensitive measure to identify chronic, subclinical under-nutrition among poor families (Lewit and Kerrebrock, 1997).The CHHIP hunger index is a scale that is composed of eight questions that investigate whether adults or children in the households are affected by food insecurity,

food shortages, perceived food insufficiency or altered food intake due to resources constraints (see Appendix F) (Lewit and Kerrebrock, 1997; Labadarios *et al.*, 2001). In order to achieve a great measure of objectivity, Labadarios *et al. (*2001) recommend that the hunger scale questionnaire be used in conjunction with other parameters such as anthropometry and dietary intake measures.

3.5 VALIDITY AND RELIABILITY

In quantitative research, validity is related to the accuracy, relevance and reliability of the measurements, whilst qualitative research concerns the understanding, representing and explaining of something. An account is valid if it represents precisely the characteristics of phenomenon that it anticipated to describe (Pyett, 2003). A study is considered to be externally valid if the findings can be taken as a reasonable representation of the true situation (Leddy and Omrod, 2004). Internal validity refers to whether the measurements actually measures what they purport to do. External validity was ensured by using various methodologies for estimating dietary patterns, i.e. 24-hour recall, Food frequency questionnaire and food inventory. On a daily basis, the researchers sampled one questionnaire from each batch of different data collectors then swapped and went back to the sampled household to redo the data collection. This was done to ensure reliability of the information gathered.

Food models and South African MRC dietary assessment and educational kit were used to estimate the quantity of food consumed by the children. Data on household inventory were validated by the researcher by observing and recording food that was available in the household on the day of data collection. Anthropometric data were validated by taking the measurement

twice. The mean value was then calculated from the two and the scales were validated daily by weighing a known mass and adjusting the weight accordingly. The researcher and a trained research assistant who was a nutrition undergraduate student collected the measurements. The researchers used their indigenous language, Sepedi, which is the local language the study population speaks. This helped with the standardization of the questions asked and also improved validity. The hunger scale questionnaire is a standardized tool used on NFCS, 1999 adapted from WHO.

Reliability was ensured by triangulation. Dietary data, anthropometry and socio-economic parameters were used to estimate nutritional status and employment status. The settings used for data collection were the villages and households. The researcher was also able to ascertain if standardized methods were used.

3.6 ETHICAL CONSIDERATIONS

The research proposal was approved by the Higher Degrees Committee of University of Venda (Appendix C). An approval letter was received from the Municipal Manager of Makhuduthamaga Municipality (Appendix D). Permission was also sought from the traditional authority and was granted verbally. Consent was explained to the participants, who were then requested to fill a consent form to be part of the study group. Confidentiality and anonymity with regard to the findings were ensured for each participant. No names of mothers/caregivers or children were used.

3.7 DELIMITATION

The study was restricted to Makhuduthamaga municipal areas. Families were excluded if the following conditions were present:

- Death in the family within the past three weeks of the visit.
- Caregiver is younger than 12 years or unavailable or mentally incapacitated or under the influence of alcohol.
- Child away for more than 24 hours or had an acute illness within the past 48 hours.

3.8 DATA ANALYSIS

Socio-economic data were analyzed using Statistical Package for the Social Sciences (SPSS version 22). Data on dietary intakes of children were evaluated, concentrating on the feeding patterns and the frequency of consumption of the food sources of important micronutrient for the specific age groups. Analysis on food procurement and household inventory was analyzed manually to determine the availability of food at a given time. Data on the relationship between different variables e.g. hunger and nutritional status, unemployment and nutritional status and unemployment and hunger and others were statistically analyzed using Chi-square. The level of significance was $P < 0.005$. A statistician was consulted during the development of the instrument and the analysis of data. All data were captured by the researcher on excel spread sheets.

Prevalence of malnutrition

Anthropometric data of children were analyzed using Z-scores using National Centre for Health and Statistics (NCHS) for children above five years. The 2006 WHO reference standards were used for children under five years of age. The anthropometric indices were interpreted as: stunting (height for age <-2SD) and severe stunting (height-for- age <- 3SD), wasting (weight –for-height <-2SD) severe underweight. Weight-for-height <-3SD) overweight (>2SDweight-for- age) using WHO classification of malnutrition in children.

The prevalence of anthropometric indices was interpreted as per WHO (1995 and 2000) guidelines as:

Table 3.1: Interpretation of severity of malnutrition in a population

	Low (%)	Medium (%)	High (%)	Very high (%)
Stunting	<20	20-29.9	30-39.9	≥40
Wasting	<5	5-9.9	10-14.9	≥15
Underweight	<10	10-19.9	20-29.9	≥30

(WHO, 1995)

Table 3.2: Classification of severity of malnutrition for children under 5 years of age

Severity of malnutrition	Acute Malnutrition (%) (weight-for-height) <-2 z score	Chronic Malnutrition (%) (height-for-age) <-2 z scores	Underweight (%) (weight-for-age) <-2 scores
Acceptable	<5	<20	<10
Poor	5-9	20-29	10-19
Serious	10-14	30-39	20-29
Critical	≥15	≥40	≥30

(WHO, 2000)

Level of hunger

The hunger scale was analyzed to determine the level or severity of hunger in each household. Questions 1 and 2 measured food security at the household level, questions 3 and 4 measured food insecurity at the individual level (referring to the mother's/ caregiver's experience) whilst questions 5, 6, 7, and 8 measured child hunger.

A child is termed hungry if affirmative answers to at least five of the eight questions are obtained, which requires that at least one of the questions centred on children be answered in the affirmative. Children in families that provide affirmative responses for one to four questions are termed at risk and children in families with no affirmative responses are termed not hungry.

3.9 CHALLENGES ENCOUNTERED

The names of some villages in the local map did not correspond with what the local people knew the place to be, resulting in unnecessary traveling around one area and also thinking that the area did not exist. e.g., the map showed Sephoto and the villagers called it Masakeng. However, the Chief and Indunas validated the village since they knew both names. We were also expected to bring something (money, gift or a memento) to the chief since we were visitors in that village. This nearly impacted on the total number of the population sampled.

The date of data collection sometimes overlapped with the payout dates for social grant, making it challenging to find people in their households. Data was collected on additional days. . Some

villages were visited on a Saturday, to ensure the presence of the caregiver or the school going child.

CHAPTER FOUR: RESULTS

4.1 SOCIO DEMOGRAPHIC PARAMETERS

This study was conducted in households at Makhuduthamaga Municipality of the Greater Sekhukhune District in Limpopo Province. A total number of 180 mothers and 180 children participated in the study. The data were collected over a twelve-month period. The sample distribution for children was 46.1% (n=83) male and 53.9% (n= 97) females. The minimum age

of the children was 17months while the maximum age was 69 months. The average age was 38 months (see Table 4.1 below)

Table 4.1: Age distribution of children

Age	N	Minimum age	Maximum age	Mean	Standard deviation
0 – 60 months	96	11.2	60.88	36.28	14.24
61 – 144 months	83	61.86	141.7	97.23	21.31

4.1.1 Age of caretaker

The study results showed that the majority of the children (73.9%, n= 133) were taken care of by their mothers, 23.3% (n=42) by their grandmothers and 2.8% (n=5) by others which were not specified during data analysis. The age group of mothers/caregivers is shown in Figure 4.1 below. Data indicated that most caretakers (87.2%, n=157) were between 20 and 59 years of age, indicating that they were cared for by mature adults.

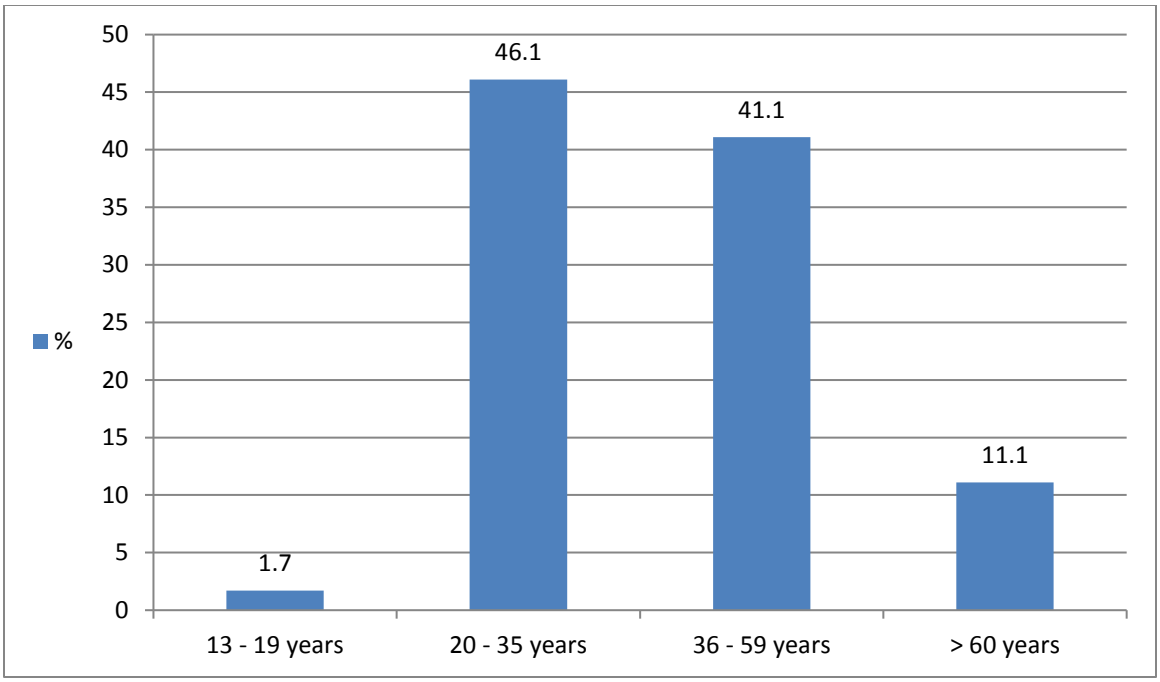

Figure 4.1: Age of caretakers (n = 180)

4.1.2 Educational level of the caretaker

About 53.3% of caretakers had gone to school up to high school level. There was an almost equal number of caretakers who had never been to school (23.9%) and 20.6 % of those who attended up to primary school level. A minority of caretakers had tertiary education as Figure 4.2 below shows.

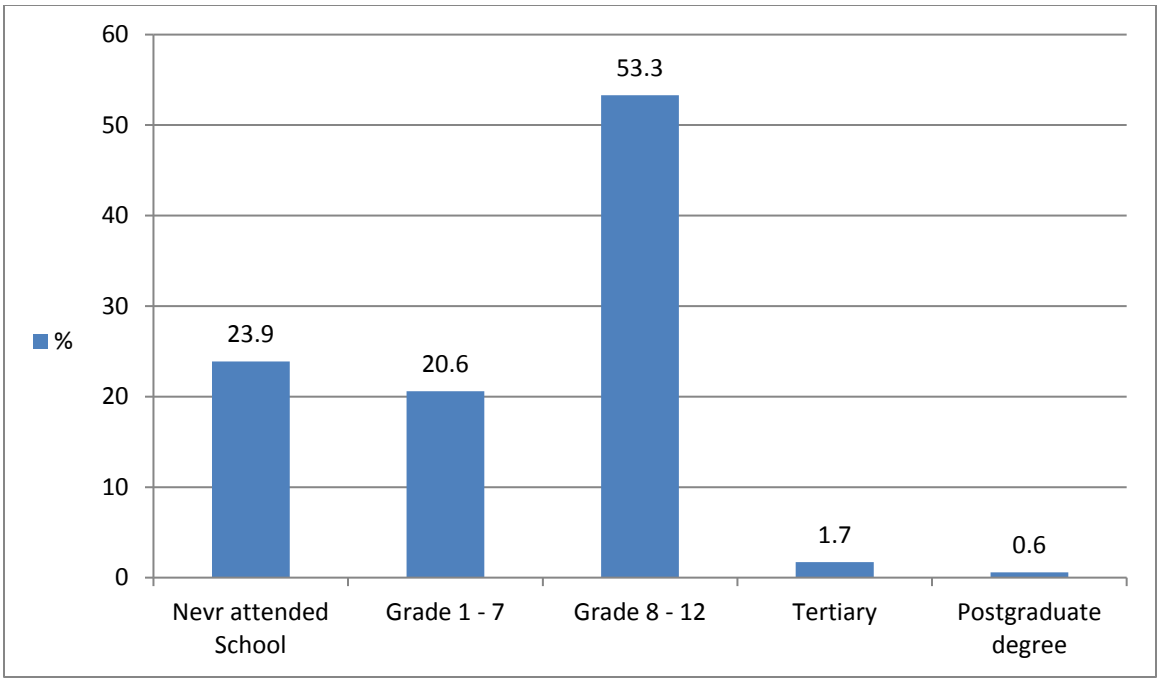

Figure 4.2: Education level of caretakers (n = 180)

4.1.3 Marital status of the caretaker

A caretaker was regarded as single if she was unmarried or widowed and married if she was married or living together with a partner. The majority of the caretakers (53.4%) were single whilst 46.7% were married.

