

**Nutrition Knowledge, Attitudes and Behaviour as
well as Perceptions of Hunger and Food Security of
Caregivers in a Resource limited Community
(Bronkhorstspuit), Gauteng, Republic of South
Africa**

Risuna Mathye

**Nutrition Knowledge, Attitudes and Behaviour as
well as Perceptions of Hunger and Food Security of
Caregivers in a Resource limited Community
(Bronkhorstspuit), Gauteng, Republic of South
Africa**

by

RISUNA MATHYE

Submitted in partial fulfilment of the requirement of a

MASTER OF SCIENCE DEGREE IN HUMAN NUTRITION

in the

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

UNIVERSITY OF PRETORIA

PRETORIA

SUPERVISOR: Ms GERDA GERICKE

October 2015

DECLARATION

This is my original work and has not been presented before for an award of a degree/diploma in this or any other university.

Signature.....Date.....

RISUNA MATHYE

STUDENT NUMBER 10567926

Dedication

This thesis is dedicated to my beloved mother,

Ms Tsakani Joyce Bila.

Thank you for making me all I am today through God's wisdom and grace.

“The wise woman builds her house, but with her own hands the foolish tears hers
down”

(Proverbs 14: 1)

ACKNOWLEDGEMENTS

Praise be to my heavenly Father, it's all because of His mercy and grace that this project was completed.

My sincere gratitude to the following people who contributed in a magnificent way to the execution of this research study:

- ❖ Ms Gerda Gericke, my study leader who provided guidance throughout the study.
- ❖ My mother, Ms Tsakani Bila; my little brother, Risana Mathye; my grandmother, Fokisa Bila; my cousins, Vutivi Mathye; Mafumisi Kubayi and Mahlori Mageza; my uncle, Vonani Bila; my aunt, Makhanani Bila; and their families for all the concern, support and love.
- ❖ My pastor, Samson Mabasa, for all the prayers and encouragement.
- ❖ The administration of Mshuluzane Mayisela Primary school and all the staff members as well as caregivers for their insight, inputs and willingness to participate in the study.
- ❖ The Institute of Food and Nutrition and Well-being, University of Pretoria for funding this project.
- ❖ My research assistants who were patient with me: Mrs Debbie Mujolosi, Mrs Keabetswe Kodi, Ms Hester Barnard.
- ❖ Mrs Cheryl Bowles and Mrs Juna Botha for all the patience, support and communication assistance.
- ❖ My friends, Christopher Mahlathi, Vukosi Khosa, Awelani Mulaudzi, Prof Lucy Maliwichi, William Makamu, Nonkululeko Mthembu and Benjamin Raselabe for continuous support and motivations that was precious.

ABSTRACT

Nutrition knowledge, attitudes and behaviour as well as perceptions of hunger and food Security of caregivers in a resource limited community (Bronkhorstspuit), Gauteng, Republic of South Africa

by

Risuna Mathye

Supervisors: Ms Gerda Gericke

Department of Human Nutrition

Faculty of Natural and Agricultural Sciences

University of Pretoria

For the degree Master of Science in Nutrition

Food insecurity in South Africa has been found to be affecting both the informal and formal settlements both in the rural areas and urban areas (Oxfam, 2014). However, the level of food insecurity in South Africa halved since 1999. Though, it was reported that the level of food insecurity did improve in 2008 and remains at 26% (SAHANES-1, 2013). Hidden hunger is often led by a lack of essential vitamins and minerals where signs of under-nutrition and hunger are less visible (Kennedy et al, 2007).

The aim of this research was to determine the nutrition knowledge, attitudes and behaviour as well as perceptions of hunger and food security of caregivers in a resource limited community in Bronkhorstspuit. A descriptive cross-sectional study in the quantitative research paradigm was done to collect data from caregivers (N=50) who were responsible for preparing and buying food for school aged children, residing in different households in Bronkhorstspuit in the Gauteng

Province of South Africa. The caregivers were selected non-randomly. Informed consent was obtained from the caregivers. Caregivers were individually interviewed using structured questionnaires (socio-demographic, Hunger Scale, nutrition knowledge, attitudes and behaviour as well as the 24 hour recall questionnaires respectively).

The majority (68%) of the caregivers had good nutrition knowledge but they did not know how to apply the knowledge in their dietary lifestyle. The socio-economic status and nutrition knowledge and attitudes of the caregivers were found to be possible factors that influenced dietary intakes of the households. Correlations were not assessed. Hunger assessment revealed that 68% of the households consumed on a limited number of foods in the previous month, and of these 36% of the households had a shortage of food because they depended on the few number of foods to feed their children for five days or more in that month. The mean Household Food Variety Score (FVS) was 4.38 (\pm 1.0) and the Household Dietary Diversity Score (DDS) was 4.28 (\pm 1.0). The results illustrated that the food variety in this research demonstrated an average of eight food items were consumed in the households during the 24hr period of the maximum of 24 food items, identified by the 24 hour recalls.

There seems to be a need for a nutrition intervention programme that will focus on nutrition education of caregivers on how they can improve their dietary intake even under constrained circumstances. This study showed that there is a limited food access by the households due to low incomes. Communities should participate more in government initiated projects in the community; this would help in improving incomes of the caregivers.

KEY WORDS: *hunger, food security, nutrition knowledge, attitudes and behaviour, dietary adequacy*

TABLE OF CONTENT

LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xiii
CHAPTER 1: BACKGROUND AND SUBSTANTIATION OF RESEARCH	1
1.1 BACKGROUND	1
1.2 PROBLEM STATEMENT	2
1.3 SUBSTANTIATION OF RESEARCH	3
1.4 IMPORTANCE AND BENEFITS OF THE STUDY	4
1.5 LAYOUT OF THE STUDY	4
2 CHAPTER 2: LITERATURE REVIEW	6
2.1 THEORETICAL FRAMEWORK	7
2.1.1 Political, economic and other determinants	8
2.1.2 Food availability and utilisation	8
2.1.3 Inadequate dietary intake	8
2.2 food insecurity and hunger	9
2.2.1 Food Insecurity	9
2.2.1.1 Availability of food	10
2.2.1.2 Food accessibility	10
2.1.2.3 Food use and utilisation	10
2.2.1.4 Stability of food	10
2.2.2 Hunger	11
2.2.3 Household gender and food security	13
2.3 NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR	14
2.4 DIETARY ADEQUACY (VARIETY AND DIVERSITY)	16
2.5 CONCLUSION	17
3 CHAPTER 3: EMPERICAL INVESTIGATION	19
3.1 RESEARCH PROBLEM	19
3.1.1 Sub-problems	19
3.2 RESEARCH PERSPECTIVE	19
3.3 RESEARCH DESIGN	20
3.3.1 Conceptual framework	20
3.3.2 Conceptual definitions	22
3.3.2.1 Household food security and perception thereof	22
3.3.2.2 Dietary diversity and variety	22
3.3.2.3 Nutrition knowledge, attitudes and behaviour	22
3.3.2.4 Hunger	22
3.3.3 Measurement and Operationalisation	23

3.4	STUDY SETTING	26
3.5	STUDY POPULATION AND SAMPLING	28
3.5.1	Study population	28
3.5.2	Sampling method	28
3.5.3	Inclusion criteria and screening	29
3.6	PILOT STUDY	29
3.7	METHODS	30
3.7.1	Data collection	30
3.7.2	Nutrition knowledge, attitudes and behaviour	31
3.7.3	Hunger Scale questionnaire	31
3.7.4	Dietary diversity and variety	32
3.8	DATA ANALYSES	32
3.9	QUALITY CONTROL	32
3.9.1	Validity	33
3.9.2	Reliability	33
3.10	DELIMITATIONS AND LIMITATIONS	33
3.10.1	Delimitations	33
3.10.2	Limitations	34
3.11	ETHICAL AND LEGAL CONSIDERATIONS	34
4	CHAPTER 4: RESULTS	35
4.1	SOCIO-BIOGRAPHIC INFORMATION	35
4.2	HOUSEHOLD CHARACTERISTICS	36
4.3	ECONOMIC RELATED INFORMATION	39
4.3.1	Source of income	39
4.3.2	Household monthly income	39
4.3.3	Household weekly expenditure on food	40
4.4	NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR	41
4.4.1	Nutrition knowledge	41
4.4.1.1	Nutrition knowledge: fruit	42
4.4.1.2	Nutrition knowledge: comparison to a healthy diet	42
4.4.1.3	Nutrition knowledge: fats	44
4.4.1.4	Nutrition knowledge: sugar	45
4.4.1.5	Nutrition knowledge: fibre	46
4.4.1.6	Nutrition knowledge: food intake and health status	48
4.5	NUTRITION ATTITUDES	49
4.6	NUTRITION BEHAVIOUR	54
4.6.1	Nutrition behaviour (Foods not eaten by the caregivers)	54
4.6.2	Caregivers' usual eating pattern	55
4.7	PERCEPTIONS OF HUNGER	55
4.8	DIETARY DIVERSITY AND VARIETY	59
4.8.1	Household dietary diversity	59
4.8.2	Household food variety	60
4.9	CONSUMPTION OF NUTRIENT RICH SOURCES	64
5	CHAPTER 5: DISCUSSION	69

5.1	SOCIO-BIOGRAPHIC INFORMATION	69
5.1.1	Educational status of the caregivers in the study	69
5.2	NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR	70
5.2.1	Nutrition knowledge of the caregivers	70
5.2.2	Nutrition attitudes of the caregivers	72
5.2.3	Nutrition behaviour of caregivers	74
5.3	PERCEPTIONS OF HUNGER AND FOOD SECURITY	75
5.3.1	Household level food security	75
5.3.2	Individual level food security	77
5.3.3	Child hunger	78
5.4	DIETARY ADEQUACY	79
6	CHAPTER 6: SUMMARY AND RECOMMENDATIONS	82
6.1	Summary	83
6.2	Recommendations	85
	REFERENCES	87
	BIBLIOGRAPHY	87
 LIST OF APPENDICES		
	APPENDIX A: CONSENT FORM	109
	APPENDIX B: SOCIO-DEMOGRAPHIC QUESTIONNAIRE	110
	APPENDIX C: HUNGER SCALE QUESTIONNAIRE	111
	APPENDIX D: NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR QUESTIONNAIRE	112
	APPENDIX E: 24 HOUR RECALL QUESTIONNAIRE	113
	APPENDIX F: ETHICAL APPROVAL	124

LIST OF TABLES

TABLE 3.1 MEASUREMENT AND OPERATIONALISATION OF CONCEPTS USED IN THE STUDY	20
TABLE 4.1 BIOGRAPHIC CHARACTERISTICS OF THE CAREGIVER (N=50)	37
TABLE 4.2 HOUSEHOLD CHARACTERISTICS OF THE CAREGIVERS (N=50)	39
TABLE 4.3.1 CAREGIVERS' SOURCE OF INCOME (N=50)	40
TABLE 4.3.4 HOUSEHOLD WEEKLY EXPENDITURE ON FOOD BY HOUSEHOLDS (N=50)	41
TABLE 4.4.1 RATINGS OF NUTRITION KNOWLEDGE OF CAREGIVERS' IN THE STUDY (N=50)	42
TABLE 4.4.1.2 NUTRITION KNOWLEDGE OF CAREGIVERS (N=50) ON THE HEALTH FITNESS OF THEIR DIET	44
TABLE 4.4.1.3 NUTRITION KNOWLEDGE (FATS) OF THE CAREGIVERS (N=50)	46
TABLE 4.4.1.5 CAREGIVERS' KNOWLEDGE OF FOODS WITH MORE FIBRE (N=50)	48
TABLE 4.4.1.5 CAREGIVERS' NUTRITION KNOWLEDGE: FOOD INTAKE AND HEALTH STATUS (N=50)	49
TABLE 4.4.1.6 CAREGIVERS' NUTRITION ATTITUDES IN THE STUDY (N=50)	50
TABLE 4.5.1 NUTRITION BEHAVIOUR (ARE THERE FOODS NOT EATEN BY THE CAREGIVERS) (N=50)	55
TABLE 4.6.1 USUAL EATING PATTERN OF THE CAREGIVERS (N=50)	56
TABLE 4.6.1.1 HUNGER PERCEPTIONS BY THE CAREGIVERS	57
TABLE 4.7.1 RESPONSES AND FREQUENCY OF THE OCCURRENCE OF POSITIVE RESPONSES ON THE HUNGER SCALE IN THE STUDY (N=50)	58
TABLE 4.8.1 FREQUENCY DISTRIBUTION OF HDDS OF HOUSEHOLDS (N=50)	61
TABLE 4.8.2 FREQUENCY DISTRIBUTION OF HFVS OF THE HOUSEHOLDS (N=50)	62
TABLE 4.8.3 FOOD GROUPS AND FOOD ITEMS CONSUMED BY THE CAREGIVERS DURING THE 24 HOUR PERIOD (N=50)	63
TABLE 4.9.1 CAREGIVERS WHO CONSUMED THE MICRONUTRIENT RICH FOODS DURING THE 24 HOUR PERIOD OF THE STUDY (N=50)	67

LIST OF FIGURES

FIGURE 2.1 UNICEF'S CONCEPTUAL FRAMEWORK OF MALNUTRITION	7
FIGURE 3.1 UNICEF'S CONCEPTUAL FRAMEWORK OF MALNUTRITION	20
FIGURE 3.2 MAP OF THE STUDY AREA	26
FIGURE 3.3 OUTSIDE MSHULUZANE MAYISELA PRIMARY SCHOOL	27
FIGURE 3.4 INSIDE MSHULUZANE MAYISELA PRIMARY SCHOOL	29
FIGURE 3.5 INTERVIEWS AND DATA COLLECTION IN THE STUDY	31
FIGURE 3.6 MAP OF SOUTH AFRICA	101
FIGURE 3.7 CAREGIVERS COOKING IN MSHULUZANE PRIMARY PRIMARY SCHOOL	102
FIGURE 3.8 CAREGIVERS SELLING SNACKS OUTSIDE MSHULUZANE PRIMARY SCHOOL	103
FIGURE 3.9 LEARNERS BUYING FROM CAREGIVERS	104
FIGURE 3.10 CAREGIVER SELLING TO LEARNERS	105
FIGURE 3.11 OVERVIEW OF BRONKHORSPRUIT	106
FIGURE 3.12 ASSISSTANT RESEARCHER AND ONE OF THE CAREGIVERS	107
FIGURE 3.13 ASSISSTANT RESEARCHER, A CAREGIVER AND RESEARCHER	108
FIGURE 3.14 TWO ASSISSTANT RESEARCHERS AND A CAREGIVER	109

LIST OF ABBREVIATIONS

- AIDS: Acquired Immune Deficiency Syndrome
- DHS: Demographic and Health Surveys
- DVS: Dietary Variety Score
- FAO: Food and Agricultural Organisation
- FVS: Food Variety Score
- GDP: Gross Domestic Product
- GIS: Geographic Information System
- HHDS: Household Dietary Diversity Score
- HELIC: Healthy Lifestyle In Children
- HFS: Household Food Security
- HFVS: Household Food Variety Score
- HIV: Human Immune Deficiency Virus
- HH: Households
- HSRC: Human Science Research Council
- KAB: Knowledge, Attitudes and Behaviour
- NFCS: National Food Consumption Survey
- PSLSD: Project for Statistics on Living Standards and Development
- RDP: Reconstruction Development Programme
- SA: South Africa
- UN: United Nations
- UNEP: United Nations Environment Programme
- UNDP: United Nations Development Programme
- USAID: United States Agency for International Development
- USDA: United States Department of Agriculture

CHAPTER 1: BACKGROUND AND SUBSTANTIATION OF RESEARCH

1.1 BACKGROUND

South Africa is a food secure nation, producing enough food to feed every one of its 53 million people (Oxfam, 2014). However, it was reported that one in four people living in South Africa is suffering from hunger on a regular basis. Oxfam (2014) also reported that more than half of South Africa's population is at risk of going hungry. Food insecurity in South Africa has been found to be affecting both the informal and formal settlements; both in the rural and urban areas (Oxfam, 2014). Food insecurity has been found to be affecting the unemployed living in urban areas, the landless living in the rural areas of the country and the majority of the unemployed youth (Oxfam, 2014). It was also reported that the level of food insecurity did not improve and remains at 26% (SAHANES-1, 2013).

Hunger has been found to be a difficult and unlikely concept to be discussed because of its sensitivity (Radimer et al., 1990). Radimer and co-workers conceptualised hunger based on the fact that people who are experiencing hunger have limited capacity to comprehend and express themselves. They indicated that hunger occurs at regular intervals (e.g. a few weeks in a year) or chronically (e.g. every month). Radimer et al. (1990) indicated that hunger can be seen in two dimensions, i.e. household hunger and individual hunger. Food insufficiency (not having enough money to buy appropriate and quality food needed), depletion of food (shortage of food supply) and food anxiety (uncertainty about the food supply) are considered the three major factors that lead to household hunger. Oxfam (2014) reported that hunger leads to physical and physiological limits to people preventing them from reaching their full potential which can result in inequalities. Though a child can have access to education, if they are hungry they cannot learn. Hunger can prevent people from engaging in learning activities and it is capable of preventing people from recovering from illnesses and growing (Oxfam, 2014).

People who are going through hunger usually spend half of their salaries buying food that is non-nutritious and it creates a society that has limited access to good nutritious food (Oxfam, 2014). Hunger has been found to be leading people into despair and hopelessness (Oxfam, 2014). Nutrition knowledge, attitudes and behavior are determinants of food intake.

1.2 PROBLEM STATEMENT

The Food and Agricultural Organisation (FAO) (2013) reported that there are approximately 842 million people in the world who are at risk of suffering from food insecurity. The majority of these people are those who are living in the rural regions of the world. In South Africa many people suffer from malnutrition that is caused by food insecurity. A large proportion of these people is found in rural areas and informal settlements in the country. Food insecurity is multifactorial caused by poverty and lack of education, HIV and AIDS as well as gender inequalities in households (Altman, et al., 2009). The Human Sciences Research Council (HSRC) (2009) indicated that there are a number of factors that can lead to household food insecurity such as the location of the household, the size of the household and the income status of the household. Household food insecurity can be associated with the distance of the household from the basic services, i.e. formal or informal settlement, the bread winner's health and education status (HSRC, 2009).

The FAO (2012) reported that there is a strong association between the growth of the economy in a country and accessibility of the food that is adequate in nutrients. There is a need for the poor to be reached and involved through employment and increased incomes in order to achieve food security in households (FAO, 2012). Oxfam (2014) indicated that price increase and lack of access to assets such as land and water are some of the things that are leading to food insecurity in South Africa. Unemployment and low wages, as well as limited food production limit households from accessing food. In a study by Oxfam (2014), it was found that unemployment and low income resulted in hunger in South Africa. People who earn low wages and those who were depending on grants were found to be running out of money to buy food (Oxfam, 2014).

The South African National Health and Nutrition Examination Survey (SANHANES-1) (2013) revealed that in South Africa there was a clear association between the knowledge regarding food choices and preparation of food. People can change their attitudes, values and behaviours if they can be educated about the importance of good nutrition. If this process can be managed effectively, there will be a gradual improvement in food and nutrition security of poorer households.

1.3 SUBSTANTIATION OF RESEARCH

Related perceptions, attitudes, values and behaviours of people were found to be some of the aspects that may contribute to hunger and food insecurity in South Africa. Food self-sufficiency may be achieved when there is a change in the way people value food and their attitudes towards food and their wellbeing (Altman et al., 2009).

Food security exists when people have economic accessibility to safe and adequate nutrient intake. Food security depends on food availability, food accessibility and food utilisation and stability (WFP, 2013). It has been revealed that South Africa is a net producer of food. Thus availability of food is a relatively insignificant problem. However, it is estimated that 14 million people are suffering from food insecurity in S.A (Altman et al., 2009).

Hunger has been described as a feeling that causes hopelessness and despair. It has been found to be a phenomenon that limits individuals of their dignity. Radimer et al. (1990) also indicated that hunger may be experienced episodically (e.g. a few weeks in a year) or chronically (e.g. every month). Hunger can also be measured in two dimensions, i.e. household hunger and individual hunger. Household hunger consists of three major components: food depletion (running out of one's usual food supply), food unsuitability (not being able to buy the quality and kinds of food considered appropriate), and food anxiety (uncertainty about whether one's food supply would last). People need to be aware of the importance of food and nutrition in relation to their well-being.

