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**Nutritional status and the use of Child Support Grant among children, 6 to 23
months, visiting 3 local clinics in the Dihlabeng Local Area,
Thabo Mofutsanyana District, Free State**

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**Dissertation submitted in accordance with
the academic requirements for the degree**

Magister Dietetics

in the

Faculty of Health Sciences

Department of Nutrition and Dietetics

University of the Free State

Bloemfontein

South Africa

January 2018

Study Leader: Prof VL van den Berg

DECLARATION

I, Carol Symington, declare that the master's research dissertation that I herewith submit to the University of the Free State, is my independent work and that I have not previously submitted it for a qualification at another institution of higher education.

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"We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the foundation of life. Many things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer: tomorrow, His name is TODAY. "

- Gabriele Mistral, 1948-

I dedicate this work to all the children who lost their lives too early due to malnutrition, specifically in the Dihlabeng Local Area, and to those who are currently suffering the consequences of childhood malnutrition. I will continue to fight for you.

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LIST OF ABBREVIATIONS

CASE	Community Agency for Social Enquiring
CCHIP	Community Childhood Hunger Identification Project
CSG	Child Support Grant
CVD	Cardiovascular disease
DDS	Dietary diversity score
DLA	Dihlabeng Local Area
DSD	Department of Social Development
ECD	Early childhood development
GHS	General household survey
IQ	Intelligence quotient
MAD	Minimum acceptable diet
MDG	Millennium development goals
MGRS	Multicentre growth reference study
MMF	Minimum meal frequency
MUAC	Mid-upper arm circumference
NCD	Non-communicable disease
PAHO	Pan American Health Organisation
PPR	Persons per room
SADHS	South African Demographic and Health Survey
SANHANES	South African National Health and Nutrition Examination Survey
SASSA	South African Social Support Agency
SDG	Sustainable development goals

T2DM	Type 2 Diabetes Mellitus
UNICEF	United Nations Children's Emergency Fund
USA	United States of America
WHO	World Health Organization

CHAPTER 1: ORIENTATION AND MOTIVATION

1.1 Introduction

Section 28(1) of the Constitution of South Africa states that every child has the right to basic nutrition (South Africa, 1996). At national level, South Africa, produces, imports, retains and sustains sufficient food to support minimum per capita nutritional standards of its population (Shisana et al., 2013; Labadarios et al., 2009). Yet, malnutrition amongst South African children younger than five years, which is closely linked to poverty and household food insecurity, remains unacceptably high (Statistics South Africa, 2017; Shisana et al., 2013).

Section 27(1)(c) of the South African Constitution provides that everyone has the right to have access to social security. If parent-caregivers are unable to support themselves and their dependants, appropriate social assistance should be accessible (Jansen van Rensburg & Lamarche, 2005). The Child Support Grant (CSG) is one of the largest anti-poverty mechanisms ever to be introduced in South Africa and was implemented as an unconditional cash transfer programme to combat food insecurity and malnutrition amongst young children (Ferreira, 2017; Nkosi, 2011; Lalthapersad-Pillay, 2007). The validity of the CSG in South Africa and whether it accomplishes its objectives to address food insecurity, poverty and malnutrition, remains in question (Ferreira, 2017; Richter, 2009).

This chapter summarises the background information, defines the problem statement, and outlines the aim and objectives of the study, as well as the outline of the dissertation.

1.2 Childhood malnutrition

According to the World Health Organisation (WHO), malnutrition contributes to about 45% of deaths amongst children under five years of age which, in 2015, accounted for the loss of 5.9 million children globally (WHO Regional Office for Africa, 2017). Compared to the 12.7 million deaths recorded in 1990 in this age group, this constituted a drop in mortality from 35 000 deaths per day in 1990, to 16 000 deaths per day in 2015 (WHO Regional Office for Africa, 2017). In 2016, the WHO indicated that an estimated 41 million children under five years were overweight or obese, 159 million suffered from stunting (chronic malnutrition), and 50 million were found to be wasted (acute malnutrition) (WHO, 2018).

1.2.1 Definition of childhood malnutrition

Malnutrition is defined as the state of being poorly nourished and refers to both undernutrition and over nutrition, resulting from deficiencies, excesses or imbalances of macro and micronutrients (WHO Regional Office for Africa, 2017; Blössner & De Onis, 2005). Malnutrition due to undernutrition and micronutrient deficiencies in the short-term results in acute malnutrition known as underweight (being too thin for age) and wasting (being too thin for height). In the long-term chronic malnutrition gives rise to stunting (being too short for age). The effect of chronic malnutrition at a young age on growth and development, is irreversible (The Mother and Child Health Education Trust, 2017; Jackson, 2003; Stratton et al., 2003). In addition, undernutrition and micronutrient deficiencies impair immune functions, making children vulnerable to infectious disease (Food and Agriculture Organization of the United Nations (FAO) et al., 2017).

Conversely, overweight and obesity causes metabolic disturbances that tracks into adulthood, thus, increasing the risks for non-communicable diseases (NCD), such as Type 2 Diabetes Mellitus (T2DM), hypertension and cardiovascular diseases (CVD) later in life (NCD Risk Factor Collaboration, 2017). Moreover, overweight and obesity does not necessarily result from eating too much, but may also be associated with eating food of a poor quality due to poverty (FAO et al., 2012).

A double burden of malnutrition is evident in developing countries, including in sub-Sahara Africa, where both undernutrition or over nutrition often co-exist in the same communities and even within the same households (FAO et al., 2017; United Nations Children's Emergency Fund (UNICEF), 2013; Aguero et al., 2006; Nelson, 2000).

1.2.2 Aetiology of childhood malnutrition

Factors contributing to malnutrition include disease, infection, food insecurity, poor socio-economic status, lack of education and unemployment (WHO, 2018; UNICEF, 2017). UNICEF developed a conceptual framework of the causes and contributing factors of malnutrition in children (UNICEF, 1991). The contributing factors are grouped into immediate, underlying and basic causes.

Household food security, one of the objectives of the research, is an underlying cause of malnutrition. A household is food secure when all the people in the household have enough food to eat at all times; thus when physical, social and economic access to safe and nutritious food that meet the daily nutritional requirements for an active and healthy lifestyle is ensured for everyone in the household (Grobler, 2015; Dlamini, 2014; FAO, 2013). The four main components of food security, are food availability, access to food, food reliability and food distribution (Grobler, 2015; Dlamini, 2014; FAO, 2013; du Toit et al., 2011; Bokeloh et al., 2009).

Families burdened with poverty struggle to afford nutritious food necessary for growing children. Food and drinks high in fat and sugar are usually more affordable options and often replace healthy food such as fruit, vegetables, legumes, meat and eggs, aggravating the prevalence of malnutrition in children (WHO, 2016). Analysis of recent data from 87 countries indicated that the rate of stunting amongst the poorest children are more than twice that amongst the richest. In addition, children born into the poorest 20% of households are twice as likely to die before the age of five years, compared to those born into the richest 20% (UNICEF, 2016).

The global estimated number of people experiencing chronic hunger and food insecurity drastically increased from 1990 to 2007. An increase in food prices and lowered food production around the world were some of the main causes. In South Africa, approximately 14 million people are affected by food insecurity. According to the most recent nationally representative survey in 2012, 54.4% of South African households were not food secure, with 28.3% being at risk of hunger and 26.0% experiencing hunger (Shisana et al., 2013). Rural households, specifically black South African citizens, were mostly affected. Socio-economic, political, ecological and climate factors have been identified as factors that contribute to food insecurity (Shisana et al., 2013) since unemployment and poverty are linked to a decline in workforce, it will result in less purchasing power and food insecurity, which directly contributes to malnutrition (Bonti-Ankomah, n.d.).

The UNICEF conceptual framework of the causes and contributing factors of malnutrition in children, is discussed in detail in chapter 2.

1.2.3 Consequences of childhood malnutrition

Malnutrition influence children from the earliest developmental stages, preventing over 200 million children from developing to their full potential (Grantham-McGregor et al., 2007). Those who survive malnutrition often suffer severe consequences and carry the effects with them into adulthood. Children, who experience weight loss and stunting, grow into adults with poor cognitive and physical development, lower IQ's and higher susceptibility to both infectious diseases, as well as NCD (Grantham-McGregor et al., 2007).

Not developing to full cognitive potential, results in poorly educated adults, which in addition to poor health, contribute to high levels of unemployment and continue the cycle of poverty. High poverty and unemployment rates, in turn, affect the economy and place huge burdens on governments to provide for these families. A vicious malnutrition cycle occurs where malnourished children grow into malnourished adults who themselves give birth to malnourished children (Black et al., 2013; Nyaradi et al., 2013). Overall, the cost of malnutrition remains a major public expenditure putting huge pressure on developing economies (Blössner & De Onis, 2005).

1.3 The scope of malnutrition in South Africa

Based on United Nations estimates, in December 2017, the population of South Africa was approximately 57 million with 15,8 million being under the age of 15 years (United Nations, Department of Economic and Social Affairs, 2017). South African statistics indicate that 75 000 children die before the age of five years, with this number increasing yearly. Malnutrition in South Africa contributes to 63.5% of deaths in children under five years of age (Statistics South Africa, 2017).

The South African Demographic and Health Survey (SADHS) of 2016 indicated that 7% children under the age of five were underweight for age, 3% were wasted, and 37% of the children were stunted (27% moderately and 10% severely); in contrast, 13% percent of children were overweight (National Department of Health et al., 2017b). Thus, improving child health should be a priority for the South African government (De Lannoy et al., 2015).

1.4 The Child Support Grant

The government of South Africa has a constitutional commitment to ensure income security for all its citizens (Ferreira, 2017; Richter, 2009). The CSG is one of the largest anti-poverty mechanisms ever to be introduced in South Africa and commenced in 1998 as a monthly allowance of R100 per child. The CSG was introduced as an unconditional cash transfer program to combat food insecurity and malnutrition amongst young children (Ferreira, 2017; Nkosi, 2011; Lalthapersad-Pillay, 2007). At the time of this study, the CSG amounted to R350 per month per child and was paid out until the age of 18 years. For successful application for the CSG, beneficiaries must be younger than 18 years, must be a South African citizen permanently residing in South Africa, and must be cared for by a caregiver with a single income of less than R3 300 per month or a joint income of less than R6 600 per month (Ferreira 2017; De Lannoy et al. 2015; Udjo 2013; Lalthapersad-Pillay 2007; Brand 2002).

At the beginning of 2017, the CSG were paid out to 12.1 million beneficiaries (Ferreira, 2017). An UNICEF impact assessment report of 2012 (DSD et al., 2012), comparing 10-year olds and 15 to 17 year-olds from five provinces in South Africa, concluded that the CSG does promote child development and nutritional, educational and health outcomes in South Africa.

According to the South African Child Gauge (Grinspun, 2016), despite the small amount of R350, the CSG contributes to improved food security, nutritional status of children, wider variety of food intake, increased crèche attendance, increased employment and improved health. However, contradicting evidence was also available, where no difference in growth between CSG and non-CSG recipients were found (Zembe-Mkabile et al., 2015). It was indicated that the CSG was too little to supply nutritious food, as the rand value of CSG stays the same, but food prices constantly rises. The CSG was also used for different needs, therefore the burden of stunting and poor growth amongst children six to 23 months, remained high (Zembe-Mkabile et al., 2015).

South African evidence, and especially in the Dihlabeng Local area (research area), is limited with regards to how the CSG is being spent, the impact of the CSG in reducing malnutrition amongst under two year olds, and whether it alleviates household food security amongst South African children (Alderman 2014; Manley 2012).

1.5 Problem statement

The Free State Province, the second smallest of the nine provinces in South Africa, had a population of 2.8 million people according to the intercensal survey in 2016, which is also the latest available data (Statistics South Africa, 2016). Males contributed to 58.3% of the population in 2016 (Statistics South Africa, 2016).

For local government purposes, the province is divided into one metropolitan municipality (Mangaung) and four district municipalities, which are in turn divided into eighteen local municipalities or local areas (Figure 1.1). The Thabo Mofutsanyana district had a population of 736 238 people and 246 171 households in 2016 (Statistics South Africa, 2016) The district is subdivided into five sub-districts or local areas, namely Setsoto, Dihlabeng, Nketoana, Maluti-A-Phofung and Phumelela. The main town situated within the Dihlabeng Local Area (DLA), is Bethlehem, which had a population of 16 236 in 2011 (Statistics South Africa, 2016). Data is limited to the 2011 Census which reported a total population of 128 704 for the DLA (Statistics South Africa, 2016). Census 2011 reported 28.7% unemployment rates within the DLA, 10.6% of the population aged 20 years and older had higher education with 8.9% having no schooling (Statistics South Africa, 2016).

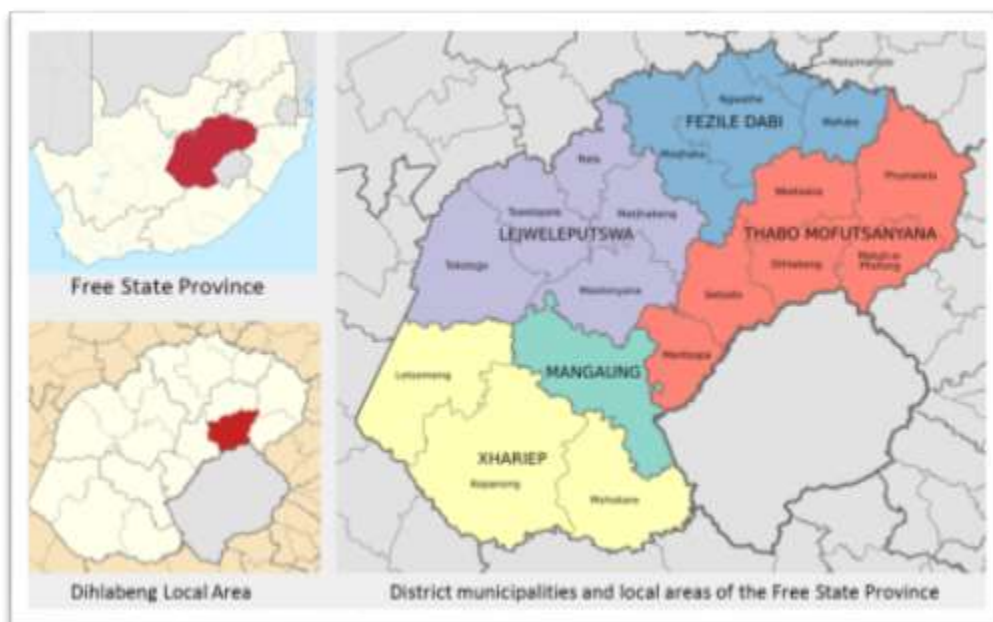


Figure 1.1: The Free State Province 2016 boundaries (Municipal Demarcation Board. 2016. Retrieved from (<http://www.demarcation.org.za/site/shapefiles/>)

1.5.1 The scope of malnutrition and food insecurity in the Free State Province and the Dihlabeng Local Area

The Free State Province also suffers the burden of malnutrition. According to the SADHS 2003, more than 15% of children in the Free State Province were underweight (Department of Health et al., 2007); by 2012, SANHANES-1 reported that underweight decreased to 5% (Shisano et al., 2013) (Figure 1.2).

Similarly, almost 35% of children in the Free State Province were stunted in 2003 (thus, suffering from chronic malnutrition); by 2012, SANHANES-1 reported a prevalence of just below 30% (Shisano et al., 2013) (Figure 1.3). Stunting in children zero to five years were the highest in the Free State Province. More recently, the SADHS 2016 reported that the prevalence in the Free State was 0.9%, for underweight, for wasting, 6.1%, and for stunting, 43.8% (National Department of Health et al., 2017).

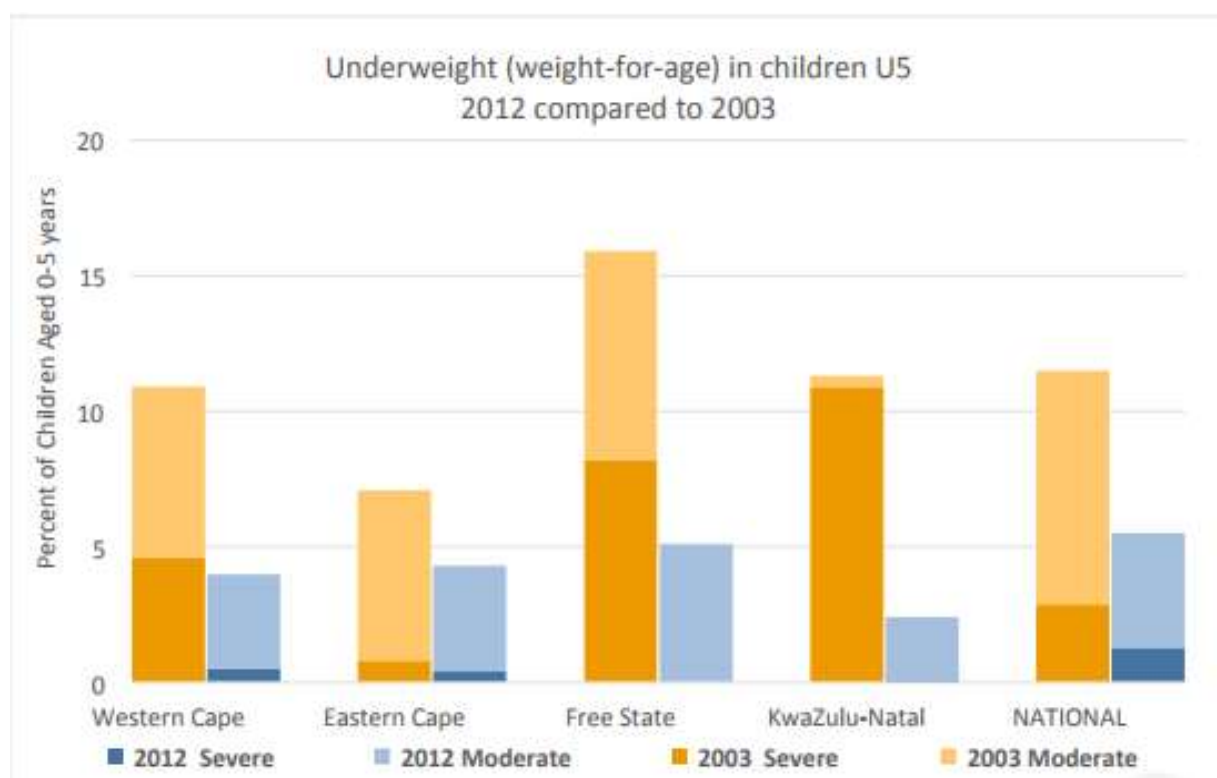


Figure 1.2: Changes in underweight for age amongst children under 5 years from 2003 to 2012 (Department of Health, 2014)

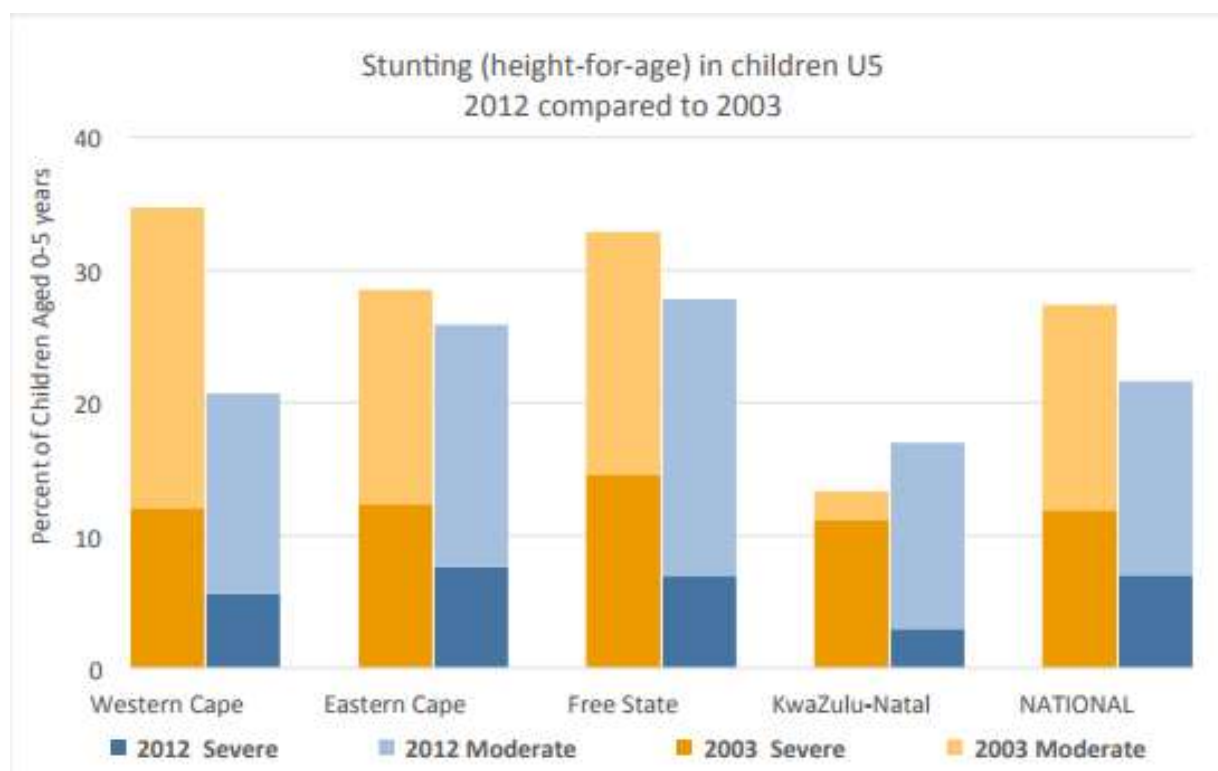


Figure 1.3: Changes in stunting amongst children under 5 years from 2003 to 2012 (Department of Health, 2014)

Health Systems Trust, an organisation responsible for publishing the District Health Barometer, indicated the severe acute malnutrition fatality rate in Thabo Mofutsanyana District 2015/2016, 7.5%, indicating a decrease from 16.6% in 2013/2014 (Massyn et al., 2016). The District Health Barometer is an annual publication providing an overview of data from the public health sector in South Africa.

In 2009, food insecurity prevalence in the Free State Province was the highest in the country. By 2011, as can be seen in figure 1.4, food insecurity in the province decreased and the Free State Province was ranked sixth in the country (John-langba, 2012). Data from the Community Survey 2016, showed that 23.4% of households in the Free State Province ran out of money to buy food in the 12 months prior to the survey and 148 697 people skipped meals (Statistics South Africa, 2016).

At the time of the study, no published data specifically related to malnutrition or any related factors, such as household food security or dietary intakes, could be found for the DLA. There

were also no available data concerning the uptake of the CSG within the DLA area, Free State Province.

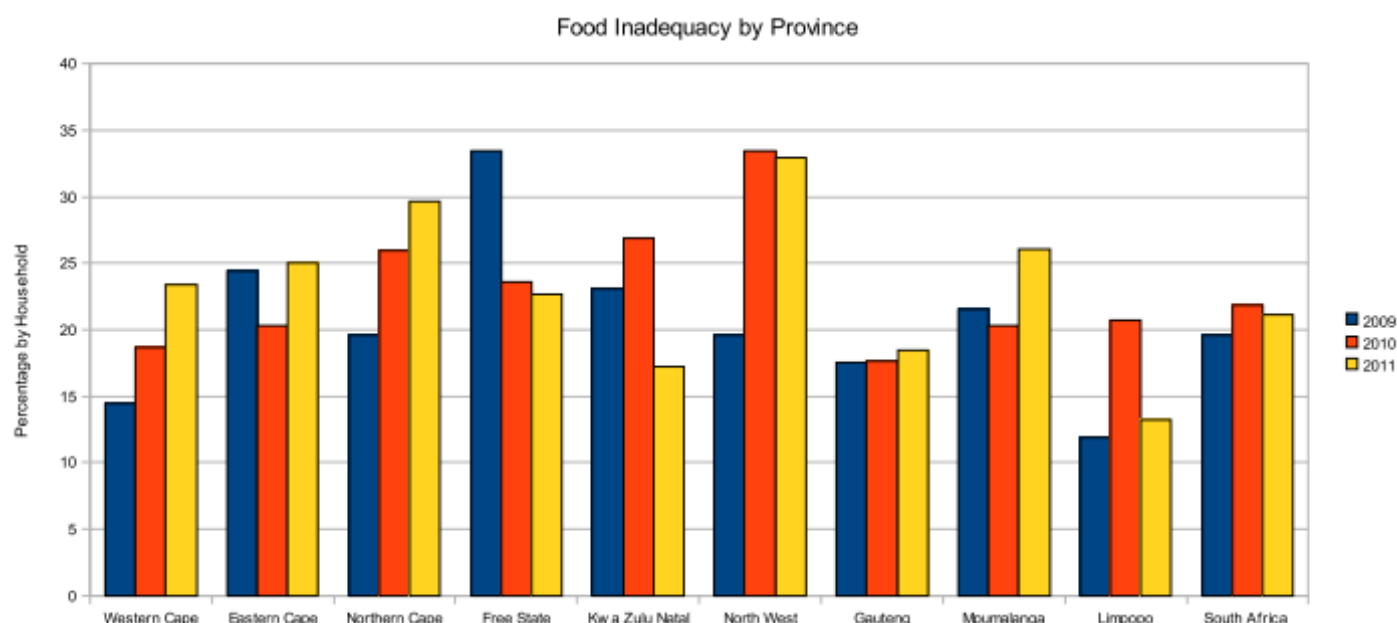


Figure 1.4: Food inadequacy by province (John-langba, 2012)

1.5.2 The Child Support Grant in the Free State Province and the Dihlabeng Local Area

At the end of March 2015, South Africa issued CSG to 11.7 million children and the Free State Province alone issued the CSG to 656 464 children. For the Dihlabeng Local Area, data were not available at the time of the study with regards to the uptake of the CSG in this area (De Lannoy et al. 2015; Department of Health 2013; Massyn et al. 2013).

Social support grants in South-Africa and the impact thereof have inconsistent results with regards to food insecurity, malnutrition prevention and dietary intake. The uptake and spending of the CSG in the Dihlabeng Local Area is unknown and no studies could be found with regards to the impact of the CSG on the children's nutritional status. Whilst some research did indicate that the CSG have a positive impact in families of poor social circumstances and that the main use is for food, statistics with regards to the nutritional status of the CSG recipients and spending patterns of the CSG in the Dihlabeng Local Area, are not available.

1.5.3 Research gaps

At the time of this study, no published research was available regarding the socio-demographics and nutritional status of children aged six to 23 months, or regarding the usage of the CSG, in the DLA of Thabo Mofutsanyane, in the Free State. Health care workers including the researcher who was working as a Dietitian for nine years in the study area, came under the impression that malnutrition was a significant burden in this rural area and that the dependence on the CSG was very high.

This study aimed to provide baseline data regarding these issues amongst the youngest children, most vulnerable to the long-term effects of chronic malnutrition, in the Dihlabeng community.

1.6 Aim of the study

The aim of this study was to determine the nutritional status and the use of the CSG amongst children, 6 to 23 months old, who visited three local clinics in the DLA, Thabo Mofutsanyana District, Free State.

1.7 Objectives of the study

To achieve the aim, the objectives were to determine the following for the participants:

- i. Socio-demographic information (gender, age, number of people in the household, marital status and education level of the primary caregiver, total household income, amount of money spent on food, available household resources);
- ii. Nutritional status of the participant based on:
 - a. WHO growth standards (using weight, height and mid-upper arm circumference (MUAC) for age); and
 - b. Child feeding practices (using the following WHO indicators: minimum dietary diversity score, minimum meal frequency and minimum acceptable diet, continued breastfeeding at one year, introduction of solids, semi-solid or soft foods, continued breastfeeding at two years and age-appropriate breastfeeding, meals received at the crèche, breastfeeding status, as well as the formula milk usage);

- iii. Household food security; and
- iv. Use of the Child Support Grant.

1.8 Layout of the dissertation

Chapter 1 outlines the background and motivation, as well as the problem statement, aim and objectives of the study. Chapter 2 is an in-depth literature review related to the research topic. Chapter 3 summarised the study design, sampling, the variables measured, the methods of data collection and analysis, as well as the ethical considerations for the study. The results of the study is summarised in Chapter 4 and discussed in chapter 5. Conclusions are drawn in chapter 6 and recommendations are made for future practice and research.

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CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Malnutrition, the vicious cycle aggravated by poverty and disease, influence children from the earliest years of their life, preventing millions of children from ever reaching their full potential. Factors contributing to malnutrition includes disease, infection, poor food quality, limited access to food and poor socio-economic status. Yearly, 5.9million deaths are reported among children below five years, furthermore 159 million children were stunted, 50 million wasted and 41 million suffering from overweight and/or obesity in 2015 (WHO, 2018; WHO Regional Office for Africa, 2017). There is a worrisome trend as childhood overweight is increasing, causing the co-existence of both under- and overnutrition in households, and has been well-established that a foetus that is growth-impaired in utero undergoes specific physiological adaptations to utilise whatever nutrition it can to survive. These adaptations can lead to future weight gain (Black et al., 2013). The prevention of childhood overweight would be much easier to achieve than the reversal thereof (FAO et al., 2017).