4.1.4 Employment status

Caretakers were classified as employed if they were working and receiving income either as a wage or salary and unemployed if not working or working as a volunteer without income or stipend. The majority of the caretakers (92.2%) were unemployed, whereas 7.8% were employed. Only 21.1 % of fathers were employed and 24.4% unemployed. About 54.5% of households were without fathers living with them.

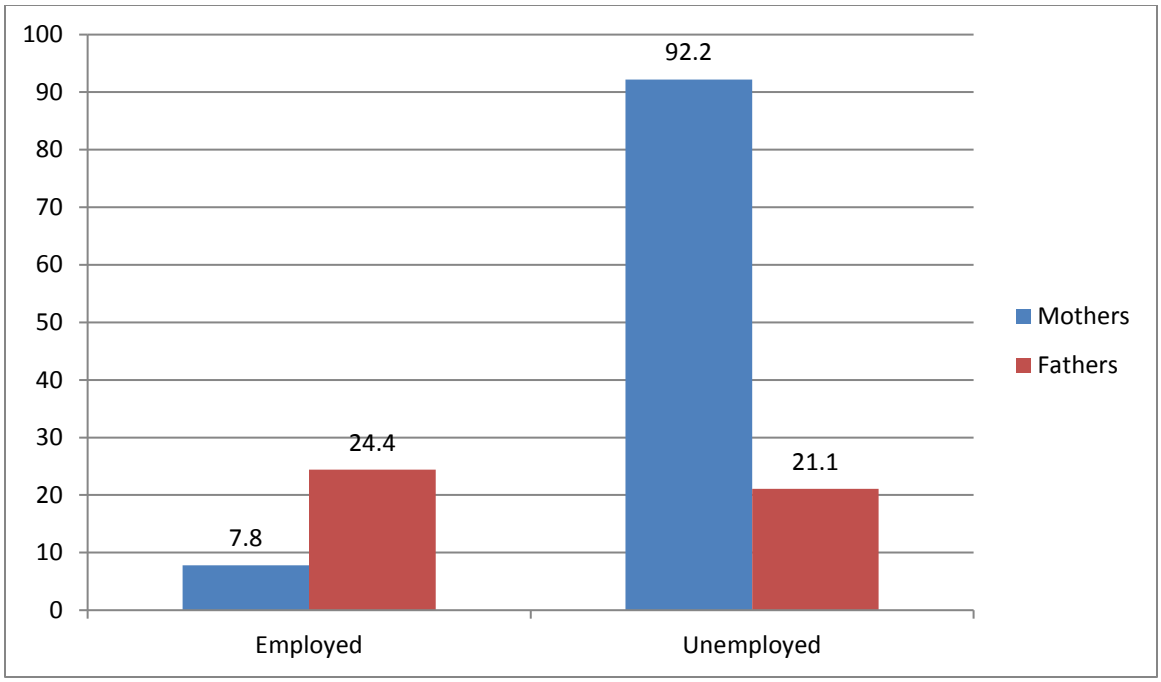

Figure 4.3: Employment status of parents (54.5% fathers were absent; n for father = 82; n for mother = 180)

4.1.5 Financial supporter

The majority of the children (53.9%) were financially supported by grandparents, 16.4 % by their fathers and 9.4% by their mothers and 7.8% by other members of family, whereas 16.7% had no financial supporter.

4.1.6 Caretakers monthly income and expenditure

Figure 4.4 shows that the majority of the caretakers earned less than R500 monthly and therefore lived below the poverty line, which is estimated at 1 USD/day or R10.00/day (World Bank, 2006).

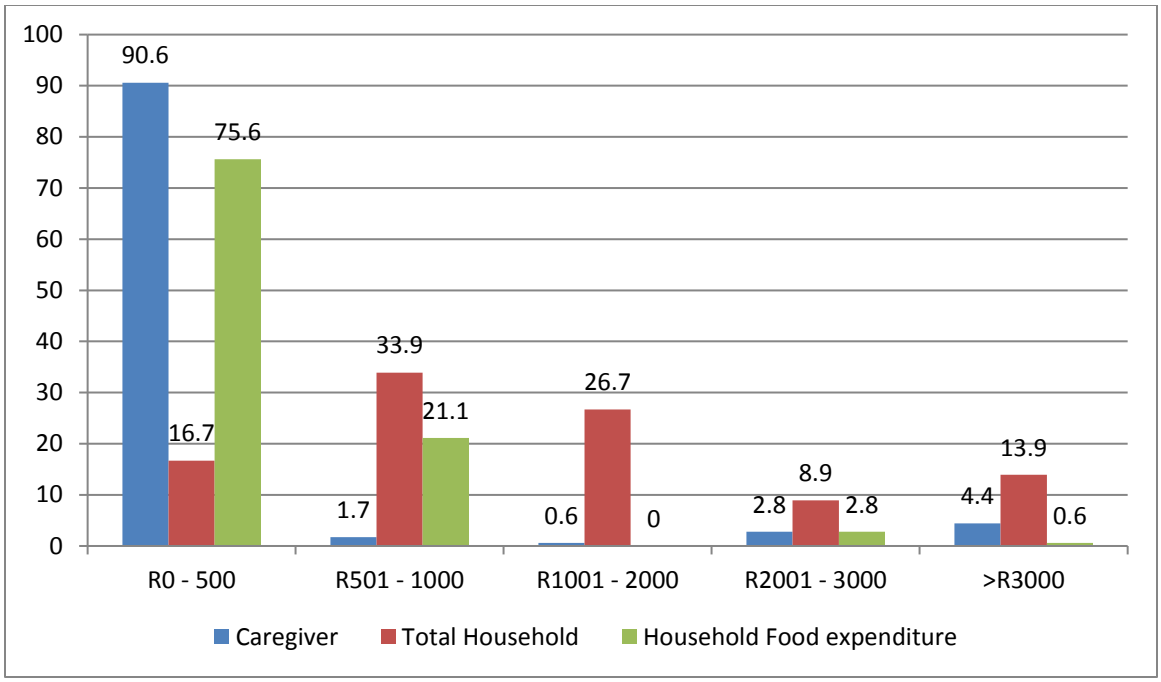

Figure 4.4: Percentage of monthly income and food expenditure (n = 180)

About 81.1% of households had an additional income. Child support grant was received by 76.7 % as an additional source of income, whereas 1.1% received old age pensions and 3.3% received resources from family members as additional income. The total household income was the sum of income from the caretaker and additional income from other sources. Figure 4.4 shows that half (50.6%) of the households had a total income of less than R1000.00 per month per household; 35.6% had a total income of between R1001.00 and R3000.00. This shows very poor households falling into low income group.

Figure 4.4 indicates the food purchasing power per household. The majority of the caretakers (96.7%) spent R1000.00 or less on food on a monthly basis. This is almost half of the total monthly household income reported in Figure 4.4 above.

4.1.7 Type of house

A house was considered to be formal if built with cement bricks, informal if it was built with wood or tin and traditional if built with mud and thatch-roofed. About 85.6% of caretakers lived in formal housing, whilst 7.8% in informal, 6.1% in traditional houses and 9.6% rented a house. This shows that even though most households were poor, they could still afford to stay in descent houses. The number of people living in the household was determined and a person was considered to be living in a household if s/he was spending more than four days in a week in the specific household. This did not include people who were working or staying away from home. The largest number (60%) of households had six to ten people, 27.2% had one to five people and 12.8% had more than ten people dwelling in a household.

4.2 ANTHROPOMETRIC STATUS OF CHILDREN AND CAREGIVERS

Tables 4.2 to 4.7 show the anthropometric indices of children and their caregivers. These have been separated according to age starting with below 60 months and the other above 60 months. The head circumference was taken only for children under 36 months, hence the total numbers differ**.**

Table 4.2: Anthropometric indices of children below 60 months of age

	N	Minimum	Maximum	Mean	Std. Deviation
Age(months)	96	11.20	60.00	35.2791	14.24288
Weight (kg)	96	6.6	22.8	13.202	2.4540
Length (cm)	96	.47	1.15	.8418	.16094
Head circumference	96	39	99	66.60	24.185
Mid upper arm circumference	96	14	21	16.51	1.303
WHZ	85	-3.42	28.22	1.5799	3.71377
HAZ	96	-12.73	1.92	-2.6995	3.46150
WAZ	96	-3.99	2.71	-.3589	1.16171
BAZ	96	-3.69	26.30	2.7501	5.56230
HC(cm)	62	39.00	53.00	48.7823	2.20212
MUAC(cm)	92	14.00	20.50	16.4783	1.19962
HCZ	62	-4.49	3.62	.7279	1.41645
MUACZ	92	-1.32	3.59	.7207	1.02026

Table 4.3: Anthropometric indices for children above 60 months old

	N	Minimum	Maximum	Mean	Std. Deviation
Age(months)	83	61.86	141.70	97.2341	21.31470
Weight (kg)	83	11.8	43.6	23.701	5.0722
Height (m)	83	.48	1.60	1.1919	.17885
Mid upper arm circumference	83	14	24	18.43	2.196
HAZ	83	-5.13	2.66	-.7814	1.31662
WAZ	73	-4.22	1.99	-.5827	1.12936
BAZ	83	-4.88	2.35	-.3290	1.21679

Table 4.4: Anthropometric status of children below 60 months old

	Frequency	Percent
Weight-for-Height (Z scores)	n= 85	
Wasting	2	2.4
Normal	66	77.6
Overweight	17	20
Height –for-Age (Z scores)	n= 96	
Stunting	38	39.6
Normal	58	60.4
Weight-for-Age (Z scores)	n= 96	
Underweight	6	6.3
Normal	88	91.7
Overweight	2	2.1
BMI-for-Age (Z scores)	n= 96	
Underweight	3	3.1
Normal	64	66.7
Overweight	11	11.5
Obese	18	18.8
HAZC	n=62	
1.00	1	1.6
3.00	51	82.3
4.00	8	12.9
5.00	2	3.2
MUACZ[a]	n=92	
Normal	82	89.1
Moderate undernutrition	8	8.7
Severe undernutrition	2	2.2

There was a high rate of stunting at 39.6%, which is a significant health concern since it is above 20% (WHO, 1995, 2000). There was a low rate of wasting and undernutrition, while the children who were overweight and were 20% and 18.8% respectively.

Table 4.5: Anthropometric status of children more than 60 months old

	Frequency	Percent
Height –for-Age (Z scores)	n=83	
Stunting	14	16.9
Normal	69	83.1
Weight-for-Age (Z scores)	n=73	
Underweight	7	9.6
Normal	66	90.4
BAZ	n=83	
Underweight	8	9.6
Normal	73	88.0
Overweight	2	2.4
HAZ	n= 83	
1.00	6	7.2
3.00	8	9.6
3.00	68	82.0
4.00	1	1.2
MUACZ[a]	n=92	
Normal	82	89.1
Moderate undernutrition	8	8.7
Severe undernutrition	2	2.2

The data in table 4.5 show that 16.9% were stunted and showing a low rate of underweight. Low overweight and obese rates are observed in this group compared to the below 60 months.

Table 4.6: Body mass index of caregivers

Category	n	Min age	Mean age ± std	Max age	Mean weight ± std	Mean height ± std	Mean BMI ± std	Interpretation
Caregivers of children below 60 months	96	17	37.06±13.35	69	63.53±16.77	1.74±0.06	44.26±6.25	Many were obese or overweight
Caregivers of children above 60 months	83	20	38.89±11.17	67	65.62±14.08	1.69±0.07	43.00±6.25	Many were obese or overweight

Table 4.6 illustrates the body mass index of the caregivers.

The data on caregivers confirm the presence of undernutrition and over nutrition in the same household.

4.3 DIETARY PATTERNS

The 24-hour recall and Food Frequency Questionnaire were used to assess the availability of food, dietary patterns and the consumption of available foods by children. Household food inventory was used to assess food availability at household level. Table 4.7 indicates the results of the dietary data.