It is imperative to determine the nutrition knowledge, attitudes and behaviour of caregivers as they influence dietary intake. This research was aimed at describing the nutrition knowledge, attitudes and behaviour of caregivers, as well as determining the perceptions of hunger and food security of caregivers in a resource limited community. This could lead to objective nutrition guidance in order to help caregivers to improve the dietary intake of households.

RESEARCH PROBLEM

The aim of this research was to determine the nutrition knowledge, attitudes and behaviour as well as perceptions of hunger and food security of caregivers in a resource limited

community in Bronkhorspruit. Factors that could possibly impact on nutrition knowledge, attitudes and behaviour as well as hunger perceptions and food security of caregivers were also assessed. These factors included socio-demographic factors, dietary adequacy and the usual food consumption of the households. Black caregivers served as point of access to the households.

OBJECTIVES OF THE STUDY

The objectives of the study were:

- ❖ to describe the socio-biographic factors relevant to the household in which the family lived;
- ❖ to assess the nutrition knowledge, attitudes and behaviour of the caregivers;
- ❖ to determine the caregiver's perception of whether hunger was experienced in the household;
- ❖ to describe the prevalence of food insecurity in the household;
- ❖ to assess the dietary diversity and variety of the households.

1.4 IMPORTANCE AND BENEFITS OF THE STUDY

This study is important because it can serve as a baseline study for designing effective and sustainable interventions on household hunger and food insecurity as well as improving nutrition knowledge, attitudes and behavior of individuals in similar communities. It was assumed that black caregivers as a point of access in this study represented food and nutrition related behaviour in the studied households.

1.5 LAYOUT OF THE STUDY

Chapter 1 summarises the background of the study as well as the research problem and the importance of the study.

Chapter 2 consists of the literature review that focused on household hunger, food insecurity within the household and nutrition knowledge, attitude and behaviour of caregivers within the

household. Dietary adequacy and variety as concepts to describe dietary adequacy in the households were also discussed.

Chapter 3 contains the methodology used in the research study. The research problem and sub-problems as well as research perspectives have been addressed. The United Nations Children’s Emergency Fund (UNICEF) conceptual framework was used to illustrate the importance of the concepts used in this study. The conceptualisation and operationalisation of the concepts were provided. The study population, sample, data collection and analysis have been discussed.

Chapter 4 provides the findings in the study through the use of tables

Chapter 5 contains the discussion of findings.

Chapter 6 The recommendations and limitations of the study are presented in chapter 6.

The Harvard reference convention was used in the thesis.

2 CHAPTER 2: LITERATURE REVIEW

The chapter covers information regarding factors associated with food insecurity and household hunger. The importance of nutrition knowledge, attitudes and behaviour of caregivers is discussed as well as dietary adequacy in households.

The UNICEF conceptual framework of malnutrition in figure 2.1 was modified to outline the immediate, underlying and basic determinants of malnutrition including other factors that could influence hunger and nutrition knowledge, attitudes and behaviour of caregivers. These factors are discussed in 2.1.1-2.1.3.

2.1 THEORETICAL FRAMEWORK

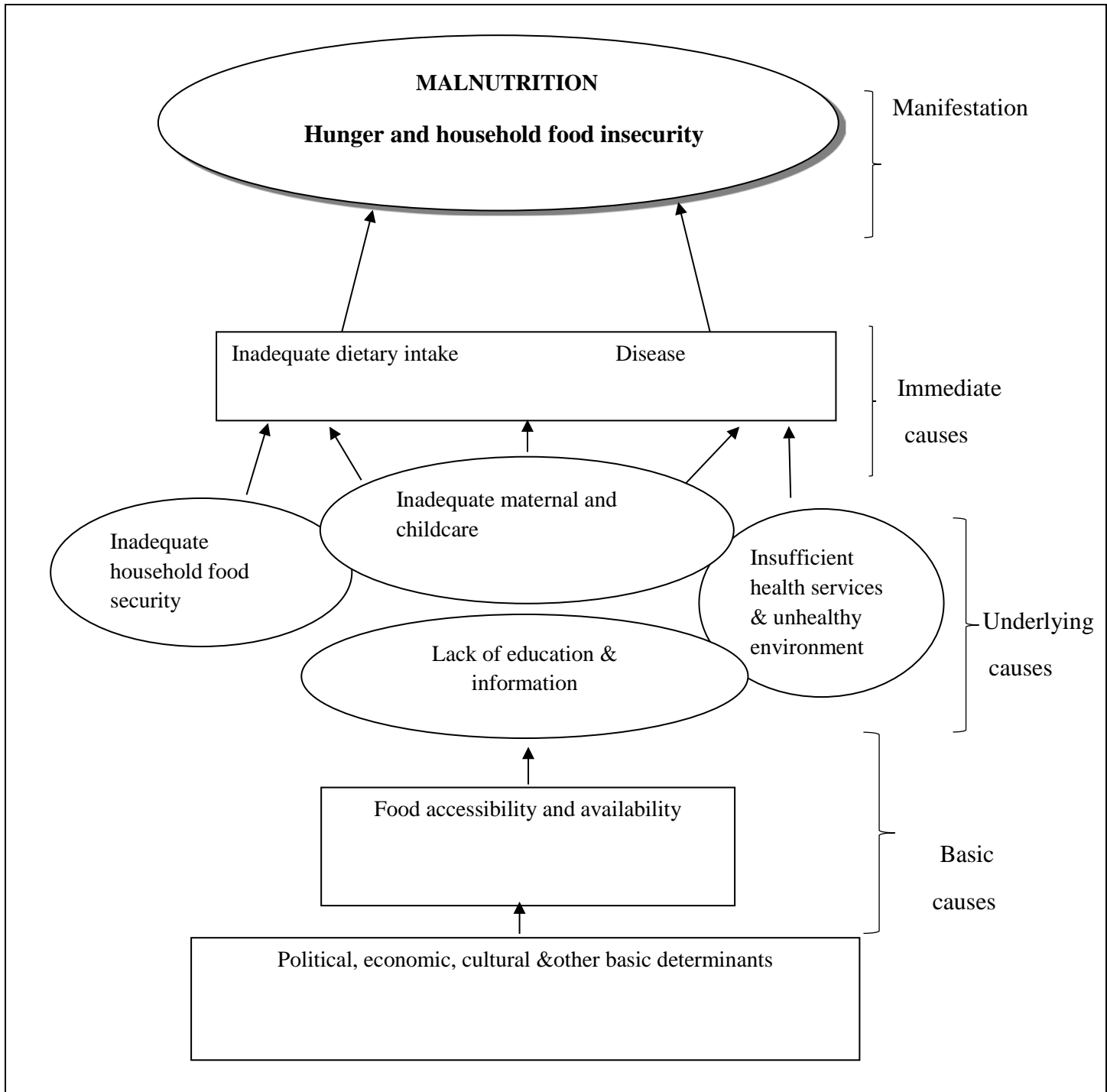


Figure 2.1. Conceptual Framework of Malnutrition (Adapted from the UNICEF, Conceptual Framework of Malnutrition, 1997)

2.1.1 Political, economic and other determinants

The accessibility of food depends on the economic access and physical access. The economic access has been defined as the access of income, and physical access is the availability of infrastructure, i.e. roads and food storage facilities (FAO, 2013). People experience food insecurity when their guarantee to the access of food is not enough to enable them to gain optimum food as required. Food insecurity has been reported to be a problem that depends on the level of availability and accessibility of food (Sen, 1981). There are so many factors that can influence the accessibility and dietary intake in households. Altman et al. (2009) indicated that the increase in oil prices and in food prices, which can be the result of political and economic problems can greatly impact on the availability of food in households.

2.1.2 Food availability and utilisation

The UNICEF's conceptual framework indicates that food utilisation translates the availability of food in a household into food security for its members. Food utilisation has been defined by the World Food Program (WFP) (2009) as the "proper storage, processing of food and techniques used in doing so", i.e. the practices and knowledge demonstrated by the caregivers in feeding the households and how food is distributed within the household. This means that when there is food available in the household, household members can maintain their nutritional intake for physical well-being. Utilisation has been seen as a result of distribution based on the need (Alderman, 2005).

2.1.3 Inadequate dietary intake

From the adapted UNICEF's conceptual framework it is clear that inadequate dietary intake is one of the leading causes of malnutrition. This proves that when there is inadequate dietary intake people easily suffer from diseases and this can lead to malnutrition. The United State Agency International Development (USAID) reported that inadequate household food security was one of the leading causes of malnutrition in households at NIGER (USAID, 2006). The Department of Agriculture, Forestry and Fisheries (2014) identified inadequate

dietary intake as one of the major problems that are leading to household hunger in South Africa.

2.2 FOOD INSECURITY AND HUNGER

2.2.1 Food insecurity

The World Food Programme (WFP) (2013) defined food security as the availability of social and economic access as well as physical access to safe, and nutritious food which can meet the peoples' dietary needs and food preferences. Altman et al. (2009) indicated food security as multidimensional in nature. It has also been revealed that there are many challenges in finding solutions for household food security. Household food accessibility does not only depend on total out-put of agricultural production but depends greatly on the distribution system and the performance of food markets. Altman et al. (2009) also indicated that there are several factors that are leading to the increase in household food insecurity that came into existence lately as well as the increase in the cost of food. Some of the factors that have come into existence in this context were constraints of household electricity supply and the increase in oil prices (Altman et al., 2009). Increase in prices of food, especially of staple foods of the poor South Africans lead to the suffering of poor rural and urban consumers since the majority of them are net consumers. The increase in prices of food would steadily continue through to the next decade even if there would be some changes in prices (Evans, 2009).

The WFP (2013) highlighted the four dimensions of food security, i.e. food availability, economic and physical access to food and food utilisation and stability:

- ❖ availability of food: domestic production, imported food;
- ❖ food accessibility: the amount of food that people can produce, purchase or receive (e.g. through formal and informal food distribution systems);
- ❖ utilisation of food: household food preparation and distribution within the household.
- ❖ food stability: ability to sustain food production i.e. sustainable food production regardless of climate changes.

The factors will be discussed.

2.2.1.1 Availability of food

The WFP (2013) indicated that food availability plays a crucial role in food security. In order to ensure sufficient access to food there is a need for enough supply of food. In the last decade it has been discovered that there is growth in food supply in developing countries. This resulted in rising availability of food. However, in Africa and South Asia the increase of food availability has been slow which resulted in diets remaining imbalanced. The improvement of food availability has been seen to improve the dietary intake of people (WFP, 2013).

2.2.1.2 Food accessibility

The WFP (2013) reported that food accessibility depends on the economic and physical access of food. The accessibility of food depends on food prices and access to social support. Physical accessibility is the availability of infrastructure which includes roads, railways and food storage facilities to help with transportation of food to the people (WFP, 2013).

2.1.2.3 Food use and utilisation

The WFP (2013) indicted that food utilisation is influenced by the way food is used, prepared and stored. Alderman (2005) indicated that there is a strong relationship between the utilisation, availability of food and food security. The utilisation of food has been seen as the result based on the need. People have nutritional requirements that are based on the nutritional standards, which depend upon different age groups, i.e. children vs. adults. However, the needy are also socially constructed based on culture (Alderman, 2005). The out indicators of food utilisation include poor health and inadequate food intake (WFP, 2013).

2.2.1.4 Stability of food

The WFP (2013) indicated that food stability is dependent on climate and food imports. Prices, production and supply have a great impact on food stability (WFP, 2013). Due to the drastic change in climate, it was indicated that in the next decade climate change will play a major role in the stability of food. Droughts, floods and hurricanes have increased in the past

decade. This can impact greatly on the stability of food production in the next decade (WFP, 2013).

2.2.2 Hunger

Radimer et al. (1990) revealed that hunger is difficult to assess. They indicated that people were unlikely to discuss hunger since it is difficult to describe. Those going through hunger can have limited capacity to comprehend and express themselves. The factors experienced differ in ways and in time in the households. However assessment of hunger must be done to ensure that hunger is caused by limited resources and not time constraints or wrong choices. Radimer et al. (1990) revealed that if women in a household were found to be hungry, the whole household was also found to be hungry. Women's and children's hunger should be measured at different times because they do not happen at the same times.

There are various aspects that are leading to hunger in South African households. Altman et al. (2009) reported that poverty, income, increased food prices, and unemployment are the prime causes of household food insecurity which leads to hunger. Though employment was found to be improving since the mid-1990s, it was found not to be enough to address food insecurity (Altman et al., 2009). Household food insecurity was found to be caused by the rise in electricity and oil prices. The rise in electricity and oil prices were found to be some of the factors that could lead to the rise in food prices (Altman et al., 2009). Between 2008 and 2011 the price of electricity was expected to increase by 100%. The rise in oil prices was also set to affect the supply of fertilisers and transport of agricultural production costs. Other factors that were seen as major contributors to the increase of food prices were found to be agricultural production cycle and bio-fuel, etc. (Altman et al., 2009).

Thirty three percent of the households in South Africa were reported to be at risk of experiencing hunger, which could lead them to experiencing hunger if ever there be an increase in food prices and decrease in income earnings (Labadarios et al., 2008; Labadarios et al., 2009). Oxfam (2014) indicated that in South Africa in 2013 there were more than 15 million people who were relying on grants, with 25% percent of the population nationally who are unemployed. Oxfam (2014) also indicated that those who are not having stable jobs are most likely to be food secure in the first week of the pay but become food insecure for the

rest of the month. This study by Oxfam (2014) highlighted that the reasons why most people were suffering from food insecurity, were because of a lack of employment, people relied on grants and casual employment and lacked of enough money to buy food.

Twenty six percent of South Africa's population is reported to be regularly experiencing hunger, while an additional 28.3% is reported to be at risk of hunger (Oxfam, 2014). The largest groups that were found to be experiencing hunger in South Africa were found to be living in urban informal settings (32.4%) and 37% were found to be living in rural informal areas (Oxfam, 2014). The formal areas were reported to be having a 19% prevalence of hunger (Oxfam, 2014).

Oxfam (2014) indicated that the median income of South African households in 2013 was R3,100 per month. This resulted in many South African households not affording adequate food. It is indicated that with the levels of income inequalities going high, the most of the households in South Africa are vulnerable to hunger because they spend majority of their income on food and electricity (Oxfam, 2014). The level of income inequality in South Africa was found to be the highest as compared to other middle income countries (Altman et al., 2009). They also indicated that poverty in South Africa is significantly high. However, the report further indicated that this has brought the South African government to commitment in reducing poverty into halve between 2004 and 2014. Other important factors (such as food and water) contributing to the well-being and human development have also been found to be a problem that South Africa is facing (Altman et al., 2009). Chronic poverty and unemployment were found to be the main causes of household food insecurity in South Africa (HSRC, 2007).

The South African Statics report of 2014 reported that the government spends over 50% on social wage. Primary health care, no-fee paying schools; social grants and RDP housing were some of the sectors that the money is shared upon. Social grants have been reported as a source of income for many South Africans and it was reported that they have played a big role in reducing poverty levels (StatsSA, 2014). However it was found that due to the amount of money that people receive from social grants, they were not able to secure adequate food for their families. People relying on social grants were found to be spending their money on other things apart from food. They had to spend their money on transport, electricity and

school fees. This resulted in many households buying what was affordable to them. The majority of the households relying on social grants were found to be spending most of their money on bread and cereals. This was because these are staple foods for most South Africans and they are cheap (StatsSA, 2014).

The FAO (2012) indicated that the importance of economic growth has been seen as an issue that can lead to improvement in incomes and employment. However it has been reported that the poor are still not benefiting from economic growth because of inequalities, e.g. people with low education levels are not able to secure jobs and this result in them not being able to secure food for their households. It has been found that people who are mostly affected are the poor. The FAO (2012) indicated that there is a great need of improving incomes in order to improve food security and help reduce hunger.

2.2.3 Household gender and food security

The association of gender inequality and food security was seen as a problem that is being faced by many households in the new South Africa (Oxfam, 2014). Oxfam (2014) revealed that women in South Africa were facing hunger more often as men. This is often due to a lack of employment for women. Though women could be working they often earned low incomes as compared to men. Cultural practices and the ways used in production of food were some of the challenges that women were found to be facing. Women often occupied low positions used for production as compared to men and they were found to be put last due to cultural practices (Oxfam, 2014). Women also had the responsibility of feeding their families and were still burdened with the pandemic of HIV/AIDS, as well as lacking time and money for caring for their families. These conditions were found to be harsh on women (Oxfam, 2014).

The Right to Food Guidelines clearly state that “States should adopt measures to eradicate any kind of discriminatory practices, especially with respect to gender, in order to achieve adequate levels of nutrition in the household” (UN, 2008). Many traditional societies, especially in rural areas, have been found to be living lifestyles that favour men. Women have been found to be consuming less nutritious foods as compared to men. In places such as Asia, women and girls were found to be underweight as compared to men. This was arguably caused by lifestyles that were found to be favouring men (UN and FAO, 2011). Food

insecurity and unequal distribution of food among rural women were found to some of the causes of implications of women's health and market participation (UN and FAO, 2011).

The State of Food and Agriculture (2010-2011) indicated that there is a strong association between the socio-economic status of female headed households and the maintenance of household food security. This was verified by studies that reported that the association of women's income, food education and health as well as nutritional incomes in the households.

The United Nations Development Programme (UNDP) (2010) reported that rural women played a big role in transforming agricultural products into food and nutrition security in households. There have been many reported food insecurity challenges in most rural areas due to the fact that women are expected to provide for their households with limited resources, e.g. due to unemployment (State of food and Agriculture, 2010-2011).

The World Bank reported that when women have outside income, they usually bought food and other household necessities compared to men (World Bank, 2009). Nutritional improvement and household welfare in Côte d'Ivoire were found to be impacted by the person who received an income (FAO, 2009). Studies have also shown that in Côte d'Ivoire when women were the ones in charge of household income, they spent more money on food as compared to alcohol and cigarettes (State of Food and Agriculture, 2011).

Women in female headed households experienced inadequate food intake due to the fact that they have to split their incomes on food and other household responsibilities (UN, 2008).

2.3 NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR

There are many factors that contribute to the eating behaviour of the household. Nutrition knowledge, income and educational levels were found to be contributing to the feeding practices by the caregivers in a study done on the effects of the mother's nutrition knowledge on nutrition attitudes and behaviour of children (Yabanci et al., 2014). Children to mothers who were educated were found to be eating variety of foods in their diets and they were found to be having high scores on healthy eating attitudes (Yabanci et al., 2014).

The SANHANES-1 (2013) indicated that in South Africa adults had a medium (5.26) mean score out of 10 points. It was also indicated that the urban formal areas had a higher nutrition knowledge percentage of 26.7%, while the urban informal had 17.6% and the rural informal had 16.1%. The SANHANES-1 (2013) reported that there is a strong association between nutrition knowledge and the socio-economic status of people. Nutrition knowledge has also been reported to be associated with the cultural norms and beliefs of the people in South Africa. The majority of South African adults indicated that what a person eats can make a difference in their chance of becoming fat. It was also indicated that there is a strong association between nutrition behaviour and nutrition knowledge. The SANHANES-1 (2013) also reported that beliefs and cultural norms have a strong influence on food choice. Food prices also have a strong influence on what people choose to eat (SANHANES-1, 2013). There are a number of factors that influence food choices, i.e. food availability and affordability, cultural norms, knowledge and personal preferences, priorities, socio-economic status as well as gender. In a survey by the National Food Consumption survey of 2005, it was indicated that people ate food that they were familiar with or had some knowledge about the food (NFCS, 2005). The NFCS (2005) indicated that the nutrition attitudes of the women who participated in the study were influenced by the nutrition knowledge and perceptions they had about the food.

In a study by Kupolati et al. (2015) to understand the nutrition education's influence on eating behaviours of learners in the Bronkhorspruit region, it was concluded that learners' eating behaviours can be positively influenced by providing learners with relevant nutrition knowledge. In a study done in Taiwan in 2007 to understand nutrition knowledge, attitudes and behaviour in Taiwanese elementary school children, it was concluded that there are many factors influencing the development of eating behaviours. They measured meal patterns and meal source as they were related to nutrition behaviours (Wei et al., 2007). Though the children understood the Taiwanese concept of a balanced diet, they appeared to be having lack of in-depth understanding of the number of servings needed daily by children. This was found to be one of the obstacles for practising a balanced diet. Children had nutrition knowledge but were not committed to eating healthy. This was an indication of them lacking motivation to practise a healthy balanced diet (Wei et al., 2007). Kupolati et al. (2015) also indicated that relevant nutrition knowledge can help solve the problem of poor nutrition knowledge and ignorance. Wei et al. (2007) recommended that nutrition education should

include application of appropriate theories to improve the motivation of healthy eating of children. In the study it has been indicated that most children's intake of milk, vegetable, fruit and cereals were severely below the recommendation. This was explained by the high price dairy products (Wei et al., 2007). Nutrition knowledge, attitudes and behaviours tended to differ due to age differences of caregivers in various households. This was found to be due to effects of education and also life related experiences. Lower family socio-economic status and insufficient resources had been found to be resulting in poorer nutrition knowledge, attitudes, behaviour and dietary quality in some families (Wei et al., 2007).