In this chapter, the background literature related to childhood malnutrition, specifically in children aged six to 23 months, including the risk factors, outcomes and methods of assessments, as well as the CSG, is explored.

2.2 Malnutrition in children

Malnutrition in children under five years of age remains a worldwide life-threatening condition of significant public concern (Bocquenet et al., 2016). Malnutrition is a common problem faced by communities and is often under-diagnosed and untreated. As early as the 1990s, results of the first epidemiological study on malnutrition published by Pelletier et al. (1993, as referenced by Blössner & De Onis, 2005) found that malnutrition and infectious disease aggravates each other and that the risk of mortality was directly related to weight-for-age. Malnutrition presents in the form of underweight-for-age, wasting and/or stunting. Children found to be severely wasted or stunted have a mortality risk that is, respectively, 11.6 and 5.5 times higher than children with a normal weight-for-height and height-for-age. Even, moderately wasted children are 3.4 times more likely to die than children with a normal

nutritional status. Those who survive malnutrition often suffer severe consequences, and the effects track into adulthood (Blössner & De Onis, 2005).

Growth disruptions in children have detrimental effects on their cognitive development, which include mental functions such as attention, memory, thinking, learning and perception. Malnutrition has long-term implications on children's education, beyond the fact that malnourished children have lower energy levels which results in a lack of interest to learn (Black et al., 2013; Nyaradi et al., 2013).

Research has linked better cognitive development to more successful schooling with increased adult productivity. Education has also been linked with better personal health, which contributes to better jobs, higher income, higher socio-economic status, better health care access and housing, as well as an overall improved lifestyle, nutritional status and physical activity (Black et al., 2013; Nyaradi et al., 2013). Malnourished children become adults with lower educational achievements and reduced future workforce, leading to poor economic growth and a future drain of resources (Rosati et al., 2013; Thapa et al., 2013). Research shows that education increases self-esteem which motivates for better health behaviour (Black et al., 2013; Nyaradi et al., 2013). A population's primary indicator of wealth are directly linked to the population's nutritional status (Rosati et al., 2013; Thapa et al., 2013).

Childhood stunting most likely takes place within the first 1000 days after conception. Stunting in children are associated with over-nutrition in adult life due to nutritional deprivation during infancy; causing permanent metabolic changes in adulthood (Black et al., 2013; Nyaradi et al., 2013). Nutritional deprivation slows down infant growth to preserve nutrients for vital functions of the body, which results in heightened risk of developing hypertension, cardiovascular disease and type 2 diabetes. The risk further increases if accompanied by weight gain and obesity from two years of age (Prendergast & Humphrey, 2014; Victoria et al., 2008).

Other consequences of malnutrition in children are decreased muscle function, which, in turn, affects the function and recovery of every single organ system in the body. The first sign of malnutrition is usually weight loss, which occurs due to the depletion of fat stores and muscle mass, including organ mass (Jackson, 2003; Stratton et al., 2003). Cardio respiratory functions

are also decreased due to malnutrition. As the cardiac muscles reduce, a decreased cardiac output is observed which also affects renal function by reducing renal perfusion and glomerular filtration rate. Micronutrient deficiencies also affects cardiac function (Silverman et al., 2016; Briend et al., 2015; Genton et al., 2015).

Adequate nutrition is necessary to ensure proper gastrointestinal function. A child suffering from chronic malnutrition will have changes in pancreatic exocrine functions, intestinal blood flow, villous architecture and intestinal permeability. The colon loses its ability to reabsorb water and electrolytes, causing secretion of ions and fluid into the small and large bowel, resulting in diarrhoea, which increase the risk of mortality. Children with malnutrition also have an increased risk of infection due to a decline in immune function, leading to early morbidity and mortality (Genton et al., 2015; Rytter et al., 2014).

2.3 Prevalence of malnutrition

Multiple malnutrition burdens are said to be the “new normal” as countries are increasingly dealing with the complex complications of malnutrition. Nearly every country in the world is affected by this burden, as it crosses generations and is now becoming of world-wide concern (Haddad, 2015). The causes and determinants of childhood malnutrition are multifaceted and consistent and if a decrease in the prevalence of malnutrition should be achieved, the most important causes of malnutrition should be understood (Abera et al., 2017).

2.3.1 Global prevalence of malnutrition

The latest global statistics as shared by UNICEF (2016), was the 2014 statistics concluding that an estimated 41million children under the age of five were overweight, 159million were stunted and 50million were wasted (UNICEF, 2016). A report by Save The Children predicted that within the next 15 years, a global total of 450million children will be affected by stunting (Rawe et al., 2012).

The United Nations developed the Millennium Development Goals (MDGs) in 2000, with the aim to reduce childhood mortality by decreasing poverty and hunger by the year 2015. The WHO’s 2016 follow-up report on the progress and achievements of the MDG’s presented that progress have been made with regards to nutrition, but that not all targets to reduce childhood mortality were met. Figure 2.1 and Figure 2.2 show the decrease in stunting,

underweight and mortality rate since 1995. Africa and South-East Asia have decreased their underweight-for-age rate from 25% in 1990, to 14% in 2015 (WHO, 2015; Marriott, et al. 2012).

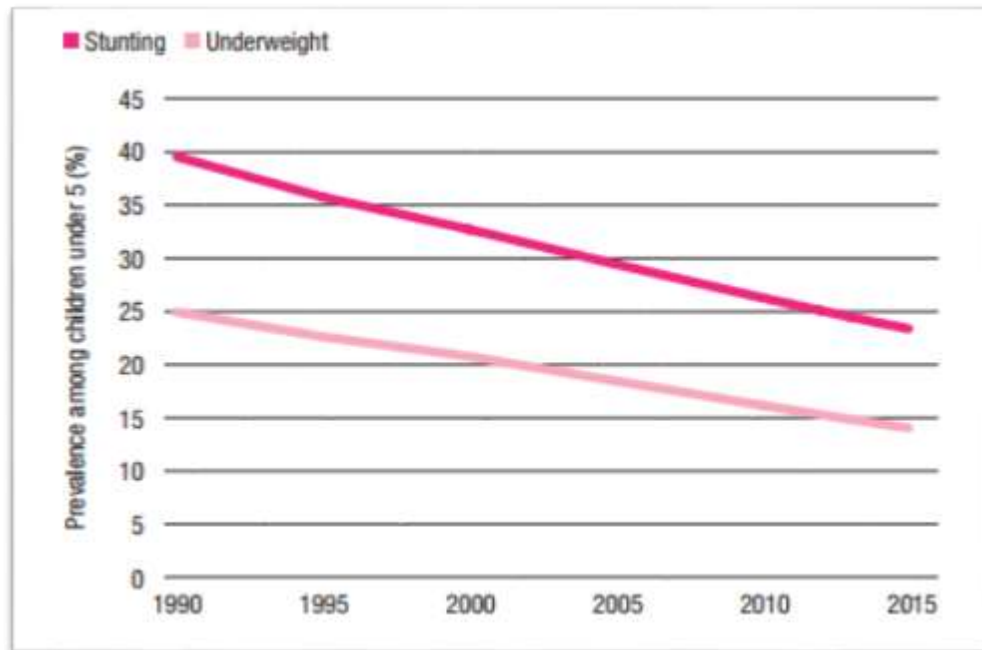


Figure 2.1: The decrease in global prevalence of stunting and underweight in children under 5 years from 1990-2015 (WHO 2015).

In 2016, the Sustainable Development Goals (SDGs) replaced the MDGs (WHO, 2015). A new target for childhood mortality and preventable deaths for children under five years of age were set.

The aim of the SDGs is to stop all forms of malnutrition by the year 2030, as not only severe cases, but also mild cases of malnutrition can lead to death (WHO, 2015).

Investing in the nutritional status of women plays an important role in ensuring child health. Many factors contribute to this global concern as malnourished mothers give birth to low birth weight babies; mothers who are stunted may give birth to babies whose growth in the womb is restricted, illustrating an intergenerational effect of stunting. Infants born small-for-age due to intrauterine growth restriction, are at increased risk for complications before, during and shortly after birth. Infants with low birth weight. In return, are at an increased risk for infection, disease and premature death. New born mortality occurs in 80% of low birth weight babies. Infants with low birth weight lead to malnourished future mothers and

this malnutrition cycle continues over generations (Salam et al., 2014; Black et al., 2013; Rosati et al., 2013; Thapa et al., 2013).

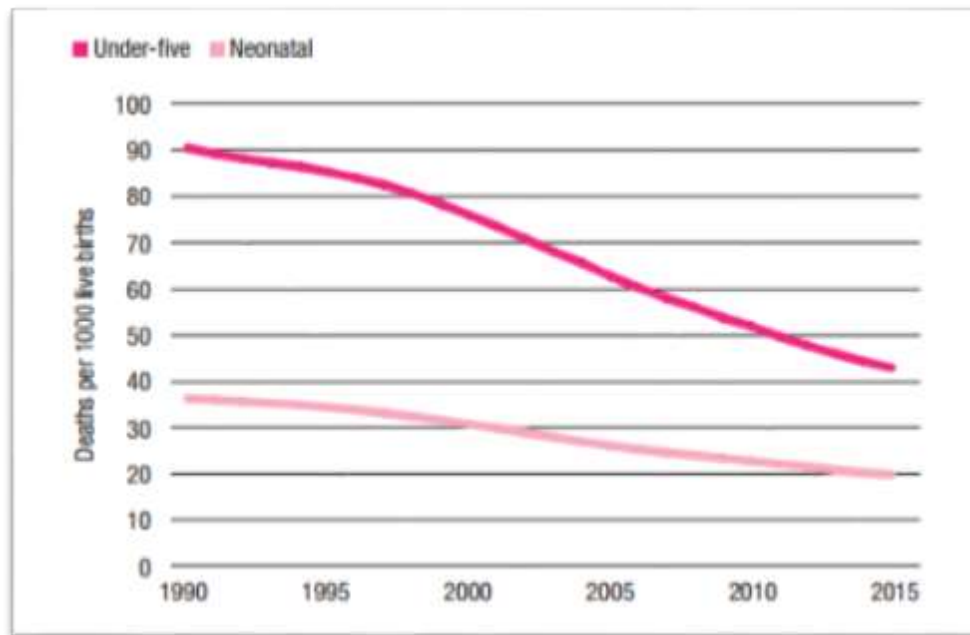


Figure 2.2: Global trends in mortality of under 5 year olds from 1990-2015 (WHO, 2015).

2.3.2 The prevalence of malnutrition in South Africa

In sub-Saharan Africa, 40% of under-five year-olds are estimated to be stunted; this is the highest rate of all global regions (de Groot et al., 2015). South Africa's population consist of just more than 57million people (December 2017) with 15.8million being under the age of 15 years (United Nations, Department of Economic and Social Affairs, 2017). Of those, 75 000 children die before the age of five years, increasing every year. Malnutrition in South Africa contributes to 63.5% of deaths in children under five years of age (National Department of Health et al., 2017).

As already indicated, the South African Demographic and Health Survey (SADHS) of 2016, specified that 7% of children under the age of five were underweight, 3% were wasted, and 37% were stunted. Stunting prevalence was higher in among males (30%) than females (25%). There were 3% of children who were wasted and 7% who were underweight, 13% of the sample suffered from overweight, which was double that of the global overweight average

(6.1%) (National Department of Health et al., 2017; International Food Policy Research Institute, 2016).

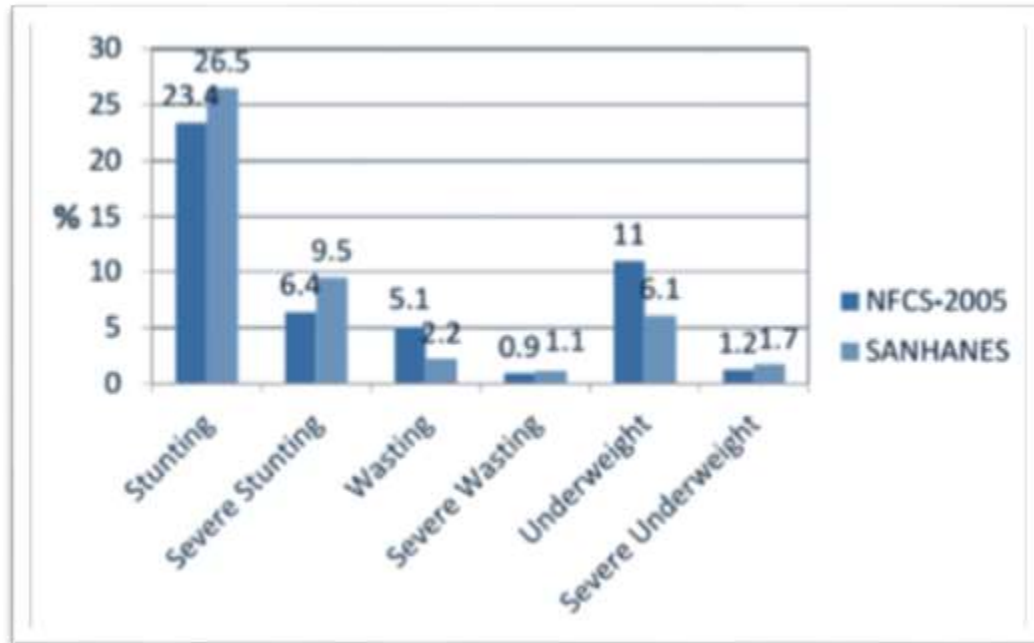


Figure 2.3: SANHANES report on prevalence of malnutrition in children 1-3 years of age (Shisana et al., 2013).

Nationally representative data from SANHANES-1 conducted in 2012, indicated that malnutrition amongst children had increased in the one to three year age group since the National Food Consumption Survey in 2005. This is illustrated in Figure 2.3 (Shisana et al., 2013). Whereas SANHANES-1 found that 26.5% of South African children were stunted, the highest prevalence occurred in the one to three year age group, 3.3% were wasted and 7.8% were underweight.

Upon the release of the SANHANES results, the South African government developed the *National Plan for Children in South Africa 2012-2017* to combat malnutrition. The goals of this programme focus on the protection, promotion and support of safe feeding practices that will improve the nutritional status of all children. Government hopes to improve the growth of all children and to reduce malnutrition through this programmes (The Department of Women children and people with disabilities, 2012).

Other government strategies in place to prevent and manage malnutrition in South Africa, are the following (Department of Health, 2012):

- The Roadmap on Nutrition for South Africa 2010-2014;
- The Strategic Plan for Maternal, Neonatal, Child and Women's Health and Nutrition in South Africa;
- Promotion of healthy eating habits to prevent childhood malnutrition;
- Nutrition Information Systems (that identifies growth trends);
- Growth Monitoring and Promotion;
- Management of Children with Severe Acute Malnutrition; and
- The Vitamin A supplementation guidelines.

2.4 Causes of malnutrition

Researchers have tried to determine the exact cause of the overwhelming burden of childhood malnutrition (figure 2.4) that still exists in the world (Wazir et al., 2015; Pryer et al., 2004). Research by Wazir et al in 2015 in Pakistan, included hospitalised children under five years, and found the major contributing factors of malnutrition being illiterate mothers and fathers, unemployment, poverty, poor environmental and living conditions, delayed weaning, more than two children under five, mixed feeding, partial vaccination, fresh cow's milk usage and households with more than five children (Wazir et al., 2015). For South Africans, some of the contributing factors to malnutrition are said to be too small social support grants that do not meet all the needs and rising food prices (Enstrom & Pettersson, 2016). The WHO defines the cause of malnutrition as a lack of access to highly nutritious foods, in context of rising food prices, poor feeding practices, poor breastfeeding rates, improper introduction to solids, lack of food and infections (Enstrom & Pettersson, 2016).

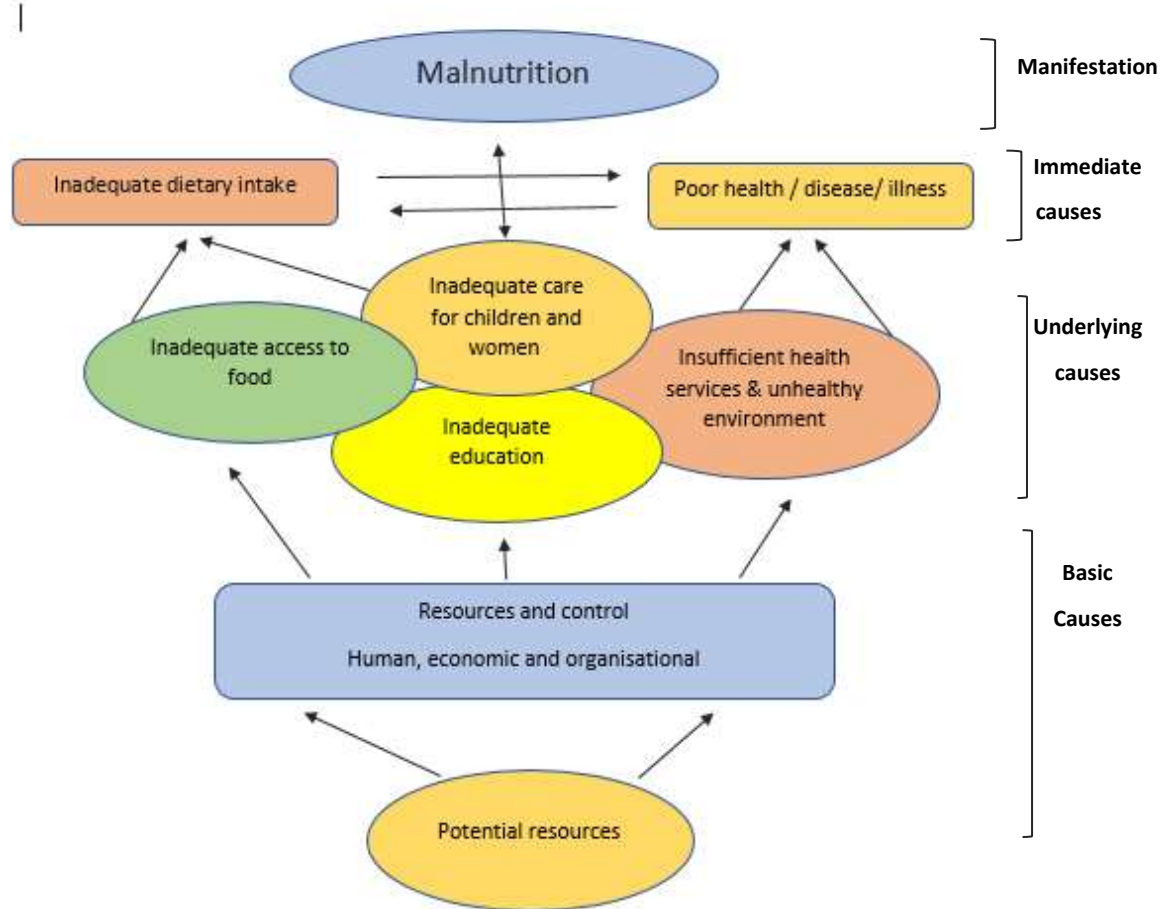


Figure 2.4: Causes of malnutrition (UNICEF, 1991).

UNICEF developed a conceptual framework, as seen in figure 2.4, of the causes and contributing factors of malnutrition in children (UNICEF, 1991). The contributing factors are grouped into immediate, underlying and basic causes.

2.4.1 Immediate causes of malnutrition

Illness and disease alone or in combination with an inadequate dietary intake, very quickly leads to malnutrition. An inadequate dietary intake due to inadequate breastfeeding practices, early or delayed complimentary food introduction, poor dietary choices or limited food intake, leads to weight loss, growth failure and a compromised immune system. Neglect, abuse, food taboos and cultural differences also plays a contributing role towards malnutrition and inadequate dietary intake. Inadequate dietary intake, poor health and illness as contributing factors will be discussed below (Tomkins & Watson, 1989; UNICEF, 1991; De Lange, 2010).

2.4.1.1 Inadequate dietary intake

Poor breastfeeding practices and too early or delayed complimentary food introduction result in an increased risk for infant mortality in the first two years of life, while optimal breastfeeding can decrease infant mortality by 13% (Black et al., 2013). Optimal adherence to exclusive breastfeeding could save the lives of 820 000 children younger than five (WHO, 2018). Breastfeeding remains the utmost form of nutrition designed by nature for all newborns and infants. Poor adherence to exclusive breastfeeding or untimely cessation of breastfeeding limits the protection that breastfeeding has against the development of diseases such as different infectious diseases, cardiovascular diseases, leukemia, necrotizing enterocolitis, celiac disease and a delay in cognitive development.

Poor adherence to exclusive breastfeeding and insufficient dietary intake. Breastmilk provides half or more of a six to 12 months old child's energy needs and one third of their needs from 12 months onwards. Breastmilk also potentially supplies critical nutrients during illness which decrease the mortality rate amongst already malnourished children (WHO, 2018). Malnutrition increase infection risk and acute phase malnutrition lead to anabolic and catabolic reactions which may result in loss of appetite causing decreased oral intake (Black et al., 2013).

The global report on the state of the world's children indicated that 39% of children below six months were exclusively breastfed during the period 2010-2015 (UNICEF, 2016), whilst for South African children, the SADHS 2016 indicated 32% of children exclusively breastfed at the age of six months. For South Africa this was an increase from the 7% in 1998 (National Department of Health et al., 2017). According to the SADHS (2016), 14% of infants below six months of age received plain water, 1% received non-milk products, 11% consumed other types of milk and 18% received solids as breastmilk substitutes. A quarter of the infants (25%) did not receive any breastmilk (National Department of Health et al., 2017a). The timely introduction of solids as well as appropriate solids, also play a role in malnutrition prevention. The SADHS 2016 indicated that only 23% of children six to 23 months, received a minimum acceptable dietary intake (National Department of Health et al., 2017a).

Error! Reference source not found. illustrates the cycle between disease and dietary intake. Poor dietary intake leads to disease and disease, in turn, leads to poor dietary intake.

Prolonged breastfeeding without proper introduction of solids at six months, lead to macro- and micronutrient deficiencies. Breastfeeding alone cannot meet the increased physiological needs of a growing child beyond six months of age. Worldwide, growth faltering and malnutrition usually occurs around six to 23 months, due to complementary food introduction. Continued breastfeeding whilst introducing solids, ensure the provision of all nutrients and ensure proper growth in length and weight (Horta et al., 2015; National Health and Medical Research Council, 2012; Rawe et al., 2012). Continued breastfeeding is very important to prevent malnutrition beyond six months, especially in households with low socio-economic status. Inadequate breastmilk replacement or even breastmilk substitutes such as formula milk, might lead to malnutrition. the reason being that caregivers over dilute formula milk to last longer, especially in low income countries (Horta et al., 2015; National Health and Medical Research Council, 2012; Rawe et al., 2012).

Cultural food practices such as food taboos and cultural beliefs often lead to malnutrition (Piercechi-Marti et al., 2006; Duggan & Golden, 2005; Zere & McIntyre, 2003). A child cannot obtain food for him or herself and is reliant on the primary caregiver for a nutritional sound diet (Piercechi-Marti et al., 2006; Duggan & Golden, 2005; Zere & McIntyre, 2003).

2.4.1.2 Poor health and illness

Inadequate dietary intake lowers the immune system which may lead to frequent illnesses and severe disease. Poor dietary intake can also independently contribute to higher mortality rates without the prevalence of disease or infections (Maseta & Am, 2008; Allen & Gillespie, 2001).

Disease and illness lead to higher energy expenditure, causing an increase in a child's energy needs. A sick child usually presents with a decreased appetite, often with vomiting and/or diarrhoea, causing nutrient losses and decreased absorption. These metabolic disturbances lead to unwanted weight loss and wasting (Torun, 2006; Golden & Golden, 2000; De Lange, 2010).

2.4.2 Underlying causes of malnutrition

Inadequate food access, poor care for women and children and the unavailability of adequate health services are all underlying causes of malnutrition. The inability to supply the necessary

health care for ill mothers and children, lead to a decrease in food consumption, whilst a food insecure household also lead to decreased consumption and food utilization, contributing to poor nutritional status (Bhatia et al., 2014; FAO, 2007).

2.4.2.1 Food insecurity

Food insecurity is influenced by food availability, food distribution, family size, gender equity and the overall socio-economic status of a household (Enstrom & Pettersson, 2016; Rawe et al., 2012). A household is deemed food secure when there is always adequate access to nutritious and safe food (De Lannoy et al., 2015; Labadarios et al., 2009). Rural households are more affected by food insecurity than urban households (Shisana et al., 2014). When a household is food insecure the children's dietary intake is usually insufficient. Hunger and food insecurity lead to additional stress in the household, which often increase emotional problems and neglect of children, causing a decrease in appetite (Play Therapy Africa, 2009). This may lead to unwanted weight loss and deficiencies of important macro- and micronutrients and subsequently malnutrition (Play Therapy Africa, 2009). Wasting, also often caused by disease, can be the result of short-term food insecurity or inadequacy, whereas stunting is caused by long-term food insecurity and dietary insufficiency (Black, 2012).

Household food insecurity can lead to increased hospitalisation due to poor health and malnutrition, iron deficiency can occur, developmental delay and behaviour problems can be found amongst food insecure children. These consequences lead to under-development, cognitive as well as nutritionally and lead to poor school performance. Low nutrient-dense foods are usually low cost and families often sacrifice diet quality just to be able to obtain some or other food sources to decrease the hunger pains (Black, 2012). These foods are usually high in energy, which can cause obesity, especially in children where stunting is already prevalent (Black, 2012). Less vegetables, fruit and proteins (including beans, legumes, meat, eggs) are consumed in food insecure households (FAO et al., 2017; Black, 2012).

2.4.2.2 Inadequate care for women and children

The National Department of Health stated that poor maternal health, poor nutritional status of the mother, anaemia, smoking, age, inadequate access to proper health care, sexually transmitted diseases and HIV, all contribute to malnutrition in children. Maternal

malnutrition also leads to low birth weight babies and underweight children. Furthermore, when a mother passes away due to inadequate care, the health of the child is at risk (Shoo, 2007; National Department of Health, 2003).

Mothers are mainly involved in food procurement, cooking and feeding of the children. Poverty and food insecurity decreases the capability of a mother to care for her children. Poverty often forces a mother to find employment and leave the children in the care of someone else (Shoo, 2007). Although employment can secure a household of income and alleviate poverty, leaving the children with a caregiver or crèche, can influence their nutritional status. Sometimes older children have to leave school to take care of their younger siblings or to find employment, leading to uneducated future mothers and children (Shoo, 2007; National Department of Health, 2003).

2.4.2.3 Insufficient health services and environment

Growth monitoring and promotion plays a major role in malnutrition prevention. Without adequate health services, whatever the reason, children are at risk of developing malnutrition. Rural communities often struggle to attend health services due to great travelling distances, long and tiring journeys and public transport problems (Enstrom & Pettersson, 2016). Local health services are also burdened with staff shortages, high volumes of patients and unavailability of necessary treatment or resources. Staff shortages lead to hasty, improper and inadequate nutrition screening and preventative counselling, leaving mothers uneducated and ill-informed regards to proper nutrition and infant feeding practices (Enstrom & Pettersson, 2016; Shoo, 2007; National Department of Health, 2003).

Overcrowding, sanitation problems, no access to safe and clean drinking water and overall poor hygiene lead to an unhealthy environment. In addition, uneducated mothers contribute to an unhealthy environment by not being able to ensure adequate hygiene in the household. Infections occur due to poor hygiene, such as improper hand washing, prolonged and improper storing of food, unsafe cooking methods, cooking with unclean water and eating unsafe food (Chena & Li, 2009; WHO, 2007; Abate et al., 2001).

Inadequate water, sanitation and hygiene could influence childhood nutrition through three ways, namely intestinal worms, environmental enteric dysfunction as well as the repeated prevalence of diarrhoea, through the exposure of enteric pathogens (Cumming et al., 2015).

A number of studies have indicated an association between water, sanitation and hygiene and childhood undernutrition (Mills & Cumming, 2016).

2.4.2.4 Inadequate education

Uneducated pregnant women, smoking, alcohol and unhealthy eating habits during pregnancy, contributes to ill- and malnourished children. Educated mothers tend to have healthier children (Enstrom & Pettersson, 2016). Poor knowledge concerning adequate child feeding practices leads to improper breastfeeding practices. Poor dietary intake, limited dietary variety, unsafe food preparation and inadequate portion sizes and infrequent meal times are all consequences of improper education (Enstrom & Pettersson, 2016).

Dangerous cultural beliefs and food taboos are also less likely prevalent amongst educated mothers. A mother's education was found to play a role in the nutritional status of her children (Enstrom & Pettersson, 2016; Chena & Li, 2009). Research among 130 malnourished children in Pakistan, found that 84.5% of the children had illiterate mothers (Wazir et al., 2015). The poverty rate of 73.1% could also be directly linked with inadequate education. Working mothers only constituted 3.1% of the research group. Very important lifesaving immunisations were also neglected in 43.1% of these children. Uneducated mothers tend to be unable to identify sick and malnourished children in time, which leads to delays in seeking medical care, contributing to untimely death (Wazir et al., 2015; Christiaensen & Alderman, 2004).

Over-crowded and under-staffed health care institutions contribute to lack of proper information given to mothers, regarding infant feeding. Nutrition counselling should be adapted to every mother and child's specific needs and socio-economic status to ensure malnutrition prevention (Enstrom & Pettersson, 2016).