Table 4.7: Dietary patterns of children

Food item	24hr recall (%)	Food frequency (%) Selected items*	Inventory (%)
Starches	**Consumption**	**Consumption**	**Availability**
Mealie meal	99.4	-	99.4
Samp	12.8	-	11.1
Rice	2.2	-	31.7
Flour	2.2	-	63.9
Bread	40.6	-	-
Protein			
Egg	5.0	47.2	16.7
Meat	33.9	41.1	16.1
Milk	17.2	55.0	16.1
Chicken	-	41.1	-
Fish	-	43.3	22.2
Polony	-	18.3	-
Beans	-	36.7	18.9
Soya	-	42.8	10
Chicken offal	17.2	46.7	16.7
Mopani worms	-	5	0.6
FAT			
Oil	9.4	-	51.7
Margarine	4.4	-	-
Peanut butter	-	15.0	7.2
Vegetables (variety)	33.9	82.2	44.4
Potato	22.8	61.1	55.0
Fruit (Variety)	7.8	-	8.3
Fruit Juice (100%)	8.3	-	-
Salt	99.4	-	16.1
Sugar	73.9	-	84.4
Tea	71.7	-	35.5
Biscuits	-	43.3	-
Sweets	-	38.9	-
Cordial	-	16.7	3.9
Soups(flour based)	17.8	-	22.2
Other	16.1	-	-

*This combined table shows that the food items were not similar for the three methods. The starches were not asked but verified by the researcher in the household using observation of the food items available like mealiemeal bag.

The 24-hour recall showed the most consumed foods by children were mealie meal (99.4%), salt (99.4%), sugar (73.9%), tea (71.7%), bread (40.6%) and meat (33.9%). Household food inventory showed that the majority of the households had mealie meal (99.4%), sugar (84.4%),

flour (63.9%), potatoes (55%), and also vegetables (44%), especially cabbage on the day of the visit. The inventory reflected availability of food for households, whereas 24-hour recall and Food Frequency Questionnaire reflected individual consumption by children. The Food Frequency Questionnaire revealed that consumption of foods was higher than when using the 24-hour recall, because it reflected usual intake, whereas 24-hour recall reflected what the child had consumed in the past 24 hours. However, the Food Frequency Questionnaire data was limited due to the omission of starches. The other most consumed foods revealed by the Food Frequency Questionnaire were vegetables (82.2%), potato (61.1%), milk (55.2%), egg (47.2%) and chicken offal (46.7%). The FFQ also listed sweets, biscuits and cordials occasionally. Figure 4.5illustrates food items and availability.

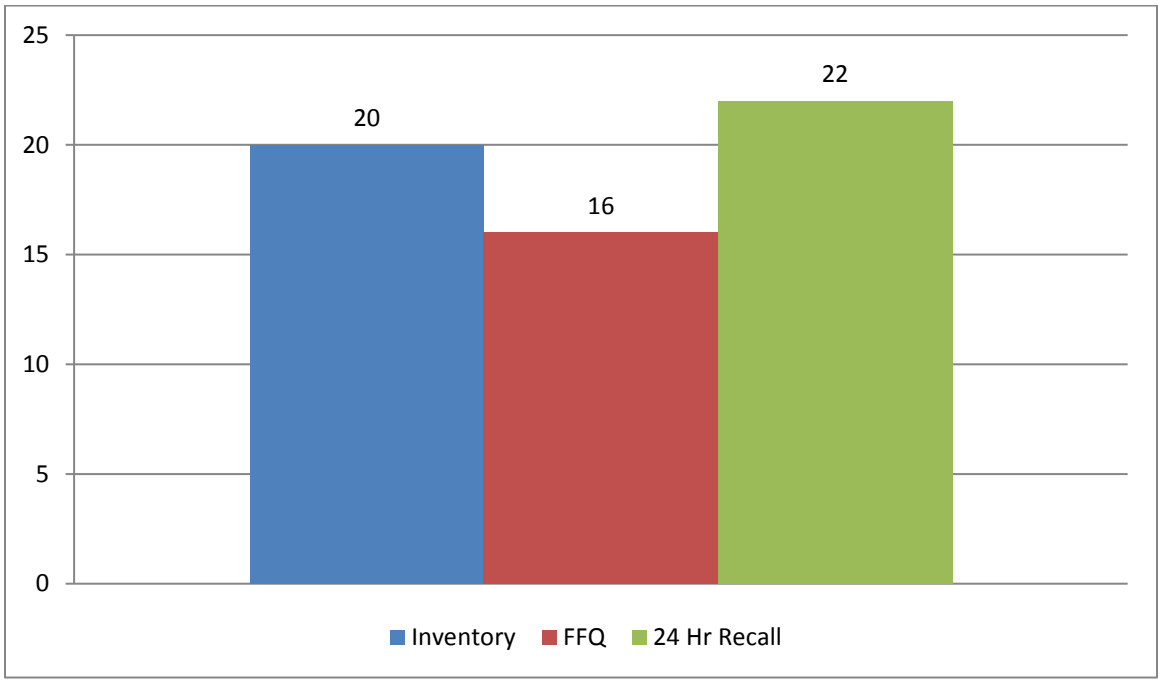

Figure 4.5: Total number of food items by technique of collection (FFQ excluded starches).

Figure 4.6 illustrates the same food items mentioned when using all the methods.

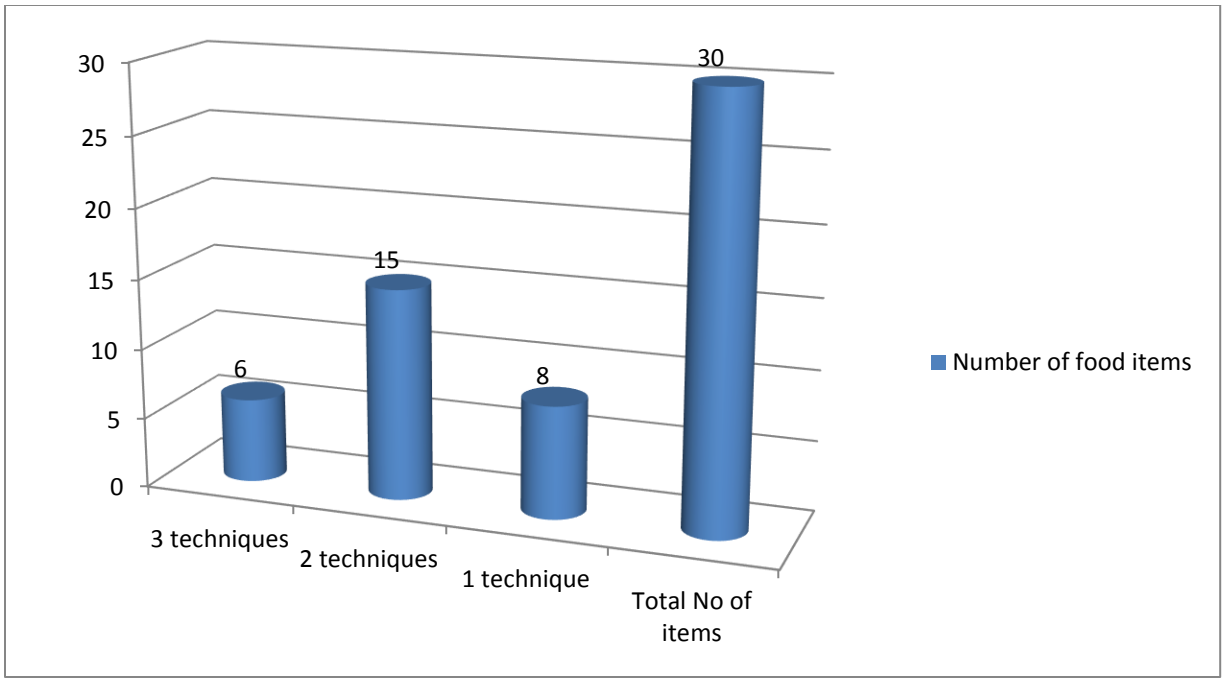

Figure 4.6: Food item availability count using more than one technique

Protein rich foods mostly consumed were milk, eggs, chicken offal, chicken, fish and soya, indicating adequate consumption of foods rich in iron and zinc. However, mopani worms were among the least consumed foods.

The majority of households had oil but children were not frequently consuming them. There was a limited variety of vegetables and fruit consumed. The majority of the households had potatoes and classified it as a vegetable rather than a starchy food. Most households consumed it together with a starchy food as a relish. The majority of the households also consumed salt and sugar. Snacks such as biscuits and sweets were also occasionally consumed.

Figure 4.7 below shows that the majority of children (66.1%) had three meals per day, whereas 26.6% had 4 meals and only 0.6% had 6 meals per day.

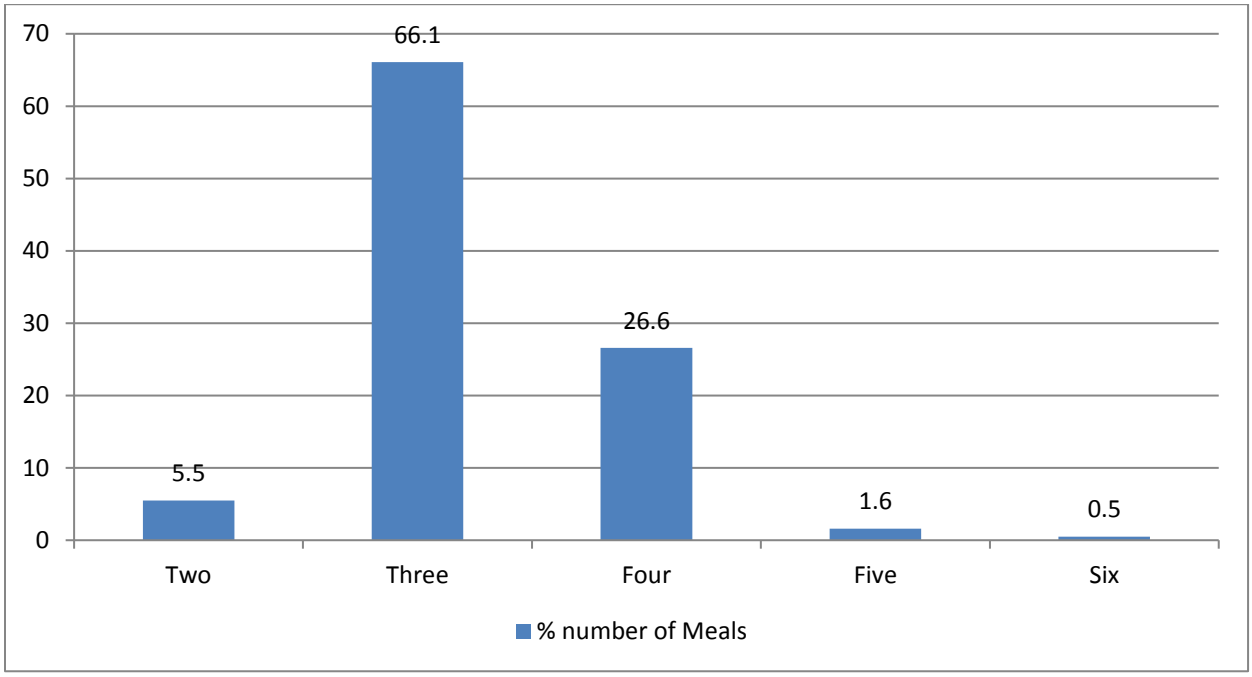

Figure 4.7: Meal Patterns of Children per day

4.4 PREVALENCE OF HUNGER

The prevalence of hunger was determined using a hunger scale. The hunger scale is an eight questions questionnaire, used to measure household and individual level of hunger. Caretakers were used as informants for their children.