2.4 DIETARY ADEQUACY (VARIETY AND DIVERSITY)

The FAO (2011) defined dietary diversity as the “qualitative measure of food consumption that reflects household access to a variety of foods, and is also a proxy for nutrient adequacy of the diet of individuals”. The FAO (2011) indicated that dietary adequacy (diversity and adequacy) can be measured by the use of a 24-hour food recall questionnaire. This is usually used to gather information at household and individual level depending on the purpose of the survey (FAO, 2011). The FAO (2011) also indicated that data collected using the 24-hour food recall questionnaire can be analysed using dietary diversity scores (DDS) and food variety scores (FVS). The FAO (2011) indicated that when administering the questionnaire at individual level, the number of groups that can be included are nine. And when administering the questionnaire at household level, 12 food groups should be included.

There is lack in dietary diversity of South African children and as their diets consist mainly of staple plant foods. This lead to micronutrient deficiencies (Labadarios et al., 2005). This was compared with diets of children in some other developing countries. Although this could be because of different diets and methods used, this shows that dietary variety of children in South Africa is limited. In a survey done by the SANHANES-1 (2013), it was reported that there was a strong association between dietary intake and obesity. SANHANES-1 (2013) indicated that in South Africa the mean dietary diversity score (DDS) for the population was 3.77 in males and in females. SANHANES-1 (2013) also indicated that 25, 6% of the participants were found to be having a low DDS and 29% of the participants were found to be having a high value dietary score. It was reported that similar mean scores occurred across different age groups in the country and there were significant difference in mean scores by

sex or age (SANHANES-1, 2013). SANHANES-1 (2013) also reported that the consumption of fruits and vegetables by households in South Africa was not optimal; this was found to be caused by lack of accessibility and availability in poor informal settlements. Poor households were found to be buying foods that were cheap and filling due to lack of buying power (SANHANES-1, 2013).

2.5 CONCLUSION

South Africa is a net producer of food. However, it is not the availability of food that often causes a problem on household level, but it is the accessibility of food that is difficult. It is reported that one in four people living in South Africa is suffering from hunger on a regular basis. Oxfam (2014) also reported that more than half of South Africa's population is at risk of going hungry.

Food insecurity was found to be caused by a number of factors, i.e. unemployment, income inequalities, lack of land and poverty. Increase in prices of food lead people into food insecurity (OXFAM, 2014). In order for people to not suffer from food insecurity, food must be available to people, there must be accessibility of food and people must be able to use food in a proper way (WFP, 2013).

Household hunger is a problem that is affecting many households in South Africa (Labadarios et al., 2008). Household hunger is a problem of poor availability and accessibility of food. This has been found to be a problem caused by various factors such as poor household incomes. People are affected by household hunger when there is not enough food to meet their daily food requirements. Households that are suffering from hunger are most likely to have low nutrient intake where signs of under-nutrition can be visible (Kennedy et al., 2007). Household hunger can be improved by improving incomes and nutrition knowledge of the caregivers. In a study by Wei et al. (2007) it was indicated that there is a strong association between caregivers' incomes and nutrition attitudes and behaviour of households. They also indicated that nutrition knowledge has great impact on the food consumed in the household and how people look at food (Wei et al., 2007). The SANHANES-1 (2013) indicated that there are a number of factors that impact on the food choices. Food distribution, perceived qualities and quantities were reported to be some of the

factors that lead to food choices. Cultural values, household structure and availability of food as well as socio economic factors were reported to be having a great impact on the perception of what should be consumed in the household (SANHANES-1, 2013).

There is a great need for efficient human resources and enough economic resources as well as organizational resources in order to provide efficient governance and a stabilized economy. This is important because it will help in ensuring a successful implementation of programmes and policies that can help address malnutrition problems (Koornhof, 2014). Challenging environmental conditions and ineffective use of human resources, economic resources and technological resources result in common basic causes of malnutrition. Food insecurity is a result of a number of factors such as lack of good governance, inefficient use of human and economic resource as well as improper health services. It is the government's responsibility to be accountable in tackling the social causes of poor health and food insecurity in the any country (Koornhof, 2014).

3 CHAPTER 3: EMPIRICAL INVESTIGATION

This chapter outlines the methodology implemented to investigate and describe various interacting groups of factors that could influence the mentioned variables, i.e. nutrition knowledge, attitudes and behaviour as well as hunger and food security. The design of the study, the population of the study, data collection and data analysis are also described.

3.1 RESEARCH PROBLEM

The aim of this research was to determine the nutrition knowledge, attitudes and behaviour, as well as perceptions of hunger and food security of caregivers in a resource limited community in Bronkhorstspuit. Factors that could possibly impact on nutrition knowledge, attitudes and behaviour as well as hunger perceptions and food security of caregivers were also assessed. These factors included socio-demographic factors, dietary adequacy and the usual food consumption of the households. Statistical relationships were not investigated.

3.1.1 Sub-problems

Black caregivers served as point of access to a household. The following sub-problems were investigated:

- ❖ To describe the socio-biographic factors of the household.
- ❖ To determine the caregiver's perception whether hunger was experienced in the household.
- ❖ To describe the prevalence of food insecurity in the household.
- ❖ To assess the nutrition knowledge, attitudes and behaviour of the caregivers.
- ❖ To assess the diversity and variety in the diets of the households.

3.2 RESEARCH PERSPECTIVE

The study was designed as a descriptive cross-sectional study to investigate nutrition knowledge, attitudes and behaviour as well as perceptions of hunger and food security of

caregivers in a resource limited community in Bronkhorstspuit. Several questionnaires were used to collect data from the black caregivers (those responsible for buying and preparing food). The caregivers served as point of access to the households.

3.3 RESEARCH DESIGN

3.3.1 Conceptual framework

The UNICEF conceptual framework was used to outline the underlying, immediate causes and inadequate food intake. Nutrition knowledge, attitudes and behaviour of the caregivers were assessed. Perceptions of hunger and household food security were also assessed. The factors are conceptualised in 3.3.2.1-3.3.2.4.

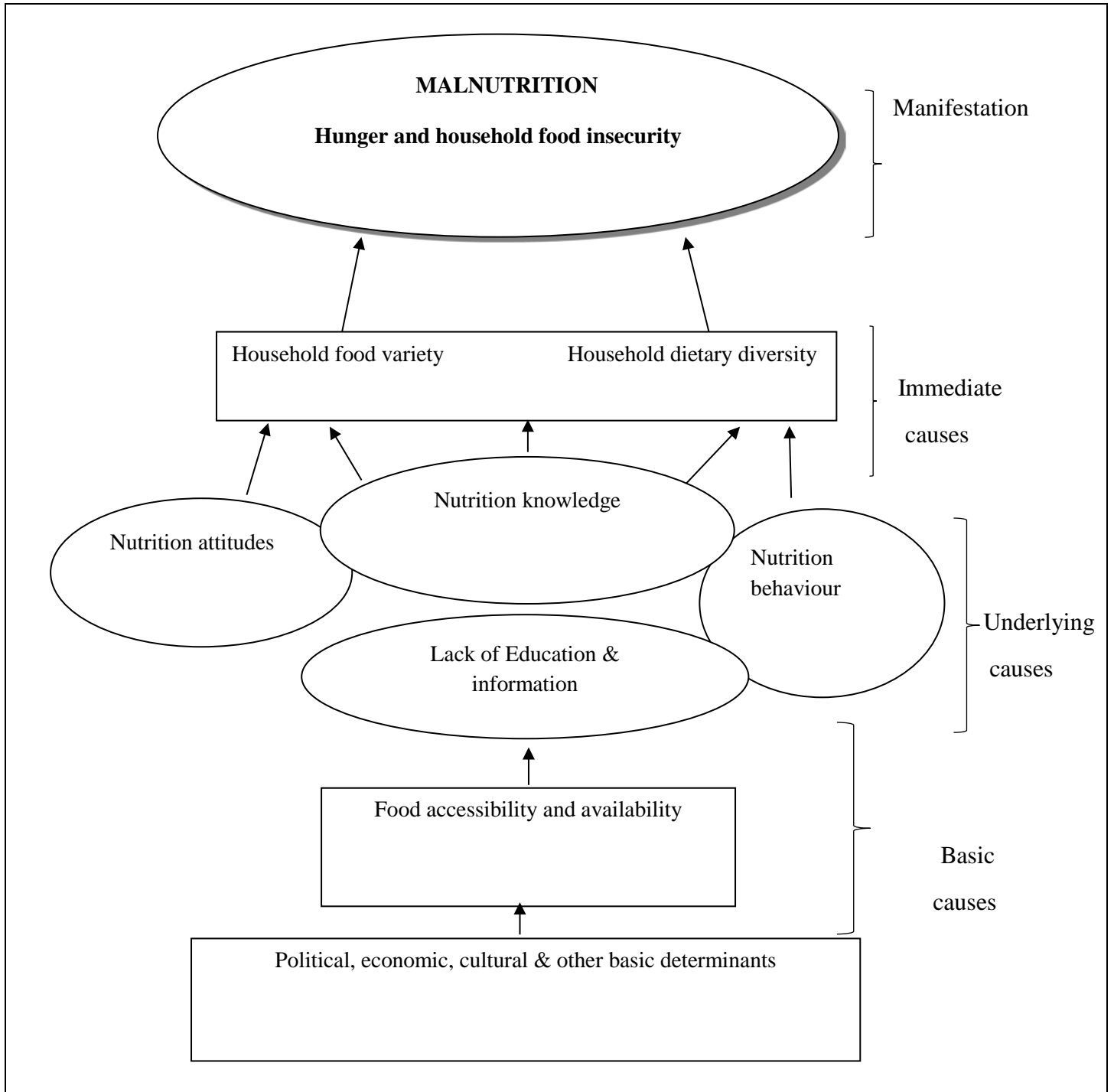


Figure 3.1. Conceptual Framework of Malnutrition (Adapted from the UNICEF, Conceptual framework of malnutrition, 1997)

3.3.2 Conceptual definitions

3.3.2.1 Household food security and perception thereof

Household food security has been defined as the “ability of the household to assure assets of entitlement such as food production, income, reserves of food so that in time of need they will be able to sustain nutritional intake for physical wellbeing” (Smith et al., 1992). Perception of food insecurity in this study indicated subjective recall of enough food in the household (or a lack thereof).

3.3.2.2 Dietary diversity and variety

Household dietary diversity refers to the number of food groups and food items (food variety) consumed over a given period (FAO, 2011). Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods, and is also a proxy for household’s adequacy of the diet of individuals (FAO, 2011). In this study this implied diversity in diets of households. Whereas food variety has been defined as the qualitative measure that reflects the households, access to a wide variety of food items.

3.3.2.3 Nutrition knowledge, attitudes and behaviour

Nutrition knowledge has been defined as the understanding of different types of food and how food nourishes the body and influences health. In this study this implied to the knowledge of the caregivers about their food intake (Insel, 2003). Nutrition attitudes are related to eating, health-care and healthy foods and the dietary restrictions of the households (Wei et al., 2007). The nutrition behaviour studied here included dietary behaviour, food intake, and behaviours which might influence the dietary intake of household members (Wei et al., 2007).

3.3.2.4 Hunger

Hunger has been defined accordingly to the study by Oxfam (2014) as “the physical sensations of emptiness and pain”.

3.3.3 Measurement and Operationalisation

Variables	Measurement	Operationalisation
Socio-biographic factors	<p>A socio-biographic questionnaire (<i>see Appendix B</i>) was specifically developed to collect information regarding the persons responsible for buying and preparing food in their households, the socio-economic status of the caregiver and the caregiver's level of education as well as the weekly and monthly expenditure on food, the type of dwelling and the number of people staying in the house (NFCS, 2004).</p>	<p>Socio-biographic information was analysed using the SPSS 21 computer software. The information was presented as frequencies in tables that were generated using the above mentioned instrument (NFCS, 2004).</p>
Hunger	<p>The Hunger Scale questionnaire (<i>see Appendix C</i>): was used to assess the caregiver's perception whether hunger is experienced in the household (NFCS, 2004). The Radimer Hunger Scale questionnaire collected information on the food availability and consumption by the household members. The Radimer Hunger Scale questionnaire is a scale composed of eight questions that investigate whether adults and/or children in the HH (Household) are affected</p>	<p>A score of five positive (yes) responses or more out of the eight possible answers indicated that hunger exists in the household (Gericke et al., 2004). Household food insecurity was measured against the scores obtained on the Hunger Scale (Gericke et al., 2004).</p>

	<p>by food insecurity, food shortages, perceived food insufficiency or altered food intake due to constraints on resources (Radimer et al., 1990). The Radimer Hunger Scale assesses three significant components that are involved in assessing household hunger, i.e. household level insecurity, individual level insecurity and child hunger (Radimer et al., 1990).</p>	
<p>Nutrition knowledge, attitudes and behaviour (KAB)</p>	<p>Nutrition knowledge, attitudes and behaviour questionnaire (see Appendix D) was used to assess the nutrition knowledge, attitudes and behaviour (SANHANES-1, 2013).</p>	<p>The data regarding the nutrition knowledge, attitudes and behaviour of household were analysed and presented as frequencies, using tables and graphs generated using the SPSS 21 computer software. The nutrition knowledge, attitudes and behaviour questionnaire has 39 questions divided into three sections. The level of nutrition knowledge was measured against the scores obtained in the nutrition knowledge, attitudes and behaviour questionnaire, i.e. 0- 9 indicated poor nutrition knowledge, 10-16 indicated good nutrition knowledge and 17-20 indicated excellent nutrition knowledge. The nutrition attitude related questions had 32 items with the 6-point Likert-type format. The response item</p>

		<p>‘always’, ‘usually’ and ‘often’, ‘sometimes’, ‘rarely’ as well as ‘never’ which were in the questionnaire were used in analysing the nutrition attitude data. The nutrition behaviour scale had five nutrition behaviour related questions that were used in collection and analysis of the data (Wei et al., 2007).</p>
<p>Dietary Adequacy</p>	<p>Dietary diversity and food variety questionnaire (<i>see Appendix E</i>): The 24-hour recall is appropriate to collect dietary information of individuals or households. It covered types of food and drinks that are consumed by the households. It identified meals/snacks eaten outside the home in the previous 24-hour period (FAO, 2011). The information was used to assess the food diversity and variety of households. The respondents were only asked to list the foods they prepared and consumed in their households in the previous 24- hour. The questionnaire was non-quantified.</p>	<p>The 24-hour food recall provided information on the types of food consumed during mealtimes, in between meals over the past 24 hours. Information obtained from the 24-hour recall questionnaire was analysed using the household dietary diversity score based methods, i.e. (Household dietary diversity score (HDDS) (FAO, 2011). Food group diversity scores were calculated in the study to check whether the households were consuming food items from different food groups to have variety in their diets (FAO, 2011). This was done by calculating the number of foods consumed over a period of 24-hous. The HDDS was calculated by summing the number of food groups consumed in the household over the 24-hour recall period (FAO, 2011). The FVS were calculated by summing the number of food items consumed in the household over a period of 24-hour recall period (FAO, 2011).</p>

Table 3.1: Measurement and operationalisation of concepts used in the study

3.4 STUDY SETTING

This study was done in the Zithobeni area, Bronkhorstspuit, located in the far east of Pretoria, Gauteng Province, South Africa. Zithobeni is divided into two extensions (*see fig 3.2-3-4*). The study was conducted in Mshuluzane primary School. Mshuluzane primary school is located in Zithobeni extension 2 in the northern area of Bronkhorstspuit (*see figure 3.3 and 3.4*).



Figure 3.2: Map of the study area (source Google earth.com/2013)

The satellite image shows the location of Bronkhorstspuit (Zithobeni Extensions) where the study was done and the surrounding areas.



Figure 3.3: Outside Mshuluzane Mayisela Primary School where the caregivers were gathered and interviewed.

3.5 STUDY POPULATION AND SAMPLING

3.5.1 Study population

The study population was 50 black caregivers (people who were responsible for buying and preparing food in their households). The population was caregivers with children in the Mshuluzane Mayisela Primary School in 2012. This study formed part of another study in school children that was done in the mentioned school in Bronkhorstspuit. In this study school children (N=50) were anthropometrically assessed and their food intake (24h recall) was determined.

3.5.2 Sampling method

Caregivers of the households to whom the selected school children belonged to (another study not reported here) were included in the study. The sample size was based on the fact that the diets of limited resource communities are homogenous (Ongosi, 2010), and that a sample size $n=50$ would reveal a trend in food intake in this community. An orientation session was organised at the Mshuluzane Mayisela Primary School situated in Bronkhorstspuit where the learners were attending. Black caregivers of the children included in this study were informed of the purpose of the study, what the study entailed and the various assessments to be conducted. Participants were given an opportunity to ask questions regarding the study and their involvement. The informed consent forms were provided should the participants wish to participate in the study (*see appendix A*). Participants who had successfully completed the informed consent were then screened to check whether they complied with the inclusion criteria of the study and whether they were willing to they fit to participate in the study (*refer to paragraph 3.5.4*). The sample population was selected non-randomly. The purpose for using Mshuluzane Mayisela Primary school was to gain access to households.



Figure 3.4: Inside Mshuluzane Mayisela Primary School where the caregivers were gathered and interviewed.

3.5.3 Inclusion criteria and screening

The following criteria were applied:

- ❖ Black caregivers who were taking care of school going children
- ❖ Black caregivers who were responsible for buying and preparing food at home
- ❖ Male and female caregivers were included in the study
- ❖ Black caregivers who were willing to participate

3.6 PILOT STUDY

A pilot test was done to ensure that the questionnaires would be well understood by the caregivers in the study. A non-random sample of three households was used. In the study the

researcher was involved from the start to the end of the collection of data. Kaliyaperumal, (1998) reported that piloting should be conducted by testing on a small group of representatives of the population before the collection of data. After the group completed the questionnaire results were analysed. This analysis showed the level to which the questions were properly understood or misunderstood, the level of interpretation by the individuals and the effectiveness of the questions in soliciting the proper information, and any areas of information which were neglected by the proposed questionnaire. The questionnaires were found sound for use in the study.

3.7 METHODS

3.7.1 Data collection

The study was conducted by the researcher and two research assistants (*refer to figure 3.5*). The study took two weeks to complete (2nd May-14th May 2013). Several questionnaires were used for data collection, namely the socio-demographic questionnaire, a Hunger Scale questionnaire, Nutrition Knowledge, Attitudes and Behaviour (KAB) questionnaire as well as the household dietary adequacy questionnaire (*refer to 3.3.3 Table 3.1*), also refer to the appendices (*B, C, D and E*).

During the interviews the caregivers were individually asked to provide answers to all the questionnaires. An assistant researcher, who was fluent in the Ndebele language assisted with the translation of questions to the caregivers' respective language, e.g. Ndebele, were requested by the participants.



Figure: 3.5: Interviews and data collection in the study.

3.7.2 Nutrition knowledge, attitudes and behaviour

The nutrition knowledge, attitudes and behaviour questionnaire (KAB) provided information on the nutrition knowledge, attitudes and behaviour of the caregivers (SANHANES-1, 2013). During the interview the caregivers were individually asked to give an answer to each of the 39 questions. The answers they gave were used to rate their KAB (*see appendix D*) (SANHANES-1, 2013).

3.7.3 Hunger Scale questionnaire

The Hunger Scale questionnaire was used to investigate whether households in the study are affected by food insecurity, food shortages and altered food intake due to lack of resources. Household food insecurity, child hunger and individual level insecurity were checked with the questionnaire. The Hunger Scale questionnaire consists of eight questions. In all eight questions there were two sub questions asked in order to determine the food insecurity over a 30 days period (Gericke et al., 2004). A score of five positive (yes) responses or more out of the eight possible answers will be an indication that hunger exists in the household. These household would be considered “hungry”. A score of one to four would be considered as being at “risk of hunger”. And a negative response (No) was assumed to mean a food secure household (*see appendix C*).

3.7.4 Dietary diversity and variety

The guidelines from the FAO (2011) were used, which indicated that the data obtained from the 24-hour recall can be analysed for food variety and dietary diversity. These are two of the score based methods that can be used in the evaluation of dietary patterns. The household dietary diversity score is designed to bring a reflection of the economic ability of the household to have access of foods in variety.