2.4.3 Basic causes of malnutrition

Religion, culture, urbanisation, population growth, agriculture, war, political instability, environment and limited resources may contribute to malnutrition, also called the root causes of malnutrition. Reduced economic growth with increased demands aggravate poverty and when a community suffers from poverty, malnutrition occurrence is more prevalent (De Lange, 2010; Maseta & Am, 2008; Pryer et al., 2004).

2.5 Measuring the nutritional status of children 6-23 months old

Nutritional status of children is measured by using anthropometric measurements to assist in the early detection of ill health and malnutrition. Indicators that are used to accurately determine a child's nutritional status are weight-for-age, length-for-age and weight-for-length. These measurements are interpreted according to z-scores. Z-scores are standardised deviation values calculated from a reference population at a certain age, divided by the standard deviation for the same specific population (WHO, 2008c).

A weight-for-age below -2 z-score, indicates underweight and a weight-for-length score below -2 z-score indicates wasting (acute malnutrition). Wasting is an acute form of malnutrition indicating a recent tissue loss, often referred to as moderate and severe acute malnutrition. A length-for-age below -2 z-score indicates stunting, which indicates chronic malnutrition (WHO, 2008c)

2.5.1 Anthropometry

Anthropometry (Cogill, 2001), derived from the Greek word *Anthropos* (human) and *metron* (measure), is defined as the study and technique of measuring the body by taking measurements to compare or classify (Cogill, 2001).

Anthropometric measurements can be linked to overall health, survival rate, economic status and social well-being of children. These measurements are non-invasive and inexpensive (Sigulem, et al., 2000; Cogill, 2001).

In the 1990's the WHO concluded from an in-depth investigation that new growth references were necessary. In 2006, the WHO finally published a new set of growth standards for infants and children, based on the Multicentre Growth Reference Study (MGRS) (WHO Multicentre Growth Reference Group, 2006). This study followed the growth patterns of six cohorts including 8500 children living in relative well-to-do circumstances, in India, Norway, Oman, Brazil, Ghana, and the United States. The MGRS aimed to ensure optimal conditions for normal growth and development and to control sources of bias in order to establish growth standards that reflect how children should grow under ideal circumstances. The MGRS found striking similarity in linear growth of children among all the sites despite marked differences among the population and environmental, and concluded, "when health and key environmental needs are met, the world's children grow the same." Thus, the growth

indicators can be used to identify and classify malnutrition (WHO Multicentre Growth Reference Group, 2006).

The revised WHO International Growth Standards makes use of z-scores, or standard deviation scores, which allow for easy comparison of statistics, especially in group research. Table 2.1 shows the classification and interpretation of the different z-scores (WHO Multicentre Growth Reference Group, 2006; Allen & Gillespie 2001; Cogill 2001; Kumchulesi n.d.).

Table 2.1: Classification of z-scores (WHO, 2015)

Z-score	Length/height-for-age	Weight-for-age	Weight-for-length/height
Above 3			Obese
Above 2			Overweight
Above 1			Possible risk of overweight
0 (Median)			
Below -1			
Below -2	Stunted	Underweight	Wasted
Below -3	Severely stunted	Severely underweight	Severely wasted

2.5.1.1 Weight-for-age

Weight may be compared against the weight-for-age of the reference standard. A child is classified as being underweight-for-age when the z-score is below the -2 standard deviation or z-score for age for reference population. When the weight-for-age is below the -3 z-score, the child is classified as being severely underweight. The prevalence of underweight in children is less than the prevalence of stunting, as stunting is a more chronic type of malnutrition, linked with prolonged food insecurity. Due to stunting prevalence, a healthy child's weight-for-age can be below -2 z-score if a short stature is present. Weight-for-age should therefore not be interpreted without the other indicators to identify malnutrition (WHO, 2008; Allen & Gillespie, 2001).

2.5.1.2 Length-for-age

Length (or height in children older than two) may be compared against the length (height)-for-age of the reference standard. Length-for-age below the -2 z-score indicates stunting. A length below the -3 z-score for age indicates severe stunting. Stunting is more prevalent in children from the age of three months onwards and is a sign of chronic malnutrition, caused by food insecurity, food shortages, starvation or chronic infections. In healthy growing children, length increases rapidly during childhood (Marriott et al. 2012; UNICEF 2012). Stunting is a clear and reliable indicator of a population's socio-economic status and malnutrition prevalence amongst children (Black, 2012).

2.5.1.3 Weight-for-length

A child's weight may also be compared against the reference standard for length, to interpret weight-for-length. Weight-for-length indicates wasting in children when below -2 z-score. Wasting in children occurs due to acute and severe weight loss, mainly due to starvation, disease and poor living conditions. Wasting usually peaks at the age of two years. Alarmingly though, according to the WHO, populations who do not suffer from severe food insecurity, still have a 15% prevalence of wasting amongst children (WHO et al., 2010).

2.5.1.4 MUAC

Mid-upper arm circumference (MUAC) is a convenient, easy, quick and affordable measurement to use to detect malnutrition, to assess the need of nutritional intervention and to determine if nutritional status is improving or declining. MUAC measurements increase along a constant trajectory in children from one year of age onwards, with sudden changes indicating muscle wasting and malnutrition. In 2009, the WHO and UNICEF recommended the cut-off value for MUAC at 12.5cm, with a MUAC <12.5cm indicating moderate acute malnutrition and <11.5cm indicating severe acute malnutrition. Literature also indicates that a MUAC < 11cm increases child mortality (Nyirandutiye, 2011; Brown et al., 2009; WHO & UNICEF, 2009; Myatt et al., 2006).

2.6 WHO feeding indicators

In 2002, the WHO and Pan American Health Organization (PAHO) collaborated in developing specific indicators to assess and measure appropriate infant feeding practices. The goal of

these indicators was to prove that, when adhering to certain feeding practices, malnutrition can be decreased. In 2004, these indicators were finalised and have been used all over the globe to determine dietary patterns and dietary intakes of different population groups (Marriott et al. 2012; WHO 2010; Working Group on Infant and Young Child Feeding Indicators 2007). These indicators include minimum dietary diversity, minimum meal frequency, minimum acceptable diet, continued breastfeeding at one year of age and the introduction of solids or semi-solid food (Saaka et al. 2015; Marriott et al. 2012; Working Group on Infant and Young Child Feeding Indicators 2007). For the of this study research, only minimum dietary diversity, minimum meal frequency and minimum acceptable diet will be discussed.

2.6.1 Minimum dietary diversity

Minimum dietary diversity in children six to 23 months who received food from four or more different food groups during the previous 24 hours (Saaka et al. 2015; Marriott et al. 2012; Working Group on Infant and Young Child Feeding Indicators 2007). Dietary intake can be scored according the representation of seven basic food groups in the diet, these include: grains, roots and tubers, legumes and nuts, dairy products, flesh food (meat, fish, poultry, organ meat) and eggs, vitamin A rich fruit and vegetables and all other fruit and vegetables. Calculated from a 24-hour recall, children six to 23 months who received food from four or more of the seven food groups during the previous 24 hours are then classified as having adequate nutrient intake and minimal dietary diverse. A dietary intake of fewer than four food groups indicate inadequacy and a non-diverse diet (Dlamini 2014). The reason behind a minimum of four food groups is improved dietary quality, independent of breastfeeding (Dlamini 2014; Marriott et al. 2012; WHO 2010; Working Group on Infant and Young Child Feeding Indicators 2007; Swindale & Bilinsky 2006).

When investigating the minimum dietary diversity scores, data sets from 10 different countries were examined for the relationship between the indicators, the seven food groups and their mean micronutrient content. Upon analysing the micronutrients in these seven food groups, iron was excluded due to the limiting prevalence in almost all diets. Micronutrients included consisted of vitamin A, thiamine, riboflavin, vitamin B6, folate, vitamin C, calcium and zinc, for all breastfed infants six to 11 months, vitamin B12 for breastfed children aged 12 to 23 months and all the other non-breastfed children (Working

Group on Infant and Young Child Feeding Indicators, 2007). The aim was to establish whether consumption of four food groups would meet at least 75% or more of the required micronutrients, which would then subsequently ensure the intake of at least a fruit, a vegetable, an animal product and a staple food. Dietary diversity is positively associated with overall dietary quality and micronutrient intake, which, in turn, promote good health and prevent malnutrition (WHO, 2008; Working Group on Infant and Young Child Feeding Indicators, 2007).

Maternal education, age of children and the area of residence are proven to influence dietary diversity (Beyene et al., 2015; Herrador et al., 2015). In developing countries, dietary diversity should be met to prevent malnutrition. A non-diverse diet, especially in poor socioeconomic communities, mainly consist of starchy and plant-based foods with little or no animal products (Taruvunga et al., 2013; Thorne-Lyman et al., 2010; Thiele & Weiss, 2003).

Data from Sri Lanka, Ethiopia, Indonesia and Nepal showed that children 12-23 months of age had twice the odds of achieving appropriate dietary diversity than children six to 11 months, mainly due to a delay in adequate solid introduction (Beyene et al. 2015; Khanal et al. 2013; Mesele et al. 2013; Senarath et al. 2012). Minimum dietary diversity score is also associated with an increased length-for-age in children aged six to 23 months (Saaka et al. 2015; B. Marriott et al. 2012; Moursi et al. 2008; Arimond & Ruel 2004; Ferguson et al. 1993).

A link has been shown between minimum dietary diversity, improved nutritional status and socio-economic status. Hatloy et al (2000) found that in both urban and rural populations, dietary diversity score increased when socio-economic status improved. In rural areas where socio-economic status were lower, the minimum dietary diversity score were also decreased (WHO/PAHO, 2003). South African research in the Gauteng province, found a link between social support grants and dietary diversity (Grobler, 2015). Social support grants that contributed to more than 50% of the total household income, led to a lower minimum dietary diversity score due to food insecurity and the poor socio-economic status of those households, with support grants being the main income (Grobler, 2015).

The WHO recommends a dietary intake of a variety of food to ensure proper nutritional intake. Meat, poultry, fish or eggs should be eaten daily or as often as possible, and vitamin A rich fruit and vegetables should also form part of the daily diet. Drinks with low nutrient

content such as tea, coffee or sodas should be limited and should not replace nutritious food (WHO/PAHO, 2003).

2.6.2 Minimum meal frequency

Children from different age groups have different needs, therefore the number of meals required per day, differs. Achieving minimum meal frequency in children aged six to 23 months of age, indicates children who receive solid, semi-solid or soft foods for the prescribed minimum number of times or more during the previous 24 hours. For children six to eight months of age, the minimum meal frequency is two meal times and for nine to 23 months of age, three meal times per day (Marriott et al., 2012; WHO, 2010; Working Group on Infant and Young Child Feeding Indicators, 2007). For children who are not breastfed, an additional one to two cups of full cream milk and an extra one to two healthy snacks are required (Dlamini, 2014; Marriott et al., 2012).

Research in Ethiopia, Sri Lanka and India found that more children aged 12-23 months had achieved the minimum meal frequency score compared to children below 12 months of age. Prolonged breastfeeding without timely introduction of solids at 6 months were the main cause thereof (Beyene et al. 2015; Saaka et al. 2015).

2.6.3 Minimum acceptable diet

To meet the requirements for a minimum acceptable diet, breastfed and non-breastfed children six to 23 months of age, should achieve at least the minimum dietary diversity and minimum meal frequency (Marriott et al. 2012; WHO 2010; Working Group on Infant and Young Child Feeding Indicators 2007).

Results from the SADHS (2016) showed that only 16% of South African children aged six to eight months, as well as 16% aged nine to 11 months, had achieved the minimum acceptable dietary intake. There were less than a quarter (21%) aged 12 to 17 months and 31% of the 18 to 23 months old, who achieved the minimum acceptable diet. This might confirm the late introduction of solids, as the percentage of acceptable dietary intake only increase with later age (National Department of Health et al., 2017)

Research in 2014 conducted in Ethiopia indicated that only 4% of children included in the sample had a minimum acceptable diet, whereas in Ghana 27.8% of children in 1984 achieved

the minimum acceptable dietary intake. From the 27.8% children that achieved minimum acceptable dietary intake, 21.1% were found to be underweight-for-age, 11.5% were wasted and 20.5% were stunted (Beyene et al., 2015).

Data from 14 different countries indicated stunting amongst children six to 23 months old, due to not meeting the minimum acceptable dietary intake (Beyene et al. 2015; Saaka et al. 2015; Marriott et al. 2012).

2.7 Household food security

Food security may be divided into two sections, food security at national level and food security at household level. When a nation can manufacture, import, retain and sustain enough food for its population, the nation is food secure. When a community or household have access to food and able to maintain a safe and nutritious intake, the household is food secure.

The USA Department of Agriculture defines food insecurity as “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (US National Research Council et al., 2006). This is interpreted as “not having sufficient food; experiencing hunger as a result of running out of food and being unable to afford more; eating a poor-quality diet as a result of limited food options; anxiety about acquiring food; or having to rely on food relief” (Rychetnik et al., 2003). When food insecurity is sustained over time, it eventually leads to chronic hunger.

Socio-economic, political, ecological and climate factors contribute to food insecurity (Bonti-Ankomah, n.d.; Koch, 2011; Oldewage Theron & Kruger, 2009). Unfortunately food insecurity is directly linked to poverty, with low income and employment status and, as the United Development Programme (UNDP) indicated in 2006, food insecurity usually occurs when there is a loss of employment and income (Du Toit et al. 2011). Unemployment and poverty cause a decline in workforce, leading to less purchasing power and food insecurity, which directly contributes to malnutrition (Koch, 2011; Oldewage Theron & Kruger, 2009; Bonti-Ankomah, n.d.; Dlamini, 2014)

2.7.1 Global food insecurity

Globally, there is more than enough food to feed the world, still 815 million people reports hunger. The greatest challenge remains to be able to continuously feed the world whilst the global population remains growing (FAO et al., 2017). Global hunger seems to be increasing as 815 million people were found to be undernourished in 2016, an increase from the 777 million in 2015 (FAO et al., 2017). Attributes including droughts, floods, climate-related shocks, violent conflicts; all having a negative effect on food security around the world. From the 815 million food insecure people, 489 million reside in countries affected by conflict, and 75% of stunted children under the age of five also reside in these conflict countries (FAO et al., 2017). Changes in dietary patterns and food systems have led to an increased consumption of processed foods, readily available and easy accessible foods, high in fat, sugar and salt. This explains why different types of malnutrition co-exist within the same households and communities (FAO et al., 2017). An increase in food prices and lowered food production around the world were some of the main causes for food insecurity. People who are chronically ill or disabled, elderly, children under five years of age, widows, divorced women and female-headed households, are high risk groups, whilst populations in remote rural areas with limited access to food and resources are also at risk (Du Toit et al. 2011; Department: Agriculture RSA 2006).

2.7.2 Food insecurity in South Africa

South Africa procures enough food for its population at a per capita level, and is thus considered a food secure nation. Yet, food insecurity remains prevalent amongst South African citizens (Dlamini, 2014). Food consumed by South Africans lack variety and children's dietary intake is insufficient to meet their nutritional requirements. Food insecurity in South Africa is primarily caused by inadequate access to food by certain individuals and groups within the population. Food insecurity is not a short-term problem, but a continuous threat, as the majority people buy their food commercially rather than growing it themselves, thus making them dependent on having money to supply in their dietary needs.

South Africa have two groups of people vulnerable to food insecurity, those who lack land, capital and tools, as well as livestock, literacy and skills, which contribute to the working poor or the under-employed poor. The second groups consist of those vulnerable due to their

gender, age, illness or disability, leaving them without any resources or employment (Labadarios et al., 2011). SANHANES-1 of 2012, found that 45.6% of their research population in South Africa (Shisana et al., 2014) was food secure, with 26% food insecure and 28.3% at risk of becoming food insecure (Shisana et al., 2014). Food insecurity was also higher in rural areas (37%) than in urban households (Shisana et al., 2014). Comparing data from four major studies in South Africa, food insecurity was the highest during the 1999 National Food Consumption Survey (52.3%) (Shisana et al., 2014; Labadarios et al., 2000).

Older research, such as the National Food Consumption Survey (NFCS) in 1999, also found that only 25% of the 2 735 participants were food secure, 23% were at risk of experiencing hunger and 52.3% had already experienced hunger. In the 2005 survey, 2 413 participants were included and only 19.8% were found to be food secure (Labadarios et al., 2011; Labadarios, 2008; Labadarios et al., 2000). This do reflect an improvement within South Africa with regards to food insecurity amongst the population, but still food insecurity is prevalent (Dlamini, 2014; Labadarios et al., 2011).

2.8 The Child Support Grant

Social protection is recognised as an important strategy to accelerate progress in improving maternal and child nutrition.

2.8.1 Social protection initiatives

Globally, governments have increasingly designed and implemented social protection initiatives to address poverty, economic shocks, and social vulnerability (DSD et al., 2012). These include social transfers, programmes that ensure access to social services, social support and care services, and legislation and policy reforms that ensure equity and non-discrimination. These initiatives aim to make poor and vulnerable households more resilient and to improve the household's ability to obtain food and health care, which are key in ensuring proper nutrition for children. A cash transfer delivering direct cash to households, usually targeted to poor and vulnerable groups, is a popular tool to achieve social protection (de Groot et al., 2015; Patel et al., 2012).

Cash transfer programmes have expanded rapidly across South Asia and Latin America and by 2008 were implemented in 48 countries. In sub-Saharan Africa , Ethiopia, Ghana, Kenya,

Lesotho, Malawi, South Africa, Zambia and Zimbabwe amongst others have implemented cash transfer programmes (de Groot, et al., 2015).

2.8.2 History of the Child Support Grant in South Africa

In the early twentieth century, social support was introduced mainly for the white population of South Africa. In 1994, the post-apartheid government of South Africa introduced cash transfer systems, including the CSG aimed at granting social protection to its child citizens of all races. Today, social support grants are an important component in protecting children, aged persons and the disabled (Patel, 2012b; Lund, 2008).

In 1995, the Lund Committee was established to ensure that social grants, especially the CSG, were directed towards all races and were reaching the poorest of poor. The Lund Committee had to investigate existing state support systems and explore alternative options. The main aim of social support grants was to support poor families and children. Grants other than cash transfers were considered by conducting research into different existing programs, but cash grants were proven to be the best suitable at that time due to the ability to reach large numbers of people over short periods of time. Household food security seemed the key to improve the nutritional status of children and the committee argued that if more money were made available, household food security could be ensured and nutritional status would improve (Patel, 2012b; Lund, 2008).

The Lund Committee wanted to ensure that the CSG followed the child. Therefore it is paid out to the primary caregiver of the child, regardless of who the primary caregiver is, because death, separation or divorce should not influence the uptake of the CSG (Case et al., 2005; Patel, 2012b; Lund, 2008).

The CSG was introduced in South Africa in 1994 as a cash transfer of R100 a month for children under the age of seven years with the sole purpose to supply in their basic needs. Over the years, the CSG, as well as the age of eligible recipients have increased (Ferreira, 2017; Nkosi, 2011; Lalthapersad-Pillay, 2007). Up to date, in 2018, caregivers receive R350 per month per child until the child reaches the age of 18 years. To successfully apply for a CSG, beneficiaries must be younger than 18 years of age, must be a South African citizen permanently residing in South Africa, and must be cared for by a caregiver with a single income of less than R3 300

per month or a joint income of less than R6 600 per month (Ferreira 2017; De Lannoy et al. 2015; Udjo 2013; Lalthapersad-Pillay 2007; Brand 2002).

2.8.3 Uptake of the Child Support Grant in South Africa

On the 1st of April 1998, the very first application for the CSG was received and in December 2005, already 6.9 million children were registered as grant recipients. By April 2008, eight million children received the CSG (Patel, 2012b; Lund, 2008) and almost 12 million children in 2015, as reported by The Child Gauge (De Lannoy et al., 2015; Hall et al., 2014). Poverty alleviation is important for families with small children, and early uptake of the CSG is associated with improved nutrition, health and education outcomes (De Lannoy et al., 2015; Hall et al., 2014). The CSG uptake for children younger than 12 months, were found less than 50% in 2011, which was the latest available data on uptake of CSG per age (De Lannoy, et al., 2015).

2.8.4 Validity and the use of the Child Support Grant

The government of South Africa has a constitutional commitment to ensure income security for all its citizens. The validity of South Africa's social grants programme remains of concern, however. The question is asked whether it create state dependency or whether it accomplishes its objectives by closing the poverty gap and providing opportunities. Negative associations about the CSG have long been in the spotlight, as teenage pregnancy in South Africa is relatively high (Richter, 2009). Jacob Zuma, the South African President at the time of the research reported in this dissertation, raised his concern that young women were abusing the system by intentionally falling pregnant and then leaving their children with grandmothers while they use the child grant for "alcohol, gambling, shopping or their own selfish needs". President Zuma stated that government "cannot sustain a situation where social grants are growing all the time and think it can be a permanent feature" (Ferreira, 2017; Richter, 2012).

Makiwane et al. (2006) analysed the pattern between teenage pregnancy rates and the CSG beneficiaries but failed to show any association. The conclusion was that teenage pregnancies decreased at the time the CSG was introduced. Only 20% of pregnant teenagers were the CSG recipients, and the study showed that teenage pregnancies had been increasing even amongst teenagers who did not qualify for the CSG. Data used for this analyses was

datasets from 1995 and 1998 October Household Surveys, 1998 South African Demographic and Health Survey and the 2001 Census (Makiwane et al., 2006). This data is relatively old and might not be indicative of the situation in 2017.

More recent research conducted by Kubheka (2013), based on findings from Kutu (2009), Naong (2011) and Mokomo (2008), concluded that there was no significant relationship between teenage pregnancy and the CSG. However, the subjects of these research studies had different views about the topic: 52% indicated that they felt that there was an association. Kutu (2009) researched teenagers' perceptions of early pregnancy. Kutu used a qualitative study design and included 30 participants from semi-urban schools and 10 from semi-rural schools. These participants were in grades 5 to 8. The results indicated that 53% of the participants did feel that the CSG is a contributing factor for teenage pregnancy (Kutu, 2009).

Naong (2011) conducted similar research in South African secondary schools, including participants from Mpumalanga, the Northern Cape and the Free State Province. The results indicated no direct link between teenage pregnancies and uptake of CSG. The results may, however, not be all that reliable, as it portrays the view of school principals and not only that of teenagers (Naong, 2011). Mokomo (2008) on the other hand used in-depth face-to-face interviews with 15 teenage mothers the North West Province who were receiving the CSG, and indicated that these teenagers were aware of the difficulties in raising children and the cost thereof. This might suggest the need for money and desperation and misuse of the CSG for their own needs. Data sets from 1995, 1998 and 2001 were used for quantitative data collections and these results showed no association between teenage pregnancy rates and the CSG, but it should be taken into consideration that this might not be relevant anymore for 2017 (Mokomo, 2008), almost 20 years later.

DSD, SASSA and UNICEF 2012, reported that adolescents who received the CSG early in childhood, had reduced sexual activity and fewer sexual partners, leading to reduced pregnancy, as well as reduced alcohol and drug abuse (DSD et al., 2012).

The CSG were initiated to relieve social stress and assist vulnerable children in supplying in their basic needs (DSD et al., 2012; Patel, 2012a). Therefore, the use of the CSG is of importance to ensure that it is utilised for what it was intended for. Research conducted from

2005-2008 in South Africa, used qualitative data collection to determine the experience and use of the CSG (Zembe-Mkabile et al., 2015). Most participants reported to use the CSG for buying basic food items, reporting that it is not enough to buy expensive food items such as meat. Basic food items include staple foods, such as maize meal, rice, flour, sugar and oil. These participants also reported that by month-end, the CSG as well as the food have been long finished, and they need to borrow money or find a piece job to buy maize meal (all they can afford with little money) to last them the rest of the month. These participants also noted that the second most important need they spend the CSG on, after food, is school and educational needs of the CSG recipients (Zembe-Mkabile et al., 2015).

Research conducted in 2012 in Doornkop, Soweto, gave some insight into the benefits and spending patterns of the CSG. The urban community included in this research consisted of 343 households, with children under the age of 15 years. Children aged zero to five years formed the largest group of participants (44.3%). Per household, an average of 2.2 CSGs were received. Almost all grant recipients lived with their children, contrary to popular belief that parents who receive the CSG absconds with the grant money (only 7.7% didn't reside with their children) (Patel et al., 2012). A positive effect on household food security, school attendance, nutrition and the overall care of the children were found in these households.

Results indicated that the CSG were mainly used for food (74.2%). Unfortunately the nutritional status of the children were not researched in-depth, but 91.6% of the children were found to be in good health, therefore some authors interpreted this as proof that the children had a normal nutritional status (Patel et al., 2012).

The respondents who received the CSG, were mostly unemployed, with 14% of the CSG recipients working regularly and 24% working part time. Respondents reported that it would be impossible to make a living if it were not for the monthly CSG they received as their main income. Even though the respondents received the CSG and used it mainly for food, 54% still experienced food insecurity (Patel et al., 2012; Patel, 2012b).

Liziwe & Kongolo (2011) researched the effectiveness and use of the CSG in Gugulethu, Western Cape Province, South Africa. Usage of the CSG (Figure 2.5) was mainly for food (36.6%), education (30%), clothing (13.3%), health (6.6%) and other (13.3%). Respondents complained that the monthly CSG was not enough to meet the basic needs of their children,

but that they would not be able to survive without it. The findings suggest that the CSG plays a vital role in reducing hunger and poverty and do promote a better life for children and the entire household. Important to note is that majority of the grant recipients also did not take part in any other income generating activity and the CSG was their main source of income (Liziwe & Kongolo, 2011).

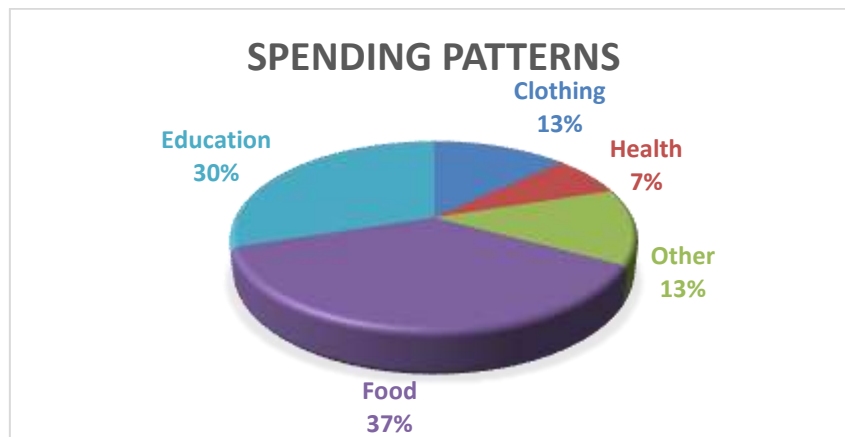


Figure 2.5: Spending patterns of the CSG in Gugulethu, Cape Town (Liziwe & Kongolo, 2011)

In 1999, the Community Agency for Social Enquiry (CASE) was awarded the tender to evaluate the implementation of the CSG in South Africa. CASE included 999 respondents from all nine provinces in South Africa and 98 households were from the Free State Province (10%). CASE concluded that more than 50% of these households were entirely dependent on support grants for their main income, with 36% dependant on the CSG recipients (Kola et al., 2000).

CASE reported the CSG did improve the household's ability to care for their children (79%) and 26% of the respondents used the CSG mainly for food for their children, whilst only 9% reported spending it on the entire household. The 10% respondents from the Free State Province reported that the CSG was used mainly for food (51%), clothes (21%), education (19%) and health (5%), as well as non-specified other (3%). Respondents (70%) complained that the CSG was not enough to meet all their needs and therefore the money was pooled with and used for the rest of the household (Kola et al., 2000).

In most research studies, caregivers complained that the CSG is not sufficient, as it is used to support the entire household and not just the child in question. Most of the caregivers have

however reported a positive impact in their ability to take care of their children and supply in their basic needs.

Danie Brand, a senior lecturer in the Faculty of Law, University of Pretoria, (2002) stated that support grants are by far the most effective way of ensuring immediate and continued access to food. The CSG can be used by the recipient for his or her individual choices and needs, thus, not taking away the dignity and freedom of choice. The CSG as a cash transfer are easy to manage and control and contributes to basic needs (Brand, 2002).

Case et al (2005) elaborated on whether state grant creates a certain type of dependency and motivated for research to determine the high percentage of grant uptake to answer the question whether it is due external factors and reasons beyond the household's control or by choice.

2.8.5 The Child Support Grant and nutritional status of children

There is limited conclusive research available in South Africa to determine the effect of the CSG on the nutritional status of children. Evidence is also inconclusive on the impact that the CSG has on food insecurity. It was indicated by the South African Child Support Grant Impact Assessment Survey in 2012 (DSD et al., 2012), that early life CSG uptake (in the first two years of life), does increase growth monitoring. Early life uptake of the CSG only improves height-for-age in children whose mothers had more than eight grades of schooling, thus, stressing the importance of education as a nutrition element. Appropriate nutrition in early life is very important for proper cognitive development, emphasizing the important role of the CSG in children. Children, who received the CSG early in life, had also reduced childhood illness prevalence. Again, mother's education played a role as well, with more than eight grades of schooling positively affecting on early CSG uptake and good health (DSD et al., 2012).