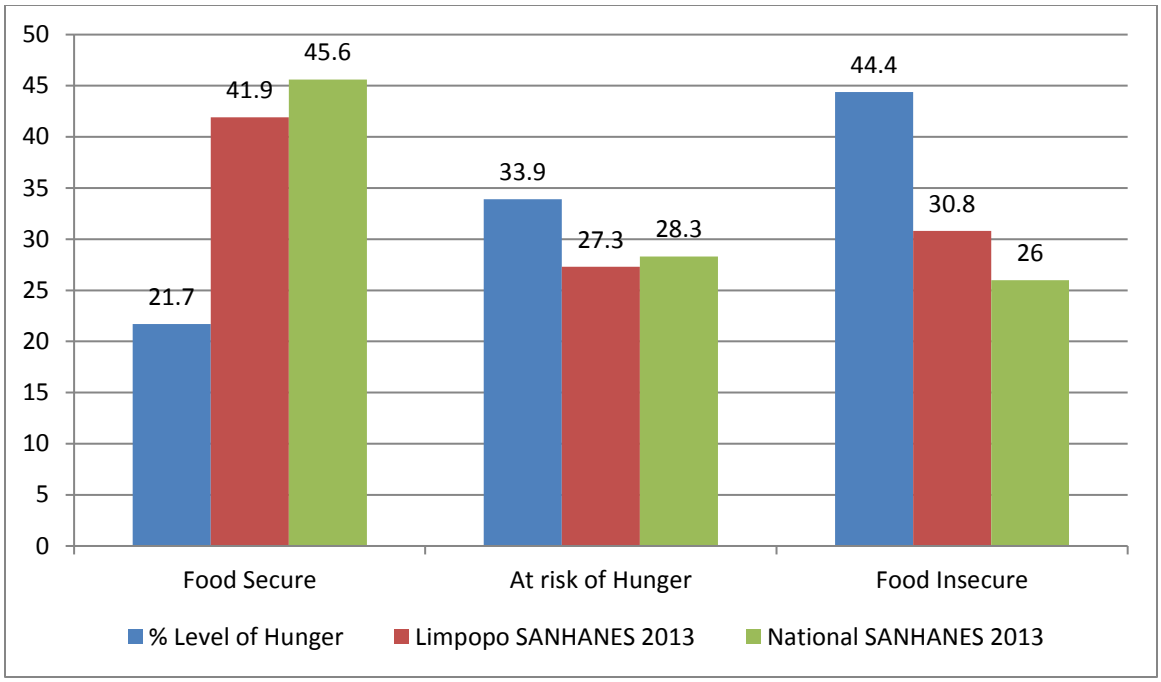

Figure 4.8: Classification of the prevalence of hunger in households

The figure above shows that most children were classified as hungry (44.4%) and 33.9% were at risk of hunger. This indicates that children were food insecure and at risk of developing nutritional deficiencies which might be irreversible later in life. The level of hunger in this study was higher than the provincial and national reported levels.

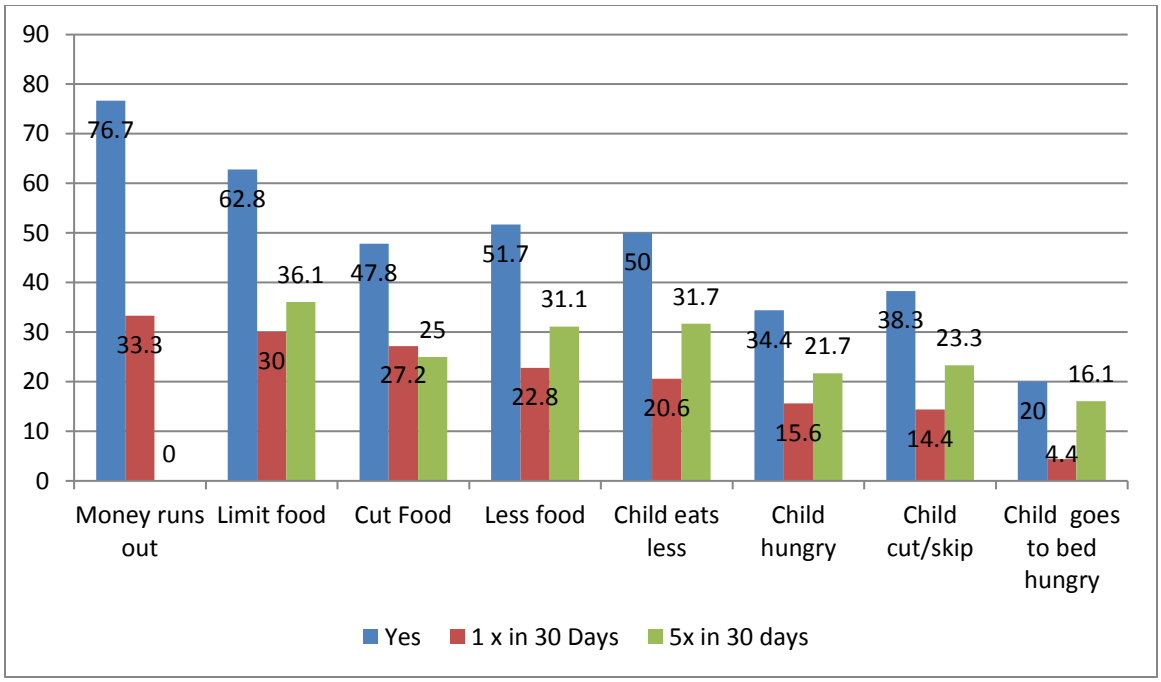

Figure 4.9: Responses to the Eight Question Hunger Scale Questionnaire

Figure 4.9 shows that at the household level, funds do run out and they have to limit, cut or eat less food. At the level of the child it seems there were concerns of food insecurity, with the children sometimes going to bed hungry.

4.5 RESPONSE MODES TO FOOD DEPRIVATION

Caregivers were asked both closed and open-ended questions about food availability, household food production in the form of subsistence farming or vegetable gardens as well as their experiences. The caregivers were further asked to explain coping strategies during periods of food deprivation.

4.5.1 Household food production

Caretagivers were asked if they produced food as part of subsistence farming. The majority of the households (78.9%) did not have a vegetable garden or field to plough during rainy seasons.

Only 21.1 % had either a vegetable garden or a field. Households were further asked if they reared animals and if they were using them for consumption. The results are shown in Table 4.8 below. Data show that chickens were the most abundant domestic animals at 49.4%. They were also consumed by 45.6% of the households. Approximately 33% of the households had goats, but only 21.7% consumed them as food. Twenty percent of the households had cattle, but only 9% consumed them as food. Other animals included sheep which were available in the minority of the households (3.3%) and consumed by a mere 2.2%.

Table 4.8: Availability of domestic animals and their use as food

Animal	**% availability**		**% use as food of those who said yes**	
	Yes	No	Yes	No
Cattle	20	79	9.4	10
Goat	32.8	67.2	21.7	11.1
Chicken	49.4	50.6	45.6	3.9
Other	3.3	96.1	2.2	0.6

4.5.2 Household food availability

The households were asked if they experienced food shortages. They were considered to have run out of food when they were able to spend more than five days without starch, protein rich food and vegetables/fruit. It excluded condiments such salt and soups. The results showed that 77.2% of the households reported experiencing food shortages whilst 22.7% never experienced food shortages. The researcher further asked about food that usually ran out or was always available in the household and their response is shown in Table 4.9 below.

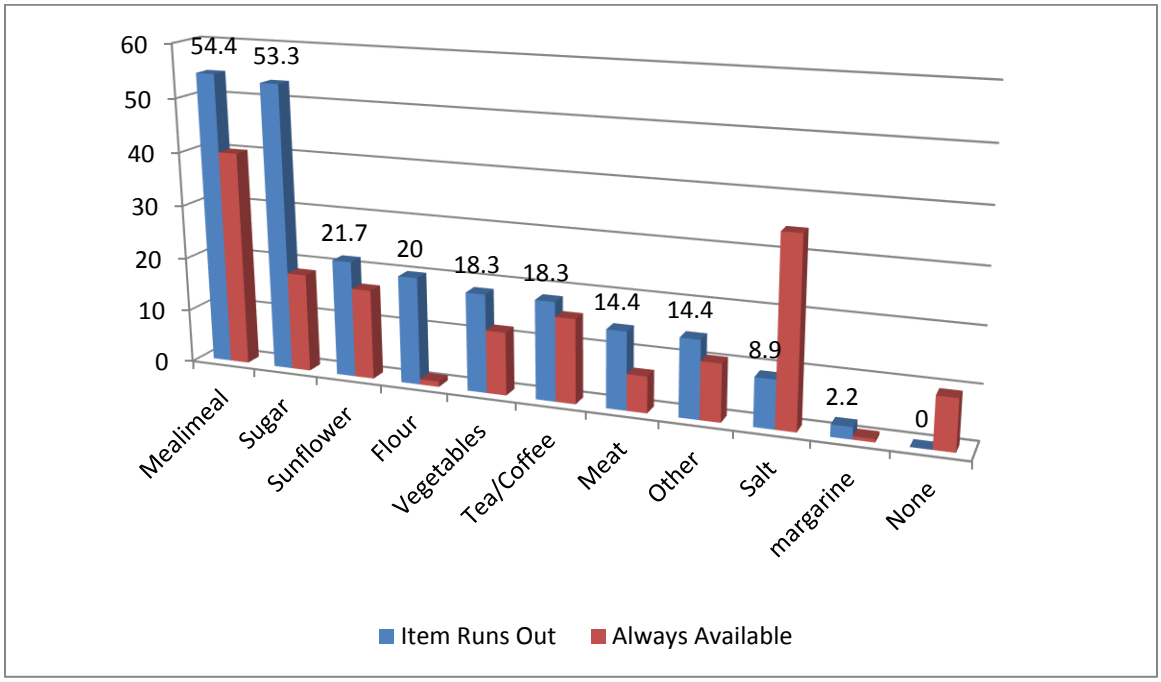

Figure 4.10: Food availability during the month in percentage (n = 180)

Maize meal and sugar were food items that usually ran out in almost half of the households. Other foods included Sunflower oil, flour, vegetables, and tea/coffee. There were limited food varieties. Caregivers were also asked to list food items always available in the household. A food item was considered to be usually available when a household spent less than five days in a week without that particular food.

Mealie/maize meal, salt and sugar were the food items that were available in households, whilst margarine and meat were the least available. Other foods included sunflower oil, tea/coffee, flour, vegetables, meat and margarine. Approximately 9.4% of the households spent more than five days without food. It is disturbing to note that only 40% of the households always had

mealie meal, as this is their staple food. The presence of mealie meal and sugar in both lists of food available and unavailable means that these were mostly consumed and replaced soon after depletion.

4.6 STRATEGIES FOR COPING WITH FOOD DEPRIVATION

Caregivers were further probed, using open-ended questions, how they coped when food ran out. Their responses have been thematically analyzed as indicated on Table 4.14 below.

Table 4.9: Response modes to food deprivation

Response	%
Borrow food from neighbours/family or friends	64.4
Take food on credit from the local shop	28.3
It never happens	10.6
Sleeps without food	3.3
Reduce portion sizes until month end	2.8
Borrow money to buy food from neighbours	2.2
Send children to neighbours or relatives	1.1
Drink tea only	1.1
Use amp	1.1
Sells traditional beer and buy food with the profit	1.1
Exchange sorghum /green mealies with white mealie meal from local shops or mobile vendors	0.6

Borrowing was interpreted as a request for something with the expectation of returning. The response mode that was widely used by the majority of households was borrowing food from neighbours, family or friends and the least used was exchanging sorghum with white mealie

meal. The eleven responses clearly show that mothers devised survival strategies when they ran out food.

Caregivers were asked if they were getting financial support or food from any other person /organization in times of food deprivation. The responses are listed in Figure 4.10 below.

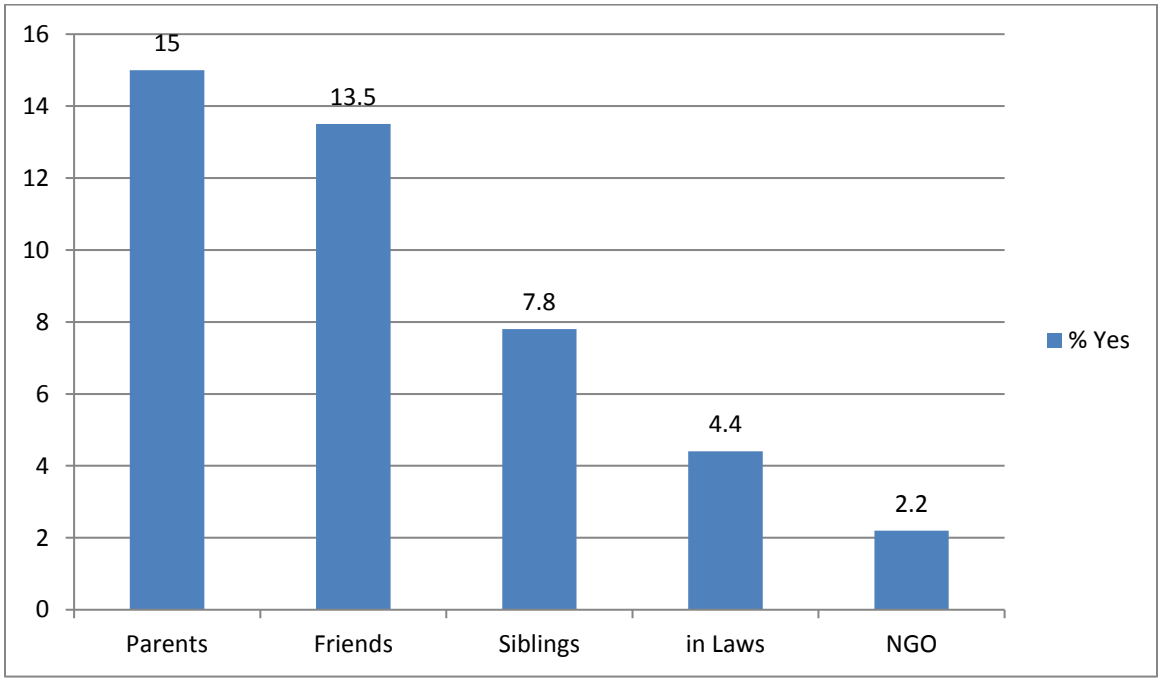

Figure 4.11: Type of people who support household when food runs short

Mothers/caregivers were asked how they acquired food, when there was a shortage at home. The results are presented in Table 4.10.