Household dietary score (HDDS) can be calculated by summing the number of food groups consumed in the household over the 24-hour recall period (FAO, 2011). In this study data obtained from the 24-hour recall were analysed using the score based methods, i.e. HDDS and household food variety scores (HFVS). HFVS is defined as the number of different food items that were consumed by the households during the 24-hour recall period in the study (FAO, 2011). The HFVS were calculated to see whether there was variety in the diets that the households were consuming.

In this study the diet was, classified accordingly into the 12 food groups recommended by the FAO which included (i) cereals, (ii) white tubers, roots, (iii) vegetables, (iv) fruits, (v) meat, (vi) eggs, (vi) fish and other sea food, (viii) legumes, nuts and seeds, (viii) milk and milk products, (x) oils and fats, (xi) sweets, (xii) spices, condiments and beverages (FAO, 2011).

3.8 DATA ANALYSES

Data were captured and cleaned by the researcher. Descriptive statistics were used to present the data. Data were presented in frequencies, percentages, means and standard deviations. The SPSS 21 computer software was used to generate tables and graphs to present the results.

3.9 QUALITY CONTROL

Philip et al., (2010) indicated that if the process used generates consistent results when repeated under similar circumstances then the process is reliable. Validity is when the measurement used reflects what it is actually intended to reflect.

3.9.1 Validity

Measurements and operationalisation of the questionnaires (*see Table 3.1*) were compared against existing theory and research. The main concepts were clarified in the process as well as their relationship within the Unicef's conceptual framework. This study cannot claim internal validity because the sample size was not representative of the larger population of households in South Africa. The questionnaires used were assessed for face validity by doing a pilot study prior to data collection. The questionnaires were adopted from questionnaires of previous studies. The socio-biographic questionnaire and the Hunger scale questionnaire were adopted from the National Food Consumption Survey (2004). While the 24-hour recall approach was adopted from the Food and Agricultural Organisation (2011) and the KAB questionnaire was adopted from the SANHANES-1 (2013)

3.9.2 Reliability

The researcher and two research assistants tried to maximise reliability (repeatability) by minimising error during data collection. The participants were treated with respect and the answers were recorded accurately. A pilot study was done to ensure that the questionnaires would be well understood by the caregivers. Three Ndebele speaking caregivers were interviewed to check whether the questionnaires were clear and understandable.

3.10 DELIMITATIONS AND LIMITATIONS

3.10.1 Delimitations

The researcher only recorded data by using appropriate questionnaires. The researcher did not take anthropometric measurements. Only caregivers (those who were responsible for

purchasing and preparing food) were interviewed. Relationships between the variables under investigation were not tested.

3.10.2 Limitations

- ❖ The KAB questionnaire contained some foods which were not common to the caregivers. This could lead to misleading nutrition knowledge reporting. This was not identified in the pilot study done prior to data collection.
- ❖ Some of the household members were afraid to disclose all of the information, e.g. what they did with their money and income.
- ❖ Some of the caregivers were not comfortable with disclosing their ages.
- ❖ The sample size was small (N=50). Therefore the findings cannot be generalised.

3.11 ETHICAL AND LEGAL CONSIDERATIONS

Ethical approval for the research study was obtained from the Ethics Committee of the Faculty of Natural and Agricultural Sciences, University of Pretoria (*Ref EC120807-069*) (*see appendix F*). Permission was also obtained from the Department of Basic Education and the Principal of Mshuluzane Mayisela Primary school in Bronkhorstspuit (Zithobeni).

4 CHAPTER 4: RESULTS

Answering specific questions cannot be done by skimming across the surface. A complete understanding of the phenomenon of what is being studied is needed. Different forms of data are required and examined thoroughly in order to extract from various angles in order to get to a rich and meaningful information (Ongosi, A. 2010). The chapter deals with the results collected in the quantitative study. The data gathered were used to describe and determine:

- ❖ the socio-biographic information
- ❖ the nutrition knowledge, attitudes and behaviour
- ❖ perceptions of hunger and dietary adequacy of the caregivers in the households.

Techniques and instruments used have been discussed in the previous chapter (*refer to 3.4.3, Table 3.1*). The results are presented in tables.

4.1 SOCIO-BIOGRAPHIC INFORMATION

The results provided here reflect the participants in this study. Socio-demographic information included the marital status, educational level and sex of the caregivers. It also included the religion and language of the caregivers.

An equal number of caregivers were married (38%) and unmarried (38%); while 4% of the caregivers reported that they were separated, 10% were involved in a traditional marriage and 8% of the caregivers were widowed. The majority of the caregivers had received high school (74%) and upper primary (18%) education; three caregivers had only lower primary level education. The majority of caregivers (94%) interviewed were female, were Christians (30%); 16% of the caregivers were of the Zion Christian Church (ZCC) and Apostle denomination respectively. The majority of the caregivers (92%) were mothers in their households, while 4% of the caregivers were fathers and grandmothers respectively. The majority of the caregivers (70%) reported that Ndebele was their home language. A summary of the participants' biographic characteristics is shown in Table 4.1.

Table 4.1: Biographic characteristics of the caregiver (N=50)

Variable	n	%
Gender		
Male	3	6
Female	47	94
Marital status		
Unmarried	19	38
Married	19	38
Separated	2	4
Traditional	5	10
Widowed	4	8
Other	1	2
Educational level		
Lower primary	4	8
Upper primary	9	18
High school	37	74
Tertiary	0	0
Language		
Ndebele	35	70
Zulu	10	20
Other	5	10

4.2 HOUSEHOLD CHARACTERISTICS

The majority of the caregivers (responsible for buying and preparing food) (92%) were mothers in the households and 4% were fathers; while 4% of the caregivers indicated that they were grandmothers. The majority of caregivers (74%) indicated that they lived in brick houses; while 18% of the caregivers reported that they stayed in tin made houses and 4% of the caregivers indicated that they lived in wood and traditional houses respectively. The majority of the caregivers (80%) reported that they had their own tap as the source of water in their houses; whereas 18% of the caregivers indicated the communal tap as the source of

water. Only 2% of the households got water from the river dam. The main source of fuel among the caregivers was electricity (86%), followed by gas and paraffin (6%), and 2% of the households indicated that they were using wood as their source of fuel.

Sixty four percent of the caregivers reported that they had flushing toilets and 24% of the caregivers indicated that they were using pit toilets; 8% of the caregivers indicated that they were using bucket toilets and 4% were using the ventilated improved pit (vip) toilets. The majority of caregivers (92%) responsible for preparing food as well as buying food were mothers. A summary of household characteristics of the caregivers in the study group is shown in Table 4.2.

Table 4.2: Household characteristics of the caregivers (N=50)

Variables	n	%
Person responsible for preparing food		
Father	2	4
Mother	46	92
Grandma	2	4
Person responsible for buying food		
Father	2	4
Mother	46	92
Grandma	2	4
Type of toilet		
Flush	32	64
Pit	12	24
Bucket	4	8
Vip	2	4
Source of water		
Own tap	40	80
Communal tap	9	18
River dam	1	2
Source of fuel		
Electricity	43	86
Gas	3	6
Paraffin	3	6
Wood/coal	1	2
Type of house		
Brick	37	74
Tin	9	18
Traditional	2	4
Wood	2	4

4.3 ECONOMIC RELATED INFORMATION

The economic related characteristics that were investigated in the study included the source of income of the caregivers and average weekly expenditure on food, as well as household monthly income and the number of people living in the household.

4.3.1 Source of income

Fifty four percent of the caregivers indicated that they were unemployed, while 20% of the caregivers indicated that they were self-employed. Seven of the caregivers indicated that they were wage earners. The sources of income are shown in Table 4.3.1.

Table 4.3.1: Caregivers' source of income (N=50)

Source of income	n	%
Unemployed	27	54
Self-employed	10	20
Wage earner	7	14
Other	4	8
Not applicable	2	4
Total	50	100

4.3.2 Household monthly income

Forty percent of the caregivers indicated through self-assessment that their household income per month was R1000-R3000 in 2013. While 20% indicated that they received more than R5000 per month. Fourteen percent of the caregivers indicated that they received between R500-R1000 per month. Ten percent indicated that they received less than R500 per month, while 12% indicated that they receive between R3000-5000 per month. The household monthly income was not based on the total amount of income they had in the household for use since some of the caregivers had spouses or other family dependents.

Less than five percent of the caregivers reported that they had ten members in their families. Sixty percent of the caregivers reported that they had eight members in their households. Only 16% of the caregivers had two to three members in their households.

4.3.3 Household weekly expenditure on food

Only 6% of the households spent R350-400 on food per week in 2013. Sixteen percent of the households indicated that they spent between R150-200 on food per week and 2% spent R0-50 per week. Ten percent of the caregivers indicated that they spent R50-R100 on food per week. Forty four percent of the respondents responded that they did not know how much they were spending on food weekly. Table 4.3.4 below shows the household weekly expenditure spent on food by the households.

Table 4.3.4: Household weekly expenditure on foods (N=50)

Money spent weekly	n	%
R0-50	1	2
R50-R100	5	10
R100-R150	3	6
R150-200	8	16
R200-250	5	10
R300-350	3	6
R350-400	3	6
Don't know	22	44
Total	50	100

4.4 NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR

4.4.1 Nutrition knowledge

The scores on nutrition knowledge were used to investigate whether caregivers had poor, good or very good nutrition knowledge (*see Appendix D*). Table 4.4.1 shows how caregivers scored on the nutrition knowledge questionnaire.

Table 4.4.1: Ratings of nutrition knowledge of caregivers' in the study (N=50)

Rating	Score	Number of caregivers	Caregivers n	%
Poor knowledge (0-9 correct answers)	0	2	9	18
	9	7		
Good knowledge (10-16 correct answers)	10	9	34	68
	12	8		
	14	7		
	16	10		
Very good knowledge (17-20 correct answers)	17	3	7	14
	18	3		
	19	1		
	20	0		
Total			50	100

Sixty eight percent of the caregivers (n=34) in the study had good nutrition knowledge (10-16 correct answers out of 20) with only ten of the caregivers scoring (16 out of 20 correct answers) in the questionnaire; seven (n=7) of the caregivers had very good nutrition knowledge with a score of 85% (17 out of 20 correct answers); whereas nine (n=9) of the caregivers had poor nutrition knowledge (9 out of 20 correct answers). None of the participants had all the answers correct. The majority of the caregivers (68%) in the study had good nutrition knowledge.

4.4.1.1 Nutrition knowledge: fruit

Eight percent of the caregivers said that a person should consume four fruits a day, and 28% of the caregivers thought one is supposed to consume two fruits a day. A third of the caregivers (37%) indicated that one is supposed to take in three fruits a day. Almost 40% of the caregivers said that one should take one fruit a day. While three of the caregivers said that there is no importance for one to take in fruits per day, one of the caregivers said that a person should consume up to six fruits a day.

4.4.1.2 Nutrition knowledge: comparison to a healthy diet

Twenty four percent of the caregivers indicated that their diets were too low in energy, 58% of the caregivers said that their diets were about right in energy, while 16% of the caregivers indicated that they had diets that were too high in energy. Twenty four percent of the caregivers indicated that their diets were too low in vegetables, 62% of the caregivers indicated that they had diets that were about right in vegetables. The majority (at least 44% and more) indicated that their diets were “about right” in energy, carbohydrates and protein, fats, sugar and sweets, fruits and vegetables. Table 4.4.1.2 below summarises how the caregivers rated their diets in comparison to a healthy diet.

Table 4.4.1.2: Nutrition knowledge of caregivers (N=50) on the health fitness of their diets.

Compared to what is healthy, do you think your diet is: “too low” or “about right” or “other” in the listed nutrients and foods	Caregivers who answered TOO LOW		Caregivers who answered ABOUT RIGHT		Caregivers who answered TOO HIGH		Caregivers who answered OTHER	
	n	%	n	%	n	%	n	%
	In energy	12	24	29	58	8	16	1	2
In protein	14	26	27	54	8	16	1	2
In fat	13	26	25	50	11	22	1	2
In sugar and sweets	18	36	22	44	9	18	1	2
In fruits	21	42	25	50	3	6	1	2
In vegetables	12	24	31	62	6	12	1	2
In carbohydrates	7	14	23	46	19	38	1	2

4.4.1.3 Nutrition knowledge: fats

The majority of the caregivers (52%) indicated that they had no knowledge of which one contains more fat between pretzels and peanuts, while 44% indicated that peanuts had more fat as compared to pretzels, and 4% of the caregivers thought pretzels had more fat. The majority of the caregivers (56%) indicated that yoghurt has more fat as compared to sour cream; 14% of the individuals indicated that they had no knowledge on which one contains more fat between yoghurt and sour cream. The majority of the caregivers (92%) indicated that chips contain more fat as compared to popcorn; while 2% indicated that they had no knowledge which one has more fat between popcorns and chips. The majority of the caregivers (52%) thought that a small bran muffin has more fat as compared to a slice of whole bread, and 36% of the caregivers did not choose which one has more fat between a small bran muffin and a slice of whole bread. Table 4.4.1.3 summarises the nutrition knowledge on (fats) of the caregivers.

Table 4.4.1.3: Nutrition knowledge (fats) of the caregivers (N=50)

Based on your knowledge, choose each food that has more fat	Caregivers	
	n	%
1. Peanuts	22	44
2. Pretzels	2	4
3. Not answered	26	52
1. Yoghurt	28	56
2. Sour cream	15	30
3. Not answered	7	14
1. Chips	46	92
2. Pop corn	3	6
3. Not answered	1	2
1. Small bran muffin	26	52
2. A slice of whole bread	6	12
3. Not answered	18	36

4.4.1.4 Nutrition knowledge: sugar

During the interview the caregivers were asked to choose the food that has more sugar relative to the other listed foods. The majority of the caregivers (70%) indicated that 100% fruit juice has more sugar as compared to 24% of caregivers who said that flavoured water has more sugar, while 6% of the caregivers said that they did not know which one has more sugar.

4.4.1.5 Nutrition knowledge: fibre

The results indicated that 44% of the caregivers chose fruit over meat for the food which they thought has more fibre. The majority (56%) of the caregivers said oatmeal has more fibre when compared to cornflakes. The results also indicated that the majority (70%) of the caregivers said wholewheat bread has more fibre when compared to white bread, while 48% of the caregivers said beans have more fibre when compared to lettuce, and 58% of the caregivers did not choose which one has more fibre between popcorn and pretzels. Caregivers' knowledge of foods with more fibre is illustrated in table 4.4.1.5 below.

Table 4.4.1.5: Caregivers' knowledge of foods with more fibre (N=50)

Based on your knowledge choose each food that has more fibre	Caregivers	
	n	%
1. Fruit	22	44
2. Meat	10	20
3. Not answered	18	36
1. Cornflakes	14	28
2. Oatmeal	28	56
3. Not answered	8	16
1. Wholewheat bread	35	70
2. White bread	7	14
3. Not answered	8	16
1. Beans	24	48
2. Lettuce	13	26
3. Not answered	13	26
1. Popcorn	11	22
2. Pretzel	8	16
3. Not answered	29	58

4.4.1.6 Nutrition knowledge: food intake and health status

The majority of the caregivers (62%) agreed that starchy foods such as potatoes and rice make people fat, while 36% of the caregivers did not agree that starchy foods such as potatoes and rice make people fat. The majority of the caregivers (82%) agreed that what you eat makes a difference in your chance of becoming fat; while 16% of the caregivers indicated that they did not agree with the statement. Caregivers' nutrition knowledge on food intake and health status has been summarised in Table 4.4.1.6 below.

Table 4.4.1.6: Caregivers' nutrition knowledge: food intake and health status (N=50)

Do you agree with following statements	Caregivers who agreed		Caregivers who did not agree		Caregivers who did not answer	
	n	%	n	%	n	%
Starchy food like potatoes and rice make people fat	31	62	18	36	1	2
What you eat can make a difference in your chance of becoming fat	41	82	8	16	1	2
What you eat can make a difference in your chance of getting diseases like heart disease and cancer	35	70	14	28	1	2
The things I eat and drink now are healthy so there is no need for me to make change	37	74	13	26	1	2

4.5 NUTRITION ATTITUDES

Caregivers were asked various questions related to nutrition attitudes (see *Appendix D*). Caregivers' nutrition attitudes are summarised in the Table 4.5.1 below.

Table 4.5.1: Caregivers' nutrition attitudes in the study (N=50)

Caregivers' nutrition attitudes	Caregivers who answered always		Caregivers who answered usually		Caregivers who answered often		Caregivers who answered sometimes		Caregivers who answered rarely		Caregivers who answered never	
	n	%	n	%	n	%	n	%	n	%	n	%
Terrified about being overweight	15	30	7	14	4	8	3	6	6	12	15	30
Avoid eating when hungry	3	6	2	4	3	6	12	24	9	18	21	42
Find myself preoccupied with food	3	6	2	4	4	8	6	12	11	22	24	48
Gone eating binges where I feel I may not stop	9	18	2	4	5	10	8	16	7	14	19	38
Cut food into small pieces	2	4	1	2	3	6	7	14	4	8	33	66

Caregivers' nutrition attitudes	Caregivers who answered always		Caregivers who answered usually		Caregivers who answered often		Caregivers who answered sometimes		Caregivers who answered rarely		Caregivers who answered never	
	n	%	n	%	n	%	n	%	n	%	n	%
Aware of the energy content of foods that I eat	1	2	1	2	1	2	1	2	2	4	44	88
Particularly avoid food with a high carbohydrate content	1	2	1	2	1	2	1	2	2	4	44	88
Feel that others would prefer if I ate more	0	0	0	0	0	0	1	2	9	18	40	80
Vomit after I have eaten	1	2	4	8	3	6	1	2	2	4	39	78
Am preoccupied with a desire to be thinner	2	4	4	8	1	2	11	22	1	2	31	62
Think about burning up calories	3	6	3	6	1	2	2	4	1	2	40	80
Other people think I'm too thin	10	20	2	4	5	10	3	6	7	14	23	46
I'm preoccupied with the thought of having fat on my body	9	18	7	14	5	10	6	12	1	2	21	42

Caregivers' nutrition attitudes	Caregivers who answered always		Caregivers who answered usually		Caregivers who answered often		Caregivers who answered sometimes		Caregivers who answered rarely		Caregivers who answered never	
	n	%	n	%	n	%	n	%	n	%	n	%
Take longer than others to eat my meals	3	6	0	0	3	6	5	10	2	4	37	74
Avoid foods with sugar in them	4	8	1	2	1	2	3	6	6	12	33	66
Eat diet foods	2	4	1	2	0	0	2	4	3	6	42	84
Feel that food controls my life	11	22	3	6	4	8	2	4	4	8	26	52
Display self-control around food	3	6	3	6	1	2	5	10	2	4	36	72
Feel that others pressure me to eat	4	8	3	6	1	2	7	14	4	8	37	74
Give too much time and thought to food	0	0	3	6	4	8	1	2	2	4	40	80
Feel uncomfortable after eating sweets	3	6	2	4	2	4	4	8	2	4	37	74
Engage in dieting behaviour	11	22	0	0	2	4	4	8	2	4	31	62

Caregivers' nutrition attitudes	Caregivers who answered always		Caregivers who answered usually		Caregivers who answered often		Caregivers who answered sometimes		Caregivers who answered rarely		Caregivers who answered never	
	n	%	n	%	n	%	n	%	n	%	n	%
Like my stomach to be empty	40	80	0	0	1	2	4	8	1	2	4	8
Have the impulse to vomit after meals	47	94	2	4	0	0	0	0	0	0	1	2
Enjoy trying new rich foods	41	82	2	4	2	4	0	0	0	0	5	10

Fourteen percent of the caregivers answered that they were usually terrified about being overweight; while 30% of the caregivers said they were always terrified about being overweight. The majority of the caregivers (88%) said they were never aware of the energy content of foods that they ate while 8% of the caregivers (66%) replied that they were sometimes aware. The majority of the caregivers (42%) said they never avoid eating when hungry and 24% of the caregivers said they sometimes avoided eating when they were hungry.