Research during 2014 in Worcester, South Africa, found that CSG recipients had higher prevalence of food insecurity and higher rates of stunting than non-CSG recipients. The dietary diversity score was similar (less than four food groups) amongst CSG and non-CSG recipients. This data can indicate that the CSG is thus reaching the poorest of poor, those vulnerable to household food insecurity. Stunting might be due to a late uptake of CSG or due to the low dietary diversity score (less than four food groups) (Koornhof, 2014).

Another study conducted in the Paarl, South Africa (2005-2008), found no correlation between the duration of the CSG receipt and childhood stunting. Other factors that was found to aggravate stunting, was maternal education, HIV exposure as well as low birth weight (Zembe-Mkabile et al., 2015). Some reasons why the CSG has no effect on childhood stunting, can be due to the CSG being the only source of income and it is used for the entire household's needs. The value of the CSG are not growing with inflation, thus, in context with raising food prices and unemployment, mothers are unable to buy nutritionally adequate food (Zembe-Mkabile et al., 2015).

Devereaux et al (2017) reviewed literature from research from six different studies between 1993 and 2013, supported by the National Research Foundation of South Africa and the Newton Fund. Different criteria, samples and participants of different ages were used in the research. There was no relationship found between social grants and certain nutrition outcomes. Out of the children under five years of age who did receive the CSG, 24.6% were stunted whilst only 20.2% of non-CSG beneficiaries were stunted. Figure 2.6 indicates that both underweight and stunting were higher in children receiving the CSG.

Older research, as early as 2006 that studied the impact of the CSG on nutrition within South Africa, also found that early CSG uptake had a positive impact on height-for-age (Aguero et al., 2006). Colombia research found that cash transfers (as called in other countries) did make a noteworthy impact on height-for-age measurements for children, but also if intervened at a young age and early in life. There were not significant improvement in height in children older than 24 months who received the grants (Attanasio et al., 2005). Baulch (2010) and Duflo (2003) found similar results, even though in different continents, Bangladesh and South Africa. Both found that for girls, there was an improvement on height-for-age, but not for boys (Baulch, 2010; Duflo, 2003), whilst a significant improvement of height-for-age in both boys and girls, as well as improved overall cognitive development were found when the cash transfers were doubled that of the normal monthly rate (Fernard, 2009).

The question remains however, whether the CSG improve the nutritional status of children.

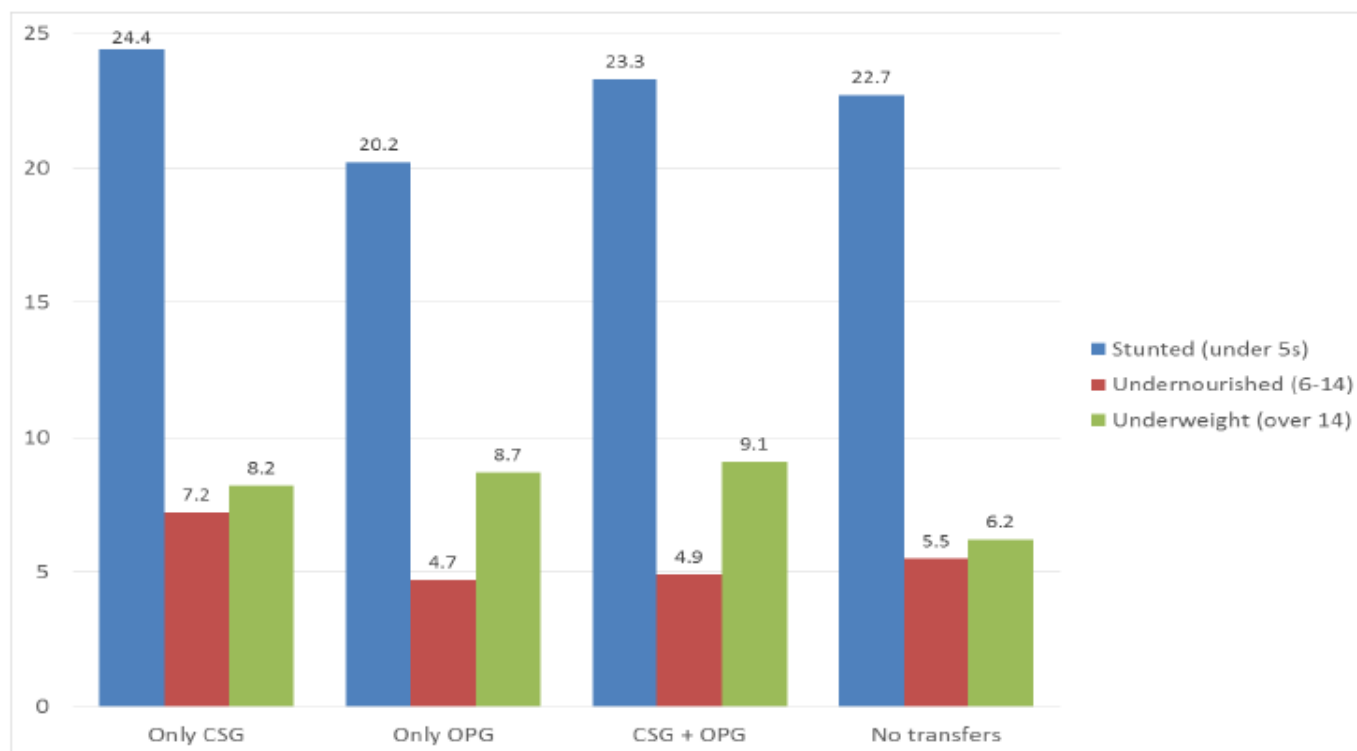


Figure 2.6: Anthropometry and the Child Support Grant (NIDS 2008)

2.9 Summary

Social support grants in South Africa are relatively generous compared to cash transfers in other countries, yet questions remain regarding its sufficiency to decrease food insecurity and meet nutritional needs of the CSG recipients. Studies seem to be inconclusive whether the CSG do make an impact on the nutritional status of children and if there is a difference between CSG and non-CSG recipients from similar socio-economic circumstances. The South African Child Support Grant Impact Assessment Evidence Survey (DSD et al., 2012) indicate that the CSG do have a positive impact if received early in life. Poverty and inequality improved with early uptake, as well as educational outcomes (DSD et al., 2012). Koornhof (2014) compared the CSG recipients with non-CSG recipients and found that education levels and employment status of the mothers were the same, as well as the mother's age, but did not look into early uptake versus late uptake. Maternal age indicated that the CSG do not cause teenage pregnancy (Rosenberg et al., 2015; Koornhof, 2014).

What Koornhof (2014) did find, was that the CSG recipients were the ones who had more people living per room (2.7ppr), lower monthly income, higher food insecurity, higher stunting prevalence (34.9%) and a low dietary diversity score (less than four food groups) than the non-CSG recipients (Koornhof, 2014). This could indicate that the CSG does target the poorest of poor people and those already affected by food insecurity and malnutrition, or it could mean that the CSG do not make a difference and have no impact on the improvement of households overall. The CSG may have a positive impact on overall health and nutritional status of children in poor and food insecure households, but as a standalone intervention, it might not be enough to eradicate malnutrition.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This study assessed the socio-demographics, nutritional status and use of the CSG amongst children, 6 to 23 months old, who attended three local clinics in the DLA, Thabo Mofutsanyana District, Free State. This chapter summarises the methodology of the study with regard to approval and ethical considerations, study design, study population and sampling methods, variables, techniques and procedures, and statistical analysis.

3.2 Ethical considerations

The study was approved by the Health Sciences Research Ethics Committee of the Faculty of Health Sciences, University of the Free State (HSREC 15/2016) (Addendum A), as well as by the Free State Department of Health (Addendum B). Prior to data collection, approval to undertake the study was obtained from the area manager of the DLA. The managers of the three clinics were also informed of the date and time that research would commence at the clinics and the planned schedule was discussed with them telephonically.

The study population were infants, therefore, written informed consent to include them as participants in the study, was obtained from their legal guardians. The purpose of the study and the procedures that would be followed, were explained in lay terms in both Sesotho and English in an information document that potential participants could keep (Addendum C and D).

The information document explained the procedures that would be followed during the study, as well as how the information would benefit science and the community. It also explained that there were no risks involved, that all participation would be voluntary and would not incur any costs to the participants, but that no remuneration would be given for participation. The document also guaranteed that all data of participants and their caregivers would be treated confidentially at all times. Guardians who met the inclusion criteria and that were willing to let their infants participate in the study and, completed informed consent (Addendum E and F).

No children, whether included or excluded from the study, were in any way kept from accessing the clinic services that they came to receive on that specific day, and the research did not interfere with the clinics' daily operations.

3.3 Study design

A descriptive observational quantitative research study was conducted.

3.3.1 Study population

The DLA in the Thabo Mofutsanyana District is serviced by 13 clinics, including mobile clinics. For this study, infants 6 to 23 months that attended the Mphohadi-, Bohlokong- and Bethlehem Clinics were selected as study population, as these three clinics serve the largest numbers of children under the age of 5 years in this district.

Records from the clinics indicated that 7 620, 5 892 and 5 870 children under the age of 5 years, visited the Mphohadi, Bohlokong and Bethlehem clinics, respectively, between April 2014 and March 2015, when the protocol for this study was being developed.

3.3.2 Sampling

With the assistance of a biostatistician, a practical sample size of 240 participants was calculated. Based on the number of children, 6 to 23 months that have attended each clinic during the previous financial year, the total was pro rata broken down to include 97 participants from the Mphohadi Clinic, 72 participants from the Bohlokong Clinic and 71 participants from the Bethlehem Clinic. Convenience sampling, which refers to a method of non-probability sampling that relies on data collection from population members who are conveniently available to participate in the study, was used (Saunders et al., 2012).

The researcher and field workers visited each clinic twice weekly, and invited all patrons present in the waiting area of the clinic who were eligible for inclusion, to participate. In the end, two extra participants were included from Bethlehem Clinic (73 in total), bringing the final sample size to 242 participants.

3.3.3 Inclusion and exclusion criteria

Children were included as participants in the study if:

- they were 6 to 23 months of age on the day that they visited the clinic;
- they were living in the DLA;
- they were accompanied by the primary caregiver; and
- their primary caregiver could speak English or Sesotho.

Children were excluded from the study if he or she:

- was an orphan or resided in a place of safety or a care home;
- was not accompanied by the primary caregiver to the clinic on the day of data collection;
- had a low birth weight (below -2 z-scores for weight-for-age at birth) or was born prematurely (before 37 weeks gestational age);
- was mentally or physically disabled; or
- was accompanied by a primary caregiver who was unable to speak English or SeSotho.

3.4 Variables and operational definitions

This study investigated the socio-demographics and nutritional status of participants, as well as their household food security, and information on how the CSG, paid towards the care of the participants, were being spent.

3.4.1 Socio-demographic data

For the purpose of this study, the assessed socio-demographic variables included the gender, age and ethnicity of the participants and the relationship between the caregivers and the participants. The housing and living conditions where the participant resided, including the type of and size of the house, the number of people living in the household with the participant, access to water and electricity, the availability of equipment to prepare and store food, as well as other electronic recreational and communication equipment in the household, were described.

Because overcrowding may be a marker of poor household conditions and poverty (Songpol et al., 2005), the household room density was also calculated. For the purpose of this study,

a room density of ≥ 2.5 persons per room (ppr), was an indication of crowding (Coetzee et al., 1988). The marital status, employment status and education level of the caregivers of the participant were described, as well as the main source and amount of household income, the number of people in the household who were contributing towards the household income, the spending of the income and the CSG.

3.4.2 Nutritional status

The nutritional status were described using the WHO growth standards and WHO indicators of child feeding practices (Working Group on Infant and Young Child Feeding Indicators, 2007a).

3.4.2.1 Growth standards

Anthropometry of children provides information about their nutritional status. For the purpose of this study, anthropometrical variables, as prescribed by the WHO, were assessed, namely weight-for-age, length-for-age, weight-for-length and MUAC. These variables were interpreted according to z-scores as indicated by the WHO growth standards (Marriott et al., 2015; WHO & UNICEF, 2009). The z-scores were calculated using the WHO Anthro Plus software (Version 3.2.2) based on standards for children under 60 months (WHO, 2016), and classified according to the categories in Table 3.1.

i Weight-for-age

Weight-for-age < -2 z-score indicated that the participant was underweight; < -3 z-score, indicated severe underweight.

ii Weight-for-length

Weight-for-length < -2 z-score indicated that the participant was wasted; < -3 z-score, indicated severe wasting. Weight-for-length $> +2$ z-score indicated that the participant was overweight; $> +3$ z-score, indicated that the participant was obese.

iii Length-for-age

Length-for-age < -2 z-score indicated that the participant was stunted; < -3 z-score, indicated severe stunting.

iv MUAC

MUAC is an easy and effective way to determine nutritional status and are suitable to use in children from the age of six months. MUAC was interpreted according to the WHO guidelines, as indicated in Table 3.2 (WHO, 2010).

Table 3.1: Classification of malnutrition according to z-scores (WHO, 2010)

z-scores	Growth indicators			
	Length/height-for-age	Weight-for-age	Weight-for-length/height	BMI-for-age
Above 3	See note 1	See note 2	Obese	Obese
Above 2			Overweight	Overweight
Above 1			Possible risk of overweight (See note 3)	Possible risk of overweight (See note 3)
0 (median)				
Below -1				
Below -2	Stunted (See note 4)	Underweight	Wasted	Wasted
Below -3	Severely stunted (See note 4)	Severely underweight (See note 5)	Severely wasted	Severely wasted

Notes:

1. A child in this range is very tall. Tallness is rarely a problem, unless it is so excessive that it may indicate an endocrine disorder such as a growth-hormone-producing tumour.
2. A child whose weight-for-age falls in this range may have a growth problem, but this is better assessed from weight-for-length/height or BMI-for-age.
3. A plotted point above 1 shows possible risk. A trend towards the 2 Z-score line shows definite risk.
4. It is possible for a stunted or severely stunted child to become overweight.
5. This is referred to as very low weight in IMCI training modules. (Integrated Management of Childhood Illness, In-service training. WHO, Geneva, 1997)

Table 3.2: MUAC classification for children 6 months to 2 years (WHO, 2010)

MUAC	Classification
≥ 12.5 cm	Normal nutritional status
≥ 11.5 cm < 12.5 cm	Moderate acute malnutrition
< 11.5 cm	Severe acute malnutrition

3.4.2.2 Feeding practices

The feeding practices of the participants were assessed according to indicators validated to portray dietary quality of infants, and agreed upon and by the WHO, UNICEF and partners (Working Group on Infant and Young Child Feeding Indicators, 2007b).

These indicators included the minimum dietary diversity, minimum meal frequency and minimum acceptability of the diet (Working Group on Infant and Young Child Feeding Indicators, 2007). These indicators were used, because it is derived and scored from a single 24-hour recall, which was the most practical method for dietary data collection in the setting of this study.

Other indicators, also recommended by the WHO, UNICEF and partners, were continued breastfeeding at one year, introduction of solids, semi-solid or soft foods as well as continued breastfeeding at two years and age-appropriate breastfeeding. Other variables concerning feeding practices included the meals received at the crèche, breastfeeding status, as well as breast milk substitute usage.

i Minimum dietary diversity

Dietary diversity is used as an indication of micronutrient intake, as different food groups contribute different nutrients to the diet. The inclusion of more food groups introduces variety into the diet and increased the odds of meeting micronutrient requirements.

Dietary diversity was evaluated according to the number of different food groups that were consumed over a specific period, which, per recommendation of the WHO, UNICEF and partners (2007), for the purposes of this study, referred to the previous 24-hours. Using data collected with a 24-hour recall, dietary intake was scored according to the representation in the diet of seven basic food groups, namely (1) grains, roots and tubers, (2) legumes and nuts, (3) dairy products, (4) flesh foods such as meat, fish, poultry, organ meat, (5) eggs, (6) vitamin A rich fruit and vegetables, and (7) all other fruit and vegetables. Participants who received food from four or more of the seven food groups, were classified as having adequate micronutrient intakes from diverse diets. Intakes from less than four food groups were classified as having inadequate intakes due to non-diverse diets (Dlamini 2014; Marriott et al. 2012; WHO 2010; Working Group on Infant and Young Child Feeding Indicators 2007).

ii Minimum meal frequency

Children of different ages, have different energy needs. Whether a child's energy needs are met, depends on the number of meals served, the energy density of the meals and the amount of food the child consumes per meal (Dlamini, 2014; B. P. Marriott et al., 2012; Working Group on Infant and Young Child Feeding Indicators, 2007b). The number of meals served, were assessed by calculating the minimum meal frequency from the participants' 24-hour recalls obtained from their caregivers. The minimum meal frequency was categorised according to breastfed and non-breastfed children, as indicated in Table 3.3.

Table 3.3: Minimum meal frequency classification (Dlamini 2014; Marriott et al. 2012; WHO 2010; Working Group on Infant and Young Child Feeding Indicators 2007)

INDICATOR	CRITERIA
Breastfed participants who achieved minimum meal frequency	Participants six to eight months consuming two to three solid, semisolid, or soft foods per day whilst breastfeeding
	Participants nine to 23 months consuming three to four solid, semisolid, or soft foods per day whilst breastfeeding
Non-breastfed participants who achieved minimum meal frequency	Participants six to 23 months consuming four or more solid, semisolid, or soft foods per day with 1-2 cups of suitable milk

iii Minimum acceptable diet

Children, both breastfeeding and non-breastfeeding who met the requirements for the minimum dietary diversity, as well as the minimum meal frequency, were classified as having a minimum acceptable dietary intake (Dlamini 2014; Marriott et al. 2012; WHO 2010; Working Group on Infant and Young Child Feeding Indicators 2007).

iv Other feeding indicators

Other feeding indicators included continued breastfeeding at one year, introduction of solid, semi-solid or soft foods, continued breastfeeding at two years, and age-appropriate breastfeeding (Dlamini, 2014; Marriott et al., 2012; WHO et al., 2010; Working Group on Infant and Young Child Feeding Indicators, 2007).

Participants aged 12 to 15 months had to be breastfed to achieve the feeding indicator for breastfeeding at one year. Participants with age 20 to 23 months, who were still

breastfeeding, achieved continued breastfeeding at two years. Both of these indicators were determined using data collected from the 24-hour recall (WHO, 2007; Working Group on Infant and Young Child Feeding Indicators, 2007). The introduction of solids, semi-solid or soft foods for participants aged six to 12 months were determined using the 24-hour recall and interpreted according to the WHO feeding indicators. This indicator requires that participants aged six to eight months receive solid, semi-solid or soft foods, whilst still breastfeeding (Marriott et al., 2015; Dlamini, 2014).

Other feeding indicators assessed for the sample, included additional information concerning questions related to dietary intake at the crèche. These questions included whether the participants received meals at the crèche, the amount of meals provided at the crèche and if the caregivers were aware of what the participants ate at the crèche. These questions were of importance to determine meals and amount of meals given at the crèche as well as if the caregivers knew what the participants were eating. Unfortunately, the crèche diet was not recorded, making it impossible to determine whether it was nutritionally balanced or not. This data just supplied additional information and do not have a researched standard guideline to compare results with. Other feeding indicators included drinks that the participants received recorded on the 24-hour recall. These drinks were breastmilk substitutes, such as formula milk and other liquids.

Formula milk were reviewed for age appropriateness, concentration (over-diluted, over-concentrated or correct) and volume given (over-fed, under-fed and sufficient amounts), and this was assessed against manufacturing guidelines as recorded on formula milk containers and reported as such, as detailed in Table 3.4. If caregivers were mixing the milk stronger than the ratio scoops per water (ml), the milk was classified as over-concentrated, if below, under-concentrated. The same with the volume, if above the recommended range, it was classified as over-fed, below was classified as under-fed.

Table 3.4: Formula milk: Age appropriateness, concentration and volume*

Formula milk	Prescribed age	Mixing requirements		Volume range according to age
		Scoops	Water (ml)	
Pelargon	0-12 months	1	25ml	600-800ml
Nan1	0-6 months	1	25ml	600-800ml
Nan2	6-12 months	1	25ml	600-800ml
Nan3	12-18 months	1	25ml	400ml
Melegi	0-12 months	1	30ml	600-800ml
S26	0-6 months	1	30ml	600-800ml
Lactogen 1	0-6 months	1	25ml	600-800ml
Lactogen 2	6-12 months	1	25ml	600-800ml
Lactogen 3	12-18 months	1	25ml	400ml
Infacare 1	0-6 months	1	30ml	600-800ml
Infacare 2	6-12 months	1	60ml	720-900ml
Infacare 3	12-18 months	1	44ml	400-600ml
Nido	12months onwards	1	56ml	450ml

*content and mixing instructions as per product label

3.4.3 Household food security

Food security plays a major role in ensuring proper nutrition. Household food security defines a situation where all people in a household have access to sufficient, safe and nutritious food at all times, that meets their daily nutritional requirements and preferences for an active and healthy lifestyle (Bokeloh et al., 2009).

The household food security were measured using the Community Childhood Hunger Identification Project (CCHIP) index (Wehler et al., 1992). CCHIP focuses on the absence of food due to a lack of resources. CCHIP consist of eight questions that investigates whether adults and/or children in a specific household are bound to be affected by food insecurity, food shortages, food insufficiencies and a poor food intake due to resource limitations.

The eight questions with simple yes or no answers, determines the severity of the hunger experienced (Shisana et al., 2014) and are indicated in Table 3.5 to Table 3.6. These eight questions determined the prevalence of food insecurity according to the number of affirmative answers Household food security CHIPP questions (Shisana et al., 2014).

Table 3.5 Household food security CHIPP questions (Shisana et al., 2014)

Does your household ever run out of money to buy food?
Do you ever rely on a limited number of foods to feed the child, because you are running out of money to buy food?
Do you ever cut the size of meals or skip meals of the child, because there is not enough money for food?
Do you ever eat less than you should, because there is not enough money for food?
Does the participant ever eat less than he/she should, because there is not enough money for food?
Does the participant ever say that he/she is hungry, because there is not enough food in the house?
Do you ever cut the size of the participant's meals or does he/she ever skip meals, because there is not enough money to buy food?
Does the child ever go to bed hungry, because there is not enough money to buy food?

Table 3.6 Classification of food security based on the CHIPP (Shisana et al., 2014)

Answers	Classification
No "yes" answers	Food secure
Fewer than 5 "yes" answers	At risk of food insecurity
5 or more "yes" answers	Food insecure

3.4.4 Use of the Child Support Grant

Questions were asked regarding the CSG, other social support grant income, employment income as well as the expenditure of the CSG.

3.5 Techniques

Techniques used to assess the above mentioned variables, included questionnaires, available in Sesotho and English, and anthropometrical measurements. Data were collected by the researcher and two fieldworkers, who were trained community health workers working in the DLA, assisting with home health care visits and identifying malnutrition within the community, at the time of the study. These two field workers were trained by the researcher to ensure that data was collected and recorded accurately and in a consistent manner.

3.5.1 Training of the fieldworkers to collect data

The two fieldworkers were community health workers with prior training regarding community malnutrition and were skilled in taking anthropometric measurements and detecting malnutrition. Before the pilot study, the researcher explained the aim and objectives of the research to the fieldworkers, as well as the questions on the questionnaire, and gave them a practical refresher workshop on taking anthropometric measurements.

The researcher and fieldworkers then went to one of the local clinics where the researcher demonstrated the structured interviews and measuring of the anthropometry on two caregivers, whilst the fieldworkers were watching. After the two demonstrations, the fieldworkers conducted structured interviews and anthropometry measurements on two caregivers each, whilst the researcher observed and listened in. When the researcher identified mistakes, she pointed these out and the fieldworkers had to practice the correct methodology until they were completely sure of what was expected of them.

3.5.2 Questionnaires

The questionnaires, assessing socio-demography, dietary intake, food security and use of the CSG, were administered during structured interviews in the preferred language of the caregivers. The researcher or fieldworkers read the questions in the order that these appeared on the questionnaires and recorded each answer consecutively.

3.5.2.1 Socio-demographic questionnaire

The socio-demographic questionnaire, compiled by the researcher, was administered in a simple question-answer type of interview and the data were recorded onto the questionnaire.

3.5.2.2 Dietary intake questionnaire

The validated methodology developed by the WHO, UNICEF and partners, followed in this study, uses one 24h-recall and only records the types of food and drink consumed, and not the quantity, making it quick to administer. This is very useful in the field setting, as compared to a quantified food frequency questionnaire that can take more than an hour per participant

and requires judgement of the caregiver regarding the quantities that the infant consumes (WHO, 2008).

The caregiver was asked to recall the dietary intake of the participant during the previous 24-hours, starting with when the participant woke up the previous morning, until the participant went to sleep the previous night. The fieldworkers noted down all the items consumed onto the questionnaire. Afterwards, the researcher compiled the items consumed according to the specific seven food groups specified to determine the minimum dietary diversity, minimum meal frequency and minimum acceptable diet (Marriott et al., 2012; Working Group on Infant and Young Child Feeding Indicators, 2007).

3.5.2.3 Household food security questionnaire

For the purposes of this study, the validated CCHIP-index questionnaire was used (Shisana et al., 2014). This questionnaire was completed by using a question-answer type of interview, during which the researcher or fieldworker recorded the answers.

3.5.2.4 Use of the Child Support Grant-questionnaire

All questions regarding the spending of the CSG were based on an in-depth literature review to ensure content validity. This questionnaire was completed during a question-answer type of interview during which the researcher or a fieldworker recorded the answers on the questionnaire.

3.5.3 Anthropometrical measurements

After the structured interviews were completed, anthropometric measurements were taken by the researcher or fieldworkers. All measurements were taken according to standardised techniques, using high quality calibrated equipment as described below. Measurements were recorded three times to ensure accuracy, and the median values were used.

3.5.3.1 Weight measurements

The weight of each participant was measured using a battery operated Seca 354 model digital baby scale, which accurately measured to the nearest 0.1 kg. The scale was calibrated daily with a 1 kg packet of maize flour, before participants were being weighed. The batteries of the scale were replaced with fresh batteries after every 60 participants were weighed.

The scale was put on a hard, sturdy surface, such as a table, and the participants were weighed without clothes, socks or nappies. The participants were weighed seated or lying down, ensuring that all the body parts were inside the scale and not touching anything outside of the scale. Three consecutive weight measurements were recorded to 0.1 kg. The mean was calculated after the data was electronically captured (as explained later) and verified by the biostatistician (Whitney & Rolfes, 2011; WHO & UNICEF, 2009).

3.5.3.2 Length measurements

A standardised portable length measuring mat, manufactured by Seca, was used to measure the length of the participants. The length mat was placed on a flat hard surface, such as a table. The length was measured immediately after weighing the participant.

When measuring length (as illustrated in Figure 3.1 The technique of measuring a child's length (WHO 2010) the participant was placed lying down on the back, with the head against the headboard of the mat, positioned so that a vertical line could be drawn from the ear canal to the lower border of the eye socket, with the participant looking straight up. The caregiver assisted by holding the head of the participant straight and in line (WHO, 2010). Whilst holding down the legs of the participant with one hand and moving the footboard, gentle pressure was applied to the knees to straighten the legs, as far as possible without causing injury (if a participant became agitated and restless, length was measured by holding only one leg in position). Whilst still pushing the knees down, the footboard was pulled up against the participant's feet. The measurement was read and recorded to the nearest 1 mm with the soles of the feet pressed flat against the mat, and the toes pointing upwards. This procedure was repeated three times and all three measurements were recorded. The mean was calculated after the data was electronically captured (as explained later) and verified by the biostatistician (WHO, 2010).



Figure 3.1 The technique of measuring a child's length (WHO 2010)

3.5.3.3 Mid-upper arm circumference

A flexible, non-stretchable standardised MUAC-tape (GPS118a, manufacture by GPC Medical Limited), was used to measure the MUAC. Before measuring the MUAC, the mid-point of the arm was determined between the acromion and olecranon, by placing the MUAC-tape around the left arm of the participants, with the arm relaxed and hanging down at the side of the participant's body. The mid-point of the participant's upper arm between the shoulder and the elbow were allocated by palpitation, measuring and marking. One end of the tape measure was held securely against the arm at the marked mid-point, while the other end was moved around the participant's arm. Both ends were then pulled until the tape closed around the arm. The tape was never so tight that it made folds in the skin, nor was it too loose. The MUAC was measured to the nearest 1 mm (Burchi, 2012; WHO & UNICEF, 2009). Three consecutive measurements were recorded and the mean was calculated after the data was electronically captured (as explained later) and verified by the biostatistician (WHO, 2010).

3.6 Validity and reliability

Validity is defined as the degree to which instruments measure what they are supposed to measure to obtain data needed to answer the research question (Lee & Nieman, 2009). Reliability is measured by the consistency of results obtained when the measurement is applied repeatedly by the same, or different people. It is of utmost importance to ensure that

only valid and reliable measurement tools are used in research; otherwise, the accuracy of data collected would be jeopardised (Lee & Nieman, 2009).

3.6.1 Validity and reliability of the questionnaires

The quality of the data obtained from questionnaires are ultimately influenced by the motivation and compliance of the interviewee and how reliable and valid each question is answered. To ensure content validity, all questions related to socio-demographic information, household food security and usage of the CSG, were based on in-depth literature reviews. In addition, seasoned researchers in this study area were asked to assess the questionnaire and give their inputs.