Table 4.10: Other means of coping with food insecurity

Means of acquiring food	**%**
Stays without food	55.0
Ask money from neighbours/relatives/ friends	14.4
Credit from a local shop	13.3
Ask food from neighbours/relatives/ friends	10.6
Food is always available	1.7
Get food from NGO or government	1.1
Use brown/green mealie meal/ bread/samp	0.6
Exchange sorghum for white mealie meal and vegetables	0.6

For the purposes of this research, asking was interpreted as a request for something without expecting to return. It was noted that only 1.7% of the households were food secure, 55% stayed without food. The 13.3 % who received credit from the local shop were mostly people that the shop owner knew that they had some form of income such as grants; others devised other means.

Caregivers were also asked what happens to children when there was no food at home. Mothers'/caretakers' responses are listed in Table 4.11

Table 4.11: Means of acquiring food for children

	%
Ask food for children from neighbours/relatives/ friends	33.3
Use sorghum mealie meal	14.4
Send the children to play with neighbours children and eat with them	12.2
Send the child to relatives to stay especially during school holidays	9.4
Sleep without food	9.4
Share small amount with children	5.6
There's always food at home especially mealie meal for children	6.1
Credit food from the local shop	4.4
They cry	2.2
They become angry	2.2
Buy bread for children	1.7
Reserve for children the small amount of food left	1.7
They drink water	1.7
Report to school and they arrange food for children	0.6
Use traditional wild foods	0.6

The most strategy used by 33.3% of the households when there was no food for children, was asking from neighbors, families or this is the same coping strategy that was used by adults when they experienced shortage. The least food insecurity coping strategy for children was the use of traditional wild foods (0.6%).This strategy was more pronounced in households who stayed in mountainous villages..

4.7 INTERACTION BETWEEN SOCIO-DEMOGRAPHIC PARAMETERS, FOOD SECURITY AND ANTHROPOMETRIC STATUS OF CHILDREN

Tables 4.12-4.13 illustrate associations between variables. Only variables which have shown significance at $\alpha < 0.05$ have been included. The selected variables are socio-economic parameters, anthropometric status of children and coping strategies to food insecurity as per Figure 1.

Table 4.12: The association between socio-demographic data, anthropometry and coping strategies to household hunger

Variables		N	Chi-square	P value
WHZ	Mother's highest qualification	85	14.12	0.028
	Uncle as the financial supporter	85	13.75	0.001
	Mining as the occupation/s of the person/s mentioned above	85	46.02	0.000
	Additional source of income per household	85	12.35	0.015
	Food shortages during the month	85	8.19	0.017
	Food items do not usually ran out	85	9.99	0.007
	Other food items do not usually run out	85	6.20	0.045
	Do not have other means of acquiring food when it is not available at home	85	7.64	0.022
	Obtain credit to buy food from the local shop	85	10.7	0.005
	No food at home - Share small quantities of food with children	85	8.81	0.012
	No food at home - Children become angry when there's no food at home	84	7.81	0.020
HAZ	Mother's month income	180	13.18	0.01
	Additional source of income per household	180	11.61	0.009
	Food items usually run out	179	7.00	0.008
	Food items do not usually run out	180	4.44	0.035
	Have cattle as one of the domesticated animals	179	5.02	0.025
	Have family support where we sometimes collect food	180	5.04	0.025
WAZ	Mother's highest qualification	180	32.39	0.000
	Money spent purchasing food per month	180	85.48	0.000
	Food items usually run out	170	9.65	0.008
	Food items do not usually run out	170	7.66	0.022
	Other food items do not usually run out	170	6.23	0.044
	Means that you use to acquire food when it is not available - Ask money from families/neighbours and friends to buy	170	12.05	0.002
	What happens to the children when there is no food - Share small quantities of food with children	170	7.25	0.027

Note: n = 85 is for children under 60 months whereas n = 180 is for all children

Table 4.13: The association between socio-demographic data, body mass index and coping strategies to household hunger

Variables		n	Chi-Square	P-value
BAZ (body mass index)	Mother's highest qualification	180	65.94	0.002
	No of people living in the household	180	49.69	0.002
	Have cattle as one of the domesticated animals	180	15.18	0.019
	Contractual worker as the occupation of the person/s mentioned as additional financial supporter	180	30.89	0.009
	Additional source of income per household	180	24.22	0.040
	Money spent purchasing food per month	180	17.35	0.043
	When food runs out of the household they exchange sorghum or green mealie meal with white mealie meal in the local shop	180	9.02	0.029
	When food runs out if of household they borrow money from neighbours	180	16.52	0.001
	No food items usually run out	180	10.28	0.016
	Other Domesticated animals in households (not specified)	180	18.17	0.006
	Siblings provide family support where we sometimes collect food	180	14.23	0.027
	When food is not available at home they eat mabele/ bread/ samp	180	9.05	0.029
	We ask for food from neighbours or families for children when there is no food at home	180	11.52	0.009
	We share the small quantities of food borrowed with children when there is no food at home	180	11.76	0.008

The data show that the anthropometric indices are associated with socio-demographic parameters that are typical for a poor household such as mother's income and number of people in the household. In addition these indices are also associated with food availability and the utilization of copying strategies such as sending children to neighbours, asking for food, credit or reducing food portion and even children going to bed hungry. These associations confirm the high rate of food insecurity observed in this study. An interesting phenomenon is the cattle as assets, which were available in some households but are not consumed as food. This was reported earlier that those households that had cattle did not consume them or sell them as a means to acquire funds**.** No associations were found between the anthropometric indices and the CCHIP scale questions.

4.8 SUMMARY OF THE RESULTS

The majority of children in GSDM are cared for by their mothers. Furthermore, the majority of these mothers attended school up to Grade 12.The study results further confirm the high rate of maternal unemployment in GSDM. Moreover, the rate of paternal unemployment is almost the same as the national data. However, only 21.1% of fathers were employed and earning less than R1000.00 per month.

Although it is difficult and cumbersome to measure household income thereby determining its purchasing power and subsequently inferring their food security, measures such as dietary diversity and money spent on food can be used as proxies for household income. Based on this, the households in GSDM have poor household income and the majority of the households spent less than R500.00 per month on food. Their diet also lacked diversification and the majority of children lived in households that were poor and below the poverty line. About, 44.4% of the households were food insecure and experienced hunger.

Anthropometric data indicated that the majority of the children had normal weight-for-height and normal BMI, a low prevalence of stunting, wasting, overweight, obesity and a medium prevalence of underweight.

The majority of the households used consumption strategies such as borrowing food, purchasing food on credit, begging or eating wild foods as a response mode to food deprivation. The increased use of these types of strategies that are short-term and unsustainable is a clear indication that the households were food insecure. The current study also indicated that a small number of households used the income and expenditure strategies as a mode to escape food

poverty. This was mainly because the area was so poor that it had nothing to sell. Use of wild foods was only employed by villages that stayed next to the mountainous areas.

The current study showed some association between the WAZ, WHZ and WAZ and income levels of the household as well as money available for purchasing food. In addition, these indices also showed some association with copying strategies that are typical of household under deprivation.

The employment status of the mother was not associated with WAZ, WHZ and WAZ. Furthermore, it was also not associated with the CHHIP hunger classification, and CHHIP was not associated with HAZ and WAZ.

CHAPTER FIVE: DISCUSSION OF RESULTS

5.1 SOCIO-ECONOMIC PARAMETERS

Maternal age ~~and~~ may reflect the maturity of the mother/caregiver and marital status the availability of resources in terms of money and time for rearing children (Khan *et al.*, 2011). The results from the current study showed that the majority of children were cared for by their mothers (73.9%) or grandmothers (22.2%). A similar care pattern was observed in the 1999 SA-NFCS (Labadarios *et al*, (2005), wherein 63% of children were taken care of by their mothers and 21% by their grandparents. The findings are contrary to the research results reported by Madhavan and Townsend (2007) which showed that high unemployment rate push men and women to migrate to urban areas, leaving children in the care of aunts and grandparents. The majority of mothers/caregivers (87%) were between 20 and 59 years of age. This reflected the available time and physical strength for rearing children. It also showed that the information given was reliable as it was given by mature adults and that there were few child-headed households.

The majority of mothers/caregivers (53.3%) had attended high school, whilst 20.6% had attended primary school and 23.9% were illiterate. The results are similar to those obtained by Labadarious *et al*. (2005), whereby 52% of mothers had attended high school and 25% primary school. The 2011 South African national census showed that 20.9% adults above 20 years were illiterate, 21% had grade 12, while only 6.1% had tertiary qualifications (Statistics SA, 2013).

Approximately, 92.2% of mothers were unemployed and only 21.1% of fathers were employed. This study results also showed that about 78% of fathers in GSDM were unemployed. This

unemployment scenario could be due to the fact that the study area was a predominantly rural area, where women were not expected to work, but to take care of the family. Most men had migrated to urban areas. The study results from this district also showed that the income from wages was 27% and the majority of households relied on social grants (FIVIMS-Sekhukhune, 2006). This posed an increased risk of poverty, since studies show that poverty is more concentrated in rural areas; adults with low or no level of education, unemployed and increasing household size (Rose and Charlton, 2001; Ferrer, 2002; Statistics SA, 2006). Similar characteristics were observed in the current study population.

Almost 91% of the mothers had an income of less than R500.00 per month and 33.9% of the households had a total income of less than R1000.00. Similar results were reported by Statistics SA in 2005 and 2007 which showed that the majority (67%) of children in South Africa lived in households that had a monthly income of R1200.00 or less. Census 2011 showed that the average household income was R45 977.00 (Statistics SA, 2013). These results clearly indicate that the majority of the children lived in poor households; they lived below the poverty line of approximately US $1 per person per day as stipulated by the World Bank. The results are also in accordance with the findings from Stats SA (2010), which show that 26% of the South African population lived below the poverty line in 2007. Additionally, the study conducted by Lambrechts and Berry (2003) showed that SA was not unique in terms of poverty, since 65% - 73% of the population in Southern Africa lived below the poverty line. Shariff and Khor (2008) conducted a similar study where demographic, socio-economic, expenditure and coping strategies were collected from 200 women of poor households in Malaysia. They observed that more of the food insecure households (58%) were living below the poverty line.

The results also showed that about 54% of households were financially supported by their grandparents, 16.1% by fathers, 9.4% by mothers and 16.7% had no financial support. This shows that the majority of the households relied on pension grants as a source of income. These findings were contrary to the findings that showed 31.25% of rural households relying on pension as a source of income (Kirsten and Moldenhauer, 2006). When applying the Stats SA (2014) recommendations of R620 per person per month, more than 77.3% of the households were impoverished, especially taking into consideration that more than 60% of the households had 6-10 people per household. This translates to R2586.00 – R4310.00 per household per month (Statistics SA, 2014). The findings could have been influenced by the location, which is mostly rural.

About 50.6 % of the households earned less than R1000.00 per month. This show that the number of households earning less amount of money is high compared to the study conducted by Bonti-Ankomah (2001) which indicated 21% of urban households who earned less than R1000.00 per month. This shows that geographic location has a close relationship with poverty, since the wages of the employed people in rural areas tend to be too low to support them and their families compared to urban households (Bonti-Ankomah, 2001). The GSDM had a 77.3% rate of child poverty and only 25.5% of children lived with employed parents compared to a higher rate of child poverty in Limpopo Province (83%), and only 28% of children living with an employed parent/s (Statistics SA, 2006).

The majority of the households (75.6%) spent less than R500.00 per month on purchasing food. The results are almost similar to findings from Statistics SA, which showed that poorer households spent an average of R200.00 per month, whilst the affluent spent R1350.00 on food irrespective of the household size (Statistics SA, 2000). In other words, this means that the majority of the households had poor household income. Household expenditure on food can be used as a proxy for household income (Zere and McIntyre, 2003).