The majority of the caregivers (66%) replied they never cut food into small pieces, while 14% of the caregivers said they sometimes cut food into small pieces. The majority of the caregivers (78%) replied that they never vomited after eating, while 8% of the caregivers said they often vomit after eating. The majority of the caregivers (66%) said they never avoided foods with sugar; while 12% of the caregivers replied they sometimes avoided eating foods with sugar. Similarly, majority of the caregivers (70%) said they cut the sizes of meals when they were asked if they ever cut the size of meals or skip because there is not enough money for food. The majority of the caregivers (88%) replied that they never particularly avoided food with high carbohydrate content, while 4% of the caregivers replied they rarely particularly avoid food with high carbohydrate content. Forty two percent of the caregivers replied that they were never preoccupied with the thought of having fat on their bodies, while 18% of the caregivers replied that they were always preoccupied with thought of having fat in their bodies. The majority of the caregivers (52%) replied that they never felt that food control their lives, while 22% of the caregivers always felt that food control their lives. Thirty eight percent of the caregivers indicated that they have never experienced eating binges where they felt they might not stop, while 18% of the caregivers have always gone eating binges where they felt they might not stop. The majority of the caregivers (74%) indicated that they never took longer than others to eat their meals, while 10% of the caregivers indicated that they often take longer than others. Ten percent of the caregivers indicated that they never enjoyed trying new rich foods; while 82% of the caregivers indicated that they always enjoyed trying new rich foods.

4.6 NUTRITION BEHAVIOUR

4.6.1 Nutrition behaviour (Foods not eaten by the caregivers)

Respondents were asked if there were any foods that they did not eat and how many foods they could not eat. Table 4.6.1 below shows the number of foods that the caregivers did not eat.

Table 4.6.1: Foods not eaten by the caregivers (N=50)

QUESTIONS	Caregivers who answered one food		Caregivers who answered two foods		Caregivers who answered three foods		Caregivers who answered more than three foods		Total	
	n	%	n	%	n	%	n	%	n	%
Are there any foods that you do not eat?	12	24	11	22	8	16	19	38	50	100

Twenty two percent of the caregivers answered that there were two foods that they did not eat in their households and 16% of the caregivers answered that there were three foods that they did not eat. Thirty eight percent of the caregivers answered that there were more than three foods that they did not eat in their households. The foods avoided were not identified in the study.

4.6.2 Caregivers' usual eating pattern

Caregivers were asked various questions related to their usual eating patterns. Table 4.6.2 below summarises the caregivers' usual eating patterns.

Table 4.6.2: Usual eating pattern of the caregivers (N=50)

Indicate which of the following best describes your usual eating pattern	Caregivers	
	n	%
More than three meals with eating between meals	1	2
Three meals with eating between meals	7	14
Three meals with no eating between meals	19	38
Two meals with eating between meals	13	26
Two meals with no eating between meals	6	12
One meal with no eating between meals	2	4
Nibble the whole day, no specific meals	2	4
Total	50	100

The majority of the caregivers (38%) indicated that they consumed three meals per day with no eating in between meals; 26% of the caregivers indicated that they consumed two meals with eating between meals; while 12% of the caregivers indicated that they ate two meals with no eating between meals. Fourteen percent of the caregivers indicated that they ate three meals with eating between meals in a day.

4.7 PERCEPTIONS OF HUNGER

For the aim of this study it was important to determine the caregivers' perceptions of hunger and food security in their households by making use of a Hunger Scale (*see Appendix C*). Table 4.7.1 below summarises the food secure households, the households that were at risk of hunger and households were hungry.

Table 4.7.1: Hunger perceptions by the caregivers (N=50)

Caregivers' responses: "households that were hungry or at risk of hunger or food secure"	Number of households	
	n	%
Households that were hungry: (Five or more positive responses out of eight)	20	40
Households that were at risk of hunger: (1-4 positive responses out of eight)	25	50
Food secure households: (0 negative response out of eight)	5	10
Total	50	100

In-depth analysis of the data was done to find out if the hunger situation had occurred recently in the past 30 days and if so, whether it had lasted for five or more days in the past 30 days. Table 4.7.2 summarises the result on each of the questions of the Hunger Scale.

Table 4.7.2: Responses and frequency of the occurrence of positive responses on the hunger scale in the study (N=50)

QUESTIONS	Has it happened?		In the past 30 days		5 or more days in the past 30 days	
	n	%	n	%	n	%
1. Does your household ever run out of money to buy food?	41	82	37	74	19	38
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?	39	78	34	68	18	36
3. Do you ever cut the size of meals or skip because there is not enough money for food?	36	72	34	68	21	42
4. Do you ever eat less than they should because there is not enough money for food?	38	76	35	70	19	38
5. Do your children ever eat less than you feel they should because there is not enough money for food?	36	72	33	66	20	40
6. Do your children ever say they are hungry because there is not enough food in the house	34	68	31	62	23	46
7. Do you ever cut the size of your children's meals or do they skip meals because there is not enough money to buy food?	30	60	30	60	18	36
8. Do any of your children ever go to bed hungry because there is not enough money to buy food?	21	42	19	38	11	22

The hunger questionnaire used in the study covered three levels of hunger that were experienced in the study, i.e. HH level insecurity represented by questions one and two (*refer to Table 4.7.2*), individual level insecurity represented by questions three and four as well as child hunger represented by questions five, six seven and eight (*refer to Table 4.7.2*). The hunger questionnaire also has two sub questions that were asked to determine the extent of food insecurity over 30 days. Radimer et al. (1990) indicated that the sub-questions determined the temporal severity and periodicity of hunger in the households.

The study found that 82% of the households indicated that they sometimes ran out of money to buy food, with 74% of the households having run out of money to buy food sometime during the past month, and of these 38% of the households ran out of money to buy food for five days or more in that month.

Food security at the individual level in the study was measured by questions three and four (*refer to Table 4.7.2*), which referred to the caregivers. Seventy two percent of the caregivers indicated that sometimes they would reduce the size of the meals or sometimes skipped because there was not enough money for food. In the past month, 68% of the caregivers were affected by this; while 42% of the caregivers had to reduce the size of their meals or skip meals because there was not enough money for food for five or more days in the month. Seventy six percent of the caregivers indicated that they ate less than they felt they should when did not have enough money to buy food, and this happened to 70% of the caregivers in the past month; only 38% of the caregivers had to eat less than they felt they should for five days or more in that month.

Child hunger was measured by questions five, six, seven and eight (*refer to Table 4.7.2*) as perceived by the caregiver. Seventy two percent of the caregivers reported that their children ate less than they felt they should eat because they did not have enough money to buy food, and this happened to 66% of the caregivers in the past month; only 40% of the caregivers indicated that that it happened five or more days in the past thirty days. Sixty eight percent of the caregivers indicated that sometimes the children would say they were hungry because there was not enough food in the house, with 62% of the caregivers indicating that this happened in the past 30 days; and 36% of the caregivers indicated that it happened five or

more days in the past 30 days. Sixty percent of the caregivers indicated that they cut the size of the children's meals or they skipped meals because there was not enough money to buy food, and 60% of the caregivers indicated that it happened in the past 30 days; with only 36% of the caregivers indicating that it happened 5 or more days in the past 30 days. Forty two percent of the caregivers reported that their children sometimes went to bed hungry because there was not enough money to buy food; with 38% of the caregivers indicating that it happened in the past 30 days, and 22% of the caregivers indicated that this happened 5 or more days in the past 30 days.

4.8 DIETARY DIVERSITY AND VARIETY

Data collected using the 24 hour recall were analysed for food variety and dietary diversity (*refer to Chapter 3, Table 3.1*).

4.8.1 Household dietary diversity

This method was adopted from a study of the FAO (2011). The FAO (2011) indicated that the HDDS was designed to reflect on the economic ability of the household to have variety of foods. The diet of households in this study was classified into the 12 food groups recommended by the FAO which included (i) cereals, (ii) white tubers, roots, (iii) vegetables, (iv) fruits, (v) meat, (vi) eggs, (vii) fish and other sea food, (viii) legumes, nuts and seeds, (ix) milk and milk products, (x) oils and fats, (xi) sweets, (xii) spices, condiments and beverages (FAO, 2011).

The HDDS can be calculated by summing the number of food groups consumed in the household over the 24-hour recall period (FAO, 2011).

The mean HDDS was calculated by the formula (FAO, 2011):

$$\begin{aligned} \text{Mean diversity score} &= \frac{\text{Sum of individual HDDS}}{\text{Total number of caregivers}} \\ &= \frac{214}{50} = 4.28 ; \quad \text{SD} = 1.0 \end{aligned}$$

The mean HDDS was 4.28 (SD 1.0). The lowest number of food groups from which the food items were consumed by the households in the study group was two and the largest number of the food groups from which food items were consumed were eight food groups. Table 4.8.1 below shows the frequency distribution of household dietary diversity score (HDDS).

Table 4.8.1: Frequency distribution of household dietary diversity score (HDDS) (N=50)

HDDS	n	%
2-3	12	24
4-5	28	56
>6	10	20
Total	50	100

The majority (56%) of the caregivers indicated that in their households they consumed four to five food groups in the 24 hour period of the study; two to three groups were consumed by 24% of the households during the 24 hour period prior to the study; while 20% of the caregivers indicated that they consumed more than six food groups in their diets during the 24 hour prior to the study.

4.8.2 Household food variety

The household food variety score (HFVS) is defined as the number of different food items that were consumed by the households during the 24-hour recall period in the study (FAO, 2011). The total number of food items included in the HFVS was 24 food items independently of the frequency consumed by the households. The sum of the food items consumed by the households was 219. The mean FVS was calculated by the formula (FAO, 2011):

$$\begin{aligned} \text{Mean Food Variety Score} &= \frac{\text{Sum of individual HFVS}}{\text{Total number of caregivers}} \\ &= \frac{219}{50} = 4.38, \quad \text{SD} = 1.0 \end{aligned}$$

The mean FVS was 4.38 (SD 1.0). The lowest number of food items consumed by the study group was two and the largest number of food items consumed was eight food items over the period of 24 hour recall period. Table 4.8.2 below shows the frequency distribution of Household Food Variety Score (HFVS).

Table 4.8.2: Frequency distribution of household food Variety Score (HFVS) (N=50)

HFVS	n	%
2-3	17	34
4-5	17	34
>6	16	32
Total	50	100

Thirty four percent of the caregivers indicated that in their households they consumed two to three different food items in the 24 hours prior to the study, four to five different food items were consumed by 34% of the households during the 24 hours prior to the study; while 32% of the caregivers indicated that they had consumed more than six food groups in their diets during the 24 hours prior to the study. Table 4.8.3 gives a summary of the consumption frequency distribution of food groups and food items over the 24 hour recall period.

Table 4.8.3: Food items consumed (per food group) by the caregivers during the 24 hour period (N=50)

Food groups	Frequency (%)	Food items	Food item consumers	
			n	%
Cereals	100	Stiff porridge (maize meal)	50	100
		Soft porridge (maize meal)	50	100
		Wheat (brown and white bread)	50	100
		Rice	50	100
		Spaghetti	12	24
Tubers and roots	23	Potatoes	24	48
		Sweet potatoes	2	4
Vitamin A rich vegetables and tubers and vitamin A rich fruits	10	Carrots	6	12
Other vegetables	38	Cabbage	9	18
		Tomatoes	50	100
		Spinach	6	12
		Onions	6	12
Other fruits	30	Apple	7	14
		Banana	9	18
		Orange	3	6
Meat and poultry	80	Chicken	40	80
		Beef	20	40
Fish	15	Fish	15	30

Eggs	30	Eggs	15	30
Legumes, nuts and seeds	2	Beans	2	4
Dairy	40	Fresh milk,	10	20
		Sour cream (Amasi)	1	2
		Cheese	1	2
Oils and fats	100	Cooking oil	50	100
		Margarine	20	40

The findings indicated that all the households had eaten some kind of cereal, mainly maize and wheat, and all caregivers used cooking oil to prepare their dishes.

Other food items that were eaten by more than half of the households were meat products (chicken, fish and beef). In total, 40% of the households consumed at least one item from the dairy products, and 4% from the legumes, seeds and nuts group, while 38% of the households consumed at least one item from the vegetables group. Thirty percent of the households included an egg in their daily diets; while 30% of the households consumed fruits from the other fruits group in the previous 24 hours prior to the study. Only 30% of the caregivers said they had fruits in their diets. Assessment of beverages (twelfth food group) was not done, and could therefore not be reported.

4.9 CONSUMPTION OF NUTRIENT RICH SOURCES

The nutrient rich sources (protein, calcium and iron, zinc, folate, vitamin A and thiamine, riboflavin as well as niacin) consumed within the 24 hour period investigated in the study were analysed using the formula (FAO, 2011):

$$\frac{\text{sum of individuals who consumed nutrient rich foods}}{\text{total number of respondents}} \times 100$$

The scores were presented per foods consumed micronutrient rich food groups (%) in Table 4.9.1

Table 4.9.1: Consumption of micronutrient rich foods by the caregivers during the 24 hour period of the study (N=50)

Nutrient rich foods	Food items	n	%
Protein rich foods	Meat (red meat)	25	50
	Chicken	40	80
	Eggs	20	40
	Milk and milk products	22	44
	Legumes	4	8
Calcium rich foods	Milk and milk products	22	44
	Spinach	12	24
Iron rich foods	Meat	25	50
	Legumes, nuts and fruits	4	8
	Eggs	20	40
Zinc rich foods	From legumes, nuts and seeds	4	8
	From animal sources	25	50
	From cereals	50	100

Folate rich foods	From legumes, seeds and nuts	4	8
	From animal source		
	Eggs	20	40
	Meat	25	50
	Fish	15	30
	From cereals	50	100
Vitamin A rich foods			
Vitamin A rich vegetables	Spinach	12	24
	Carrots	6	24
From animal source	Eggs	20	40
	Milk	22	44
Thiamine (vitamin B ₁) rich foods	Legumes	4	8
	Fish	15	30
	Eggs	40	80

Riboflavin (vitamin B ₂) rich foods	Milk and milk products	22	44
	Meat	25	50
	Fish	15	30
	Cereals	50	100
Niacin (vitamin B ₃) rich foods	Meat	25	50
	Eggs	20	40
	Milk and milk products	22	44
	Fish	15	30
	Cereals	50	100
	Legumes, nuts and seeds	4	8
Vitamin C rich foods	Spinach	12	24
	Carrots	6	12
	Cabbage	9	18
	Banana	9	18
	Orange	6	12
	Apple	14	28

The study revealed that cereals were consumed by all the caregivers in the study during the 24 hour recall period. Additionally, the study findings indicated that the majority of the households (80%) consumed foods rich in protein during the 24-hour recall period. Thirty eight percent of the caregivers indicated that they had vitamin A and vitamin C rich foods respectively. The study also revealed a lower number of caregivers (30%) were consuming diets rich in iron.

The majority (100%) of the households were getting their zinc and folate from the cereal food group respectively. The results indicated that 80% of the caregivers were getting the thiamine nutrient from the meat food group, and 100% of the caregivers were getting the riboflavin nutrient from the cereal food group. The results indicated that all of the caregivers 100% were getting niacin from the cereal group, while 50% of the caregivers were getting niacin from the meat food group.

5 CHAPTER 5: DISCUSSION

This chapter gives an in-depth discussion of the findings of this study. The chapter is divided into three main parts:

- ❖ the socio-biographic information
- ❖ the nutrition knowledge, attitudes and behaviour
- ❖ perceptions of hunger and dietary adequacy.

5.1 SOCIO-BIOGRAPHIC INFORMATION

5.1.1 Educational status of the caregivers in the study

The study findings indicated that the majority (74%) of the caregivers had high school education and no one had a tertiary level education. The educational status of the caregivers probably determined their employment status. This was verified through the caregivers' responses when they were asked about their employment status. Fifty four percent of the caregivers' indicated that they were unemployed. However, it can also be argued that even though they were unemployed, there were other sources of income that could have been their main financial supply, such as self-employment and social grants. The findings in this study indicated that 20% of the caregivers in the study were self-employed. These results are in line with the findings by Oxfam (2014) that indicated that food accessibility in South Africa has been worsened by the lack of employment, and most of the households in rural areas depend on grants for incomes. The FAO (2013) reported that food security in households can be achieved by improving women's education. By empowering caregivers with proper education, can help in improving household food security because they will be able to secure good jobs.

Thirty eight percent of the caregivers were unmarried and the majority of caregivers were the mothers to the children in the studied households. It could be argued that the reason why some of the caregivers were not able to secure enough food for their households was because they were

unmarried as this could have resulted in the households to depend on single incomes. This was verified by the Hunger Scale findings in this study that reported that 82% of the households ran out of money to buy food. These results are in line with the findings reported by Ndhleve et al. (2013) that indicated that households that were most likely to suffer from food insecurity were dependent on single incomes. The results in this study also indicated that only 6% of the households spent R350-R400 on food per week in 2013. It can be concluded that the income of the caregivers had an impact on the household weekly expenditure on foods. As some of the households were depending on single incomes. These results are in agreement with the findings by Ndhleve et al. (2013) that indicated that the existence of two people providing for a household simply means that there will probably be combined incomes to improving the household's food security.

5.2 NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR

The SANHANES-1 (2013) indicated that there are several aspects that can influence food intake. Levels of nutrition knowledge, socio economic status and availability of food have a great impact on the types of food people eat. Food intake practices and beliefs can be positively influenced by the nutrition knowledge that people have (SANHANES-1, 2013).

5.2.1 Nutrition knowledge of the caregivers

In this study, the nutrition knowledge, attitudes and behaviour of caregivers were assessed by using a KAB questionnaire (*see Appendix D*). The results in this study (chapter 4, table 4.4.1) revealed that more than half of the caregivers (68%) who participated in the study had good nutrition knowledge with 68% of the respondents scoring between 10 and 16 out of 20 correct answers in the questionnaire; seven of the caregivers (14%) had very good nutrition knowledge scoring (80%) 17 and 19 out of 20 correct answers, whereas 18% of the caregivers had poor nutrition knowledge scoring between 0 and 9 correct answers out of 20 (45%) . No participants had all the answers correct. In the study by the SANHANES-1 (2013) nutrition knowledge was determined by using nine questions, which covered four questions on fibre content, three

questions on fat content and sugar as well as one question on fruit. The SANHANES-1 (2013) indicated that a high score was regarded as a score of 6-8, moderate 3-5 and low 0-2. The findings by the SANHANES-1 (2013) indicated that one out of five participants (22.6%) achieved a high score, while the majority of the participants (62.9%) achieved a medium score and 14.5% of the participants achieved low score. The results in this study are in agreement with the findings by the SANHANES-1 (2013) that indicated that there is still a need to improve on adults' nutrition knowledge. Yabanci et al. (2013) in a study about the effects of a mother's nutrition knowledge on attitudes and behaviours of children about nutrition indicated that the dietary intakes of the children in the households were strongly influenced by the nutrition knowledge of the mother. They indicated that children to mothers who had nutrition knowledge were eating a variety of foods in their diet. It could be argued that the nutrition knowledge of the caregivers in this study probably had an influence on the dietary intake of their households.

The results in this study revealed that the majority (74%) of the caregivers had high school level of education, while 18% of the caregivers had only upper primary level education, and 8% had lower primary education. The level of education of the caregivers probably had an impact on the level of nutrition knowledge they demonstrated. The SANHANES-1 (2013) indicated that the nutrition knowledge of the caregivers was found to be improving with the level of education that the adults had. These results are also supported by the findings reported by Nekesa (2012) that indicated that there is a strong association between education levels and the nutrition knowledge of individuals.

However, it can also be argued that the nutrition knowledge of the caregivers was not the only factor leading to the foods that were consumed in the households, but that the income levels of the caregivers also played a role in the food choices made by the caregivers. Oxfam (2014) reported that the income levels of the caregivers determined the food that was eaten by the households. This is verified by the findings in this study that indicated that in June-July 2013, 16% of the households were spending R150-R200 on food per week, while 10% of the households were spending R50-R100 on food per week. This is also in agreement with the findings reported by Nekesa (2012) that indicated that having enough knowledge is not enough for one to be able to afford sufficient food to support themselves.

The SANHANES-1 (2013) found that adults who were living in poor residential areas with low incomes were found to be consuming energy dense foods. Foods that are dense in energy often contain high quantities of fat, sugar and starch such as fibre foods and snacks. In this study it was found that caregivers had some knowledge about the fat content in food. This was verified by the majority of the caregivers (92%) who indicated that chips contain more fat as compared to popcorn (*refer to chapter 4, table 4.4.1.3*). It can be argued that though the caregivers had some knowledge about the energy density of food, other factors also had an impact on the foods they were eating.