Dietary intake questionnaires are considered valid and reliable if it yields very similar results each time that it is repeated by the same, or different people under the same conditions (Koh & Owen, 2000). A standardised 24-hour recall method was used to obtain the dietary intake of the participants. The 24-hour recall was developed and validated by the WHO, UNICEF and the Food and Nutrition Technical Assistance Project for data collection purposes, to assess infant and young child feeding practices (Dlamini, 2014; Marriott et al., 2012; WHO et al., 2010; FANTA et al., 2007).

The information obtained from the 24-hour recall was used to determine the feeding indicators to assess infant and young child feeding practices and validated indicators for assessing the quality of the diet of infants and young children, recommended by the WHO, UNICEF, FANTA and USAID. (Dlamini, 2014; Marriott et al., 2012; WHO et al., 2010; FANTA et al., 2007).

The household food security questionnaire known as the CCHIP-index, was used. The CHIPP-index was developed by the Connecticut Association for Human Services with the assistance of a panel of child health and research experts. It was first used in 1987 and 1988. A validity study carried out in 1999 in the United States of America deemed the CCHIP-index a valid tool to measure household food insecurity (Frangillo, 1999).

The questionnaire regarding the usage of the CSG was based on an in-depth literature review to ensure content validity. In this questionnaire, the spending patterns of the CSG and other income was assessed.

The questionnaires were structured, and the questions designed to be straightforward, short and easy to complete, without leading the interviewee, as not to influence the answers. The fieldworkers who helped to collect the data were fluent in both Sesotho and English and the questionnaires were also available in both languages, ensuring easy reading, completion and understanding by the interviewers as well as the participants.

3.6.2 Validity and reliability of the anthropometrical measurements

Validity of anthropometry were ensured by using variables, as well as methods designed to measure each variable, which are recommended in the literature. When a measuring tool is used for the purpose that it was designed for, such as a baby scale to measure children's weight, it is deemed a valid tool (Leedy, 1997). Thus, anthropometry was measured using the appropriate equipment and standardised techniques as described in the literature.

Reliability of anthropometric equipment refers to the instrument's capability to produce reliable results each time it is used (free from random error) and to produce results that does not change, even when a different field worker would take the measurements. In addition, reliability of the measurements depends on standardised, accurate and repeatable techniques. Reliability in this specific research study was ensured by using standardised techniques as recommended by the WHO and by ensuring that all measurements were taken by trained and experienced personnel. The researcher was a qualified dietician, who, at the time of the study, had nine years' experience taking anthropometric measurements, and classifying children according to their Z-scores. The two fieldworkers were community health workers who were trained by the researcher before commencing the pilot study.

All subjects were positioned as prescribed in the literature and measurements were taken three times. Weight and MUAC were recorded to one decimal and all recordings were correctly captured on the questionnaire (WHO, 2008). Extra care was taken not to make parallax errors when reading the measurement instruments. The researcher and biostatistician calculated the average of three measurements for each variable to ensure reliability.

Scales were calibrated daily before measuring using a standardised weight to ensure accuracy. The participants' weights were measured without clothes, socks or nappies that could influence the value. The scales' batteries were replaced after weighing every 60

participants. The scale was used only on a hard and flat surface, such as a table to ensure reliable results (Whitney & Rolfes, 2011; WHO et al., 2010).

3.6.3 Reliability in data capturing

The researcher captured the data twice (independently) on two separate Excel sheets. These data sheet were compared and verified by the biostatistician to ensure data integrity and to rule out any human errors in the data capturing process.

3.7 Data collection process

The data collection occurred according to the following steps:

3.7.1 Approvals and permissions

Before the data collection process commenced, the necessary ethical approvals were obtained as discussed in 3.2. A letter was written to the Office of the DLA Manager to inform them of the ethical approved study and to ask their approval as well. The letter also communicated the needs of the research team during the period of data collection, such as a private office or area with a desk and chairs to interview the participants and an electronic baby scale. A roster indicating the dates of visits to each clinic was also included. The clinics were supplied with the names of the research team and the researcher's contact details in case of enquiries. Clinic managers were contacted again before the research commenced to ensure that they were aware of the study, and to remind them when the team would visit the clinic. Before the final data collection process, the pilot study was conducted at Mphohadi Clinic.

3.7.2 Pilot study

The researcher and both fieldworkers together conducted a pilot study on five conveniently selected participants who attended the Mphohadi Clinic, and who met the inclusion criteria conducted the pilot study. Upon arrival at Mphohadi Clinic, the head of the clinic was informed that the research team was there and a private office with an electronic baby scale was allocated to the team. The study was explained to the patients seated in the clinic's waiting area and participants were randomly selected per inclusion criteria. The selected participant and their caregivers were taken to the private interview area one at a time, for

data collection. In the private area, the study and ethical issues, and the need for and purpose of the research were explained to the caregivers. In addition, guaranteed anonymity, right to withdraw from the study at any stage without being penalised, the time that it will take to complete the interview and anthropometric measurements, and the fact that participation would be voluntarily with no remuneration, were also explained. Information letters were handed to the caregivers in their preferred language (Sesotho or English), after which they signed the consent forms to include themselves and the child as participants in the research. Each interview took approximately 30 to 40 minutes. The pilot study was successful and no changes to the questionnaires or data collection procedure were required. Data collected during the pilot study, were therefor included in the final data set.

3.7.3 Main data collection

The three clinics, Mphohadi, Bohlokong and Bethlehem Clinic, were each visited twice weekly on Tuesdays and Thursdays during working hours, starting early in September 2016, and continuing until the required number of participants per clinic were obtained. The initial plan was to include at least 10 to 12 participants per day, but, eventually, the daily number of participants depended on how busy the clinics were, depending on the day of the month, as well as the weather. Data were collected from September 2016 to November 2016 (three months), during which 97 participants at Mphohadi Clinic, 72 at Bohlokong Clinic and 73 at Bethlehem Clinic were included in the study.

No problems were experienced, nor were any complaints received during or after the data collection process from the clinic managers, the fieldworkers, or the caregivers. Normal service delivery at the three clinics continued as usual and there were no disruptions.

The researcher captured the data weekly, transferring it from the questionnaires onto two separate Excel sheets, as discussed before. The data was then verified by the biostatistician.

3.8 Statistical analysis

Statistical analysis of the data was performed by the Department of Biostatistics of the Faculty of Health Science of the University of the Free State, and generated with SAS® Software (copyright, SAS Institute – SAS and all other SAS Institute Inc. products or service names are

registered trademarks or trademarks of SAS Institute Inc., NC, USA). Categorical data were described as frequencies and percentages and continuous data as medians and percentiles.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter summarises the socio-demographic information, nutritional status and the use of the CSG with regard to 242 children, 6 to 23 months, who attended the three clinics in the DLA, Thabo Mofutsanyane District, Free State, by their caregivers (Table 4.1).

Table 4.1: Participants according to clinic (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Mphohadi Clinic	97	40.0
Bethlehem Clinic	73	30.2
Bohlokong Clinic	72	29.8

4.2 Uptake of the child support grant

The uptake of the CSG amongst the participants, who were selected by convenience sampling, was 100%. Uptake of the CSG was not included under sampling inclusion criteria, and there were no participants who were not CSG recipients.

4.3 Socio-demographic information

The sociodemographic data is summarised in Table 4.2 to Table 4.17.

4.3.1 Relationship of the caregivers to the participants

As summarised in Table 4.2, for most participants, the primary caregiver that also brought them to the clinic, was their biological mother (n=222, 92%) or father (n=3, 1.2%), henceforth referred to as the biological parent-caregiver. The remaining 17 (7%) of the participants were brought to the clinic by a female family member, who were also their primary caregivers, henceforth referred to as a non-biological parent-caregiver.

Table 4.2: Relationship of primary caregiver to the participants (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Mother	222	92.0
Father	3	1.2
Grandmother	13	5.4
Sister	2	0.8
Aunt	2	0.8

4.3.2 Age, gender and ethnicity of the participants

The age, gender and ethnicity of the participants are summarised in Table 4.3. The sample included almost equal numbers of male (n=124, 51.2%) and female (n=118, 48.8%) participants. Their ages, calculated from the date of birth, ranged from six to 23 months (median age: 12 months; lower quartile: 8 months; upper quartile: 18 months). Overall, almost half of the participants (n=110, 45.4%) were younger than 12 months, 65 (26.9%) were 12-17 months old and the remaining 67 (27.7%) were 18-23 months old. For 18 of the participants, the age given by the caregivers did not match the participant's date of birth as calculated from the birth dates. All the participants included in the study were Black Africans (100%).

Table 4.3: Age, gender and ethnicity of the participants (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Gender		
Male	124	51.2
Female	118	48.8
Age (months)		
6-11	110	45.4
12-17	65	26.9
18-23	67	27.7
Ethnicity		
Black Africans	242	100

4.3.3 Housing and living conditions

The housing and living conditions of the participants are summarised in Table 4.4. Although most participants (n=159, 65.7%) resided in brick houses, almost a third (n=76, 31.4%) lived in corrugated iron (informal) houses. For seven (2.9%) participants, other types of housing which were unfortunately not specified, were listed. Houses had between one and 11 rooms (median: three rooms per house; lower quartile: 3; upper quartile: 9). More than a third of participants resided in homes with one (n=28, 11.6%) or two (n=60, 24.8%) rooms.

Households included one to seven adults (median: 2; lower quartile: 2; upper quartile: 6), and one to seven children (median: 2; lower quartile: 2; upper quartile: 6). The frequencies and percentages of adults and children per household, are summarised in Table 4.4. The room density ranged from 0.4 to 6 ppr (median: 1.3; lower quartile: 2; upper quartile: 4). In total, 34 households (14%) had ≥ 2.5 ppr, indicating overcrowding (Coetzee et al., 1988).

Some participants (n=44, 18.2%) also attended crèches a few days per week, mostly (93.2%, n=41) five days per week.

All the households that participants resided in had access to some form of running water. Most (n=207, 85.5%) had access to outside municipal taps, whilst only around a third (n=88, 36.4%) had access to municipal water inside the house. One household (0.4%) was dependent on a rainwater tank as their only access to water, and none of the households depended on dams or rivers for water.

Most households had electrical cooking equipment including electrical stoves/2-plate stoves (n=206, 85.1%) and microwaves (n=165, 68.2%). A small percentage of households used paraffin stoves (n=39, 16.1%) or gas stoves (n=16, 6.6%). Seven households (2.9%) reported only having access to open fire, without any other means of cooking food. Most households had at least a fridge (n=202, 83.5%) and only 10.7% (n=26) had a freezer. Only one household had only a freezer and no fridge. Overall, 39 households (16.1%) did not have a fridge or freezer and thus no means of keeping food cold and fresh.

Regarding electronic recreational and communication equipment, most households had television (n=210, 86.6%) and/or radio (n=201, 83.1%). In addition, almost half of the households (n=106, 43.8%) had subscription satellite television (DSTV). Almost all the households (n=237, 97.9%) had a cellular phone, while about one in ten households had

tablets (n=33, 13.6%) and/or computers (n=30, 12.4%). The 2.1% of households that did not have access to cellular phones were found to have access to a television and radio (only two households had access to a radio only). No households did not have at least one type of electronic, recreational or communication equipment.

Table 4.4 Socio-demographic information related to the participants (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Type of housing		
Brick	159	65.7
Corrugated iron	76	31.4
Unspecified	7	2.9
Number of rooms per house		
1	28	11.6
2	60	24.8
3	35	14.5
4	65	26.9
5	22	9.1
6	16	6.6
7	4	1.7
8	9	3.7
9	1	0.4
10	1	0.4
11	1	0.4
Number of adults per household		
1	23	9.5
2	150	62.0
3	49	20.3
4	12	5.0
5	4	1.7
6	3	1.2
7	1	0.4
Total number of children per household		
1	71	29.3
2	85	35.1
3	59	24.4
4	19	7.9
5	5	2.1
6	1	0.4
7	2	0.8
Attends crèche		
Yes	44	18.2
No	198	81.8
Number of days per week attending crèche (=44)		
3	2	4.6
4	1	2.3
5	41	93.2

Table 4.5 Socio-demographic information related to the participants (N=242) continued

VARIABLES	FREQUENCY	PERCENTAGE
Available cooking equipment in the household	n	%
Stove top (plates) that work with electricity	206	85.1
Stove top (plates) that work with paraffin	39	16.1
Stove top (plates) that work with gas	16	6.6
Oven	66	27.3
Microwave	165	68.2
Other (specified as open fires)	7	2.9
Cooling facilities in the household		
Fridge	202	83.5
Freezer	26	10.7
None	39	16.1
Electronic, recreational and communication equipment in the household		
Television	210	86.8
DSTV	106	43.8
Radio	201	83.1
Computer	30	12.4
Tablet	33	13.6
Cellular phone	237	97.9
Water source available to the household		
Tap inside the house	88	36.4
Tap on property outside the house	207	85.5
Communal tap	22	9.1
Rain water tank	1	0.4

4.4 Socio-demographics of the caregivers

Overall, 225 participants (93.2%) were brought to the clinic by their primary caregiver who was also their biological parent (biological parent-caregivers). The socio-demographic information of these biological parent-caregivers, are summarised in Table 4.5 to Table 4.9.

Data concerning the 17 participants, whose primary caregivers were not their biological parents (non-biological parent-caregivers) are presented in Table 4.11 to Table 4.16.

4.4.1 Biological parent-caregiver: Age

The ages of the biological parent-caregivers (Table 4.5) varied from 16 to 42 years (median: 29 years; lower quartile: 22; upper quartile: 36). Under-aged parents (< 21 years) comprised 12.9% (n=29) of this group. Seven (3.1%) of these were still of school-going age (<18 years); but only two of these seven were still attending school. The other five had only completed primary school.

Table 4.6: Age of the biological parent-caregivers (n=225)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Age (years)		
16-17	7	3.1
18-20	22	9.8
21-30	112	49.8
31-35	50	22.2
36-40	28	12.4
>40	6	2.7

4.4.2 Biological parent-caregiver: Number of children in care

As summarised in Table 4.7, most biological parent-caregivers (n=218, 96.9%) had one to three biological children (including the participant) in their care; seven (3.1%) had four to five biological children. Beside their own child(ren), 21 (9.3%) biological parent-caregivers cared for other children that were not their own offspring. Thus, a biological parent-caregiver cared for up to seven children.

More than a quarter (n=62, 27.6%) of the biological parent-caregivers indicated that they wanted more children. Of them, just under half (n=27, 45.8%) wanted one more child and about a third (n=21, 35.6%) wanted two more children. A small group (n=11, 18.7%) wanted three to four more children.

Table 4.7 Children in the care of the biological parent–caregivers and their desire for more children (n=225)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Number of biological children		
1	90	40.0
2	83	36.9
3	45	20.0
4	6	2.7
5	1	0.4
Wants more children		
Yes	62	27.6
No	163	72.4
Number of children the biological parent-caregiver still wants (n=59)		
1	27	45.8
2	21	35.6
3	8	13.6
4	3	5.1
Number of children <18 years (including participants) in the care of the biological parent-caregiver		
1	69	30.7
2	84	37.3
3	55	24.4
4	14	6.2
5	2	0.9
7	1	0.4

4.4.3 Biological parent-caregiver: Relationship status

Table 4.8 summarises information related to the relationship status of the biological parent-caregivers (only one option could be chosen from the questionnaire). Most (n=156, 69.3%) indicated that they were either married to, nor in a relationship with the other biological parent. Four (1.8%) were in a relationship with someone other than the biological parent. Overall, 65 (28.8%) indicated that they were single, separated, divorced or widowed (and not in a relationship).

Regarding the whereabouts of the other biological parent, most were reported to be working (n=190; 84.4%). Five (2.2%) were still at school, seven (3.1%) had passed away, and 14 (6.3%) had reportedly absconded. One biological parent-caregiver was not familiar with the whereabouts of the other biological parent. Seven (3.1%) reported other whereabouts of the other biological parent; three of which indicated that the other biological parent was at home, whilst other four did not specify the whereabouts.

Table 4.8: Relationship status of the biological parent-caregivers (n=225)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Relationship status		
In a relationship with the other biological parent of the participant	100	44.4
Married to the other biological parent of participant	56	24.9
In a relationship with someone else	4	1.8
Single	25	11.1
Separated	34	15.1
Divorced	1	0.4
Widowed	5	2.2
Whereabouts of the other parent of the participant (n=224)		
Passed away	7	3.1
At school	5	2.2
At work	190	84.8
At college/university	1	0.5
Absconded	14	6.3
Other (specified)	7	3.1

4.4.4 Biological parent-caregiver: Education and employment

As summarised in Table 4.8, only half (n=120, 53.6%) of the biological parent-caregivers had completed primary school and 90 (40.2%) had completed high school (secondary school). Only 14 (6.3%) completed a college or university qualification. One parent did not answer the question.

Three quarters (n=169, 75.5%) of the biological parent-caregivers were unemployed. Less than a fifth had any form of employment; 15 (6.7%) full time and 26 (11.6%) part-time. A few were still in school (n=13, 5.8%) and one was a tertiary student (n=1, 0.5%).

The biological parent-caregivers could choose more than one reason on the questionnaire to explain their unemployment. Of the 169 unemployed biological parent-caregivers, most (n=161, 95.3%) indicated that they could not find work. Just under half (n=71, 42%) indicated that their partners provided enough for the family. Six (3.6%) reported that the CSG they received monthly, met all their needs. One biological parent-caregiver did not work, but no reason was given.

Table 4.9: Education and employment status of the biological parent-caregivers (n=225)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Highest completed level of education (n=224)		
Primary school	120	53.6
High school	90	40.2
College	12	5.4
University	2	0.9
Employment status (n=224)		
Employed full time	15	6.7
Employed part time (piece jobs)	26	11.6
Unemployed	169	75.5
Attending school	13	5.8
Attending College/University	1	0.5
Reasons given for unemployment (n=169)		
"The CSG is enough for me"	6	3.6
"My partner provides for me"	71	42.0
"I cannot find any work"	161	95.3
"I am too ill to work"	2	1.2
Other (unspecified)	1	0.6

4.4.5 Single parent biological parent-caregivers

Overall, 65 biological parent-caregivers were either single, separated, divorced or widowed, and were raising the participants as single parents. Amongst them, these single parent biological parent-caregivers had a total number of 157 children (including one participant per household) in their care. This ranged from one to seven children per household. The education levels of these single biological parent-caregivers, varied, as summarised in

Table 4.10. More than half had only completed primary school (n=39, 60.9%), and less than a quarter had completed secondary school (n=23, 35.9%). Only two single biological parent-caregivers (3.2%) who had completed tertiary studies. One did not answer the question.

Concerning employment, most of the single biological parent-caregivers were unemployed (n=46, 70.8%), whilst only two (3.1%) were employed full time. Some were still attending school.

Table 4.10: Education and employment status of the single biological parent-caregivers (n=65)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Highest completed level of education (n=64)		
Primary school	39	60.9
High school	23	35.9
College	1	1.6
University	1	1.6
Employment status (n=65)		
Employed full time	2	3.1
Employed part time (piece jobs)	11	16.9
Unemployed	46	70.8
Attending school	5	7.7
Attending College/University	1	1.5

4.4.6 Non-biological parent-caregiver: Relationship to participants

Overall, 17% of participants were primarily cared for by a female family member that were not their biological parent; either a grandmother (n=13, 5.4%), sister (n=2, 0.8%) or aunt (n=2, 0.8%).

4.4.7 Non-biological parent-caregiver: Age

The ages of the non-biological parent caregivers (Table 4.10) varied from 22 to 68 years (median: 45 years; lower quartile: 37; upper quartile: 51). There were no under-aged caregivers (<21 years) in this group. Most of these caregivers were older than 40 years (n=13, 76.5%).

Table 4.11: Age of the non-biological parent-caregivers (n=17)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Age (years)		
22-30	2	11.8
31-35	1	5.9
36-40	1	5.9
>40	13	76.5

The ages of the biological mothers and fathers, as reported by the non-biological parent-caregivers, are summarised in Table 4.12. The reported ages of the biological mothers varied from 17 to 44 years (median: 24 years; lower quartile: 21; upper quartile: 32). The reported

ages of the biological fathers varied from 27 to 42 years (median: 30 years; lower quartile: 27; upper quartile: 32). These caregivers did not know the ages of 12 of the biological fathers.

Table 4.12: Age of the biological parents as reported by non-biological parent-caregivers (n=17)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Age of the biological mothers (n=12)		
16-17	1	5.9
18-20	2	11.8
21-30	10	58.8
31-35	1	5.9
36-40	1	5.9
>40	2	11.8
Age of the biological fathers (n=5)		
21-30	3	60
31-35	1	20
>40	1	20

4.4.8 Non-biological parent-caregivers: Number of children in care

The non-biological parent-caregivers had one to four of their own biological children and were taking care of one to four other children, including the participant (Table 4.13). Only two caregivers indicated that they still wanted more children of their own.

Table 4.13: Number of children in care of non-biological parent-caregivers (n=17)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Number of children <18 years in care (including participant)		
1	6	35.3
2	3	17.7
3	5	29.3
4	3	17.7
Number of biological children		
0	2	11.8
1	7	41.2
2	7	41.2
4	1	5.8
Wants more children		
Yes	2	11.8
No	15	88.2

The non-biological parent-caregivers were asked to report on the number of children the participant's biological mothers have (Table 4.13). They reported that most of the biological

mothers (n=10, 76.9%) had only one child (the participant). Three mothers had more children.

Table 4.14: Report of the non-biological parent-caregivers on the number of children the biological mother has (n=17)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Number of children the biological mother has (n=13)		
1	10	76.9
2	1	7.7
3	1	7.7
4	1	7.7

4.4.9 Non-biological parent-caregivers: Relationship status

As summarised in Table 4.15, most (n=6, 35.2%) of the non-biological parent-caregivers were widowed, two were divorced and one was single. Eight were either married, or in a relationship.

The non-biological parent-caregivers reported that of the biological mothers of the 17 participants in their care, two were married to the biological father, and eight were in a relationship, either with the biological father (n=7, 41.2%), or with someone else (n=1, 5.9%). Four were separated (23.4%) and three (17.7%) were single.

Table 4.15: Relationship status of non-biological parent-caregivers and the biological mothers of the participants under their care (n=17)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Relationship status of the non-biological parent-caregivers		
Married	5	29.4
Living with a life partner	3	17.7
Single	1	5.9
Divorced	2	11.8
Widowed	6	35.2
Relationship status of the biological mother		
Married to the participant's father	2	11.8
In a relationship with the participant's father	7	41.2
In a relationship with someone other than the father	1	5.9
Single	3	17.7
Separated	4	23.4

4.4.10 Non-biological parent-caregivers: Education and employment

According to the summary in Table 4.16, most of the non-biological parent-caregivers (n=14, 82.4%) had only completed primary school; two (11.8%) had completed high school (secondary school) and one (5.8%) had no education.

The non-biological parent-caregivers reported that most biological mothers (n=8, 47.1%) had completed high school (secondary school) and one had completed a university degree.

Most (n=11, 64.7%) of the non-biological parent-caregivers were unemployed and three (17.7%) were pensioners. The non-biological parent-caregivers could choose more than one reason on the questionnaire to explain their unemployment, but only three answered this question. From these three, two indicated that they were unable to find any work (66.7%) and one indicated that they were too ill to find work (33.3%).

The non-biological parent-caregivers reported the employment status of the biological mothers and the reasons for their unemployed where applicable. Four (23.5%) biological mothers were employed full time (23.5%), three (17.7%) were unemployed and five (29.4%) were still scholars/students. Of the three unemployed mothers, two (66.7%) were reported to be unable to find work and one (33.3%) was reportedly too ill to work.

Table 4.16: Education and employment of the non-biological parent-caregivers and the biological mothers of the participants under their care (n=17)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Highest completed level of education of non-biological parent-caregivers		
Primary school	14	82.4
High school	2	11.8
No education	1	5.8
Highest completed level of education of biological mothers		
Primary school	7	41.1
High school	8	47.1
University	1	5.9
Unknown by the other primary caregiver	1	5.9
Employment status of the non-biological parent-caregivers		
Employed full time	1	5.9
Employed part time (piece jobs)	2	11.7
Unemployed	11	64.7
Pensioner	3	17.7

Table 4.17: Education and employment of the non-biological parent-caregivers and the biological mothers of the participants under their care (n=17) continued

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Reasons given non-biological parent-caregivers by for unemployment (n=3)		
Cannot find any work	2	66.7
Too ill to work	1	33.3
Employment status of the biological mothers		
Employed full time	4	23.5
Employed part time (piece jobs)	3	17.7
Unemployed	3	17.7
Pensioner	1	5.9
Attending school	4	23.5
Attending College/University	1	5.9
Unknown by the other primary caregiver	1	5.9
Reasons given by non-biological primary-caregivers why the biological mothers were unemployed (n=3)		
Cannot find any work	2	66.7
Too ill to work	1	33.3

4.5 Socio-demographics of other adults staying in the same household as the participant

Along with the participants and their primary caregivers, other adults were also staying in the same households, as previously indicated in Table 4.4. Table 4.16 summarises the employment status of these adults.

4.5.1 Other adults in the household: Employment status

According to Table 4.16, less than half (108, 44.6%) of the households included other adults (thus, not the primary caregiver of the participant) who were employed full time. Most of these 108 households had only one full-time employed adult (n=96, 88.9%).

In total, 44 (18.2%) of the households included other adults who were part-time employed (mostly just one).

More than a third of the households (n=94, 38.8%) included other unemployed adults, ranging from one to three per household. Most of these 94 households included at least one unemployed other adult (n=79, 84%).

Table 4.18: Employment status of other adults living in the same households as the participants (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Number of households with other adults who were employed full time (n=108)		
1	96	88.9
2	9	8.3
3	3	2.8
Number of households with other adults who were employed part time (44)		
1	41	93.2
2	3	6.8
Number of households with other adults who were unemployed (n=94)		
1	79	84.0
2	9	9.6
3	6	6.4

4.5.2 Other adults in the household: Social support grants

Overall, 67 households (27.6%) included other adults who also contributed to the household income with various types of social support grants, some receiving more than one support grant. The CSG was the most prevalent grant, received by other adults in 31 households (in 29 (43.2%) of these households, other adults received one CSG (93.6%) and in two, other adults received two CSGs (6.5%) (Table 4.17). In 29 households, other adults received the old age grant, and in only two (3%) households, other adults received pension from former employment (indicating that not many of these other adults in the households, were previously employed).

Table 4.19: Number of households with other adults besides the primary caregiver, receiving social support grants (living with the participant in the same household) (n=67)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Number of households with other adults receiving pension from former employment (n=2)		
1	1	50
2	1	50
Number of households with other adults receiving old age grants (n=29)		
1	27	93.1
2	1	3.5
3	1	3.5
Number of households with other adults receiving disability grants (n=4)		
1	4	100.0
Number of households with other adults receiving child support grants (n=31)		
1	29	93.6
2	2	6.5

Table 4.20: Number of households with other adults besides the primary caregiver, receiving social support grants (living with the participant in the same household) (n=67) continued

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Number of households with other adults receiving care dependency grant (n=1)		
1	1	100.0

4.5.3 Households with CSG as only income

In 38 households (15.7%), there were no other income besides the CSGs of the participant (and other children in the household where applicable). There were no other employed adults and no other social support grants in these households. These 38 households consisted of 77 adults (median: 2; lower quartile: 1; upper quartile: 4) and 74 children (including the participants) (median 2; lower quartile: 1; upper quartile: 3).

Overall, 26 (68.4%) of these households had a fridge, four (10.5%) that had a fridge and freezer and one in five (n=8, 21.1%) had none of these means to keep food fresh. All these households had some form of cooking equipment, mostly electric stovetops/2-plate stoves (79%, n=30) and/or as a microwave (n=28, 73.7%). The rest made use of paraffin stoves (18.4%, n=7) and one used a gas stovetop.

In these households, almost all the primary caregivers (n=35, 97.4%) had a cellular telephone. Most of these households (n=33, 86.8%) had television and radio, whilst 39.5% (n=15) had satellite television (DSTV), 5.3% (n=2) had a computer and 13.2% (n=5) had a tablet.

4.6 Nutritional status

The nutritional status of the participants included feeding practices and growth standards, which are summarised in Table 4.21 to Table 4..

4.6.1 Growth indicators

The growth indicators of the participants are summarised in Table 4.21, according to weight-for-age, weight-for-length, length-for-age and MUAC, interpreted with WHO age-specific tables (WHO, 2010). Concerning markers of acute malnutrition, overall, 13.2% of participants (n=32) were underweight-for-age and 3.3% (n=8) were wasted. According to MUAC, only 5% of participants (n=12) suffered from moderate acute malnourishment, whilst the rest had MUAC within normal parameters.

Concerning markers of chronic malnutrition, 33.1% of participants (n=80), overall, were stunted. In addition, 6.2% of participants (n=15) were overweight and/or obese.