A minority of households (21.1 %) had either a vegetable garden or field for subsistence farming and almost 50% of the households had chicken and also used them as food. Cattle were the least available animals and also rarely used as food. The results are in contrast with the study conducted by Kirsten and Moldenhauer (2006), which indicated that as many as 71% of the 2.4 million rural households in the former homelands had access to land for farming purposes. The difference could be due to the fact that most of the farming areas around the area were then used as residential areas, thereby allowing little space for farming.

5.2 ANTHROPOMETRIC STATUS OF CHILDREN AND CAREGIVERS

The status is discussed under the following sub-headings: stunting, wasting and underweight**.**

5.2.1 Stunting

The current study indicated the prevalence of stunting to be low for children above 60 months, while medium for stunting was ~~of~~ high significance ~~for~~ in children below 60 months at 39.6% according to WHO (1995). The results of the present study are supported by Mamabolo *et al.* *(*2005) who also showed a low prevalence (19%) of stunting in the same province. NFCHS (2005) showed an overall national stunting prevalence of 18% for children below 60 months. This is likely to have serious consequences on child development. Conversely, Kimani-Murage (2010) indicated a medium prevalence of stunting at 23% in one to five year-olds and a low prevalence of stunting at 7% in 10-14 year-olds. Furthermore, A study conducted in South Africa by Shisana *et al*.(2013) showed a 26.5% of stunting in 1to 3 year olds, 11.9% in 4 to 6 year olds as well as 9.4% in 7 to 9 year olds. The results of the current study showed stunting to be at 39.6%, while those of Labadarious *et al*, 2005 were reported to be 26.5%, indicating an increase in the present study. The study results indicate that stunting in children below 60 months is a serious concern, while that of the above 60 months is of less concern. According to Dewey and Begum (2011) there is growing evidence of the connections between slow growth in height early in life and impaired health and educational and economic performance later in life. Stunting in early life can have long term effects on cognitive development, school achievement, economic productivity and wages earned in adulthood, as well as maternal reproductive outcomes.

5.2.2 Underweight

The current study indicated that approximately 84% of the children had normal weigh-for- age. The study results concur with the study conducted by Oldewage-Theron and Egal (2010) with

a similar setting. Their results showed the majority of the children (79.6%) are of normal weight. However, about 11.1% and 3.9% of the children were underweight and severely underweight respectively (Oldewage-Theron and Egal, 2010). Similarly, Labadarios *et al.* (2005) showed the prevalence of underweight to be 12.8% and 1.8% severe underweight. Furthermore, Shisana *et al.* (2013) reported that 6.1% in 1-3 years, 4.5% in 4-6 years and 6.6% in 7-9 years were underweight. Based on WHO (1995), the combined prevalence of underweight and severe underweight was 15% in the present study and 14.6% in the 1999 SA-NFCS (Labadarios *et al.*, 2005), indicating a medium prevalence of underweight using WHO (1999) as a reference base.

However, a study conducted by Kimani-Murage (2010) pointed out that the prevalence of underweight in rural South African children was higher. The difference in the prevalence between the above mentioned studies could have been caused by the variation in the age group, hence the difference in growth patterns. The present study's age group was 1-12 years. The 1999 SA-NFCS study age group was 1-9 years and the Kimani-Murage (2010) and Shisana et al, (2013) was from 1 to 14 years of age. When looking at these results, irrespective of the medium or high prevalence of underweight, the bottom line is that the prevalence of underweight is abnormal and requires some form of intervention. The consequences of underweight include mortality, long-term cognitive deficits, poorer performance in school and lower adult economic productivity (Humphrey, 2009).

5.2.3 Wasting

The prevalence of wasting was low, it was 2.2% in children below 60 months. WHO (1997) concurs with the study results since it indicates that provided there is no severe food shortage, the prevalence of wasting is usually below 5%, even in poor countries. An equally important

fact is that about 57% of the children in this study group had normal weight-for-height. The low prevalence of wasting was also found in rural areas as reported by the 1999 SA-NFCS (Labadarios et al. 2005) and Schoeman *et al*. (2010). They also reported a low 4.9% prevalence of wasting and a low 1.3% for severe wasting respectively (Labadarios *et al.*, 2005). However, Kimani-Murage (2010) showed a medium prevalence of wasting at 7% for ages one to four years and 6% in five to nine year olds. There was a 0% prevalence of wasting in the 10-14 years of age category. Additionally, Shisana *et al* (2013) reported the prevalence of wasting at 2.2% in 1- 3 years, 0.8% in 4-6 years and 0.5% in 7-9 years. Bhattacharya *et al*. (2004) indicates that nutritional outcomes among school age children are not closely related to family resources, implying that the nutritional status of school going children might be normal although the family is food insecure. Since these children might be able to supplement their food consumption at school, friends and at neighbours' homes.

The majority of children above two years of age (69.4%) had normal body mass index, although 3.3% and 5% were thin or severely thin, indicating severe depletion of adipose tissue. BMI-for-age can also indicate whether the child is underweight, overweight or obese. In addition, 2.2% of the children were overweight whilst 8.9% were obese. The result of the present study is in agreement with the study conducted by Kumani-Murage (2010), which showed low prevalence of overweight (7%) and obesity (1%) respectively. On the other hand, a study by Oldewage-Theron and Egal (2010) showed a 17 % prevalence of overweight and 4% of obesity. Another study conducted by Armstrong *et al*. (2006) reported a high prevalence of overweight and obesity in South African primary school children. Mamabolo *et al. (*2005) also showed 18% high prevalence of overweight in 1-3 year olds. The prevalence of overweight in children was

estimated at an 'acceptable' level of 5% (Labadarious *et al.*, 2008). Evidence now demonstrates that overweight and obesity in childhood and adolescence have adverse consequences on premature mortality and physical morbidity in adulthood (Reilly and Kelly, 2010).

5.2.4 Head circumference

The head circumference -for-age was computed only for children below three years of age, and indicated that the majority of children had normal brain growth/volume. A study conducted by Bartholomeusz *et al.* (2002) indicated that there was a close relationship between head circumference and brain volume. Moreover, head circumference for age is an excellent predictor of brain volume in 1.7 years to 6 years olds. Head circumference for age is also used as a predictor of mortality, indicating that they were at the lowest risk of mortality. Large head circumference has been associated with conditions such as hydrocephalus and Autism Spectrum disorder, while a small head circumference indicates microcephaly or poor brain development (Muratori *et al.*, 2011).

5.2.5 Caregivers Body mass index

The caregiver's body mass index indicated that many were overweight and obese. This is not surprising as the presence of over nutrition and undernutrition in same household has been reported in South Africa (Armstrong *et al*. (2006); Truter *et al*. (2010). This is a cause for concern as it suggests that the little food available in the household is given or eaten by adults. The dynamics of household food distribution needs further investigation into the factors that contribute to it in order to develop interventions.

5.3 DIETARY PATTERNS

The study results indicated that food items mostly consumed by children were maize meal, sugar, tea, iodated salt, bread and meat. Furthermore, vegetables (mostly cabbage, potatoes, onions and tomatoes) eggs, meat, chicken offal (giblets) milk and fish were also consumed. Household food inventory showed that the majority of household had mealie meal, sugar, flour, , oil, potatoes and also vegetables, especially cabbage. Some of the children also consumed milk. This is in line with the WHO (2004), which recommends consumption of milk, especially in non-breastfed children between 6 and 24 months of age.

The results are also in agreement with the study conducted by Oldewage-Theron and Egal (2010), which showed that maize meal, sugar, tea, soup, bread and full cream milk were the food items mostly consumed by children in QwaQwa in the Free State. In addition, the 1999 SA-NFCS pointed out that maize, brown bread, *vetkoek*, tea and sugar were mostly consumed food items (Labadarios et al., 2005). Moreover, cabbage and potatoes were consumed as vegetables. Again, Theron *et al.* (2007) pointed out that cheaper alternative sources of high biological value proteins such as eggs, tinned fish and chicken giblets were mostly consumed. This also confirms that the poor have less purchasing power. In most cases they purchase poor quality monotonous foods that are nutritionally inadequate in important nutrients for growth.

The quality and quantity of food consumed by children can be considered as a measure of food poverty. However, this could not be done since it is unacceptable to analyze and draw conclusion using invalidated dietary data (Moeller *et al.*, 2007). Dietary intakes were not

determined in this study. Instead, the researcher used the dietary data to assess only the availability of food consumed and dietary patterns. Dietary intake determination requires complex data collection techniques and availability of nutrient analysis for the food.

About 66% of children ate three meals per day and this results concur with the recommendation by WHO (2004) which spells out that a child should consume three meals and additional snacks per day. The diet lacked a variety of vegetables and fruits. This is in agreement with Kendal *et al*. (1996) who showed a significant decrease in the frequency consumption of fruits and vegetables and the amount of food in the household. Consequently, micronutrient deficiency could follow. Studies by Onyango (1998), Makola *et al.* (2003), Steyn *et al.*, (2006) and Kimani-Murage (2010) showed that poor households have a limited food variety and diversification, which are associated with the nutritional status. However, Haddad *et al.* (1996) and Webb-Thorne-Lyman (2006) cited in Jacobs, (2009) maintain that food availability index does not offer information on food quality and nutrient intake.

5.4 HOUSEHOLD FOOD SECURITY AND THE PREVALENCE OF HUNGER

The present study results indicate that 44.4% of households were food insecure, whereas 33.9% were at risk of hunger and only 21.7% were food secure. Similar findings were revealed by the 1999 SA-NFCS, which showed that 42% of urban households experienced hunger or food insecurity. This indicated a decrease in the prevalence of households who were food insecure, compared to the 54% and 62% of households who experienced hunger in rural households of

Limpopo Province and other rural areas of SA respectively (Labadarios *et al.*, 2005). The results from SANHANES 1 revealed that in Limpopo, 45.6% were food secure while 30.8% were experiencing hunger (HSRC, 2013). The results of this study show that the area still has households who are food insecure. This could be linked to poverty levels and the unemployment status of the mother which was extremely high. It is for the same reason that district or regional based data is highly recommended as it gives a true reflection of what is happening in that particular community. This allows for targeting when interventions are implemented. The South African MDG country report (2013) to the United Nations has showed that household food insecurity has dropped at the national level from 29.9% in 2002 to 12,9% in 2011 (Statistics SA, 2013; MDG country report, 2013).

Additionally, the result from Labadarios *et al*. (2005) showed that nationally, 52% of households were food insecure. Again, in 2010, Kimani-Murage *et al*. indicated that in SA, 35% of households were food insecure. Shisana *et al*. (2013) showed a huge decrease from the 2005 figure to 26.0%. This clearly indicates that the number of food insecure households is decreasing. Indeed, this is good news to a country with a high rate of unemployment. Perhaps this indicates that intervention strategies such as grants and poverty relief strategies do indeed improve the livelihood of people in SA. The study area of Sekhukhune District was among the poorest earmarked for poverty alleviation programmes through the provincial FIVIMS. According to Altman *et al*. (2009) food security cannot be understood in isolation from other developmental questions such as social protection, sources of income, rural and urban development, changing household structure, health, access to land, water and inputs, retail markets or education and nutritional knowledge. The consequences of prolonged food

insecurity and hunger were discussed earlier. Jyotti *et al*. (2005) showed how over time food insecurity was related to mathematics performance, weight, MBI and social skills in children. Food insecurity was predictive of poor development trajectories in children. Although, not a subject in this study, it would be good in future to measure the developmental characteristics of children in the area of study and link the variables with the level of food security and the prevalence of hunger.

5.5 RESPONSE MODES AND COPING STRATEGIES TO FOOD DEPRIVATION

About 64.4% and 28.4% households of the current study borrowed food from their neighbours/family or friends and bought food on credit from the local shop as a means to cope with food deprivation. Likewise, local shops, like any other business people do in the country, would only give credit if they knew that the borrower would be able to repay the debt. It is assumed that people will more likely trustworth that whatever is borrowed will be returned if the borrower's source of income is known. Perhaps this is the reason why the majority of the subjects used this strategy since 76.7 % of the children received child support grant, and households were dependent on this grant as well as old age pension grant. Altman *et al.* (2009) indicated that evidence has shown that social grants in South Africa have played an important role in improving household food security since 2001, but improvements in employment status are also important (Van der Berg, 2006).