In a study by Yabanci et al. (2013) children to mothers with more advanced nutrition knowledge were found to be eating a variety of foods in their diet, i.e. water, rice, bread, vegetable, fruit, meat, fish, chicken, egg and milk products as compared to the children of middle or poorly educated mothers. This shows that the nutrition knowledge of the caregiver had an impact on the food intake by the household. The findings in this study indicated that 34% of households were consuming two to three different food items in the 24 hour period of the study and the mean FVS was 4.38 (SD 1.0), while 56% of the caregivers indicated that their households consumed four to five food groups in the 24 hour period of the study and the mean HDDS was 4.28 (SD 1.0). It can be concluded that the households in this study were not able to afford a variety of foods probably because of their poor socio economic status.

5.2.2 Nutrition attitudes of the caregivers

In this study it was found that 30% of the caregivers were always terrified about being overweight. These results are similar to the findings by The SANHANES-1 (2013), it was reported that 11.5% of the participants attempted to lose weight than gain weight 8.6% over the past 12 months during the study. It could be concluded that the fear of gaining weight could have affected the participants' choice of foods. The results in this study also indicated that 88% of the participants never avoided food with a high carbohydrates content. These results are also in line with findings reported by the SANHANES-1 (2013), it was indicated that 74.5% of the participants believed that starchy food such as bread, rice and potatoes make people fat. It could

be reasoned that the caregivers in this study did not avoid starchy foods because of low nutrition knowledge or it could be because they were able to afford starchy foods more as compared to the other food groups

Nutrition attitudes and education, nutrition attitudes and income as well as nutrition attitudes and preferences were discussed as factors that could influence the nutrition attitudes of the caregivers in the study. Sebotsa et al. (2009) indicated that there are various factors that can influence the nutrition attitudes of people. Higgins et al. (2010) reported that though nutrition attitudes did not influence the practices of the participants, they can be used to measure the dietary preferences and a person's perceptions about the role of food.

The results (*chapter 4, paragraph 4.5.1*) in this study indicated that the majority of the caregivers (88%) were never aware of the energy content of foods that they ate, while 8% of the caregivers replied that they were sometimes aware. These results are similar to the results by SANHANES-1 (2013) that indicated that 14.1% of women were aware of nutrient content in the food they ate as compared 7.4% of man who did not know. The nutrition attitudes were probably influenced by the level of nutrition knowledge the caregivers demonstrated. This is also supported by the findings presented by Wei et al. (2007) that indicated that there is a strong association between the nutrition knowledge of a person and the person's attitude towards nutrition and food. The SANHANES-1, (2013) also found that nutrition attitudes of the mothers were strongly related to the level of nutrition knowledge they had.

The majority of the caregivers (80%) always enjoyed trying new foods, while 10% of the caregivers indicated that they never enjoyed trying new foods. These results are similar to the findings by SANHANES-1 (2013) that indicated that 48% of adult South African have eaten outside the home. The results in this study are similar to the results by Sebotsa et al. (2009) that found that though participants did not know the effects of iodine, all of them indicated that they had no problem of eating foods or salt that had iodine in it. It can also be argued that nutrition knowledge had an impact on the nutrition attitudes of the caregivers. This is verified by the results reported by Sebotsa et al. (2009) that only 3.3% of the participants added salt to their diet because it was iodised, while others added it according to the taste. This is supported by the

results found in the study done on nutrition knowledge, attitudes and behaviour of elderly Taiwanese. It was reported that dietary behaviour can be influenced by the nutrition attitudes of the individuals. People tend to choose what they eat based on the nutrition attitudes which are influenced by preferences, knowledge, cost and culture, etc. (Wei et al., 2007).

The SANHANES-1 (2013) also indicated that the amount of income the adults were getting had an impact on the food they ate. Therefore, it can be argued that the income level of the caregivers had an impact on the nutrition attitudes of the caregivers, because the caregivers could only buy foods that they could afford. These findings are in agreement with the findings by Wei et al. (2007). They indicated that there is a strong association between education, employment status and attitudes towards nutrition of the caregiver.

5.2.3 Nutrition behaviour of caregivers

The SANHANES-1 (2013) revealed that in South Africa there is a clear association between the knowledge regarding food choices and preparation of food. The results in (*chapter 4, paragraph 4.6.1*) show that 24% of the caregivers answered there was at least one type of food that they did not consume in their respective diets. It could be argued that the caregivers did not eat certain foods due to the nutrition knowledge they possessed. These results are in agreement with the results indicated by the SANHANES-1 (2013) that indicated that dietary behaviour of individuals is influenced by their nutrition knowledge.

It could be argued that the nutrition behaviour of the caregivers was also influenced by income and other factors such as health and religion. This was verified through the results which indicated that 16% of the caregivers who were of the ZCC religion revealed that they did not eat certain foods such as pork, mopane worms and some said they did not eat foods with salt (*chapter 4, paragraph 4.1*). These results are in agreement with the results reported by SANHANES-1 (2013) that indicated that dietary behaviour is also influenced by social and cultural norms. The SANHANES-1 (2013) reported that dietary behaviour of the participants was influenced by their beliefs and nutrition knowledge.

The SANHANES-1 (2013) also reported that 33.9% of children did not eat breakfast because there was not enough food in house, and 33% of people did not eat breakfast at home; while 19.2% could not wake up early enough to make breakfast. It can be argued that the socio-economic status of the caregivers probably had an impact on the frequency of food intake by the households. The SANHANES-1 (2013) concluded that there is a clear association between dietary behaviour and the socio-economic status of people.

5.3 PERCEPTIONS OF HUNGER AND FOOD SECURITY

5.3.1 Household level food security

In this study it is reported that the majority of the households reported food uncertainty, i.e. 82% of the households reported that they sometimes ran out of money to buy food, with 74% of the households having ran out of money to buy food sometime during the past month. And of these 38% of the households ran out of money to buy food for five days or more in that month. These results are in agreement with those presented by Oxfam (2014) that indicated that almost 10% of the people residing in tribal areas had to cut the size of meals atleast five of the past 30 days during the study. The households cut the sizes of their meals because they did not have enough money to buy food and buy other household needs (Oxfam, 2014). It can be reasoned that food uncertainty in this study group was a result of poverty which was represented by low incomes and also low levels of education in this study. Oxfam (2014) reported that food insecurity in South Africa is not seen as a failure to produce food but it is failure to provide adequate cash to buy food at the household level. Low incomes, unemployment as well a limited household food production are some of the factors leading to food insecurity in most South African households. Twenty six percent of the population in South Africa regularly experiences hunger; while 28% of the population are at risk of hunger. Food insecurity was found to be affecting both formal and informal settlements (Oxfam, 2014). These findings are in agreement with the findings in this study that indicated that 38% of the households were at risk of hunger.

The StatsSA (2014) indicated that 83% of rural households were suffering from food insecurity due to poverty. A large number of South African rural households were dependent on grants for

incomes in 2011. This resulted in them not being able to afford sufficient food to support themselves (StatsSA, 2014). These results are in agreement with findings in this study which indicated that the majority (74%) of the caregivers were in possession of only high school education. It could be reasoned that the households in this study ran on a limited number of foods sources to support their children, because the caregivers could not secure stable jobs (*refer to chapter 4, table 4.3.1*) due to the education they possessed. These results are in agreement with the findings by Ndheve et al. (2013) that indicated that being uneducated is one of the leading causes to household food insecurity. This was verified by the findings in this study that indicated that 78% of the households sometimes relied in a limited number of foods to feed their children. These results are in agreement with the findings by Altman et al. (2009) that indicated that a large proportion of households in South Africa were food insecure due to low incomes. The findings by the SANHANES-1 (2013) also indicated that there is a substantial amount of black and coloured South African households that are at risk of hunger.

Altman et al. (2009) indicated that poverty and lack of education are the leading causes of food and nutrition insecurity in most households in South Africa. It can be argued that the low education status of the caregivers had an impact on the households' food security. The findings in this study also indicated that 36 % of the households in the study were suffering from hunger. These results are in agreement with the findings by the Oxfam (2014) that indicated that 37% of households in rural areas of South Africa are suffering from hunger, and 32.8% of the households are at risk of hunger. Unemployment was found to be one of the biggest problems leading to food insecurity in South Africa affecting the youth, urban poor and the landless rural poor (Oxfam, 2014). The findings in this study indicated that the salaries of the caregivers were generally R3000.00 or less per month in 2013, which was found to be inadequate for the households to secure enough food. Therefore, it can be reasoned that the lack of jobs by the caregivers resulted in the inability to secure incomes that would help them in securing enough food for their households. The findings are in agreement with the findings by (StatsSA, 2014) that revealed that in order for a household to afford sufficient food, there must be stable incomes which are determined by the employment status of the parents. The StatsSA (2014) indicated that 33.5% of poor households spent only R8485 per annum on food. It was also indicated that they spent 34.7% of this annual expenditure on bread and cereals. Therefore it can be concluded that

food security in the households was probably affected by the socioeconomic status of the caregivers.

5.3.2 Individual level food security

The results in the study indicated that 72% of the caregivers would sometimes cut the size of meals or sometimes skipped meals because there was not enough money for food. This is in agreement with findings by Oxfam (2014) that indicated that a community member in the Western Cape revealed that they spent days and sometimes weeks without having proper nutritious food in their households. It was also revealed that people in South African households go hungry on a regular basis (Oxfam, 2014). Oxfam (2014) revealed that 26% of South Africa's population was facing hunger in 2013 and 28% of the population were at risk. Oxfam (2013) reported that almost 23% of South Africa's population has at some point run out of money to buy food and 21% have skipped meals or reduce the size of meals. The findings in this study indicated that 76% of the caregivers indicated that they sometimes eat less than they should be eating because there is not enough money for food. It can be argued that low incomes had an impact on securing enough food to feed the households in this study. This was verified through the results given by the caregivers, that indicated that 10% of the households received less than R500 per month which was spent on food and other household needs. These results are in agreement with the findings reported by Ndhleve et al. (2013) that indicated that households in Nqushwa local municipality were food insecure and they were surviving on fewer than three meals per day and some would go two to three days per month without food. They indicated that this was caused by lack of jobs and income to help them buy enough food for their households (Ndhleve et al., 2013).

These findings were also in agreement with the findings reported by the StatsSA (2014) that found poverty affecting those social groups with the weakest or no guarantee to food access. The StatsSA (2013) indicated that in 2011 68.8% of people living in rural areas were found to be poor as compared to 30.9% of people living in urban areas. The SANHANES-1 (2013) also indicated that the low incomes led to the majority of individuals not being able to secure adequate food for their households. Therefore it can be concluded that because the majority

(54%) of the caregivers in this study were unemployed, it was difficult for them to be able to make enough money for food.

5.3.3 Child hunger

The findings in the study indicated that 72% of the caregivers reported that their children ate less than they felt they should eat. Sixty eight percent of the caregivers also indicated that because of a lack of food in the house, their children would say they were hungry; 62% of the caregivers indicated that this happened in the past thirty days. Forty two percent of the caregivers in this study also indicated that their children went to bed hungry because there was not enough money to buy food; 38% of these caregivers indicated that this happened in the past 30 days prior to the study; while 22% of the caregivers reported that it happened 5 or more days in the past 30 days. It can be concluded that the lack of enough money to secure food by the households in the study led to children going to sleep hungry. These results are in line with the results reported by OXFAM (2014) that indicated that 19% of South African children have no access to food. Sixty percent of the caregivers in this study indicated that they cut the size of their children's meals because there they do not have enough money to buy food. These are results are in line with results reported by OXFAM (2014) that indicated that 23% of the households in South Africa run out of money to buy food and 21% of the households reduce the size of their children's meals because there is not enough money to buy food. Since the caregivers were responsible for buying and preparing food in the households and the majority (54%) of them were unemployed, this probably resulted in the lack of money to buy food for their households. These findings are in agreement with the report by The State of Food and Agriculture, (2010-2011), which revealed that the economic status of female-headed households presented stark consequences for household food security, as studies had shown that women's income was positively associated with greater food, health, education, and nutritional outcomes. Forty percent of the caregivers indicated that this happened 5 or more days in the past 30 days. This was confirmed by data gathered from the Philippines, which indicated that increasing the amount of household income earned by mothers significantly contributes to an improvement in household food consumption (The State of Food and Agriculture, 2010-2011). The results in this study also indicated that the in the past 30 days prior to the study 66% of the caregivers indicated that their children ate less

than they should because there is not enough money for food. Some of the households in this study were headed by single parents; this could have resulted in them not being able to buy enough food to support their families. These findings are in agreement with those reported by the StatsSA (2014) that indicated that the majority of single headed households were found to be most likely to suffer from food shortages. The StatsSA (2014) indicated that 52.6% of the female headed households in 2011 were most likely to be suffering from poverty which led to food insecurity (StatsSA, 2014). The StatsSA (2014) also indicated that more than half (55.7%) of all female headed households in South Africa were living below the poverty line.

5.4 DIETARY ADEQUACY

DDS and FVS cannot give a complete view of the adequacy of nutrient intake (Hatloy et al., 1998). However, they are complex methods that can be used to demonstrate a fairly appropriate indication of nutrient adequacy. In this study a total of 25 different food items were consumed by the households during the period of data collection, corresponding to a mean HFVS of 4.

The mean HDDS was 4.28 (SD 1.0). Households in the study were found to be consuming a minimum of two to eight food items a day. The DDS of households showed that the food groups that were consumed by the households ranged from an average of three (food items which incorporated a number of food groups from one) to seven groups. In a study by Ongosi (2010) on the nutrient intake and nutrition knowledge of lactating women in a low socio-economic area in Kenya, it was found that the mean food variety score was 6.6 and the lowest number of food items consumed in a study group was one and the highest number of food items consumed was 12 items over a 24 hour recall period. The results in this study are similar to the results reported by the SANHANES-1 (2013) that indicated that the current national mean DDS scores are 4.2.

It can be concluded that the households had a limited variety and diversity of diet since the food items and food groups were limited. These results are also similar to the study done by Labadarios et al. (2013) that indicated that a DDS of less than 4 was regarded as poor dietary diversity and poor food security (Labadarios et al., 2013). Labadarios et al. (2013) indicated that

in South Africa the majority of people consumed diets low in dietary variety, more especially those who were living in informal and tribal settlements.

A possible explanation could be that the limited variety and diversity of diets in these households were a result of caregivers not being able to afford a variety and enough food to support their households. These results are also supported by the study done on the determinants of rural household dietary diversity in South Africa. Taruvinga et al. (2013) indicated that there is a strong correlation between education and dietary diversity. The researchers also indicated that households which were found to be educated were most likely to attain higher dietary diversity scores than households with low education or no education at all (Taruvinga et al., 2013). It can be concluded that the ability of the households in this study to consume a variety of foods was influenced by the low economic ability of the households.

An assessment of different nutrients from different food items consumed by the households in the study was done in comparison with other studies in order to get an in-depth understanding of their contribution to the variety of diets consumed. A summary of the food items was compiled to show the nutrient rich sources (refer to table 4.9.1). The FAO (2004) indicated that there is a strong association between dietary diversity and nutrient intake of households/individuals.

In 2005, a study done on hidden hunger indicated few examples of how hidden hunger can be translated amongst groups and individuals. The study revealed that even though people look well-nourished and consume sufficient amounts of energy foods, they may be deficient in key micronutrients such as vitamin A, iron, and iodine (Alderman, 2005).

Cereal group

The findings indicated that all of the households in the study consumed at least maize meal or rice a lot as compared to the other foods, while some of these households also consumed white

and brown bread as a part of their staple food. The households probably consumed more of the cereal group food items because of money shortages. Steyn et al. (2005) indicated that the quality and quantity of foods purchased in households are determined by the income level. These findings are similar to the South African data that indicate that maize meal purchase is the staple food to many households in SA; 94% of the households in SA use maize meal as a staple food. Maize meal flour and brown bread were consistently bought and consumed by all the households in all the provinces regardless of the income as findings reported by the NFCS (Hart, 2009).

In this study it was found that the food groups that were mainly consumed by the households were mainly the cereal group.

Vegetable and fruit group

The results in this study indicated that only 12% of the households consumed vitamin A vegetables and other tubers and 30% of the households consumed fruits rich in vitamin A. The households consumed a limited number of fruits and vegetables in their diets. This was in agreement with the findings of a study done by MacIntyre et al. (2000) that indicated that fruit and vegetable consumption were found to be low in rural areas and only a bit higher in the urban areas. MacIntyre et al. (2000) also reported that in urban areas, fresh vegetables and fruits were expensive and there seems to be limited space for cultivation.

Protein group

In the study it was identified that food items in the protein group consumed by the households included chicken, beef and fish as well as eggs and beans. Chicken and beef were the most

consumed sources of protein by the households. Few of the households also consumed eggs and fish (see Table 4.8.3) as well as beans. Most of the protein intake was from the animal source. This is not similar to the findings of the Thusa study, which reported that rural and farm strata indicated that more than half of the protein intake consumed by the households was from plant sources (MacIntyre et al., 2000). The results in the study by MacIntyre et al (2000) are in agreement with the results reported by Labadarios et al. (2011) that indicated most of the protein intake was from animal source food such as eggs.

Miscellaneous, fats and beverages group

In this study a number of food items that were sometimes consumed by the households included sour cream, margarine and cooking oil as well as sugar. These findings are similar to that of the Thusa study, whereby the most popular form of fat used for food preparation was sunflower oil which was similar to rural, farm and informal settlements (MacIntyre et al., 2000). The results in this study are also similar to the results reported by the SANHANES-1 (2013) that indicated that South African households consumed diets high in fat and sugar.

6 CHAPTER 6: SUMMARY AND RECOMMENDATIONS

6.1 SUMMARY

“A society which can be said to enjoy food security is not only one which has reached a food norm. But one which has also developed the internal structures that will enable it to sustain the norm in the face of crises threatening to lower the achieved level of food consumption” (Oshaug, 1985).

The aim of the study was to determine the nutrition knowledge, attitudes and behaviour of the caregivers, and to assess whether hunger was experienced in households, as well as to describe the dietary adequacy of households in Bronkhorstspuit. The UNICEF conceptual framework for malnutrition modified was used to reflect on the interactive aspects that could have impact on food security, hunger as well as dietary adequacy of households (UNICEF, 1997).

A descriptive cross-sectional study in the quantitative research domain was undertaken. Individual interview in English, and interpreted into a local language by an assistant researcher, using structured questionnaires (socio-demographic questionnaire, nutrition knowledge, attitudes and behaviour, Hunger Scale as well as the 24 hour-recall questionnaire) were done and descriptive statistics were applied. Black caregivers (people responsible for buying and preparing food in the households) were voluntarily selected; both females and males were included. Ethical approval for the research study was obtained from the Ethics Committee of the Faculty of Natural and Agricultural Sciences, University of Pretoria (*Ref EC120807-069*) and the Department of Basic Education. Permission was also granted by the Principal of Mshuluzane Mayisela Primary school in Bronkhorstspuit (Zithobeni). All the participants were informed about the aim of the study where after they signed informed consent. The data collection took place in June/July 2013.

The study indicated that:

- ❖ The socio-economic circumstances of the caregivers and the education level of the caregivers were poor. No one amongst the caregivers had an advanced tertiary level education; hence the majority of the caregivers were unemployed (54%). This was also

illustrated by the living conditions of the families. The majority of the households (74%) indicated that they were staying in Reconstruction and Development Programme (RDP) houses (brick-houses), while 18% households dwelled in tin made houses (shacks made of corrugated iron). The caregivers (40%) also indicated that they received between R1000 and R3000 per month in 2013, while 20% received at least over R5000 a month. Sixteen percent of the caregivers indicated that they spend R150-200 a week on food. Socio-economic status was found probably to be a serious constraint for the caregivers to be able to buy a variety and enough foods for their households. This impacted on the dietary diversity and variety of the households.

- ❖ The nutrition knowledge of the caregivers probably impacted on the food consumption and food security of the households. The results indicated that the majority (68%) of the caregivers had good nutrition knowledge. For 32% of the nutrition knowledge could be improved. Fourteen percent of the caregivers scored above 80%; where as 18% of the caregivers need had poor nutrition knowledge with a score of less than 20%. Though the nutrition knowledge of the caregivers was found to be good, the study findings revealed that the nutrition behaviour of the households was impacted by the incomes they were getting.
- ❖ It can also be concluded that the socio-economic status of the households probably resulted in food uncertainty in some households. They were found to be consuming diets low in certain nutrients such as folate, calcium and vitamins. The households were consuming more of the cereal food group than the rest of the food groups. It was concluded that the diets of the households were not diverse and they lacked variety in the foods they were consuming. The mean HDDS was 4.28 (SD 1.0). Households in the study were found to be consuming a minimum of two to eight food items a day. The DDS of households showed that the food groups that were consumed by the households ranged from an average of three (food items which incorporated a number of food groups from one) to seven groups.