Table 4.21: Growth indicators of the participants (N=242) (WHO, 2010)

Growth Parameter	Classification	FREQUENCY	PERCENTAGE
		n	%
Weight-for-age			
≤-2.1 z-scores	Underweight	32	13.2
≥ -2.0 z-scores	Normal	210	86.8
Weight-for-length			
<-2.0 z-scores	Wasted	8	3.3
≥-2.0 z-score ≤ 1.9 z-score	Normal	219	90.5
>1.9 z-score	Overweight	15	6.2
Length-for-age			
≤ -2.1 z-score	Stunted	80	33.1
≥ -2.0 z-score	Normal	162	66.9
MUAC (cm)			
11.5 ≥ 12.5	Moderate acute malnutrition	12	5.0
> 12.5	Normal	230	95.0

4.6.2 Feeding practices

As recommended by the WHO, UNICEF and partners, feeding practices, based on a 24-hour recall, included dietary diversity, minimum meal frequency and minimum acceptable diet (WHO et al., 2010). Other dietary data were related to meals eaten away from home, breastfeeding practices and breast milk substitutes. These are summarised in Table 4.22 to Table 4.29.

4.6.2.1 Dietary intake of the participants

The dietary intake of the participants according to food groups, are summarised in Table 4.22 (Marriott et al., 2012; WHO et al., 2010; Working Group on Infant and Young Child Feeding Indicators, 2007). According to the 24-hour recall, almost all the participants (n=237; 97.9%) had consumed starch on the day before data collection, 72.3% (n=17) had consumed dairy products and a third of the participants (n=83; 34.3%) had consumed meat, fish, or poultry. Less than half (40.9%, n=99) had consumed any fruits and vegetables in the reference period; of which only a third (n=33) had consumed vitamin A rich fruits and vegetables. Very few participants had consumed legumes, nuts or eggs. Table 4.22, thus, indicates a dietary intake high in carbohydrates and energy, but limited in sources of high biological value proteins, as well as micronutrients.

Table 4.22: Dietary intake of the participants according to food groups (N=242) (Marriott et al., 2012; WHO et al., 2010; Working Group on Infant and Young Child Feeding Indicators, 2007b)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Food groups eaten in the previous 24 hours		
Starchy foods, grains, cereals, roots and tubers	238	98.3
Eggs	7	2.9
Legumes and nuts	7	2.9
Dairy products, milk, cheese	175	72.3
Flesh foods, meat, fish, poultry, organ meat	76	31.4
Vitamin A rich vegetables and fruits	33	13.6
Other vegetables and fruits	66	27.3

4.6.2.2 Dietary diversity

Table 4.23 summarises the dietary diversity of the participants according to the number of food groups consumed in the reference period. Only 7.9% (n=19) of the participants, consumed four or more food groups on the day before data collection, and were, thus, classified as having a diverse diet. The majority of participants (92.1%, n=223) were classified as having non-diverse diets (Marriott et al., 2015; WHO et al., 2010).

Table 4.23: Dietary diversity according to the number of food groups consumed by participants (N=242) (Marriott et al., 2012; WHO et al., 2010; Working Group on Infant and Young Child Feeding Indicators, 2007b)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Non-diverse diet (0-3 food groups consumed)	223	92.1%
Diverse diet (4 or more food groups consumed)	19	7.9

4.6.2.3 Minimum meal frequency

Minimum meal frequency was determined by the minimum required solid, semisolid or soft foods consumed per day, differentiating between breastfed and non-breastfed participants (Marriott et al., 2015; WHO et al., 2010). To achieve minimum meal frequency, as summarised in Table 3.3, participants six to eight months had to consume two to three solid, semisolid or soft foods per day, in addition to breastfeeding (Marriott et al., 2015; WHO et al., 2010). As summarised in Table 4.24, 85.4% (n=41) of the 48 breastfed participants between six to eight months old, achieved the minimum meal frequency, whilst 14.6% (n=7) did not achieve the minimum meal frequency.

Participants nine to 23 months had to consume three to four solid, semisolid or soft foods per day in addition to breastfeeding to reach the minimum meal frequency (Marriott et al., 2012; WHO et al., 2010). Overall, 86% (n=86) of these participants achieved minimum meal frequency and 14% (n=14) did not achieve minimum meal frequency.

Non-breastfed children have to consume a minimum of four solid, semisolid or soft foods with suitable milk (one to two cups per day) to achieve minimal meal frequency (Marriott et al., 2012; WHO et al., 2010). None of the 94 non-breastfed participants achieved minimal meal frequency, as all of them had an intake of three or less solid, semisolid or soft foods in the 24-hours prior to data collection.

Table 4.24: Minimum meal frequency of the participants (N=242) (Marriott et al., 2012; WHO et al., 2010; Working Group on Infant and Young Child Feeding Indicators, 2007b)

VARIABLES	FREQUENCY		PERCENTAGE	
	Yes		No	
	n	%	n	%
Breastfed participants who achieved minimum meal frequency (n=148)				
Participants six to eight months consuming two to three solid, semisolid, or soft foods per day whilst breastfeeding (n=48)	41	85.4	7	14.6
Participants nine to 23 months consuming three to four solid, semisolid, or soft foods per day whilst breastfeeding (n=100)	86	86.0	14	14.0
Total	127	85.8	21	14.2

4.6.2.4 Minimum acceptable diet

Participants, both breastfed and non-breastfed, who had achieved both the minimum dietary diversity and the minimum meal frequency during the previous day, were classified as having a minimum acceptable dietary intake (Marriott et al., 2012; WHO et al., 2010). According to this definition, only 4.5% of participants (n=11) achieved a minimum acceptable diet.

4.6.2.5 Continued breastfeeding at one year

Breastmilk provides more than half of a six to 12 months old child's energy needs and one third of a 12 to 23 months old child's energy needs (Marriott et al., 2012; WHO et al., 2010). This dietary indicator specifically applies to children aged 12 months to 15 months. There were 48 participants in this age group; 24 (50%) were breastfeeding at the time of data collection, and the other 24 (50%) were not.

4.6.2.6 Introduction of solid, semi-solid or soft foods

Introduction of solid, semi-solid or soft foods were determined for participants aged six to eight months who were still breastfeeding (Marriott et al., 2012; WHO et al., 2010). There were 63 participants aged six to eight months old who were being breastfed and 42 (66.7%) of them also received solid, semi-solid or soft foods in addition to breastfeeding during the previous day. A third of the participants (n=21, 33.45) did not meet this requirement.

4.6.2.7 Continued breastfeeding at 2 years

Only 40% (n=16) of the 40 participants, aged 20 to 23 months, had received breast milk during the 24 hours prior to data collection (Marriott et al., 2012; WHO et al., 2010).

4.6.2.8 Age-appropriate breastfeeding

Participants aged six to 23 months who were being breastfed, as well as receiving solid, semi-solid or soft foods (59.1%; n=143) were classified as being age-appropriately breastfed (Marriott et al., 2012; WHO et al., 2010). Fewer than half of the participants (40.9%; n=99) were not age-appropriately breastfed.

4.6.2.9 Dietary questions: meals away from home

Around one fifth of the participants (n=44; 18.2%) attended crèches. Most (n=41, 93.2%) of these participants attended five days per week and 86.4% (n=38) received meals at the crèche (summarised in Table 4.25). Most crèches provided two (n=29, 78.4%) meals per day and in most cases (n=32, 84.2%) the caregivers were aware of what the children ate at the crèche.

Table 4.25: Dietary intake at crèche (n=44)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Food provided during time at crèche (n=44)		
Food that the primary caregiver packs for participant	26	59.1
Food that the crèche provides	38	86.4
Number of meals per day provided by the crèche		
2	29	78.4
3	7	18.9
4	1	2.7
Do you know what food the participant receives at the crèche (n=38)		
Yes	32	84.2
No	6	15.8

4.6.2.10 Breastfeeding history

At the time of data collection, 61.2% (n=148) of the participants were being breastfed. Of those participants who were not being breastfed (n=94, 38.8%), 75% (n=69) were previously breastfed. Overall, 23 (25%) participants were never breastfed and unfortunately two did not answer the question. This data are summarised in Table 4.26.

Of the 69 (75%) participants who were breastfed before, but at the time of data collection were not breastfeeding anymore, 38 (55.1%) were exclusively breastfed for up to three months and only 18 (26.1%) were exclusively breastfed to six months. Only one (1.5%) participant was never exclusively breastfed. Unfortunately, for the 148 participants who were breastfed at the time of data collection, the number of months that they were exclusively breastfed, were not recorded.

Of the 69 participants who were not breastfed at the time of data collection, 43.3% (n=29) stopped breastfeeding at six months, and 14.9% (n=10) were breastfed for one year and beyond. Two caregivers did not answer the question. Of the 23 participants who never breastfed, 17 biological parent-caregivers gave reasons for that. These are summarised in Table 4.26 and the most common reason was the inability to produce enough milk for the infant (29.4%, n=5).

Table 4.26: Breastfeeding history of the participants (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Participants breastfeeding at the time of the study		
Yes	148	61.2
No	94	15.8
Participants not breastfeeding at the time of the study, but breastfed before (n=92)		
Yes	69	75
No	23	25
Duration of exclusive breastfeeding for participants who were breastfed before: months (n=69)		
0	1	1.5
1	5	7.3
2	4	5.8
3	38	55.1
4	2	2.9
5	1	1.5

Table 4.27: Breastfeeding history of the participants (N=242) continued

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Duration of exclusive breastfeeding for participants who were breastfed before: months (n=69)		
6	18	26.1
Total months that the participant was breastfed before stopping (n=67)		
1	5	7.5
2	2	3.0
3	6	9
4	1	1.5
6	29	43.3
7-12	22	32.8
13-18	2	3.0
Reasons why participants were never breastfed (n=17)		
No reason given	4	23.5
“had a breast problem”	2	11.8
“was too ill to breastfeed”	2	11.8
“participant refused to breastfeed”	1	5.9
“the participant’s mother absconded”	1	5.9
“the participant’s mother was working”	1	5.9
‘did not have enough breastmilk”	5	29.4
“work away from home”	1	5.9

4.6.2.11 Use of breastmilk substitutes

The 94 participants who were not breastfed, received different kinds of feeds, some suitable and others not, as summarised in Table 4.25. Most participants (n=82, 87.2%) received tea, 79.8% (n=75) received plain water, 77.7% (n=73) received diluted porridge drinks and 73.4% (n=69) received sugar water, all of which are unsuitable breastmilk substitutes. Some participants (n=6, 6.4%) even received condensed milk. Overall, 56 participant received formula milk as a breastmilk substitute. Another 38 participants were neither breastfeeding nor formula feeding (15.7%). These participants received different kinds of substitute feeds, as summarised in Table 4.24.

Table 4.24: Breastmilk and formula milk substitutes (n=38)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Tea	31	81.6
Cow's milk	29	76.3
Diluted porridge drink (motoho)	28	73.7
Plain water	27	71.1
Custard	24	63.2
Sugar water	24	63.2
Juice / Tropica	22	57.9
Condensed milk	6	15.8
Other (unspecified)	1	2.6

Cow's milk was used by 29 participants (n=76.3%), four of the participants under the age of 12 months. More than three-quarters of the participants received tea as a breastmilk substitute (n=31, 81.6%).

Overall, 56 participants (59.6%) who did not receive any breastmilk, received infant formula milk; the types of formula received, are summarised in Table 4.26.

Table 4.25: Breastmilk substitutes received by non-breastfeeding participants (n=94)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Tea	82	87.2
Plain water	75	79.8
Motoho/lesjelesjele (diluted pap drink)	73	77.7
Sugar water	69	73.4
Cow's milk	67	71.3
Juice/Tropica/cordial	64	68.1
Custard	60	63.8
Formula milk	56	59.6
Condensed milk	6	6.4
Creamers	1	1.1
Other (unspecified)	1	1.1

Table 4.26: Formula milk used by participants (n=56)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Pelargon	20	35.7
Nan1	13	23.2
Nan 2	13	23.2
Nan 3	6	10.7
Melegi	7	12.5
S26	4	7.1
Lactogen 1	6	10.7
Lactogen 2	11	19.6
Lactogen 3	4	7.1
Infacare 1	5	8.9
Infacare 2	10	17.9
Infacare 3	3	5.4
Nido	3	5.4

Different formulas are specified for different ages and Table 4.27 indicates whether the formulas used, were age appropriate or not. When using formula milk, it is important that the formula milk is age appropriate and correctly mixed. This includes the correct concentration and volume per day according to the mixing instructions given on the formula milk. For the 56 participants who received formula milk, some received more than one type of formula milk per day, as there were 66 recordings of formula feeds given. Overall, only five of the 66 formula feeds that were age appropriate, the correct concentration as well as the correct volume (7.6%).

Concerning age appropriateness of formula milk, 32 (48.5%) feeds given were age appropriate, whilst 34 (51.5%) were not age appropriate.

Table 4.27: Age appropriateness of formula milk received by participants (n=66)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Age appropriate	32	48.5
Not age appropriate	34	51.5

Some primary caregivers over-diluted or over-concentrated the formula milk. Table 4.28 summarises the mixing of the formula milk as reported by the caregivers. Less than half ($n=32$, 48.5%) of the formula feeds received by participants were the correct concentration. There were 19.7% of the formulas that were over-concentrated ($n=13$) and 21 (31.8%) formula feeds were over-diluted.

Table 4.28: Concentration of formula milk ($n=66$)

CONCENTRATION	FREQUENCY	PERCENTAGE
	n	%
Over-diluted	21	31.8
Over-concentrated	13	19.7
Correct concentration	32	48.5

Table 4.29 indicates whether the participants received sufficient amount of formula milk per day, classified as over-fed, under-fed or correct amounts of formula feeds received according to their age, as prescribed for each formula. Only 18 of the formula feeds given were the correct amount per day (27.3%), whilst more participants were being over-fed ($n=38$, 57.6%) than under-fed ($n=10$, 15.2%).

Table 4.29: Adequacy of formula milk given to participants per day ($n=66$)

ADEQUACY	FREQUENCY	PERCENTAGE
	n	%
Over-fed	38	57.6
Under-fed	10	15.2
Sufficient amounts of formula milk given	18	27.3

4.7 Household food security

The classification of household food security amongst the participants are summarised in Table 4.30. Only 23.6% ($n=57$) of the households where the participants resided, were food secure, whilst 27.7% ($n=67$) were at risk of food insecurity and 23.6% ($n=57$) were food insecure (indicative of going hungry) (Labadarios et al., 2011).

Table 4.30: Classification of household food security (N=242)

CLASSIFICATION	FREQUENCY	PERCENTAGE
	n	%
Food secure	57	23.6
At risk of food insecurity	67	27.7
Food insecure	118	48.7

For interest sake, the answers to the questions in the CHIPP index that are scored together in order to predict food security, are summarised in Table 4.30. From these answers it was evident that the households of the participants struggled to supply food. Most caregivers reported that their households ran out of money (n=170; 70.3%) to buy food, forcing them to have to cut back on their own intakes (66.5%, n=161). Moreover, lack of money had forced them to feed the children (referring to the participants) a less diverse diet (66.5%, n=161), cut the children's portion sizes (57.9%, n=140), let them skip meals (47.6%, n=113) and send them to bed hungry (3.3%, n=8). Overall, 6.6% (n=16) of the children were reported to having said they were hungry; which may have been an underestimation of the real situation, as many of the participants were too young still to communicate hunger in words.

Table 4.31: Questions of the CHIPP index to determine the household food security of the participants (N=242)

QUESTIONS AND ANSWERS	FREQUENCY	PERCENTAGE
	n	%
Does your household ever run out of money to buy food?		
Yes	170	70.3
No	72	29.8
Do you ever rely on a limited number of foods to feed the child, because you are running out of money to buy food?		
Yes	161	66.5
No	81	33.5

Table 4.31: Questions of the CHIPP index to determine the household food security of the participants (N=242) continued

QUESTIONS AND ANSWERS	FREQUENCY	PERCENTAGE
	n	%
Do you ever cut the size of meals or skip meals of the child, because there is not enough money for food?		
Yes	140	57.9
No	102	42.2
Do you ever eat less than you should, because there is not enough money for food?		
Yes	133	55.0
No	109	45.0
Does the participant ever eat less than he/she should because there is not enough money for food?		
Yes	115	47.5
No	127	52.5
Does the participant ever say[#] that he/she is hungry, because there is not enough food in the house?		
Yes	16	6.6
No	226	93.4
Do you ever cut the size of the participant's meals or does he/she ever skip meals, because there is not enough money to buy food?		
Yes	113	46.7
No	129	53.3
Does the child ever go to bed hungry, because there is not enough money to buy food?		
Yes	8	3.3
No	234	96.7

[#] Note that this question may have been misleading, because many of the children were still too young to say that they were hungry.

4.8 Household income, expenditure and the CSG

Data related to monthly income, expenditure and social support grants, including the CSG, are summarised in Table 4.32 to Table 4.38.

4.8.1 Social support grants received by participants and their primary caregivers

As summarised in Table 4.32, all 242 participants were recipients of the CSG, although this was not inclusion criteria.

There were only three (1.2%) primary caregivers who also received other social support grants, namely the old age grant (n=1), the disability grant (n=1) and the care dependency grant (n=1). One (0.4%) primary caregiver also received pension from former employment.

Some primary caregivers received more than one CSG per household, ranging from one to five CSGs per household (depending on the number of child recipients that they had in their care). Most households received one (n=120, 49.6%) to two (n=78, 32.2%) CSGs. Although 225 (93.2%) of the participants were in the primary care of a biological parent, 233 (96.3%) of the CSGs were paid out to biological parents. Conversely, seven participants were in the primary care of someone other than their biological parents, but only eight of them had the CSG paid out to them.

Table 4.32: Social support grants, including the CSG, received by the primary caregiver of the participants (N=242)

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Social support grants received by primary caregivers		
Pension from former employment	1	0.4
Old age grant	1	0.4
Disability grant	1	0.4
Child support grant	242	100
Care dependency grant	1	0.4
Number of CSGs paid out to primary caregiver		
1	120	49.6
2	78	32.2
3	38	15.7
4	5	2.1
5	1	0.4
Rand value of CSG received for the participant		
R350	242	100
To whom is the participant's CSG paid out to		
Non-biological parent-caregiver	8	3.3
Biological parent-caregiver	233	96.3
Someone else (Grandmother)	1	0.4

4.8.2 Monthly income and food expenditure per household

Table 4.33 summarises the estimated monthly income of the households and the amounts that were being spent on food per households. The caregivers reported a median income of R2 897 per month per household. This ranged from R200 (which was less than the CSG,

indicating that this person misunderstood the question, as all the participants were receiving the CSG) to R R12 350.

A median of R925.50 per month was reportedly being spent on food per household (ranging from nothing, which also seems like misreporting) to R3 000.00 per month.

Table 4.33: Monthly income and expenditure on food per household (n=239)

Monthly income	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
	R200.00	R1 850.00	R2 897.00	R3 700.00	R12 350.00
Monthly expenses	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
	R0.00	R500.00	R925.50	R1 200.00	R3 000.00

4.8.3 Monthly expenses of the participants

The specific items that were procured monthly for the participants are listed in Table 4.34 and amounts spent on these is summarised in Table 4.44. Almost all the caregivers reported buying toiletries (such as soap, baby creams and powders) (n=239, 98.8%) and clothes (n=234, 97.6%) for the participants. These were also the items that most money was also spent on (clothes - median: R318.40 per month; followed by toiletries - median: R247.33 per month).

Most also reported buying medicine for the participants (n=209, 86.4%) on a monthly basis, although that was only the fifth highest expense (median: R82.26 per month). The maximum amount spent on medicine per month amounted to R520.00 per participant.

Only 151 participants listed foods and drinks for the participant as a monthly expense (n=151, 62.4%), ranking as the fourth most expensive items (median: R189.06 per month). The minimum monthly expenditure on food (n=151) was reportedly R20 per month, and the maximum R700 per month.

Although only 56 of the participants were receiving infant milk formula, according to Table 4.34, this was listed as an expense by 74 of their caregivers. Milk formula was listed as the third highest monthly expense for the participants (R223.38 per month; maximum R430 per month).

Table 4.34: Items procured per month for the participants (N=242)

ITEMS PROCURED PER MONTH	FREQUENCY	PERCENTAGE
	n	%
Toiletries	239	98.8
Clothes	234	96.7
Medicine	209	86.4
Food and drink	151	62.4
Entertainment (toys, activities, birthdays)	116	47.9
Milk formula	74	30.6
Crèche	47	19.4
Transport (to and from crèche)	10	4.1

Although 44 participants attended crèches, 47 listed it as a monthly expense (median: R157.83 per month, maximum R200.00 per month), of which 10 listed transport to and from the crèche as a monthly expense (median: R104.00 per month; maximum: R350 per month).

Table 4.35 Rand values of items procured for the participants (N=242)

Amount spent on participants monthly	Min	Lower quartile	Median	Upper quartile	Max
Toiletries (n=239)	R30.00	R150.00	R247.33	R300.00	R800.00
Clothes (n=234)	R15.00	R200.00	R318.40	R400.00	R1000.00
Milk formula (n=74)	R50.00	R160.00	R223.38	R300.00	R430.00
Food and drink (n=151)	R20.00	R120.00	R189.06	R250.00	R700.00
Medicine (n=209)	R 7.00	R 40.00	R 82.26	R100.00	R520.00
Transport (to and from crèche)(n=10)	R20.00	R 25.00	R104.00	R150.00	R350.00
Crèche (n=47)	R20.00	R250.00	R157.83	R145.00	R200.00
Entertainment (toys/activities/birthdays) (n=116)	R 5.00	R300.00	R 63.56	R 30.00	R 92.50

The CSG were reported to be spent primarily on the participants' needs (n=229; 94.6%), whilst 13 primary caregivers (5.4%) indicated that it is added to a household money pool for spending on the entire household (Table 4.36).

Table 4.36: Distribution of CSG (N=242)

OPTIONS	FREQUENCY	PERCENTAGE
	n	%
Goes into money pool used for the whole household	13	5.37
Get spent on the participant alone	229	94.63

4.8.4 Use of the CSG

Primary caregivers reported the purpose and use of the CSG, as summarised in Table 4.37. Almost half of the primary caregivers reported that the CSG are meant for and used for food and clothes for the participants (n=113, 46.7%) as well as other (unspecified) needs of the participants (n=113, 46.7%). Only 2.5% (n=6) of the primary caregivers reported the CSG to be intended for and used for the participants food alone. There were eight (3.3%) participants whose CSG were reportedly used for the whole family.

Most primary caregivers (n=234, 96.7%) reported that the amount of R350.00 per month was not enough to cover all the needs and expenses of the participants. From these 234 who reported that the current CSG was not enough, 196 (83.8%) reported that it was not enough for the needs of the participants and 34 (14.5%) reported that it was not enough for the whole family's needs.

Table 4.37 Perceptions of the purpose of, and actual usage of the CSG (N=242):

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Primary caregiver's perception on the purpose and the use of the CSG		
Food and clothes for the participant	113	46.7
For the participant's needs	113	46.7
For the family's needs	7	2.9
Food for the participant	6	2.5
Food and nappies for the participant	1	0.4
Food for the family	1	0.4
Nappies for the participant	1	0.4
Is the CSG used for above given reasons		
Yes	241	99.6
No (not specified)	1	0.4

Table 4.37 Perceptions of the purpose of, and actual usage of the CSG (N=242) continued

VARIABLES	FREQUENCY	PERCENTAGE
	n	%
Is R350 as CSG money enough to take care of the participant's needs		
Yes	8	3.3
No	234	96.7
If the CSG is not enough, give reasons why (n=234)		
Not enough for all the needs of the participant	196	83.8
Not enough for the family's needs	34	14.5
Not enough for a single mother's needs	2	0.9
Not enough for food and clothes for the participant	1	0.4
Not enough for the crèche fees	1	0.4

Table 4.38 indicates the value of the CSG that caregivers would have preferred, which was a minimum of R350.00, a maximum of R2 000.00, with a median of R612.10 per month.

Table 4.38: Preferred amount of the CSG per month (N=242)

What amount of CSG would be enough per month?				
Min	Lower quartile	Mean	Upper quartile	Max
R350.00	R500.00	R612.10	R700.00	R2000.00

4.9 Summary

The results of this study indicate the nutritional status and the use of the CSG amongst a random sample of children, six to 23 months old, living in the DLA. All data were collected and analysed according to the objectives of the study and manage to give a clearer indication of the socio-demography, anthropometry, dietary intake as well as the CSG spending patterns of this specific community. The results indicated a poor community, mainly dependent on the CSG, limited food availability, and poor dietary practices amongst children six to 23 months. The community also did not have high levels of education, and unemployment was prevalent amongst most of the parent-caregivers. Poor food security, poor socio-economic status and insufficient dietary intake existed along high levels of stunting amongst these

infants. The CSG was not mainly spent on food and seemed to be used for the entire household. The results are discussed in more detail in the next chapter.

CHAPTER 5: DISCUSSION OF RESULTS

5.1 Introduction

The CSG was introduced in South Africa in 1998, thus, at the time of this study, in 2016/2017, all children under the age of 18 years in South Africa, had had the opportunity to benefit from the CSG. At the time when this study were conducted, it was no longer possible to do an impact study in the way that Case et al (2005) and others had done, by comparing recipients and non-recipients from the same socio-demographic background. Rather, this study aimed to describe the socio-demographic information, nutritional status and the use of the CSG amongst children six to 23 months in a rural area of the Free State where very little is known in this regard. This age group was chosen as global research indicates that up to 70% of stunting takes place before the age of two years, whilst malnutrition at such a young age is linked to impaired cognitive development, reduced school achievement, lower economic productivity in adulthood and poorer maternal reproductive outcomes (Zembe-Mkabile et al., 2015). Investing in this critical period in a child's life therefore has the potential to yield significant returns.

The results of this study provide baseline data, which may be used by the local government to reassess current poverty-relief strategies in the area, and plan future research and interventions. The findings of which are discussed below.

5.2 Uptake of the child support grant in the sample

Although it was not an inclusion criterion of the study, all 242 participants were recipients of the CSG. As this was a convenient sample rather than a stratified sample, it is impossible to predict the uptake of the CSG in the area from this research. Non-receipt of the CSG by children that qualified for it is certainly a reality in South Africa. A recent study in four different areas in South Africa identified reasons for non-receipt ranging from administrative factors such as the caregiver and child, respectively, not being in possession of an identity document or birth certificate, to institutional issues, including long queues, and delays and errors at the social grants administration offices (Zembe-Mkabile et al., 2015).

5.3 Socio-demographic conditions

This study assessed the socio-demographic conditions in which the participants were being raised.

5.3.1 Age, gender and ethnicity of the participants

The participants in the current study ranged from six to 23 months with a median age of 12 months and an interquartile range of 10 months calculated from the date of birth. They were all Black Africans (100%) and included almost equal numbers of males (51.2%) and females (48.8%). This is very similar to the national gender distribution, which, according to the GHS 2015 which surveyed 21 228 households through face-to-face interviews across all nine provinces was 50.5% males and 49.5% females amongst black African children zero to four years (Statistics South Africa, 2015).

5.3.2 Relationship of the primary caregivers to the participants

It is not uncommon in South Africa for children to live apart from their biological parents and in the care of other relatives (Hall et al., 2014). In the current study, 93.2% of participants had a biological parent as primary caregiver (for the sake of clarity, referred to as the biological parent-caregiver); only 1.2% of which had their biological fathers as primary caregiver.

According to the General Household Survey (GHS) 2013, which surveyed 25 330 South African households, only 36% of children resided with both their biological parents, 43% lived with only their biological mother and 2% with only their biological father. Overall, 19% lived with a non-biological parent-caregiver (Statistics South Africa, 2013). A report by the Child Institute of the University of Cape Town (Hall et al., 2014), which compared the GHS 2014 to that of the first one in 2002, found that the proportion of children in South Africa who lived with both parents had decreased from 39% in 2002 to 35% in 2014. The report also stated that children in the poorest 20% of households were least likely to reside with both parents (only 17% had both parents living with them) compared to 76% of children in the least-poor 20% of households (Hall et al., 2014). Ethnicity played a role, with less than one-third (29%) of African children were living with both their parents as opposed to 84% of Indian and 78% of white children residing with both biological parents (Hall et al., 2014).

By 2014, 22% of South African children did not have either of their biological parents living with them. In 83% of cases, these children had at least one parent who was alive, but living elsewhere. Age also played a role, with younger children more likely than older children to live with their biological mothers, while older children were more likely to be living with neither parent (Hall et al., 2014). In the current study sample recruited from the DLA, only 7.1% of the children had people other than their biological parents as caregivers, mostly grandmothers or aunts. It is not clear as to why participants are left in the care of caregivers other than their biological parents. Teenage pregnancies, and biological parents still trying to finish school, may be one reason. In addition, the area is also rural, and some parents work away in larger towns or cities. The socio-demographics, education, employment, age and marital status of the participants' caregivers are discussed later in this chapter and may shed more light.

5.3.3 Housing and living conditions of the participants

The Constitution of South Africa, section 26, provides that “everyone has the right to have access to adequate housing”, and section 28(1)(c) gives children “the right to ... shelter” (Constitution of the Republic of South African, 1996). Adequate housing according to the constitution refers to formal habitable houses, safely built with bricks and complying with safety standards. Houses should also be big enough to prevent overcrowding (Hall, 2016).