Borrowing from a neighbour is a known African practice dating back centuries. Borrowing, purchasing on credit, begging and using wild foods were regarded as short term and

unsustainable strategies to cope with food deprivation. Borrowing money to buy foods, receiving food from family members, relatives and neighbours and reducing the number of meals seemed to cushion the food insecurity of households (Sheriff and Khor 2008) ; Akerele *et al*. 2013). According to Sheppard *et al.* (2009), the use of these unsustainable strategies reflects a high level of current food insecurity, as when food insecurity becomes severe, families naturally start sparing foods for children. Therefore, this study can safely conclude that this population had a high level of current food insecurity since more than 92.7% of households used these short term strategies.

This study showed that a minority of households (2.8%) reduced portion sizes until month end. Similarly, findings by Kruger *et al.* (2008) on farm workers showed that they consumed less preferred foods or bought on credit or gathered food from their surroundings rather than limit food for 30 days. However, the findings of this study are not in agreement with the results of the Vaal triangle study which showed that the majority of households (84.7%) limited portion sizes over a 30-day period (Oldewage-Theron *et al.*, 2006). The difference could have been due to the location, since the study area located in a rural village, while the Kruger *et al.* (2008) study was in a farm where normally families live as a closely knit unit and assist each other with food shortage and indeed with other necessities. Alternatively, people living in the rural/ farm areas can always gather food from their immediate surroundings (mountains, veld). All these coping strategies may not apply in an informal settlement, however, due to overcrowding and lack of space/land. The result from the study in the Vaal Triangle showed that most households procured and cooked a limited variety of foods in order to cope with the shortage of food (Oldewage-Theron *et al.*, 2006).

Expenditure and income strategies were rarely used by the population in this study. The reason is that in South Africa, health care services are free for children under five of age and free for all people at the primary care level. Moreover, primary and secondary education is free. This could have buffered the expenditure strategy since they did not have to sell anything to cover for such services.. Lambrechts and Barry (2003) and Shariff and Knor (2008) indicated that this strategy is mostly used by families with high income asset. Several studies have shown that in countries where services such as health care and education are not free, the family will reduce expenditure on these services and will imply that the household does not value them (Snel and Staring, 2001; Maxwell *et al.*, 2003; Shariff and Knor, 2008). Tarasuk (2001) reported that women delayed paying bills or other services when threatened with acute food shortages.

The results of the current study indicated that few of the households (1.1%) sent their children to the neighbours or relatives. Maxwell *et al.* (2003), Misselhorn (2005) and Senefeld and Polsky (2006) reported a migration strategy which can also be used to reduce the number of people including adults, to have less people to feed. The explanation for the low number of people using the migrating strategy might be, as elucidated clearly by Snel and Starring (2001) that poor people have their own pride. Thus, they sometimes prefer to be poor and not depend on any third party assistance or paternalistic support. This is further supported by the observations in this study which showed that around 15.0% of households reported getting assistance from their parents and friends. In addition, 55% also indicated that they would rather stay without food than ask for money and food from external sources. Since borrowing and asking was interpreted differently by the subjects as already explained when reporting the

results, it seems that many preferred borrowing and credit from the local shops. In a similar Malaysian study by Shariff and Khor (2008), most of the food insecure households adopted a strategy of cooking whatever was available in the home.

Consumption of seeds and harvesting insects from the bush was not mentioned as one of the food coping strategies in the current study. Since it was conducted in a rural area, a high consumption of seeds was expected. This is supported by the study conducted by Misselhorn (2005) and Hunter *et al.* (2007), which points out that poor households consume seeds and locusts in times of food scarcity. Perhaps they were not mentioned in this study due to the data collection method (open-ended questions) and thus the interviewees could not have viewed the consumption of seeds as a food coping strategy but, as part of their usual eating habits. On the other hand, maybe they kept some for planting during the rainy seasons or could not afford to procure them due to poverty or due to the effect of nutrition transition. The household inventory revealed no stock of seed in most households, though. The results from the current study also showed that households used traditional wild foods as a food coping mechanism. This coping strategy was used by families who stayed in mountainous areas. The use of locusts as a coping strategy to food deprivation due to death of the wage earner was also used by rural children in South Africa (Kimani-Murage, 2010). Poor households mostly use this coping strategy as gathering locusts does not require money (Shariff and Khor, 2008).

The emotional response by children due to food deprivation was also observed. Some children cried or became angry. Although a minority of children used these responses, it is important to note, however, that these elements of psychological disturbances are due to hunger and poverty.

Thus, the recommendation by Oldewagen-Theron *et al*. (2006) that caregivers and children should be targeted for interventions is strongly supported.

Consumption of bread was mentioned by only 1.7% of the households as one of the food coping strategies used by children. The rationale behind mentioning this could be that bread is a starch that is "supposedly" consumed in the morning as breakfast. The observed practice in many people living in the rural households is that, they usually consume maize/mealiemeal porridge as part of lunch or supper or both and not bread. The food inventory investigation revealed that bread was available in most households most of the time.

The use of school support system should not be undermined. This is because 0.6% households used school support to assist their children in coping with food deprivation. Although not established in this study, it is a known fact that South Africa has school feeding programmes that provide at least one balanced meal per school day (National School Nutrition Programme, 2014). Additionally, teachers in schools can easily identify children affected by hunger and refer them to the relevant authorities.

5.6 THE RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC PARAMETERS, FOOD INSECURITY AND ANTHROPOMETRIC STATUS OF CHILDREN

Study results found association between anthropometric indices, income parameters, and coping strategies employed by caregivers during periods of food deprivation. The study findings concurred with the 1999 SA-NFCS findings which showed that maternal education

was associated with the significant reduction in the prevalence of stunting, wasting and underweight in all groups of children (Labadarios *et al.,* 2005). In addition, Shrimpton *et al.* (2001) and Lesiapeto *et al.* (2010) indicated that low maternal education was associated with a higher risk for child underweight and a lower risk for child overweight, but not with child stunting. Furthermore, Chopra (2003) indicated that children were less likely to be stunted if their mothers had a minimum of five years of schooling. Again Davoodi *et al*, 2015 indicated that stunting is more prevalent in households where mothers are less educated. In addition, the 1999 NFCS, showed that maternal education (<7 years of schooling) was associated with a lower risk of child stunting and a higher risk of obesity (Labadarios *et al.,* 2005). Furthermore studies indicate that the more educated the mother is, the lower the risk of malnutrition. This is due to, amongst other things, increased awareness and understanding of health issues, proper hygiene practices and financial security (Mansuri, 2006; Khan and Azid, 2011). The Education level and income of the caregivers in this study was homogeneous. An improvement in education has been associated with increased prevalence of obesity (Dinour *et al.,* 2007). However, this was not the case in the population of the present study. Perhaps the difference was due to by the location and homogeneity as the study was conducted in a rural setting. This is evidenced by studies which showed a higher prevalence of obesity in children in urban areas than in rural areas (Labadarios *et al.,* 2005; Tanumihardjo *et al.,* 2007)

The highest educational level of the mother was positively associated with total household income per month, whereas total household income per month was associated with the number of food items in the household. This is expected as the purchasing power is known to influence food availability.

There was no association between employment status of the mother, underweight, stunting and wasting. This is contrary to the data from Latin America, which showed that children from women who are employed and earning wages have higher prevalence of obesity than those whose mothers who are unemployed (Edin and Lein, 1997). Again, the discrepancy in the data could have been caused by the unavailability or inaccessibility of shops in the rural areas that sell high energy dense food than (maybe) in the USA. Therefore, in South Africa, the little money that mothers receive from the child support grant and other sources is used to buy basic foodstuffs. The employment status of the mother was associated with total household income per month and household food insecurity, but not with the nutritional status of the child. Almost all caregivers were unemployed and therefore no significant associations would be expected.

Income is a decisive factor when it comes to food procurement (Koch, 2011). It is postulated that mothers with a higher educational qualification earn more and have higher purchasing power. Possibly, this was the reason forthe association between food security and educational qualification. In addition, there is an overall assumption that the educational qualification of the mother and a consequent increase in income will increase the number of food items in the household. The highest education level in this study was homogeneous and hence no significant observations were made. Perhaps the fact that the majority of households (75.6%) spent less than R500.00 per month to purchase food could have also contributed to the less number of food items at the household level. The subjects were homogeneous in terms of socio-economic status.

There was also a positive association between educational qualification of the mother and the level of hunger, but neither was associated with the number of food items. This is contrary to the expectation that education of mothers will have a better influence on the quality of foods to be purchased. In addition, education is expected to increase the household income, thereby increasing the purchasing power of the family (Webb and Lapping, 2002) as well as improving food availability and subsequently improving the nutritional status of children.

There was no association between the level of hunger, stunting and underweight. This is not in agreement with the study conducted by Labadarios *et al.* (2005), which indicated poor anthropometric data in households which were at risk or experiencing hunger. The results are surprising, since stunting is used as a proxy for chronic hunger that affects everybody at the household level. Moreover, this study was conducted in a poor rural setting with a high unemployment rate, and most households were also food insecure. When considering all these factors, the probability was that the majority of the children would present with poor nutritional status. However, although most households were food insecure, their children could have been receiving meals from other sources such as pre-school and primary school nutrition programmes, which were not determined by the current study. Matheson *et al*. (2002) examined the relations among household food insecurity, household food supplies, and school age Hispanic children's dietary intakes and body mass index in the USA. They found that food insecurity was negatively associated with children's body mass index and household supplies, but not with food intakes. Association can only be observed if the sample under study has distinct socio-demographic variable, e.g. being employed and not employed.

5.7 LIMITATION OF THE STUDY

The current study results are applicable to Greater Sekhukhune District Municipality which is predominantly rural area. Therefore the results may notcannot be generalized to other areas. The study was conducted in an area with a known high rate of unemployment, although the researcher did not investigate further to determine the actual unemployment rate. Measurements of socio-economic parameters cannot rule out the possibility that the control for socio-economic parameters was not complete (e.g. measurement of household assets in order to determine wealth of each household). Frangillo *et al.* (1997) assessed the validity of questionnaire-based measures for the identification of rural household with hunger and food security. Using two interviews they collected data on demography, factors contributing to food security, coping strategies, fruit and vegetable consumption, disordered eating behaviours, height, weight, dietary recall and household food inventory. They concluded that these methods could be used to screen for hunger and food insecurity among rural households. The commonality of their methods and this study was with the selected food items for the food frequency.

The study only assessed the quality and not the quantity of foods consumed. This is known to have an effect when measuring socio-economic parameters such as food poverty and nutritional status. Furthermore, the Food Frequency Questionnaire did not ask questions on starch consumption. The contribution of the school meal was also not quantified as the study focused on the foods that the caregiver gave the child at home. The researcher, however, did observe household circumstances since interviews were conducted in the home.

Further research is recommended to further explore the link between socio-economic, child anthropometry and household hunger and the tracking of consequences of food deprivation, especially cognitive development and children's performance at school.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSIONS

The aim of the current study was to assess the relationship between employment status of the mother, household hunger and nutritional status of children in Sekhukhune District, Limpopo Province, South Africa. The first objective was to determine the socio-economic parameters of the household. Information on socio-economic parameters revealed that the majority of children (60%) stayed in formal houses built with cement bricks with six to ten people in each household. About 74% of the children were taken care of by their mothers who were between 20 and 59 years old. Additionally, the majority of the mothers had attended school up to Grade 12.

Children were cared for by mothers who were either single or married. Children were staying in households where more than 92.2% of their mothers were unemployed. The few employed mothers and fathers earned less than R1000.00 per month. Furthermore, the households had poor income as evidenced by the fact that they spent less than R500.00 per month to purchase food. Some of the households reared chicken and few had either cows or goats. The majority of the children lived in poor households below the poverty line; social support grant was received by almost 77% of the children. Therefore, GSDM had a high rate of unemployment, poor household income and a high level of poverty.

The second objective was to assess the nutritional status of children using anthropometric measurements. The study results revealed a high prevalence of stunting in this population group at 39.6% for children under 60 months and 16.9% for children above 60 months. The prevalence of wasting and underweight were low for both age groups. Overweight and obesity rates were also observed. Therefore, the findings of the current study revealed a high prevalence of stunting, low rates of wasting, overweight and obesity and a medium prevalence of underweight.

The third objective was to assess dietary patterns of children in households. The current study results indicated that about 66% of children ate three meals per day. Their diet was monotonous and lacked diversification, especially with regard to fruits and vegetables. In addition, mealie/maize meal, sugar, tea, iodated salt, bread and meat were some of the food items mostly consumed by children in households. Furthermore, vegetables (mostly cabbage, potatoes, onions and tomatoes) eggs, meat, chicken offal (giblets) milk and fish were also consumed.

The fourth objective was to determine household food consumption patterns using food inventories. Household food inventory showed that most households had up to 17 food items in their households. This showed a lack of food diversity which could have contributed to the high level of food insecurity, as most households had only mealie/maize meal, sugar, flour potatoes, oil, and vegetables, especially cabbage. This also showed lack of dietary diversification which could result in poor nutrient intake.