6.2 RECOMMENDATIONS

Nutrition intervention should focus on improving the nutrition knowledge and food and nutrient intake of the households. This can be achieved by educating the caregivers about the importance of nutrition. This includes advice on the food they consume every day. The intervention should also focus on how the caregivers can make use of the resources they have to improve their food and nutrient intake and therefore their health.

- ❖ The researcher illustrated that the caregivers had good nutrition knowledge. The caregivers showed to be in need of better understanding nutrition knowledge which would help them in how to practise the nutrition knowledge they have. However some caregivers showed to be in need of the basic nutrition knowledge and also to use the resources they are having to improve their nutrition status and nutrient intake in their households and individually. Hence the researcher is of the opinion that there should be a nutrition education programme offered that can promote understanding of the importance of good nutrition in everyday life.
- ❖ Nutrition education for mothers/caregivers could be provided at local primary schools in the area studied. The majority of caregivers were mothers who were unmarried. Therefore nutrition education for single parents could help them to improvise on available resources to improve their food accessibility, thus improving the variety and diversity of their diets.
- ❖ A nutrition education programme can also be used for educating mothers who get children grants to educate them about the importance of practising good nutrition. Mothers ought to understand that they should prioritise their health and nutrient intake first.
- ❖ Caregivers should be encouraged to get involved in food production activities; such as greenery projects, brick making projects, etc. so they can use the money they get from the

projects to buy food for their families. This would help the caregivers in improving the dietary diversity and variety of their households.

- ❖ A similar study with a bigger sample of participants could be done.

REFERENCES

- Ajani, S. (2010). An assessment of dietary diversity in six Nigerian states. *African Journal of Biomedicine*, 13(10), 161-167.
- Alderman, H. (2005). Linkages between poverty reduction strategies and child nutrition: An Asian Perspective. *Economic and Political weekly*, 40(46), 48-42.
- Aliber, M. (2009). Exploring statistics South Africa's national household surveys as sources of information about household-level food security. *Human Science Research Council*, 48(4).
- Altman, T. (2009). Household food security status in South Africa. *Human Research Council*, 48(4), 1-20.
- Anderson, S. (1990). The 1990 life sciences research office (LSRO) report on nutritional assessment defined terms associated with food access: Core indicators of nutritional state for difficult to sample populations. *Journal of Nutrition* , 102, 1559-1660.
- Bakker, J.I. (1990). *The world food crisis: food security in comparative perspective*. Toronto: Canada Scholars'.
- Birch. L.L., & Fischer, L. B. (1998). Development of eating behaviours among children and adolescents . *Pediatrics* , 101, 539-549.
- Bonti, S. (2001). Addressing food insecurity in South Africa. The National Institute of Economic Policy: Paper presented at the SARPN conference on Land Reform and Poverty Alleviation in Pretoria: South Africa. Pretoria: SARPN.
- Department of Agriculture and Fisheries. (2014). *Annual report*. Pretoria: Department of Agriculture and Fisheries.
- de Klerk, M, Drimie, S. & Aliber, M., Mini, S., Mokoena, R., Randela. (2004). Food Security in South Africa: key policy issues for the medium term. *Human Science Research Council*.
- Department of Agriculture. (2002). *The Intergrated Food Security Strategy for South Africa*. Department of Agriculture.
- Department of Agriculture. (2006). *Fighting hunger. A survey in Sekhukhune: Limpopo Province*. Limpopo Province: Department of Agriculture.
- Drewnowski, S. A., Ahlstrom, H.A & Driscoll, B.R. (1997). The Diversity Variety Score: Assessing diet quality in healthy young and older adults. *Journal of the American Dietetic Association*, 97, 266-271.

- Denzin, N. & Lincoln, YS (eds.) (1994). *Introduction; Entering the field of qualitative research*. CA: SAGE.
- Evans, A. (2009). *The feeding of the nine billion: Global food security for the 21st century*. London: A Chathan House Report: The Royal Institute for International Affairs.
- Evans, A. (2009). *The feeding of the nine billion: Global food security for the 21st century*. London: A Chathan House Report: The Royal Institute for International Affairs.
- Farber, T. (2009). Contemporary issues in South Africa. *A toolkit for journalists*.
- Francesco, B., Jessica, F & Emile, F. (2011). The role of food and nutrition system approach in tackling hidden hunger. *International Journal of Environment Research and Public Health*, 8, 358-373.
- Food and Agricultural Organisation (FAO), 2013. Gender Equality and Food Security; Empowerment as a tool against hunger. ISBN. Asian Development Bank
- Gericke, G., Labadarios, D & Nel, J.H. (2000). *Hunger scale questionnaire: A measure of Hunger*. Cape Town: University of Stellenbosch.
- Green, F. (2004). A community based model for nutritional interventions. Dissertation (PhD). Pretoria: University of Pretoria.
- Haddad, J., Pena, C., Quisumbing, A & Slack, A. (1995). *Poverty and Nutrition within Households: Review and New Evidence, report written in collaboration with the nutrition unit, World Health Organisation*. Washington DC: Institute Food Policy Research Institute.
- Haddad, L. (1992). The impact of women's Employment status on household food security at different income levels in Ghana. *Food and Nutrition Bulletin*, 14(4), 341-344.
- Haggins, M. (2010). Nutrition related practices and attitudes of Kansas Skipped-Generations caregivers and their grandchildren Nutrients. 2(2), 1188-1211.
- Hart, T. (2009). Food security Definitions, Measurements and Recent Initiatives in South Africa. *Human Science Research Council*, 48(4).
- Hatloy, A., Torheim, L.E & Oshaug, A. (1998). A good indicator of nutritional adequacy of diet? A case study from an urban area in Mali, West Africa. *European Journal of Clinical Nutrition*, 52, 891-898.
- Heady, D. & Fan, S (2008). *Anatomy of Crisis: The Causes and Consequences of Surging Food Prices*. IFPRI Discuss.

- Hubley, J. (1988). Health education in developing countries. The need for appropriate technology. *Health Education Research*, 3(4).
- Human Sciences Research Council. (2004). *Annual Report*. Pretoria: Human Sciences Research Council.
- Human Sciences Research Council. (2007). *Achieving Food Security in South Africa: Characteristics, Stressors and Recommendations to 2019. Report to the Office of Presidency*. Pretoria: Human Sciences Research Council.
- Human Sciences Research Council. (2009). *Annual Report*. Pretoria: Human Sciences Research Council.
- International Fund for Agricultural Development. *Rural Poverty Portal, Rural Poverty in the Bolivarian Republic of Venezuela*. Bolivia.
- Insel, P., Turner, E & Ross, D. (2003). *Discovering nutrition: Jones and Bartlet*. USA: Thompson Wadsworth.
- Izumi, K. (2006). *Reclaiming Our Lives: HIV and AIDS, Womens's Land and Property Rights and Livelihoods in East and Southern Africa-Narratives and Responses*. Cape Town: Human Sciences Research Council.
- Kaliyaperumal, K. (1998). *Guidelines for conducting a knowledge, Attitudes and Practice (KAP) study*. Diabetic Retinopathy Project.
- Kane, E. & O'Reilly- de Brun, M. (2001). *Doingh your own research*. USA & Great Britain: Marion Boyars Publishers.
- Kennedy, E. & Peters, P. (1992). Household Food Security and Child Nutrition: The interaction iof Income and Gender of Household Head. *World Development*, 20, 1077-1085.
- Kennedy, G, Pedro, M.R., Seghieri, C., Nantel, G & Brouwer, I. (2007). Dietary diversity score is a useful indicator of micronutrient intake in non breastfeeding Filipino children . *Nutrition Journal*, 137, 1-6.
- Krebs-Smith, SH., Smiciklas-Wright, H & Guthrie J. (1987). The effects of variety in food choices on dietary quality. *Journal of the American Dietetic Association*, 87, 897-903.
- Kruger, R & Gericke, G. (2004). A qualitative approach for exploration of feeding practices, Knowledge, and attitudes on child nutrition framework. *Journal of family Ecology and Consumer Sciences*.
- Kupolati, D., Gericke, G., & MacIntyre, U. (2015). Teachers' Perceptions of school nutrition education's influence on eating behaviours of learners in Bronkhorstspuit District. *South African Journal of Education*,35(2), May 2015.

- Labadarios, D., Swart, R., & Maunder, E.M., Kruger, H.S., Gericke, GJ, Kuzwayo, P.M.N et al. (2008). ExecBaselineutive summary of the National Food Consumption Survey Fortification (NFCS-FBI). *Journal of Clinical Nutrition*, 21(13).
- Labadarios, D., Steyn, N & Maunder, E, MacIntyre, U., Gericke, G., Swart, R et al. (2005). The National Food Consumption Survey (NFCS). *Public Health Nutrition*, 8(5), 533-543.
- Ladzani, R. (2009). The impact of HIV and AIDS on food security and nutrition in South Africa. Pretoria: Human Science Research Council.
- MacIntyre, U.E., Venter, C.S & Vorster, H.H. (2000). A culture-sensitive quantitative food frequency questionnaire used in an urban African. *African Journal of Biotechnology*, 4(1), 63-71.
- Madden, J. P & Yoder, M.D. (1972). Program evaluation: Food stamps and commodity distribution in rural areas of central Pennsylvania. *Pennsylvania Agricultural Experiment Station Bulletin*, 78, 1-110.
- Massingue, C. D. (2007). Illness, Death and Macronutrients: Adequacy of rural Mozambique Household Production of Macronutritents in the Face of HIV/AIDS. *Food and Nutrition Bulletin* , 28(2), 331-338.
- Maunder, N., & Wiggins, S. (2007). *Food Security in Southern Africa: Review of lessons learnt on responses to chronic transitory hunger and vulnerability*. London: ODI Natural Resources Perspective 106.
- McGranaham, G, Lewin, S & Fransen, T, Hunt, C, Kjellen, M., Pretty, J et al. (1996). *Enivironmental change and human health in countries of Africa, the Caribbean and the Pacific*. Stockholm: Stock Environmental Institute.
- Monyela, D. (2007). *Critical Appraisal of the Home-Based food security projects with reference to layers at Makhuduthanga Sekhukhune District in Limpopo Province*. Limpopo: University of Limpopo.
- Mwaniki, A. (2003). *The utilisation of locally grown plant materials in the production of an intervention formulation of malnourished children in marginal areas, the case of Makindu location Makueni District*. Nairobi: University of Nairobi.
- Ndhleve, S., Musemwa, L., & Zhou, L. (2013). How severe hunger is amongs rural households of the Eastern Cape Province of South Africa. *Journal of Economics and Sustainable Development*, 4(3), 15-20.
- Nekesa, M. (2012). *Nutritioanl knowledge attitudes and practices of primary caregivers of home grown school feeding programme pupils at Sauri Millenium village, Masters Thesis*. Kenya: Kenyata University.

- Ongosi, A. (2010). *Nutrient intake and Nutrition Knowledge of lactating women (0-6 months postpartum) in low socio economic area in Nairobi, Kenya*. Pretoria: University of Pretoria.
- Oshaug, A. (1985). *The Composite concept of food security in WB. Introducing nutritional considerations into rural development programmes with focus on Agriculture: a Theoretical Contribution, (ed) Development of Methodology for the evaluation of nutritional impact*. Oslo: Oslo: Institute of Nutrition Research, University of Oslo.
- Oxford Committee for Famine Relief (OXFAM). (2013). *Promoting local food reserves in the Sahel*. Retrieved March 10, 2015, from [ww.OXFAM.org.com](http://www.OXFAM.org.com)
- Oxford Committee for Famine Relief (OXFAM). (2014). *Hidden Hunger in South Africa*. Retrieved March 10, 2015, from www.oxfam.org/grow
- Philip, M. (2010). Publishing nutrition research: validity, reliability, and diagnostic test assessment in nutrition related research. *Journal of the American Dietetic Association* , 110, 409-410.
- Prakash, D. (2003). *Rural development centre, rural women*. New Delhi: Food security and Agricultural Cooperatives.
- Project for Statistics on living standards and development . (1994). *South African rich and poor: Baseline Household Statistics*. Rondebosch: South African Labour and Development Research Unit(SALDRU).
- Quisumbing, A.R., Lynn, R., Brown, H., Feldstein, S, Haddad, L & Peña, C. (1995). *Women; The key to food security*. Washington DC: International Food Policy Research Institute.
- Radimer, K., & Oslon, C. (1990). Development of indicators to assess hunger. *Journal of nutrition* , 11(15), 44-48.
- Ruel, M.T. (2003). Operationalizing dietary diversity : A review of the measurement issues and research priorities. *Journal of Nutrition*, 33(11).
- Statistics South Africa (STATSSA). (2000, April 20). Measuring poverty in South Africa, Pretoria. *Statistics South Africa*, p. 107.
- Statistics South Africa (STATSSA). (2014). *Poverty trends in South Africa*. Retrieved April 20, 2015, from <http://beta2.statssa.gov.za/publications/report-03-10-06-March>.
- Savy, M., Martin-Prevel, Y., Traissac, P & Delpuech, F. (2006). Dietary Diversity scores and nutritional status of women change during the seasonal food shortage in rural Burkina Faso. *Journal of Nutrition*, 136, 25-32.

- Sebotsa, M., Dannhauser, A., Mollentze, W., Oosthuizen, G, Mahomed, F., Jooste, P. (2009). Knowledge, attitudes and practices regarding iodine among patients with hyperthyroidism in the Free State. *South African Journal of Clinical Nutrition*, 22(1), 18-21.
- Sen, A. (1981). *Poverty and Famines: an Essay on Entitlement and Deprivation*. Clarendon: Oxford: Clarendon Press.
- Steyn, N., Nel, J, Nantel, G., Kennedy, G & Labadorios, D. (2005). Food variety and dietary diversity scores in children: are they good indicators of dietary adequacy? *Medical Research Council*, 9(5), 644-650.
- Survey, N. F. (2000). International Institutes for population Sciences. Mumbai: International Institutes for population Sciences.
- Survey, T. N. (2004). *Executive Summary of the National Food Consumption Survey Fortification Baseline* . South Africa: Department of Health.
- Taruvunga, A., Muchenje, V. & Mushunje, A. (2013). *Determinants of rural household dietary diversity: The case of Amatole and Nyandeni districts*. South Africa.
- Thesarus. (2012). *Thesaurus*. Retrieved June 23, 2013, from www.thefreedictionary.com/conceptualisation
- Thomas, C.L. (1989). *Taber's Cyclopedic Medical Dictionary* (17th ed.). Pennsylvania: Davis Company.
- Thompson, J., Manore, M & Vaugh, L. (2008). *The Science of Nutrition* . San Francisco: Pearson Education.
- The South African National Health and Nutrition Examination Survey (SANHANES-1), 2013. *Aspects of the health and nutritional status of South Africans with respect to the prevalence of NCDs and their risk factors*, Pretoria, South Africa: Human Science Research Council.
- Statistics South Africa (STATSSA), 2000. Measuring poverty in South Africa, Pretoria. *Statistics South Africa*, 20 April, p. 107.
- Statistics South Africa (STATSSA), 2014. *Poverty trends in South Africa*. [Online] Available at: <http://beta2.statssa.gov.za/publications/report-03-10-06-March> [Accessed 20 April 2015].
- The United Nations Environment Programme (UNEP), 2002. *Africa Environment Outlook: Past Present and Future, Perspective*, s.l.: UNEP.

- The United Nation's Children Fund (UNICEF) , 1997. *The state of the world's children* , Oxford: Oxford University Press. Available at :<http://www.unicef.org.sowc97/>
- United States Agency International Development (USAID), 2006. *Understanding nutrition data and the causes of malnutrition in Niger*, Niger: United States Agency International Development.
- World Food Program (WFP) (WFP), 2009. *World hunger series: Hunger and markets..* [Online] Available at:
home.wfp.org/stellent/groups/public/documents/communications/wfp200279
[Accessed 5 September 2012].
- World Food Program (WFP), 2013. *The State of food insecurity in the world. The multiple dimensions of food insecurity*, Rome: Food and Agricultural Organisation of the United States.
- World Health Organisation (WHO), 1995. *Physical Status: The use and interpretation of the Anthropometry*, Geneva: Report of a WHO Expert Committee.
- United Nations, Food and Agriculture Organization & The State of Food and Agriculture, 2011. *Women in Agriculture: Closing the Gender Gap for Development*, Rome: United Nations.
- United Nations, Food and Agriculture Organization, FAO Women, Population Division & Sustainable Development Department 1998,, Rome. *The right to Food in Theory and Practice: Rural Women and the right to Food* , Rome: FAO.
- Wei, L, Hsiao-Chi, Y, Chi-Ming, H. & Wen-Ham, P, 2007. Nutrition knowledge, attitudes and dietary restriction behaviour of the Taiwanese elderly, Asia Pac. *Journal of Clinical Nutrition*, 16(2), pp. 534-546.
- WHO, 1996. [Online] Available at: www.who.int/trade/glossary/story028/en
[Accessed 20 February 2014].
- Wingo, PA, Higgins, JE., Rubin, GL & Zahniser, SC, 1994. *An epidemiological approach to reproductive health*, World Health Organisation: Geneva.
- Yabanci, N, Kisac, I & Karakus S., 2014. The effects of mother's nutritional knowledge on attitudes and behaviours of children about nutrition. *Available on Sciencedirect*, Volume 116, pp. 4477-4481.
- Zurayk, H., 1997. Women's health problems in the Arab World: A holistic policy perspective. *International journal of Gynaecology and obstetrics*, Volume 58, pp. 13-21.

THE MAP OF SOUTH AFRICA

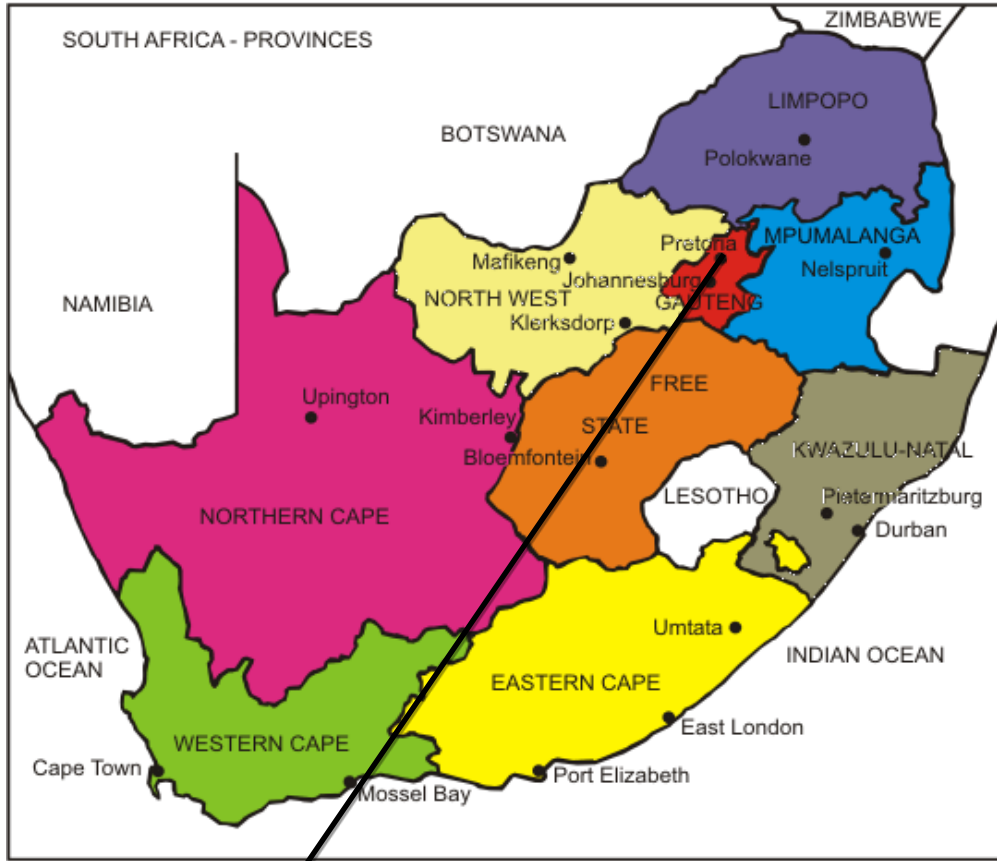


Figure 3.6: Map of South Africa (where the study was conducted).