In the current study, most participants (65.7%) resided in brick houses, almost a third (31.4%) in corrugated iron (informal/traditional) houses and 2.9% in other types of housing which were not specified. The percentage of participants in this study who were being raised in formal housing, were much lower than the national averages reported by the GHS. According to GHS 2015, 79.3% of South Africans resided in formal or brick type houses. For the Free State province specifically, the GHS 2015 found that 81.3% of the respondents resided in brick houses, 18.3% in informal or traditional housing and 0.4% in other unspecified types of housing (Statistics South Africa, 2015). The DLA is rural with many people staying on farms and on small holdings; the high prevalence of informal housing amongst the participants suggest a poor socio-economic status of the black African community possibly related to education, employment, income and available household services, which will be discussed further in subsequent sections.

In the current study, the participants resided in houses with between one and 11 rooms per house (median: three rooms per house). The national average in the GHS 2015 was one to seven rooms per house with an average of six rooms per house (Statistics South Africa, 2015).

Households in the current study included one to seven adults (median: 2) and one to seven children (median: 2). Room density ranged from 0.4 to 6 ppr (median: 1.3). Overall, 14% of households had ≥ 2.5 ppr, indicating crowding (Coetzee et al., 1988). Some households included seven children and seven adults, which must all eat, survive, grow and prosper. This can have an influence on the nutritional status of children, particularly if the adults are not employed, meaning that the CSG, which is currently R350 per child, may have to be used to sustain the total household's needs.

Hall (2014) indicated that amongst children in the poorest 20% of households, a quarter (25%) of them are likely to live in overcrowded households, and only 1% of children from the richest households. Young children were also found to be more likely to live in overcrowded households than older children, as 23% of children below two years are said to live in overcrowded households (Hall et al., 2014).

5.3.3.1 Access to water

In the current study, all the households that the participants resided in had access to some form of running water. Water was available on the premises in the form of outside taps, as well as indoor taps. This indicates that adequate and safe water resources were available to the participants, even though it was mostly outside the house; it was still on the premises. Overall, less than 0.5% of households had to make use of a rainwater tank and no households had to walk to the nearest dam or river to collect water that might pose hygiene and health risks to them. This indicate good municipal water resources and access to water in the DLA, which is a constitutional right (Constitution of the Republic of South African, 1996).

Other South African studies, such as the GHS 2015, indicated that specifically for the Free State province, 96.1% of the households had access to piped water or tap water at their homes, inside or outside. Overall, 46.4% of South African households had piped water with taps inside their houses, and 26.8% only outside their house on site, but not inside. Less than 1% had to make use of a rain water tanks and 2.4% used rivers or dams to collect water (Statistics South Africa, 2015).

Only around a third of households in the current study (36.4%) compared to the national average of 46.4% reported in the GHS 2015, had piped water inside the homes.

5.3.3.2 Access to cooking facilities

Most of the households from the current study had electrical cooking equipment. This included ownership of electrical stoves (2-plate or otherwise) (85.1%) as well as microwaves (68.2%). Less than a quarter made use of paraffin stoves and only a few households made use of gas stoves.

According to the GHS 2015, the percentage of South African households that were connected to the electricity supply increased from 77.1% in 2002, to 84.2% in 2015, with 88.2% of households in the Free State province being connected to electrical supply by 2015. Electricity as fuel for cooking increased in South Africa from 58% in 2005 to 76.8% in 2016. Fewer than 5% of the households were using paraffin and gas were by 2015. According to the GHS 2015, the Free State province had the second highest percentage of households that cooked with electricity (84.3%).

In the current study, almost 3% of the households reported only having access to open fires, without any other means of cooking food. This is in line with the 3.3% of households in the Free State that used open fires according to the GHS 2015. Open fires were used by 9.1% across South African households.

Overall, this indicates that the Free State province, including the DLA, at the time of the study had good access to electricity and are able to use it for cooking purposes.

5.3.3.3 Food storage facilities

In the current study, 83.5% of households reported owning a fridge and 10.7% owning a freezer to store food safely. This is higher than the national average reported by the GHS 2015 where 75.3% of South African households had a fridge or freezer. In rural areas, only 63% had a fridge or freezer (Statistics South Africa, 2015) .

In the current study, 16.1% of households did not have a fridge or freezer and thus no means of keeping food cold and fresh, which can pose serious health risks. Electricity is available in these households, but the reason why there were so many households without cold storage, remains uncertain. This might be due to fridges being more expensive than two-plate

electrical stoves or small size microwaves, indicating that electricity availability is not the problem, rather the expense of the asset.

5.3.3.4 Electronic, recreational and communication equipment

Most households of the current study had a television (86.6%) and/or a radio (83.1%) and almost half of the households (43.8%) had subscription satellite television (DSTV). Almost all the households had a cellular telephone, with only 2.1% not having a cellular telephone. More than one in ten households had tablets (13.6%) and/or computers (12.4%).

Even those households that did not have a cellular phone had access to a television and radio (only two households had access to a radio only). No households did not have at least one type of electronic, recreational or communication equipment.

This is in line with data from the GHS 2015 (Statistics South Africa, 2015). For all population groups across the Free State province, only 4.8% of the households did not have access to cellular telephones. In the national survey, the Free State households had access to televisions (82.8%), satellite television (34%) and computers (16.7%) (Statistics South Africa, 2015).

Most households had access to a television and it was the most prevalent asset per household. Interestingly, in the current study in the DLA, more households had satellite television and computers than was found during the GHS 2015, specifically for the Free State province. Noteworthy that 16.1% of households of the current study which did not have access to a fridge or freezer to keep food cold and fresh, had reported having electronic, recreational and communication assets, some more than one per household. Less households did not have television compared to those who did not have cold storage. This could indicate that parent-caregivers were uneducated concerning budgeting and prioritising money for food, health and other basic needs, particularly for children, rather than for electronics and assets. On the other hand, the excellent uptake of telecommunication such as radio, television and cellular phones, poses opportunities for the delivery of health and nutritional education that can reach into households (Odorume, 2015).

5.3.4 Crèche (day care) attendance

In the current study, less than a fifth of the participants (18.2%) attended a crèche (or other type of day-care). Their parent-caregiver was caring for most of them at home. Of those who did attend crèche, 93.2% did so five days per week. The GHS 2015 confirmed that investing in early childhood development, especially in children aged zero to four years, is a very important priority for later development and therefore crèche attendance was important (Statistics South Africa, 2015). South Africa has developed comprehensive early childhood development (ECD) programmes a very important educational priority. The ECD programmes are offered at day-care centres, crèches, playgroups, nursery schools and in pre-primary schools (Statistics South Africa, 2015). The GHS 2015 indicated that 41.3% of South African children aged zero to four years attended crèche or day care centres outside their homes. According to the GHS 2015, the Free State province had the second highest crèche attendance (47,6%) for the age group zero to four years. This was much higher than in the current study, but still below 50%.

The reason why less than a quarter of the participants of the DLA study attended crèche or day-care is unclear. Unfortunately, reasons were not asked for why the participants were attending or not attending crèche. This might have been due to unemployment; without enough income to pay for a crèche or day-care centre, the parents may have kept the children at home, or because they were unemployed, they could look after the children themselves. There may also not be sufficient crèche facilities in the DLA due to the area being rural and some people staying on farms. The poor rate of crèche attendance, thus poor early childhood development, might have an effect on the school dropout rate and influencing the unemployment rate. Brain development is modified by the quality of the environment, such as early exposure to undernutrition, poor stimulation and limited social interaction. Early schooling, such as crèche attendance, predict later school outcomes. Learning problems and restricted cognitive development, lead to limited development opportunities as well as limited employment. There is increasing evidence available that early intervention and schooling, can prevent the loss of future potential (Grantham-McGregor et al., 2007).

The household demographics for the current study indicated that the participants mostly had necessary access to basic rights for living, such as running water and electricity. A very large proportion of households also owned electronics, recreation and communication assets,

which are not basic needs, whilst some of these same households did not have the means to cook food and had to take time to make a fire daily, whereas others did not have any way of cold storing their food.

Many participants stayed in houses that were over-crowded, with up to seven adults and/or seven children per household. With these many children and adults per household, requires high expenditure on basic needs like food. The income in such households would depend on the number of adults in the households earning an income. If there would be a limited number of employed adults per household, this could lead to a severe shortage of income and limited food availability and would put the children of the households at risk for malnutrition.

Over-crowding may cause outbreaks of disease, and without cold storage to keep food safe and fresh, it could lead to serious health problems. How the caregivers stored and kept food without access to cold storage, remains unclear. Without proper cold storage or proper electrical equipment to cook food at a reasonable safe temperature to kill bacteria, can cause bacteria to spread, grow, and lead to serious health problems. At the age of these participants, nutrition plays a vital role in their current and future development.

Early development and stimulation is important, and most of the participants were found not to attend any crèche or day-care. This could have future implications for the participants concerning their development and learning abilities, as well as future earning capabilities.

5.4 Age, education and employment levels of the caregivers

Socio-demography regarding the age, education and employment levels of both the biological and non-biological parent-caregivers' are discussed below.

5.4.1 Biological parent-caregivers

Overall, 12.9% of the biological parents who were also the primary caregivers of the participants in the current study, were younger than 21 years; 3.1% were still of school-going age. The youngest biological parent was 16 years of age and the oldest 42 years. The biological fathers were older than the biological mothers were, and there were no underage fathers.

Data from the GHS 2012 indicated that almost 70% of the mothers in South Africa were aged 20 to 34 years. Mothers above the age of 45 years, constituted only 2%. Teenage mothers of school-going age (15 to 19 years) comprised 6.5% of the mothers. This is almost double what was found in the current study in the DLA (Statistics South Africa, 2012).

According to the GHS 2012, similar to the current study, biological fathers were older than the biological mothers were. Data from the GHS 2012 indicated that most of the fathers (50.7%) were aged between 30 and 39 years and the number of teenage fathers were so few that they were excluded from the data analysis. In addition, only 4.8% were aged 20 to 24 years (Statistics South Africa, 2012).

5.4.1.1 Underage pregnancies

The GHS 2015 reported 30% underage pregnancies across SA. According to the SADHS 2016, 16% of underage women 15 to 19 years had begun childbearing, 12% had already given birth once and 3% were pregnant at the time of the survey. Specifically in the Free State province, 12% of women aged 15 to 19 years, had already begun childbearing (Statistics South Africa 2015; National Department of Health et al. 2016), which is in line with the findings of the current study.

Children born to teenage mothers are more likely to experience health problems later in life as these children are often born with a low birth weight, which is associated with negative outcomes. Cognitive and physical disabilities, as well as poor educational outcomes might occur. Low birth weight is a significant risk factor for infant mortality. Breastfeeding is also crucial for early development of babies and studies indicate that unwanted and unplanned teenage pregnancies results in fewer breastfed babies. Children born from teenage mothers are also more likely to develop malnutrition (Panday et al., 2009). Teenage pregnancies may affect school dropout rates, as according to Kaufman (2000), childbearing often is associated with the end of education and school attendance, whether due to policy, social norms or material conditions.

In the current study, half (53.6%) of the biological parent-caregivers had completed only primary school and 40.2% had completed high school (secondary school). Only 6.3% of the biological parent-caregivers completed a college or university qualification. The education levels of the biological parent-caregivers were thus not very high.

Whether teenage pregnancy is a cause of or a result from school dropout, local and international studies have found that both is associated with poverty and poor school performance. Thus, underage mothers, poor school completion rate, unemployment and poverty, is all intertwined (Panday et al., 2009). According to a report commissioned by UNICEF (Panday et al., 2009) inadequate education is one of the leading factors of malnutrition. Teenage pregnancy has a huge influence on educational success of the youth in South Africa, and education plays a very important role in families to assist in breaking the poverty cycle and allow for a better future. In addition, this report showed that when young people drop out of school early, often due to poverty or poor school performance, the risk for early pregnancy is significantly higher. In addition, growing up in informal areas and rural areas also increases the risk early pregnancy. Conversely, having both parents, and in particular, the mother, present in the home, decreases the risk (Panday et al., 2009).

Underage pregnancy influences the long-term life experience of underage parents, as well as the baby, as this critical point shapes the health, development, productivity and future poverty and dependency of both the mother and the child. South Africa has liberal policy that allows pregnant girls to remain in school and to return to school after pregnancy, yet the UNICEF-commissioned report (Panday et al., 2009) found that only about a third of teenage mothers return to school. Lack of support from family, peers and the school environment, may play a role. In addition, the social stigma of being a teenage mother also takes its toll. Having a baby at home makes it difficult to find the time to complete homework, as a baby requires attention. When the baby falls sick, the mother may miss schoolwork due to sitting at hospital. Panday et al (2009) indicated that teenage mothers often become overwhelmed and fail to cope with their situation in school. Sometimes there is not enough money to pay a caregiver to take care of the baby whilst the mother is in school, due to poverty in the household. Data from South African studies show that lack of childcare support in the home, decreases the likelihood of going back into the education system (Panday et al., 2009).

The consequence of teenage pregnancies is therefore the spread of poverty from generation to generation due to incomplete education and high rates of school drop-outs (Panday et al., 2009). A birth-cohort study in New Zealand, which followed up women until age 30, found that early motherhood was associated with economic disadvantage, including lower personal incomes and dependence on welfare (Gibb et al., 2015).

5.4.1.2 Levels of education and employment

Data from the SADHS 2016 indicated that 3.9% of South African adults did not have any form of education, 9.0% had only finished primary school and 51.9% had finished high school. The GHS 2015 found that in the Free State Province, 3.4% of adults older than 20 years did not have any schooling (Statistics South Africa, 2015). Literary rates are a key social indicator of a community's development (National Department of Health et al., 2017). The poor education completion amongst the biological parent caregivers in the current study may tie in with the high unemployment rate, as only 6.3% had a tertiary qualification and 6.7% were permanently employed.

The biological parent-caregivers could choose more than one reason on the questionnaire to explain their unemployment. Of the 169 unemployed biological parent-caregivers, 95.3% indicated that they were unable to find any work. Just under half (42%) indicated that their partners provided enough for the family. Six (3.6%) reported that the CSG they received monthly, met all their needs (important to remember that all 242 participants were CSG recipients).

Amongst the older caregivers in the study who were of school going age before 1994, apartheid and gender-inequity may have contributed to limited education levels (Akala & Divala, 2016). During the 1970's, only 21.6% of black South Africans enrolled in higher education (Akala & Divala, 2016). Even in 1991, only nine out of 1 000 black students enrolled for post-secondary education, compared to 51 out of 1 000 white and 35 out of 1 000 Indian students (Akala & Divala, 2016).

According to Akala & Divala (2016) isolating and sexist apartheid policies kept particularly black South African women from participating in meaningful higher education. Moreover, during the 1960s, only 13.3% of black women were enrolled in higher education, which increased only marginally to 18.9% in 1970 and 21.6% in 1975 (Akala & Divala, 2016). In the rural DLA in those days, children living on farms might have had difficulty to access schools due to limited transport and poor rural roads, or because some of them might have been engaged in child labour on farms.

Concerning the low employment rate, the data unfortunately does not elaborate on exactly what the caregivers perceived as being unable to find any work. Future studies may

investigate the availability of suitable work in the DLA, if they had applied for positions, or for how long they had been searching for work. If higher educational levels do not seem to have an influence on the employment rate, that may affect high school dropouts as well.

5.4.2 Non-biological parent-caregivers

Those caregivers that were not biological parents of the participants in their care, were older than the biological parent-caregivers, ranging from 22 years to 68 years, with most of them older than 40 years (median: 45 years; lower quartile: 37; upper quartile: 51). Most of them were the grandmothers of the participants. Besides one having no form of formal education, 82.4% (n=14) reported that they had completed primary school, and only 11.8% (n=2) reported that they had completed high school (secondary school). As discussed above for the biological parents, the limited education levels, gender inequality and Apartheid may have contributed to the low education rates.

The non-biological parent-caregivers were mostly unemployed (n=11, 64.7%), with three of them being pensioners and three working. These non-biological parent-caregivers cared for one to four children along with one to four of their own biological children, which indicates a heavy burden on the overall limited household resources.

These non-biological parent-caregivers supplied information about the biological mothers of these 17 participants. The biological mothers, who left the participants in the care of a non-biological parent-caregiver, were aged 17 to 44 years old. The biological fathers were between 27 to 42 years, thus overall older than the mothers, indicating that some teenage mothers were having sex with much older men. According to Mchunu et al., 2012, 35% of pregnancies amongst 15 to 19 year olds are unplanned, unwanted and untimed, and are associated with mostly unstable relationships, especially when young girls engage in sexual activity with older partners. Young teenage girls having sex with older partners, have little power over condom usage and safe sex, which, in addition to unplanned pregnancy may also lead to them contracting sexually transmitted diseases and HIV/AIDS (Mchunu et al., 2012).

The biological mothers of participants who were being raised by someone else, in the study, mostly had only one child (the participant), with only three mothers having two, three or four children. This could indicate responsibility as they had only the one child, which they left in the care of someone else, allowing them to pursue an education to make a better life. In

addition, most of them had higher completed education levels than the participants biological parent-caregivers (n=225).

This could also be due to having the resources and opportunity to leave the participants with a trustworthy caregiver, as well as family support (all 17 non-biological parent-caregivers were direct family members of the participants), whilst they could continue with school and complete it. One biological parent was even completing her studies at a university.

Only seven out of these 17 biological mothers (41%) who had left their infants in a family member's care, generated any form of income. Reasons for unemployment were mainly inability to find work or due to illness, whilst some were still attending to school and studies. Even though these biological mothers seemed to have the support to continue with school and studies and seemed responsible, this may put more strain on limited resources in the household, with a small child (participant) to look after in addition to the mother's school requirements.

The GHS 2015 indicated that, within the Free State Province, only 60.4% of adults earned an income from employment, whilst the rest received support grants, pensions and other types of income. This finding was corroborated by the GHS 201, which found that the main monthly source of income in the Free State Province, was firstly from salaries and secondly from social support grants. In the current study, however, it seemed that the main income was from social grants and unemployment was high. Due to the DLA being a rural and farming community, one would suspect that many people could work on farms, but this was not the case. According to Bhorat et al. (2014), the inception of minimum wages had a huge, partly unforeseen, impact on the labour market of South Africa with significant reduction in employment opportunities, especially in agriculture. In addition, it was noted that working hours did not increase in areas where wages were high (Bhorat et al., 2014). Whether this may be linked to the high unemployment rate in the DLA, might need further investigation.

5.4.3 Summary

Primary caregivers of children six to 23 months, in the DLA had moderate to low levels of education, with high levels of unemployment and, thus, seemed dependent on the CSG, as all the participants were recipients. A positive finding was that no parent-caregiver absconded with the CSG, and that the CSG did indeed follow the participants as intended by government.

The most reported reasons for being unemployed, was not being able to find any work. Unfortunately, it is not clear what the process of searching for employment entailed, and how far the parent-caregivers went to find employment. It is notable that the biological mothers who left the participants with non-biological parent-caregivers, had better completion of high school and even some tertiary education. It seems that these mothers with the support and assistance of a caregiver for their child had the chance to finish school.

However, having high school and tertiary qualifications did not seem to positively influence the chances of being employed in this area, as most of the parent-caregivers who had completed high school, were unemployed and reported that they were unable to find work. Yet, poor education will make the unemployment rate even worse. The non-biological parent-caregivers were worse off, as most of them had only completed primary school.

The national minimum wage, below which no worker in South Africa may be paid, are still in the process of implementation. This is expected to address previous inequities and reduce poverty, as well as support economic growth and prevent further job losses, although there are many arguments about the positive and negative impacts. The minimum wage will not have an influence on people working in informal employment or those who are unemployed, but hopefully extended families and households, as found to be the norm in this study, will include members who earn minimum wages that may increase the household income (Jamieson et al., 2017).

5.5 Number of biological children caregivers had and still wanted

In the current study, almost all the biological mothers had between one to three children (96.9%) and 3.1% had four or more children (including the participant). More than a quarter of the biological mothers wanted more children. Non-biological parent-caregivers had from one to four of their own biological children, whilst taking care of the participants. The mothers of the 17 participants, who were being cared for by non-biological parent-caregivers, also had one to four biological children (including the participant).

National data from the GHS 2012 indicated that biological mothers had one to four children. The SADHS 2016 reported that mothers had between zero to six children, and amongst the mothers who already had six children, 2.3% wanted more. This agrees with the current study where mothers had between one and three biological children and still wanted more children.

The number of children that mothers have, is cause for an ongoing debate in South Africa concerning the connection between the CSG uptake and teenage pregnancies, as it has been argued that the CSG increased teenage pregnancy rates. Available evidence suggests that the teenage fertility rates in South Africa was high before the introduction of the CSG and that it has declined since. Several studies have been reviewed with regards to this statement, and none showed significant evidence that the CSG results in an increase of teenage pregnancies (Aguero et al., 2006; Makiwane et al., 2006).

In the current study, 29 underage mothers (12.9%) had 36 children between them, ranging from one to three children per mother. Nine (31%) of these mothers reported that they wanted one to four more children. Amongst the biological mothers who left the participants with non-biological parent-caregivers ($n=17$, 7%), three (17.6%) were underage with one child each. Kirby (2007), identifies various reasons for teenage and/or underage pregnancies: Studies show that teenagers who live in communities with high rates of hunger, substance abuse and violence, are more likely to have sex at an earlier age resulting in unwanted pregnancies. Conversely, teens who live in communities with a higher proportion of foreign-born residents are more likely to delay having sex. Moreover, teenagers with educated parents are less likely to become pregnant. Household income was another indicating factor, with teenagers from poorer families having higher pregnancy rates. This indicates that completing school, pursuing tertiary education, and being employed and earning a salary, result in fewer unwanted underage pregnancies.

5.5.1 Summary

The number of children that parents had, did not seem to be influenced by the poor socio-demographic situation amongst the current study population. One would hope that the parents understood how expensive it is to raise a child and that the CSG is not a sustainable income to care for a child, let alone an entire household. Future qualitative research may shed light on the factors that drive these notions.

5.6 Relationship status of caregivers

Most biological parent-caregivers in the current study were in a relationship (44%) and less than a quarter were married (24.9%). There were also almost 30% of the biological parent-caregivers who were single parents (including those that were separated, divorced or

widowed). When the data of only these single biological parent-caregivers (n=65) were analysed, it was found that, between them, they had 157 children in their care. This amounted to one to seven children per households. Amongst these single parents, less than 40% had more than primary school education and most of these parents were unemployed (70.8%). Five of them were still attending school and only one was busy with tertiary education.

Amongst the non-biological parent-caregivers, only 30% were married, three were living with a partner, whilst nine were single (single also included being widowed, divorced or separated). This indicates that more than half were single parents. As previously indicated, most of these non-biological parent-caregivers only completed primary school and most (64.7%) were unemployed.

The non-biological parent-caregivers reported that, for the biological mothers of the 17 participants in their care, most were in a relationship with the biological father, but marriage prevalence was very low (11.8%), whilst seven (41.1%) were single (including divorced, separated, widowed).

5.6.1 Summary

Data from the current study indicates that parents the biological parents of most participants were not married to each other; in total only 58 biological parents were married to each other, which is less than a quarter. Less than half of the biological parents were in a relationship with the other biological parent. This indicate that there were many single parent households and that the participants mainly did not stay in a household with both biological parents. Almost 28% (more than a quarter) of the biological parents were either single, divorced or widowed, and they were raising the participant without the help of the other biological parent or another partner.

The SADHS 2016 found less than a quarter (23.3%) of South African women were married, whilst only 19.5% of South African men are married. Single women (divorced/separated/widowed) made up 5.6% of the female population, whilst 58.6% were never married before. Overall, 4.4% of men were either divorced, separated or widowed and 64.7% had never been married before. This data corroborates the findings of the current study, where not many parent-caregivers were married, but for the current study there were

more single parent-caregivers than what was found in other research (National Department of Health et al., 2017). This data indicates that marriage is not high priority in South Africa. Data did not indicate how many of these unmarried women and men had children, and how many, but did show that 4% of unmarried women in the Free State Province were sexually active at the time of the survey. Nationally, there were 12% unmarried sexually active teenagers and 24% unmarried sexually active 20 to 24 years old (National Department of Health et al., 2017).

For children to thrive, relationships matter. A child needs love, care and a sense of belonging, which are some of the essential elements in overall emotional and mental well-being. The care of a family is thus important for a child's development and health (Jamieson et al., 2017).

5.7 Socio-demographics of other adults in the household

The participants resided in households that included other adults, besides their caregivers. Overall, 108 full time employed adults (one to three per household) were living with the participants. There were 44 part-time employed adults, ranging from one to two adults per household, also living with the participants. Overall, 94 unemployed adults were living with the participants (one to three per household).

5.7.1 Social support grants

Other adults staying in the same household with the participants, whether employed or not, contributed to the household income with various types of social support grants. In total, 67 adults contributed to the households with social support grants. The CSG was the most prevalent grant received by 31 adults, whilst 29 adults received the old age grant. A future development that might assist to decrease poverty and malnutrition amongst children, is the amendment of the social assistance bill. End 2016, the Minister of Social Development proposed an amendment whereby the CSG would be topped up, specifically for orphans and those children in the care of people other than their parents. The proposed amount of the CSG would then be R570 per month, which constitutes an additional R90 per month. Whether this top-up amount would be sufficient, remains to be seen (Jamieson et al., 2017).

5.7.2 Summary

Above data indicates that all the households of the participants included adults other than the participant's caregiver' they were mostly unemployed and may have had children in their care. The households seem to depend on the support grants, especially the CSG. Interestingly, when the data of only the over-crowded households (discussed before) were analysed, almost all the adults in these homes were unemployed.

5.8 Nutritional status

The nutritional status of the participants based on growth indicators and feeding practices are discussed below.

5.8.1 Growth indicators

The growth indicators, weight-for-age, weight-for-length and length-for-age are extremely important as they give a clear indication of the participant's nutritional status. Overall, 13.2% of the DLA study were underweight-for-age and 3.3% were wasted, which is indicative of acute malnutrition (WHO, 2008; Allen & Gillespie, 2001). This was supported by the MUAC score, which indicated that 5% of the participants were moderately acutely malnourished (Nyirandutiye, 2011; WHO & UNICEF, 2009). None of the participants were severely acutely malnourished. Stunting was prevalent amongst 33.1% of the participants, which was the highest prevalent form of malnutrition amongst the DLA participants. Compared to the results of other studies such as the SADHS 2016, stunting existed amongst 37% of children aged zero to five years (National Department of Health, 2017). This indicated that stunting, a chronic form of malnutrition, was prevalent in approximately a third of children for both studies, local (DLA) and national (National Department of Health et al., 2017).

Stunting indicates a chronic malnutrition due to a chronic food and nutrient deficiency (WHO, 2010). Older research, such as the SANHANES-1 and NFCS 2005, found that 36% of children zero to three years and 29.8% of children aged zero to five years, were stunted. This indicates an increase in stunting, as well as when compared to the SADHS 2016 (Shisana et al., 2013; National Department of Health, 2017). Globally, a 2012 report by Save the Children (Rawe et al., 2012), indicated that one in every four children are stunted, with one in three children in developing countries. Poor socio-economic status (including food insecurity, low income,

poor dietary intake) are one of the main causes of stunting, a chronic form of malnutrition. Stunting is irreversible, even if nutrition improves in later life, as the beginning of the first 1000 days of life is the most important, up until age two (Rawe et al., 2012). Stunting hampers both physical and cognitive growth and development, causing a reduction in the levels of school completion, also a loss in IQ percentage, which in return cause reduced future earning potential (Rawe et al., 2012).

Wasting, caused by a sudden lack of food or acute disease, is of short term and can be corrected and reversed (Rawe et al., 2012). Much less global children are wasted than stunted, as global wasting contributes to 55.5 million children (9%) (Rawe et al., 2012). This agrees with South African data as well as the local current study (DLA) where stunting is most prevalent and wasting least prevalent form of malnutrition.

Overall, 6.2% of the participants in the current study were overweight and 27% were obese. When a community who are suffering from food insecurity, poor minimum dietary diversity score and CSG dependency, there should be a cause to explain overweight and obesity. It is interesting to find that, in a community with high food insecurity, poor minimum dietary diversity score, as well as CSG dependency, 27% of the participants were overweight or obese. However, it has been well-established that a foetus that is growth-impaired in utero undergoes specific physiological adaptations to utilise whatever nutrition it can in order to survive. These adaptations sets it up for future weight gain, however (Black et al., 2013). Specific risk factors for childhood overweight and obesity which occur during the first 1000 days of life after conception, were identified in a recently published systematic review. These include accelerated infant weight gain, which could be prevalent in malnourished children who have catch-up growth later in infancy, inappropriate bottle use, introduction of solid food before the age of four months and low socio-economic status (Woo Baidal et al., 2016). All these risk factors were prevalent in the current DLA study,. The SADHS 2016 indicated that 13% of children zero to five years were overweight, which was twice as high as that of the global overweight prevalence of 6.1% (National Department of Health, 2017). The prevalence of overweight in the current study (DLA), was also similar to the global prevalence of overweight (National Department of Health, 2017).

SANHANES-1 (2012) found 6.9% of children to be underweight and 3.7% were wasted under the age of five years (Shisana et al., 2013). In the current study, 13.2% (almost double) were

underweight. Wasting was almost similar between SANHANES-1 and current DLA study (3.3% versus 3.7%) (Shisana et al., 2013). The SADHS 2016 found that 7% of children zero to five years were underweight (which is almost similar to the SANHANES-1 report), but also found 3% of participants wasted (National Department of Health, 2017).