The fifth objective was to determine the prevalence of household hunger, using the standardized hunger scale. About 21.7 % of the households were food secure, 33.9 % at risk of hunger and 44.4 % food insecure. This translates to 4 to 5 out of ten children go to bed hungry.

Regarding the sixth objective, the most common food coping strategy that the majority (64.4%) of households employed was borrowing food from neighbours/family or friends; 28.4% bought food on credit from the local shop. Again, approximately 84.7% of the households had limited portion sizes. Expenditure and income strategies were rarely used by the study participants. However, 55% also specified that they would rather stay without food than using strategies such as asking for money and food from external sources. Furthermore, children in few households used traditional wild foods as a food coping mechanism. Some children cried or became angry as an emotional response due to food deprivation.

The seventh objective was to determine the relationship between employment status of the mother, nutritional status of children and household hunger. The associations were seen with

the anthropometric indices, some socio-demographic factors and coping strategies to food deprivation. The consequences of unemployment, household food insecurity and children's poor nutritional status according to Koch (2011) can be reduced by addressing challenges of the right to food, food access, agricultural support (Altman *et al.*, 2009), multisectoralism, social accountability and participation, and broad employment opportunities, particularly for women.

6.2 RECOMMENDATIONS

1. The households were poor and require social and economic interventions for the improvement of livelihoods.

2. There is need to address the medium prevalence of underweight and acute hunger. This could be by adding food items or an additional meal at school.

3. The households must be encouraged to diversify the diets by adding vegetables, fruits and nuts in their diets. The use of nutrition education as an intervention strategy requires little or no money and will help educate the population on nutrition security, which includes dietary diversification and can subsequently improve the nutritional status.

4. The high prevalence of household hunger/food insecurity should be addressed through sustainable food programmes. Comprehensive multi-sectorial approach such poverty alleviation, cash transfers and agricultural support can also be employed.

5. Positive response modes for food deprivation such as use of wild foods and livestock should be encouraged through the promotion of community support groups.

6. Finally, the unemployment rate of the mothers should be addressed by creating jobs in the area and investing in the education of their children. Mothers can be empowered with vocational skills to increase household income and ultimately household food security. This strategy is feasible, given that the majority of the mothers had Grade 12 as their highest level of education

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Appendix A

THE RELATIONSHIP BETWEEN EMPLOYMENT STATUS OF THE MOTHER, HOUSEHOLD HUNGER AND NUTRITIONAL STATUS OF CHILDREN IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE

Consent Form

The researcher has outlined the purpose and objectives of the research to me. I fully understand them and therefore take an informed decision to participate or not to participate in the study. If during the study period I feel that I can longer continue with the study, I can withdraw without giving any explanation. I am also sober minded and not under the influence of intoxicants.

I understand that the information that I am going to furnish to the researcher is fully confidential. I also understand that the result of the study will be used for scientific purposes and may be published in any professional and scientific media.

I ALSO AGREE TO HAVE MY CHILD AGED…… TO PARTICIPATE IN THE STUDY. ALL MEASUREMENTS THAT WILL BE COLLECTED FROM MY CHILD HAVE BEEN EXPLAINED TO ME AND I UNDERSTAND THAT THEY ARE NOT HARMFUL

I fully agree to participate in the study

Name: _____

Signature: _____

Witness: _____

Researcher: _____

Place _____

Date _____

Appendix B

THE RELATIONSHIP BETWEEN EMPLOYMENT STATUS OF THE MOTHER, HOUSEHOLD HUNGER AND NUTRITIONAL STATUS OF CHILDREN IN SEKHUKHUNE DISTRICT, LIMPOPO PROVINCE

General and Socio-demographic Questionnaire

Greetings

Section 1

I appreciate the time that you have given the researcher to have a conversation with you. I would like to ask you general questions about your household.

A. Exclusion criteria

1.1 Do you have any children between 1 and 12 years old?

Yes	1	No	2

1.2Who takes care of the child?

Mother	1	Caretaker	2	Grandmother	3	Other	4

1.3 How old is the person in 1.2?

0-12 years	1	13-19	2	20-35	3	36- 59	4	60 and above	5

1.4 Was the child sick within the past 48 hours?

Yes	1	No	2

1.5 Was the child away for more than 24 hours?

Yes	1	No	2

1.6 Was there death in the family in the past three (3) weeks?

Yes	1	No	2

1.7 If yes, how is she/he related to the child?

Mother	1	Father	2	Aunt	3	Uncle	4	Brother	5	Sister	6	Other	7

1.8 Are you and/or your spouse employed?

		Yes	1	No	2
1.8.1	Mother				
1.8.2	Father				
1.8.3	Other(specify)				

1.9 If no, did you or any of the family members actively look for job in the past four weeks?

Yes	1	No	2

Section 2

I am going to ask you questions in relation to your household. The information that you give me will be treated with confidentiality.

2. General information

Subject number _____-

Municipality _____ Village_____

Date_____

2.1 Marital Status of the mother?

Single	1	Married	2	Divorced	3	widowed	4	Living together	5

2.2 What is the highest qualification of the mother?

Never schooled	1	Grade 1-7	2	Grade 8-12	3	Tertiary	4	Post Degree	5

2.3 What is the employment status of the mother?

Houswife	1	Wage/salary earner	2	Self employed	3	Unemployed	4	Other(specify)	5

2.4 What is the type of house that you live in?

Formal	1	Informal	2	Traditional	3	Hostels/ rented	4	other	5

2.5 How many people live in this household?_____

2.5.1 Age (years)	2. 5.2 Gender		2.5.3 Relationship with the mother	
	Male 1	Female 2		
			Son	1
			Daughter	2
			Niece Nephew Cousins Grandchild	3 4 5 6

2.6. Who is the financial supporter/s?

Mother	1
Father	2
Brother	3
Sister	4
Aunt	5
Uncle	6
Grandmother	7
Grandfather	8
Other (specify)	

2.7 What is the Occupation/s of the person/s mentioned above (in 2.6)? _____

2.8 How much does the mother earn per month?

0-500	1	501-1000	2	1001-2000	3	2001-3000	4	3001and above	5

2.9 Does the family have additional source/s of income per month?

Yes	1	No	2

2.10 If yes, what is/are the source/s?

Child support grant	1	Government old age pension	2	Other	3

2.11 What is the total income per month per household?

0-500	1	501-1000	2	1001-2000	3	2001-3000	4	3001and above	5

2.12 How much money do you spend purchasing food per month?

0-500	1	501-1000	2	1001-2000	3	2001-3000	4	3001and above	5

Section 3

Response modes to food deprivation
I appreciate the time that you have given the researcher to have a conversation with you.
I would like to ask you general questions about your household.

3.1 Does your household ever run out of food?

Yes	1	No	2

3.2 What happens when food runs out in the household?

3.3Which food items usually run out at your household?

3.4 Which food items do not usually run out at your household?

3.5 Do you own a vegetable garden or a field for subsistence farming?

3.6 Do you have any of the following domesticated animals in the household?

	Yes	1	No	2
3.6.1 Cattle				
3.6.2 Goat				
3.6.3 Chicken				
3.6.4 other (specify)				

3.7 Do you use any of the above mentioned animals as food?

3.8 Do you have family support where you sometimes collect food?

	Yes	1	No	2
3.8.1 Parents				
3.8.2 In-laws				
3.8.3 Siblings				
3.8.4 Friends				
3.8.5 NGO				
3.8.6 Other (specify)				

3.9 Do you have any other means that you use to acquire food when it is not available?

3.10 What happens to the children when there is no food at home?

Section 4

Greetings

Thank you for your willingness to participate in this research. I am now going to measurements different parts of the body.

ANTHROPOMETRIC DATA

CHILD

4.1 Age (DOB): _____ 4.2 Gender _____

4.3 Weight (kg) _1. 2_ 4.4 Length/Height (m)_1. 2. -

4.5 Head circumference _____ 4.6 MUAC_____

ADULT

4.7 Age: _____ **4.8 Sex: _____**

4.9Weight (kg):1. **2._____** **4.10 Height(m):_1.** **2.**

4.11BMI: _____ **4.12 IBW: _____**

4.13 MUAC: _____ **4.14 TSF:_____**

Section 5

24 Hour Recall Dietary Intake Questionnaire

Subject number _____

Area _____ Village_____

Date_____

Greetings

Thanks again for your continued support. I am now going to ask you about the food that the child consumed in the past 24 hours:

- What did s/he eat?
- How much of each food item does he/she eat?
- How is the food prepared?

I am going to show models of the food item that you mention (if any) in different sizes. Please identify the food model and report the amount that the child will consume in terms of equal , bigger, smaller or in between the one shown by the model. Report the amounts using household measures such as cups (C), tablespoons (T) or teaspoon (T)

FOOD ITEMS	TIME	AMOUNT

Thank you

Section 6

FOOD FREQUENCY QUESTIONNAIRE

Thanks again for your continued support. I am now going to go a list of food items and ask you about the food that the child usually consumes:

- What did s/he eat?
- How much of each food item does s/he eat?
- How many times per day/week/month does she eat a particular food item?
- How is the food prepared ?

I am going to show models of the food item that you mention (if any) in different sizes. Please identify the food model and report the amount that the child will consume in terms of equal , bigger, smaller or in between the one shown by the model. Report the amounts using household measures such as cups (C), tablespoons (T) or teaspoon (T)

FOOD FREQUENCY QUESTIONNAIRE

		Frequency			
FOOD ITEMS	Amount	Per day	Days per week	Per month	Seldom /never
Milk and milk products					
Eggs					

Chicken Chicken feet and heads Chicken giblets Chicken offal Chicken liver Other					
Beef /mutton Beef liver Beef tripe Other					
Pork					
Fish					
Mopani worms					
Polony/ viennas					
Beans					
Peanuts/ butter					
Soya products					
Fruits					
Vegetables Beetroot Cabbage Carrots Pumpkin and family Potatoes Tomato *Morogo* (spinach) Pumpkin seeds Other					
Fruit Fruit juices (specify) Bananas Orange Peaches Pears Guava Mangoes Grapes Indigenous fruit (specify) Other					
Snacks Biscuits Potato or maize crisps and family Sweets					

Other					
Miscellaneous					

Section 7

Food procurement and household inventory
Number of household members _____
0-12 years _____ 13-21 years _____ 25-55 years _____55 years and above _____

Greetings
I am now going to ask you to show me food and beverages that are in your household. I am going to measure some food items if necessary. Remember the information is confidential.

Food purchased	Amount purchased	Frequency of food purchase	Food produced at household level	Amount in storage	Amount per day

Section 8

Subject number _____ Date _____

Area: _____ Village_____

Hunger Scale

I am going to ask you questions on food that is available in your household.

	Yes	No
8.1. Does your household ever run out of money to buy food?		
8.1.1 Has it happened in the past 30 days?		
8.1.2 Has it happened 5 days or more days in the past 30 days?		
8.2 Do you ever rely on a limited number of foods to feed your children because you are running out of money to buy food for a meal?		
8.2.1 Has it happened in the past 30 days?		
8.2.2 Has it happened 5 days or more days in the past 30 days?		
8.3 Do you ever cut the size of meals or skip any because there is not enough food in the house?		
8.3.1Has it happened in the past 30 days?		
8.3.2Has it happened 5 days or more days in the past 30 days?		
8.4. Do you ever eat less than you should because there is not enough money for food?		
8.4.1 Has it happened in the past 30 days?		
8.4.2 Has it happened 5 days or more days in the past 30 days?		
8.5 Do your children ever eat less than you feel they should because there is not enough money for food?		
8.5.1Has it happened in the past 30 days?		
8.5.2 Has it happened 5 days or more days in the past 30 days?		
8.6 Do your children ever say they are hungry because there is not enough food in the house?		

8.6.1 Has it happened in the past 30 days?		
8.6.2 Has it happened 5 days or more days in the past 30 days?		
8.7 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?		
8.7.1 Has it happened in the past 30 days?		
8.7.2 Has it happened 5 days or more days in the past 30 days?		
8.8 Do any of your children ever go to bed hungry because there is not enough money to buy food?		
8.8.1Has it happened in the past 30 days?		
8.8.2Has it happened 5 days or more days in the past 30 days?		

Source: SA-NFCS, 1999

APPENDIX C: HIGHER DEGREES COMMITTEE APPROVAL LETTER, UNIVERSITY OF VENDA

APPENDIX D: MAKHUDUTHAMAGA MUNICIPLAITY APPROVAL LETTER