Figure: 3.7: Caregivers cooking in Mshuluzane Primary school

OTHER SOCIO-ECONOMIC ACTIVITIES THAT THE CAREGIVERS ARE INVOLVED IN



Figure: 3.8: Caregivers selling snacks outside Mshuluzane Primary school



Figure: 3.9: Learners buying from caregivers

Outside the school premises, school learners buying food during break



Figure: 3.10: Caregiver selling to learners

One of the caregivers selling snacks to school learners



Figure: 3.11: Overview of Bronkhorspruit

DURING DATA COLLECTION



Figure: 3.12: Assistant researcher and one of the caregivers

Debby (assistant researcher) and (one of the caregivers) at Mshuluzane Mayisela Primary School



Figure: 3.13: Assistant researcher, a caregiver and researcher



Figure: 3.14: Two assistant researchers and a caregiver
Debby Mojolisa (assistant researcher), one of the caregivers and Keabetwe Kodi

CONSENT FORM

APPENDIX A

SCHOOL OF HEALTH SCIENCES



DEPARTMENT OF HUMAN NUTRITION

SNYMAN BUILDING

UNIVERSITY OF PRETORIA

Researcher: Risuna Mathye

Contact details: 0795427410

PERCEPTIONS OF HUNGER, FOOD SECURITY AND NUTRITION KNOWLEDGE, ATTITUDES AND BEHAVIOUR IN HOUSEHOLDS IN BRONKHORSPRUIT, PRETORIA, SOUTH AFRICA.

DECLARATION BY PARTICIPANT

I, the undersigned,.....hereby give my permission to take part in the above mentioned research study. I understand that the purpose of the study is to assess and describe the perceptions of hunger, food security and knowledge, attitude and Behaviour in regard to nutrition in a resource poor community. Advantages for my participation in the study include my contributions to assessing and describing the perceptions of hunger, food security and knowledge, attitude and Behaviour in regard to nutrition in the community. I understand that I have agreed to take part in the study on the voluntary basis .I understand that I may withdraw from the study at any stage without any consequences. I understand that I cannot hold the University of Pretoria for any inconvenience that I may experience because of the study.

Signature.....

Date.....

DECLARATION BY THE RESEARCHER

I, declare that, I have explained the information about this study to the participant named above and I asked her to ask any questions for the clarification if anything was not clear to her.

Signature..... Date.....

(Researcher)

Signature..... Date.....

(Witness)

SOCIO-DEMOGRAPHIC QUESTIONNAIRE

APPENDIX B

Interview Code

--	--	--

1. Who is the head of household?	Father	Mother	Husband	Grandpa	Aunt	Uncle	Brother/ nephew	Sister	Friend	Self	Other
2. What is your relationship to the head of household?											
3. How would you describe yourself in terms of population group (population group as perceived by the woman herself).											

1 Socio-Demographic questionnaire

4. What is your marital status?							
unmarried	Married	Divorced	Separated	Widowed	Living together	Traditional Marriage	Other specify:
1	2	3	4	5	6	7	8

	Father	Mother	Husband	Grandma	Grandpa	Aunt	Uncle	Brother/nephew	Sister	Friend	Self	Other
--	--------	--------	---------	---------	---------	------	-------	----------------	--------	--------	------	-------

5. Who decided on what types of food are bought for this household?	1	2	3	4	5	6	7	8	9	10	11	12
6. Who decided how money is spent on food for this household?	1	2	3	4	5	6	7	8	9	10	11	12

7. Type of dwelling: You can circle more than one number , If necessary	Brick, concrete 1	Traditional mud 2	Tin 3	Plank, wood 4	Other, specify 5
8. How many people sleep in this house for at least 4 nights per week for most of the year? (insert number in box)					
9. How many rooms does this house have?(excluding bathroom, toilet and kitchen, if separate?) (insert number in the box)					
10. Where do you get drinking water most of the time? (circle one number)	Own tap 1	Communal tap 2	River dam 3	Borehole, well 4	Other (specify) 5

11. What type of toilet does this household have? (Circle as many numbers as necessary)	Flush 1	Pit, VIP 2	Bucket,Pot 3	None 4	Other(specify) 5
--	------------	------------------	-----------------	-----------	---------------------

12. What fuel is used for cooking most of the time? (you can circle more than one number)	Electric	Gas	Paraffin	Wood	Coal	Other
	1	2	3	4	5	6
13. Does this home have a working:						
(i) Refrigerator/freezer	Fridge		Freezer	Both	None	
	1		2	3	4	
(ii) Stove	Yes	No	If yes, circle all relevant options			
	1	2	Gas	Coal	Electricity	
(iii) Primus or paraffin stove	Yes			No		
	1			2		
(iv) Microwave	Yes			No		
	1			2		
(v) Hot plate	Yes			No		
	1			2		
(vi) Radio or Television	Radio	TV	Both	None		
	1	2	3	4		
(vii) Telephone	Land line	Call	Both	None		
	1	2	3	4		

14. What is your highest formal education? (circle one number only)	None	Primary school	Std 6-8/Grd8-10	Std 9-10/Grd 11-12	Tertiary Education
	1	2	3	4		5

15. What is your employment status? (circle one number only)	unemployed 1	Homemaker by choice 2	Self employed 3	Wage earner 4	Self-employed professional 5	Other (specify) 6	
16. Do members of this household receive any grants? (you may circle more than one number)	None 1	Child support 2	Social relief 3	Disability 4	Old age person 5	Other (specify) 6	
17. Do members of this household regularly receive food from a feeding scheme?				Yes 1	No 2		
18. How many people contribute to the total income (money) in this household? (circle one number only)	1 person 1		2 persons 2	3-4 Persons 3	5-6 Persons 4	More than 6 5	
19. What is the total household income per month (including wages, rent, grants, sales of vegs, etc.)? (circle one number only)	None 1	R1-R500 2	R501-R1000 3	R1001-R3000 4	R3001-R5000 5	Over R5000 6	Don't know 7
20. Is this the usual income of this household? (circle one number only)	Don't know 1		Yes	No	If NO, what other income is available, specify:		
21. Is this more or less than the income you had over the past six months? (circle one number only)	Don't know 1	More 2	Less 3	The same 4	Specify reasons if more or less: 5		

22. How much money is sent on food weekly? (circle one number only)	R0-R50 1	R51-R100 2	R101-R150 3	R151-R200 4	R201-R250 5	R251-300 6	R301-R 350 7	R351-R400 8	OverR400
23. Did you receive a high dose vitamin A capsules from health services during the past six months? You may show the example of the capsules. (Circle one number only)					Yes 1	No 2	Not sure 3		
24. Did you take any other vitamin or mineral tablets/ pills or syrup during the past month? (circle one number only) if yes, provide detailed information below: Brand name:					Yes 1	No 2	Not sure 3		
Tablet or capsules or syrup (circle relevant option) Dose (e.g. 1 tablet/capsule or 1 tablespoonful per day):					Tablet 1	Capsule 2	Syrup 3		

HUNGER SCALE QUESTIONNAIRE
APPENDIX C

Interview code

--	--	--

ALL SECTIONS OF EACH QUESTION MUST BE ANSWERED

		YES	NO
1.	Does your household ever run out of money to buy food?		
1a	Has it happened in the past 30 days?		
1b	Has it happened 5 or more days in the past 30 days?		
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?		
2a	Has it happened in the past 30 days?		
2b	Has it happened 5 or more days in the past 30 days?		
3.	Do you ever cut the size of meals or skip any because there is not enough food in the house?		
3a	Has it happened in the past 30 days?		
3b.	Has it happened 5 or more days in the past 30 days?		
4.	Do you ever eat less than you should because there is not enough money for food?		
4a.	Has it happened in the past 30 days?		
4b.	Has it happened 5 or more days in the past 30 days?		
5.	Do your children ever eat less than you feel they should because there is not enough money		
5a.	Has it happened in the past 30 days?		
5b.	Has it happened 5 or more days in the past 30 days?		
6.	Do your children ever say they are hungry because there is not enough food in the house?		
6a.	Has it happened in the past 30 days?		
6b.	5 or more days in the past 30 days?		
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?		
7a.	Has it happened in the past 30 days?		
7b.	Has it happened 5 or more days in the past 30 days?		
8.	Do any of your children ever go to bed hungry because there is not enough money to buy		
8a.	Has it happened in the past 30 days?		
8b.	Has it happened 5 or more days in the past 30 days?		

APPENDIX D

DIETARY KNOWLEDGE, ATTITUDES AND BEHAVIOUR, QUESTIONNAIRE

Section E 1		Knowledge	
NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
1.	Based on your knowledge, how many servings of fruit and vegetables a day do people need to eat to stay healthy?	NUMBER..... <input type="text"/> <input type="text"/>	
2.	Based on your knowledge, choose each food that has more fat?	PEANUTS.....1 PRETZELS.....2 YORGHUT..... 1 SOUR CREAM.....2 SMALL BRAN MUFFIN.....1 A SLICE OF WHOLE BREAD.....2	
3.	Based on your knowledge, choose each food that has more sugar?	100% FRUIT JUICE.....1 FLAVOURED WATER.....2	
4.	Based on your knowledge choose each food that has more fibre?	FRUIT..... 1 MEAT.....2 CORNFLAKES..... 1 OATMEAL.....2 WHOLE-WHEAT BRAED..... 1 WHITE BREAD.....2 BEANS..... 1 LETTUCE..... 2 POPCORN.....1 PRETZEL.....2	

Section E 1				Knowledge			
5.	Do you agree with the following statements? (READ OPTIONS)	<p style="text-align: right;">YES NO</p> STARCHY FOOD LIKE BRAED, POTATOES AND RICE MAKE PEOPLE FAT.....1 2 WHAT YOU EAT CAN MAKE A DIFFERENCE IN YOU CHANCE OF BECOMING FAT.....1 2 WHAT YOU EAT CAN MAKE A DIFFERENCE IN YOUR CHANCE OF BECOMING FAT AND GETTING DISEASES LIKE HEART DISEAS OR CANCER.....1 2 THE THINGS I EAT AND DRINK NOW ARE HEALTHY, SO THERE IS NO NEED FOR ME TO MAKE CHANGES .....1 2					
6	Compared to what is healthy do you think your diet is						
6a	.....in energy (calories/kilojoules)	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	4 OTHER	
6b	....in protein(meat/chicken/fish/legumes)	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	4 OTHER	
6c	.....in fat (butter/margarine/oil)	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	3 TOO HIGH	
6d	.....in sugar and sweets	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	3 TOO HIGH	
	.....in fruits	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	3 TOO HIGH	
	.....in vegetables	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	3 TOO HIGH	

Section E 1				Knowledge		
	.....In carbohydrates (bread/cereals/rice/ pasta)	1 TOO LOW	2 ABOUT RIGHT	3 TOO HIGH	3 TOO HIGH	

Appendices 1: Dietary knowledge, attitudes and behaviour questionnaire

2 Dietary Knowledge, Attitudes and Behaviour Questionnaire

SECTION E-2		DIETARY BEHAVIOUR ASSESSMENT	
NO.	QUESTIONS AND FILTERS	CODING CATERGORIES	SKIP
7	<p>Are there any foods that you do not eat?</p> <p>Please list them and give reasons why you do not eat them (e.g. Due to religious beliefs or health reasons)</p>	<p>.....1</p> <p>.....2</p> <p>.....3</p> <p>.....4</p> <p>.....5</p> <p>.....6</p> <p>.....7</p> <p>.....8</p> <p>.....9</p>	
8	<p>Please indicate which of the following best describes your unusual eating pattern?</p> <p>(MARK ONLY</p>	<p>MORE THAN THREE MEALS WITH EATING BETWEEN MEALS.....</p> <p>1 THREE MEALS WITH EATING BETWEEN MEALS</p> <p>2 THREE MEALS WITH NO EATING BETWEEN MEALS..... 3</p>	

SECTION E-2		DIETARY BEHAVIOUR ASSESSMENT	
	OPTION)	TWO MEALS WITH EATING BETWEEN MEAL..... 1 ONE MEAL WITH EATING BETWEEN MEALS.....1 ONE MEAL WITH NO EATING BETWEEN MEALS.....2 NIBBLE THE WHOLE DAY, NO SPECIFIC MEALS..... 8 OTHER, PLEASE SPECIFY..... 9	
9a	Do you ever eat elsewhere, other than at home?	YES.....1 NO.....2	
9b	Where else do you eat?	LUNCHEON CLUB.....1 CHURCH MEETINGS.....2 EATING OUT.....3 EAT WITH RELATIVES/FRIENDS.....4 OTHER (SPECIFY).....5	
9c	How often do you eat at the above mentioned places?	MORE THAN ONCE A WEEK .....1 WEEKLY.....2 MONTHLY.....3 MORE THAN ONCE A MONTH.....4 OTHER (SPECIFY).....5	

SECTION		DIETARY BEHAVIOUR ASSESSMENT
NO	QUESTIONS AND FILTERS	CODING CATERGORIES
10	Please choose one or more factors from the list that influence your choice when you do grocery shopping? (MARK MORE THAN ONE OPTION)	SAFETY (INTERMS OF SANITATION) OF THE FOOD ITEM..... 1 THE NUTRIENT CONTENT OF THE FOOD ITEM.....2 THE PRICE OF THE ITEM.....3 HOW WELL/ HOWLONG THE FOOD ITEM KEEPS .....4 HOW EASY THE FOOD ITEM IS PREPARED 5 TASTE OF THE FOOD 6 MOOD..... 7

		CONVENIENCE.....8 SENSORY APPEAL..... 9 NATURAL CONTENT.....10 WEIGHT CONTROL.....11 FAMILIARITY.....12 ETHICAL CONCERNS.....13 HEALTH.....14 OTHER.....15 DON'T DO GROCERY SHOPPING.....16	
11	Do you read food labels when grocery shopping?	YES.....1 NO.....2	

SECTION E-3		DIETARY BEHAVIOUR ASSESSMENT	
QUESTIONS AND FILTERS	AND	CODING CATEGORIES	SKIP
11a	How often do you read food labels?	ALL THE TIME.....1 SOMETIMES.....2 OTHER.....3 NEVER.....4	
11b	Do you understand the information on the food label?	YES.....1 NO.....2	

SECTION E-3		DIETARY BEHAVIOUR ASSESSMENT	
12a	How often do you wash your hands before handling food?	ALL THE TIME.....1 SOMETIMES.....2 OTHER.....3 NEVER.....4	
12b	How often do you wash your hands before eating?	ALL THE TIME.....1 SOMETIMES.....2 OTHER.....3 NEVER.....4	

SECTION E-4		DIETARY ATTITUDES ASSESSMENT					
N O	QUESTIONS AND FILTERS	CODING CATEGORIES					
		CHECK A RESPONSE FOR EACH OF THE FOLLING STATEMENTS?					
13	I am terrified about over weight?	1 ALWAYS	2 USUALL Y	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
14	I avoid eating when I'm hungry?	1 ALWAYS	2 USUALL Y	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
15	I find myself preoccupied with food?	1 ALWAYS	2 USUALL Y	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
16	I have gone on eating binges where I feel that I may not be able to stop?	1 ALWAYS	2 USUALL Y	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER

SECTION E-4		DIETARY ATTITUDES ASSESSMENT					
17	I cut my food into small pieces?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
18	I'm aware of the calories content of the foods that I eat?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
19	I particularly avoid food with high carbohydrate content (bread, rice, potatoes)?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
20	I feel that others would prefer if I ate more?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
21	I vomit after I have eaten?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
22	I feel extremely guilty after eating?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
23	I am preoccupied with a desire to be thinner?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
24	I think about burning up calories when I exercise?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
25	Other people think that I am too thin?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
26	I am preoccupied with the thought of having fat on my body?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER

SECTION E-4		DIETARY ATTITUDES ASSESSMENT					
27	I take longer than others to eat my meals?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
28	I avoid foods with sugar in them?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
29	I eat diet foods?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
30	Feel that food control around food?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
31	Display self-control around food?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
32	Feel that others pressure me to eat?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
33	Give too much time and thought to food?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
34	Feel uncomfortable after eating sweets?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
35	Engage in dieting behaviour?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER

SECTION E-4		DIETARY ATTITUDES ASSESSMENT					
36	Like my stomach to be empty?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
37	Have the impulse to vomit after meals?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
38	Enjoy trying new rich foods?	1 ALWAYS	2 USUALLY	3 OFTEN	4 SOMETIMES	5 RARELY	6 NEVER
In the past 6 months have you:							
39a	Gone on eating binges where you feel that you may not be able to stop?	1 Never	2 Once a month	3 2-3 times a month	4 Once a week	5 2-6 Times a week	6 Once a day/ more
39b	Ever made you sick (vomited) to control your weight or shape?	1 Never	2 Once a month	3 2-3 times a month	4 Once a week	5 2-6 Times a week	6 Once a day/ more
39c	Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?	1 Never	2 Once a month	3 2-3 times a month	4 Once a week	5 2-6 Times a week	6 Once a day/ more
39d	Exercise more than 60 minutes a day to lose or control our weight?	1 Never	2 Once a month	3 2-3 times a month	4 Once a week	5 2-6 Times a week	6 Once a day/ more

SECTION E-4		DIETARY ATTITUDES ASSESSMENT					
39e	Lost 20pounds or more?	1 Never	2 Once a month	3 2-3 times a month	4 Once a week	5 2-6 Times a week	6 Once a day/ more

APPENDIX E

DIETARY DIVERSIFICATION QUESTIONNAIRE

Please describe the foods (meals and snacks) that you ate yesterday during the day and night, whether at home or outside the home. Start with the first food eaten in the morning.

Write down all food and drinks mentioned by the respondent. When the respondent has finished, probe for meals and snacks not mentioned.

Breakfast	Snack	Lunch	Snack	Dinner	Snack

[Household level: consider foods eaten by any member of the household, and exclude foods purchased and eaten outside of the home]

When the respondent recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed

Question Number	Food group	Examples	YES=1 NO=0
1	CEREALS	corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + <i>insert local foods e.g. ugali, nshima, porridge or pastes or other locally available grains</i>	
2	VITAMIN A RICH VEGETABLES AND TUBERS	pumpkin, carrots, squash, or sweet potatoes that are orange inside + <i>other locally available vitamin-A rich vegetables (e.g. red sweet pepper</i>	
3	WHITE TUBERS AND ROOTS	white potatoes, white yams, white cassava, or other foods made from roots	

Question Number	Food group	Examples	YES=1 NO=0
4	DARK GREEN LEAFY VEGETABLES	dark green/leafy vegetables, including wild ones + <i>locally available vitamin-A rich leaves such as amaranth, cassava leaves, kale, spinach etc.</i>	
5	OTHER VEGETABLES	other vegetables (e.g. tomato, onion, eggplant) , including wild vegetables	
6	VITAMIN A RICH FRUITS	ripe mangoes, cantaloupe, apricots (fresh or dried), ripe papaya, dried peaches + <i>other locally available vitamin A-rich fruits</i>	
7	OTHER FRUITS	other fruits, including wild fruits	
8	ORGAN MEAT (IRONRICH)	liver, kidney, heart or other organ meats or blood-based foods	
9	FLESH MEATS	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
10	EGGS	chicken, duck, guinea hen or any other egg	
11	FISH	fresh or dried fish or shellfish	
12	LEGUMES, NUTS AND SEEDS	beans, peas, lentils, nuts, seeds or foods made from these	
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
14	OILS AND FATS	oil, fats or butter added to food or used for cooking	
15	REDPALM PRODUCTS	Red palm oil, palm nut or palm nut pulp sauce	
16	SWEETS	sugar, honey, sweetened soda or sugary foods such as chocolates, candies, cookies and cakes	
17	SPICES, CONDIMENTS, BEVERAGES	spices(black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages OR <i>local examples</i>	

Question Number	Food group	Examples	YES=1 NO=0
			YES=1 NO=0
Individual level only	Did you eat anything (meal or snack) OUTSIDE of the home yesterday?		
Household level only	Did you or anyone in your household eat anything (meal or snack) OUTSIDE of the home yesterday?		

3 Dietary Diversification Questionnaire

APPENDIX F



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

ETHICS COMMITTEE
Faculty of Natural and Agricultural Sciences

28 September 2012
Prof A Oelofse
Department of Nutrition
University of Pretoria
Pretoria
0002

Dear Prof Oelofse

EC120807-069 Perceptions of hunger food security and nutrition knowledge, attitude and behaviour of households in a resource poor community

The project conforms to the requirements of the Ethics Committee.

Kind regards

Prof NH Casey
Chairman: Ethics Committee

Agriculture Building 10-20
University of Pretoria
Private bag X20, Hatfield 0028
Republic of South Africa

Tel: 012 420 4107
Fax: 012 420 3290

ethics.nas@up.ac.za

Open Rubric