5.8.2 Feeding practices

Adequate infant and young child feeding practices is required for optimal growth in children, especially during the first two years of life. Inappropriate feeding practices during the first two years of a child's life, are related to more than two-thirds of malnutrition-related deaths (Beyene et al., 2015). For rural populations, the reality is that most of the population cannot afford a healthy balanced diet, with adequate amounts of fruits, vegetables, legumes and other proteins. Food that is not locally produced, are very costly at the local supermarkets, and because smaller rural towns have limited supermarket and have to bring in food and other merchandise over long distances, prices are higher than in the larger towns and cities. This might leave rural populations prone to poor feeding practices and eventual malnutrition (McIntyre, 2016). Interventions to improve dietary intake amongst infants, include proper dietary education, as well as access to nutritious food (Jamieson et al., 2017). Feeding practices are often the result of the food environment, rather than personal choices, leading to unhealthy food consumption due to affordability and availability. Yet, studies show that, in rural areas of South Africa, food is mostly bought rather than produced at home, therefore food choices are limited according to income (McIntyre, 2016).

When comparing food choices with the current DLA study's income, it indicates why feeding practices might not be adequate, due to high unemployment as well as the CSG being a main source of income for some households. Feeding practices and food security are therefore dependent on the CSG and other social support grants, but unlike food prices, social support do not increase according to the food price hikes (McIntyre, 2016).

The feeding practices of the participants were assessed according to indicators validated to portray dietary quality of infants (Working Group on Infant and Young Child Feeding Indicators, 2007). These indicators included the minimum dietary diversity, minimum meal frequency and minimum acceptability of the diet, as well as continued breastfeeding at one year, introduction of solids, semi-solid or soft foods as well as continued breastfeeding at two

years and age-appropriate breastfeeding (WHO *et al.*, 2010). Other variables concerning feeding practices included the meals received at the crèche, breastfeeding status, as well as usage of breast milk substitutes. These feeding practices are discussed below.

5.8.2.1 Minimum dietary diversity

Dietary diversity was based on the number of food groups (out of seven predetermined groups) that were consumed in the 24 hours prior to data collection (Working Group on Infant and Young Child Feeding Indicators, 2007). Only 7.9% of participants achieved minimum dietary diversity, thus consumed food from at least four of the predetermined food groups. Most of the participants (92.1%) did not achieve the minimum dietary diversity score. Moreover, no participant achieved a score higher than four out of seven and no one had a completely diverse dietary intake (thus, consuming all seven of the food groups during the previous 24 hours). The Infant and young child feeding status by country (WHO, 2010) indicated only two countries below 10% dietary diversity score, namely Ethiopia (3.9%) and Niger (5.4%) (WHO, 2010).

i Food consumption patterns

From the current study, it is evident that participants mostly consumed starch in the form maize meal (pap), potato, rice and bread. Maize meal “pap” is the most commonly consumed starch food in African countries and is a staple food for most South African (Labadarios, 2008). The second most consumed food group was dairy, as most participants (being under two years of age) were either breastfeeding or receiving infant milk formula, and many were given their “pap” with added milk. The consumption of other food groups, including meat and meat substitutes, and fruit and vegetables, was low.

This consumption pattern may predispose the participants to nutrient deficiencies and, thus, influence their nutritional status negatively. A diet consisting mainly of staple foods and lacking in animal sources, is the major cause of micronutrient malnutrition (Lucas *et al.*, 2012; Bouis, 2003). Consumption of high amounts of starch foods without enough fruit, vegetables and proteins, can cause various micronutrient deficiencies. An increased consumption of starch can also lead to overweight and obesity in children, which may continue into adulthood (Labadarios, 2008).

Bioavailability of mineral components in food vary and is affected by interactions of minerals with one another, as well as with additional organic compounds, which can lead to nutritional deficiencies (Gallagher, 2012). Therefore, all micronutrients are essential substances required for optimal growth and development in young children and should therefore be ingested through consumption of a diet with adequate dietary diversity (Gallagher, 2012).

In children that are not breastfeeding or receiving iron fortified milk formulas, low content of iron in cow's milk, as well as the poor absorption of non-heme iron in the presence of excess calcium and casein from milk, may predispose to iron deficiency (Ziegler, 2011). Breastmilk contains lactoferrin which renders the iron content, albeit low, very bioavailable (Koreti & Prasad, 2014). Therefore, most of the participants in the current study were still protected against iron deficiency. However, after the age of two, when breastfeeding stops, most of these children may only receive cow's milk. Research suggests that excess consumption unfortified animal milk, defined as more than two cups per day, displaces iron-rich foods in the diet and increase the risk of developing an iron deficiency anaemia (Freuman, 2016: Online; Baker & Greer, 2010).

Less than 35% of the participants in the current study consumed food from the food groups other than starch and milk, with the three least consumed food groups being legumes, eggs and all fruit and vegetables. The 7.9% of participants who did achieve the minimum diverse dietary intake, consumed foods mainly from the starch, dairy, meat, fruit and vegetable food groups. Very few consumed legumes and vitamin A-rich fruit and vegetables. Even though meat, vegetables and fruit were amongst the four food groups consumed, the number of participants who ate them were very few.

Although meat products (animal proteins) were the most prevalent protein source consumed by the participants, and the third most consumed food group, the number of participants who were reported to have eaten meat during the previous 24 hours, were limited to just under a third of the participants (31%). Most households had access to a fridge, where fresh meat can be safely stored. Meat products are readily available in the DLA, but can be a very costly item that not everyone might be able to afford. Flesh and organs of animals, birds and fish are excellent sources of iron and zinc, whilst animal liver is also high in vitamin A. Meat products consist of proteins, which are the main structural constituent of human cells, functioning as enzymes, membranes, transport carriers, hormones and immunoproteins.

Therefore, an adequate protein supply is essential for optimal physiological functioning of the host (Gallagher, 2012). Animal protein sources are naturally higher in quality than plant sources. Infants and toddlers require sufficient dietary protein to maintain a positive nitrogen balance, in addition to ensuring protein deposition for adequate growth. Diets low in protein rich foods can lead to serious deficiencies and malnutrition (Gallagher, 2012).

Legumes as excellent sources of plant proteins that is well recognised in the prevention of malnutrition in Africa (Venter & Vorster, 2013). Legumes are more affordable than other protein sources, do not need cold storage and are readily available in shops in the DLA. Only seven (2.9%) participants, however, consumed legumes. Low intakes of legumes and nuts also suggest low intake dietary fibre and phytochemicals (Rauch, 2016).

Eggs is also a good protein- and micronutrient source, which is more affordable than fresh meat (Miranda et al., 2015), but were consumed by only seven (2.9%) participants. Eggs is freely available in the DLA with many large chicken farmers in the surrounding area. Eggs can also be stored without the need of a refrigerator. It is unlikely that taboo's regarding the consumption of eggs by young children exists in the area, as it does in some other African cultures (Meyer-Rochow, 2009).

In many studies, low fruit and vegetable consumption is associated with numerous micronutrient deficiencies, limited fibre intake and poor phytochemical consumption. Phytochemicals, known as nutritive plant chemicals, assists in preventing NCD, amongst other benefits. According to the South African Food Based Dietary Guidelines (FBDG) for children, fruit and vegetables should be consumed daily.

Vitamin A-rich fruit and vegetables as well as all other fruit and vegetables, were consumed by less than half of the participants (40.9%). Vitamin A is a fat-soluble vitamin and plays a significant role in vision, immunity, gene expression, growth and dermatological health (Escott-Stump, 2015).

Research in 2001 in a rural area in Kwazulu-Natal amongst children aged two to five years, found a similar dietary patter, rich in carbohydrates, mainly in the form of maize meal. Most of the children also failed to consume recommended amounts of vegetables, fruit, proteins and dairy. This manifested, amongst others, as low vitamin A status (50%), anaemia (54%), depleted iron stores (33%) and stunting (21%) (Faber et al., 2001). National representative

data confirms that this dietary pattern is very common in South Africa. The NFCS-1999 (Labadarios, 2008), amongst children aged one to nine years, reported deficiencies of vitamins A, D, E, C, riboflavin, niacin, vitamin B6 and folic acid in association with similar food consumption patterns as found in the current study. The three main food group consumed by South Africans were cereals and starches, whilst consumption of legumes, eggs and vitamin A-rich foods was very low (Labadarios et al., 2011). According to the NFCS-1999, the protein intake of children in the Free State Province was less than half of the recommended dietary allowance (RDA). Fibre intake was also very low (Labadarios, 2008).

Indeed, this dietary pattern is common across Africa, particularly with westernisation and abandoning of traditional ways of living and eating. Ethiopian research by Herrador et al (2015) among school-aged children, for example, found a low dietary intake of animal proteins amongst the participants (<12%) (Herrador et al., 2015). An investigation of the consumption of fruit and vegetable amongst Kenyan children younger than five years, concluded that food prices, availability of fresh fruit and vegetables as well as education levels and family income, were factors that influences fruit and vegetable consumption (Imbumi, 2014). Similar findings is reported by the International Food Policy Research Institute in a WHO-commissioned a study comparing the determinants of fruit and vegetables consumption in sub-Saharan countries (Ruel et al., 2005).

ii Translation of dietary intakes to diversity scores

A diverse dietary intake, especially in children, is very important for growth and development and to meet their forever changing nutritional needs, thus the South African FBDGs recommend that a variety of foods should be eaten daily (Steyn et al). A study using data from the demographic and health surveys of 11 countries, showed a significant association between dietary diversity and height-for-age z-scores in infants and young children, six to 23 months of age in all but one of the countries (Arimond & Ruel, 2004).

Labadarios et al (2011) indicated that, when comparing South African surveys, dietary diversity and food variety are alarmingly low, despite programs in South Africa, such as the food fortification program implemented in October 2003, micronutrient deficiencies are still highly prevalent. Both the NFCS of 1999 and 2005, found low dietary diversity scores (<4) in children aged one to eight years (Labadarios et al., 2011). Factors found to be associated with

poor dietary diversity scores, included no access to electricity, part time employment and a limited variety available in small shops.

More recently, in a study amongst children aged 6–24 months from low socio-economic status in KwaZulu-Natal, Faber et al (2014) reported that fewer than 25% of children consumed ≥ 4 food groups. Dietary diversity and nutrient density of the complementary diet (excluding breast milk and formula milk) was found adequate for protein, vitamin A and vitamin C; but inadequate for 100% of children for zinc, for $>80\%$ of children for calcium, iron and niacin; and between 60% and 80% of children for vitamin B6 and riboflavin. Higher dietary diversity was associated with higher nutrient density for protein and several of the micronutrients including calcium, iron and zinc. The conclusion was that mandatory fortification of maize meal/wheat flour in South Africa has little impact of on infants/toddlers' diets.

Low dietary diversity is not just a South African problem but is common across sub-Saharan Africa and other developing regions of the world (Marshall et al., 2014). A study in Ethiopia amongst school-aged children, found that up to 80% of these children residing in rural as well as urban households, had an intake of only three food groups during the previous 24 hours. Starch and cereals were mostly consumed, but the intake of legumes and nuts were also high, whilst meat products, eggs, dairy and fruit and vegetable consumption were low (Kemkem et al., 2015).

Positive impact of education on diversity of diets were also reported in studies in Nepal, Bangladesh, Indonesia, India including Ethiopia (Mesele et al., 2013; Senarath, Agho, et al., 2012). These authors speculated that educated mothers are more likely to have had access to information via media exposure, had a better understanding of educational messages, had permanent employment and would have received lessons on child feeding in the curricula at school (Beyene et al., 2015). The low education levels and high unemployment rates found in the current study may be factors that contribute to the low dietary diversity scores achieved by all but around 8% of participants. A closer look at the few participants who did achieve the minimum dietary diversity score versus those who did not, showed no differences concerning employment and education rates.

Most of the participants had access to electrical stoves, microwaves and fridges, indicating that the means of storing and cooking a variety of food were available, but the high unemployment rate may have been the main barrier preventing caregivers to procure the necessary food variety for the children in their care. Caregivers may also not have received enough education via the school syllabus to empower them to make good food choices for their children. Future research may assess whether better nutrition knowledge via proper nutrition education will have a positive impact on the dietary diversity score of participants in the area. Qualitative research may also shed light into the specific knowledge that parents have on food intake.

5.8.2.2 Minimum meal frequency

Children need to eat frequently throughout the day to meet their energy needs, but according to a UNICEF report (UNICEF, 2013, globally half (52%) of all children, 6-23 months of age, do not achieve the minimum daily meal frequency. Minimum meal frequency is associated with high stunting rates, especially in South Asia and sub-Saharan Africa. The SADHS of 2016 found that 50.4% of South African children achieved minimum meal frequency (UNICEF 2013; National Department of Health et al., 2017).

Most participants aged six to 23 months in the current study did achieve the minimum meal frequency. For participants six to eight months, this meant consuming two to three solid, semisolid or soft foods per day, together with breastfeeding. For participants nine to 23 months, this meant consuming three to four solid, semisolid or soft foods per day together with breastfeeding (WHO, 2003). All the participants that did achieve minimum meal frequency were being breastfed at the time of data collection, whilst all those who did not receive the minimum meal frequency, were not being breastfed at the time of data collection. This highlights the value of breastfeeding to meet the requirements of children under two years.

Ethiopian research on the same age group (six to 23 months) in 2014, almost 50% of the participants failed to achieve minimum meal frequency. Other studies in Ethiopia, Sri Lanka, India (Beyene et al., 2015), as well as in Ghana (Saaka et al., 2015) found similar results, and delayed introduction of solids were identified as the probable cause. It was also indicated that participants whose mothers had access to television or radio as well as newspapers at

least once a day or more, did achieved minimum meal frequency, which indicates the power of education and mass media on dietary habits (Beyene et al., 2015).

A 2011 study conducted in North-India on children younger than 24 months of age, found that only 29.6% consumed adequately diverse diets, but 77.8% achieved minimum meal frequency (Parashar et al., 2015). It was evident that minimum meal frequency was easier to achieve than adequate dietary diversity, due to children being breastfed and eating the required number of times per day, albeit only from three or fewer food groups. Similarly, in the current research, only 7.9% of participants achieved the minimum dietary diversity score, whilst 85.8% achieved minimum meal frequency, which may still cause deficiencies and malnutrition. This is reflected in the indicator, minimal acceptable diet, which is discussed below.

5.8.2.3 Minimum acceptable diet

Participants, both breastfed and non-breastfed, who had achieved the minimum dietary diversity and the minimum meal frequency during the previous day, were classified as having a minimum acceptable dietary intake (WHO et al., 2010). Only 4.5% of participants in the current study had a minimum acceptable diet. This is alarmingly low and indicate poor nutritional status of the participants of the DLA. This is also lower than the national average. SADHS 2016 reported that 23% of children, aged six to 23 months, had achieved minimum acceptable dietary intake (National Department of Health et al., 2017).

Conversely, global data collected when developing the WHO feeding indicators (WHO, 2003), indicated a similar pattern to that of the current study, with a low dietary diversity scores, much higher minimum meal frequency scores and a low level of minimum acceptable dietary intake reported in studies in Bangladesh, Benin, Cambodia, Ethiopia, Lesotho and Madagascar (WHO, 2008; WHO/PAHO, 2003).

5.8.2.4 Breastfeeding history

Breastfeeding remains a very important part of a child's dietary intake. If breastfeeding is stopped, without being replaced with a suitable breastmilk substitute, malnutrition can occur. Breastfeeding is high in fat compared to most complementary foods and therefore a key source of energy and essential fatty acids. Breastfeeding also plays an important role in

utilisation of pro-Vitamin A carotenoids found in predominantly plant-based diets. Breastfeeding keeps a sick child hydrated during childhood illness. A longer period of breastfeeding is associated with better growth, health, reduced risk of childhood chronic illnesses, obesity and improved cognitive outcomes and therefore makes a very important nutritional contribution well beyond the first year of life (WHO/PAHO, 2003; Marriott et al., 2012).

In the current study, approximately 60% of the participants (six to 23 months) were breastfeeding at the time of data collection, and 63.5% of participants aged six to 12 months. The most prevalent age at which breastfeeding was stopped amongst the participants were six months (43.3%). Research by Parashar et al (2015) found the main reason for mothers stopping breastfeeding at six months, due to going back to work. However, for the current study, the employment rate was very low and this could have been the reason.

Inadequate breastfeeding can lead to malnutrition, but proper breastfeeding has numerous benefits and is effective in providing proper nutrition for a baby. Suboptimum breastfeeding accounts for 800 000 child deaths yearly in children under the age of five years (UNICEF, 2014). Breastmilk provides all the essential micronutrients for a growing baby to ensure normal development (Enstrom & Pettersson, 2016). The 2003 WHO Global Strategy for Infant and Young Child Feeding, raised that every year 55% of infant deaths were occurring due to inappropriate feeding practices, less than 35% infants world-wide were being exclusively breastfed for four months, and solids were introduced either too early or too late, most often also using inappropriate type of foods (WHO, 2003).

In the DLA study, amongst the participants that were not breastfeeding, 25% had never been breastfed at all. This was similar to the results of the SADHS, but for younger children; 25% infants under six months were never breastfed at all (The National Department of Health, 2017). National representative data from the SADHS 2016, found that only 32% of infants below six months of age were being exclusively breastfed and were receiving mixed feeding, feeds consisted of plain water (14%) and solids (18%). For the age group 12 to 17 months, 47% were breastfeeding, and 18 to 23 months, only 19% were breastfeeding (The National Department of Health, 2017).

The WHO indicates that breastfeeding at two years of age, provides the full benefit to children. Age-appropriate breastfeeding refers to continued breastfeeding, whilst adequate solids are being introduced (WHO, 2010).

In the current study, 40% of the participants (six to 23 months) were not breastfeeding. Drinks that the non-breastfeeding participants were fed included mostly tea (87.2%), plain water (79.8%), diluted porridge drinks (77.7%) and sugar water (73.4%), all of which are unsuitable breastmilk substitutes. Some participants (6.4%) even received condensed milk. Only 59.6% received formula milk as breastmilk substitutes. For South African population, it is often difficult to prepare formula milk hygienically and safely, as there is often a lack of clean water, limited access to electricity as well as unhygienic conditions (WHO, 2010).

Due to the high prevalence of HIV in South Africa, woman with HIV seldom knows if they are allowed or able to breastfeed safely. They then often resort to formula feeding or other unsuitable breastmilk substitutes (Enstrom & Pettersson, 2016). When bottle-feeding is done unhygienically and/or formula is mixed incorrectly, the child is at greater risk of mortality (WHO, 2010). Formula feeds are discussed later in this chapter.

5.8.2.5 Introduction of solid, semi-solid or soft foods

According to the WHO feeding indicators, participants aged six to eight months, need to receive solid, semi-solid or soft foods daily. Around the age of six months children's energy requirements increase due growth and these needs exceeds what is supplied by breastmilk or formula milk alone, and solids needs to be introduced (WHO, 2010a).

The South African DOH also promotes proper solid introduction from six months of age whilst breastmilk is continued. This promotes health, support growth and enhance development (DOH, 2013). Infants have high nutritional requirements relative to their body size, but consume small amounts of food at a time, therefore the need of nutrient-dense complementary foods in small frequent quantities (Faber et al., 2014).

In the current DLA study, 66.7% of the participants aged six to eight months received solids during the previous day together with breastfeeding. A third of the participants, 33.5%, did not meet this requirement because they did not receive any solids during the previous 24 hours. More participants were receiving solids, than what was reported by SADHS (2016). National representative data from SADHS 2016, found that only 47.2% of children aged six to

eight months, were receiving solid foods, and only 16% of them received a minimum acceptable diet (National Department of Health, 2017).

The National Survey of Early Childhood Health (NSECH) carried out in 2011 included 2068 participants by use of telephonic interviews. The results found that late introduction of solids, between seven to nine months of age, was more prevalent amongst younger mothers and especially those with lower school grade completion. The consequences of late solid introduction, mainly malnutrition and poor growth (Kuo et al., 2011).

This late solid introduction amongst the participants of the current study, also influence their nutritional status concerning their growth, as well as their dietary diversity and minimum acceptable diet.

5.8.2.6 Continued breastfeeding at one year

This indicator refers to the proportion of children 12 to 15 months of age who are fed breast milk. Breast milk provides half or more of a child's energy needs (six to 12 months) and one third of their energy needs from 12 months onwards. Breastfeeding is critical during a period of illness and infection, as it reduces mortality amongst malnourished children (WHO, 2010). In the current study, only 50% of the participants in this age group were still breastfeeding. National representative data from the SADHS 2016, reported very similar statistics with 47% of the participants aged 12 to 15 months of age, still breastfeeding (National Department of Health et al., 2017).

According to the indicators for assessing infant and young child feeding practices (WHO, 2010), different countries had different compliance with regards to continued breastfeeding at one year. There were 36 countries where more than 80% of children 12 to 15 months were breastfed at one year. Some of these countries included Ethiopia, Ghana, India, Kenya, Lesotho, Nigeria, Zambia and Zimbabwe. However, there were three countries below 60% children breastfeeding at one year, two countries below 50% and the Dominican Republic had 34% breastfeeding at one year (WHO, 2010). The current study falls within the group below 60%.

A 2011 study in the Shimla district of Himachal Pradesh located in India found that continued breastfeeding was more prevalent in rural (66.7%) compared to the urban areas (33.3%). This may be attributed to communities being poorer, and thus have less money available to buy

suitable breastmilk replacer; in addition these products may be less available in rural areas (Parashar et al., 2015; National Department of Health et al., 2017).

For the current study, reasons why there were only 50% being breastfed at one year and beyond, were not clear. The small percentage of employed biological parents as well as the ones who were still attending school, could have an influence.

5.8.2.7 Continued breastfeeding at two years and age-appropriate breastfeeding

This indicator refers to the proportion of children 20 to 23 months of age who are breastfeeding. The WHO and UNICEF recommends continued breastfeeding up until two years. Participants from the current DLA study who were still breastfeeding from age 20 months onwards, amounted to 16%, much less than a quarter. Similar results were found in countries such as Azerbaijan, Dominican Republic, Morocco, Bangladesh, Benin, Burkina Faso and Liberia. Countries where the percentage of continued breastfeeding at age 20 months were less than 5%, included Niger (3.1%), Guinea (4.7%), Ethiopia (2.9%) and DR Congo (3.6%) (WHO, 2010).

The reason why there were so few who continued breastfeeding at 20 months, were unknown as only quantitative data were collected and not qualitative.

5.8.2.8 Age appropriate feeding

Participants aged six to 23 months old who received breastfeeding as well as solid, semi-solid or soft foods during the previous 24 hours are fed age-appropriately. In the current study, almost 60% of the participants complied with this guideline. Participants, who did not comply, were mostly only breastfeeding with a delay in solid introduction. This will most definitely have an impact on the participants' nutritional status. According to the indicators for assessing the feeding practices of young children, the WHO (2010) profiling indicates that Nepal had the highest compliance (81.1%), with Azerbaijan the lowest (22.1%).

5.8.2.9 Summary

The dietary intake of the participants of the current study was insufficient in diversity (only 7.9% achieved minimum dietary diversity). The 24 hour recall reveals a high intake of mainly "pap and milk", a South African traditional meal. A dietary intake that excludes certain food

groups on daily basis, can lead to serious deficiencies and malnutrition. Excess energy and lack of protein and micronutrients both contribute to underweight, stunting and wasting, as well as overweight and obesity, all of which occurred in the study population (WHO, 2010).

The WHO (2010) indicates that children should eat a variety of food to ensure that they receive the optimum nutrition to aid in health and growth. In addition to starch food, dark-green vegetables or other fruit and vegetables together with food rich in proteins, should be included daily.

The rural nature of the DLA could also have contributed to the lack of variety of foods consumed. Rural areas do not always have big grocery stores and some of the communities are farms. Small shops in rural areas are often expensive and lack fresh food products (McIntyre, 2016). Lack of buying power due to high unemployment rate also plays a role. This would particularly affect the group of single parent-caregivers and those who had the CSG as their only income. Furthermore, lack of education (most caregivers only completed primary school) may contribute to ignorance as to what to feed children. Interventions to improve dietary intake amongst infants, should include proper dietary education, as well as access to nutritious food (Jamieson et al., 2017).

The poor dietary diversity scores indicate a diet lacking important micro- and macronutrients. Breastfed participants met the minimum meal frequency, but amongst the 94 participants who were not breastfed, no one met the criteria for minimum meal frequency. Conversely, although the minimum meal frequency for breastfed participants were above 80% for all age groups, only 4.5% of participants achieved the minimum acceptable dietary intake (WHO, 2010). This was due to the fact that mainly starch and dairy, indicating limited variety and diversity. This led to

For some participants, not having access to a fridge or freezer, could have attributed to the low consumption of fruit, vegetables and animal-proteins. However, foods consumption of legumes and eggs, which do not need refrigerated storage prior to cooking, were extremely low. Households had access to either electric stove plates and/or microwaves; cooking of fresh food was also not a problem.

Early breastfeeding cessation or late solid introduction also play a role when it comes to a child's nutritional status. The current study indicates that 50% of the participants aged 12 to

15 months were breastfeeding and 50% were not breastfed. Late or improper introduction of solid was also evident in the current study. Amongst the participants of the ages six to eight months, 66.7% were breastfeeding and eating solids, but 33.5% did not receive breastfeeding together with solids. Late introduction of solids can be very dangerous, as children's needs increase as they grow. Therefore, solids should be introduced by six months to keep up with the nutritional requirements (UNICEF, 2016). Most participants were breastfeeding at the time of the research, but those who were not breastfeeding received unsuitable breastmilk replacement that could lead to malnutrition and nutritional deficiencies. Continued breastfeeding at two years (including participants aged 20 to 23 months who have given breast milk during the previous 24 hours), were reported in 40% and at least almost 60% of participants were age appropriately breastfed.

The poor minimum dietary diversity score and limited compliance of a minimum acceptable dietary intake, explains the high percentage of stunting prevalence. Overall, 33.1% of the participants in the current study presented with stunted height, an indication of chronic malnutrition (WHO, 2010). This was almost similar to the stunting rates indicated by the SADHS (National Department of Health et al., 2017) amongst children zero to five years. Stunting hampers both physical and cognitive growth and development, causing a reduction in the levels of school completion, also a loss in IQ percentage, which in return cause reduced future earning potential (Rawe et al., 2012).

There were 13.2% underweight, 3.3% wasted and 6.2% overweight participants in the current study and 5% were classified as moderate acutely malnourished, according to their MUAC score (Nyirandutiye, 2011; WHO & UNICEF, 2009). None of the participants were severely acutely malnourished. Factors that may have contributed to overweight and obesity were accelerated infant weight gain (which could be prevalent in malnourished children who have catch-up growth later in infancy), inappropriate bottle use, introduction of solid food before the age of four months and low socio-economic status (Woo Baidal et al., 2016).

Interventions to improve dietary intake amongst infancy, include proper dietary education as well as access to nutritious food (Jamieson et al., 2017).

5.8.2.10 Dietary questions: meals away from home

Most participants did not attend crèche and mainly stayed with the parent-caregiver. Amongst the 18.2% of participants that did attend crèche, some mothers reported packing food parcels for the participants to take along, although the participants also received food at the crèche. Most of the crèche attendees received two meals per day and most parent-caregivers reported that they were aware of what the participants were eating at the crèche. Future research could evaluate the diets supplied by the crèche, as well as the contribution that it makes towards achieving minimum dietary diversity, minimum meal frequency and, thus, minimum acceptable diet.

5.8.2.11 Formula milk usage for non-breastfed participants

Some of the participants, who were not breastfeeding, received formula feeding. A wide variety of formulas were used by the parent-caregivers, the most prevalent being Nan Pelargon. Overall, 44.8% of the participants did not receive age appropriate formula feeds, whilst formulas were mixed incorrectly (over-concentrated in a third of these participants and over-diluted in around a quarter) or inappropriate amounts were given, all of which may cause nutritional deficiencies and lead to either underweight or overweight. Incorrect mixing of formula milk may be due to limited education or poor socio-demographic status where parent-caregivers over-diluted the formula milk to make it last longer. With a CSG of only R350 per month, and in some households the only income due to unemployment, caregivers might over-dilute and under-concentrate the feeds to make them last longer.

A study in Kwazulu-Natal (Faber, 2007) amongst 505 participants aged six to 12 months, to determine what type of feeds they consumed, found that 58% of the participants were breastfed, whilst 42% received formula milk. Of this 42% who were receiving formula milk, half of the formula milk were over-diluted and 14% were over-concentrated. Data indicated that only a third of the formula feeds were correctly mixed. This can be due to improper education concerning safe and correct preparation and usage of formula milk.

Breastmilk is promoted as the most suitable infant feed according to WHO and IYCF policies of the Department of health (DOH, 2013), and therefore health workers are sometimes reluctant to give formula feeding education and even their knowledge with regards to formula milk may be limited. The research in KZN indicated that community health workers were the

ones who were supposed to educate the women on how to mix the formula correctly, and that they were the ones the mothers relied on to educate them (Faber & Benade, 2007).

5.8.2.12 Summary

The current study indicates that formula milk was often being incorrectly prepared, which poses a health risk and contributes to malnutrition. Research in the future should evaluate the knowledge of the health workers concerning formula feeding. Focus should be on correct and proper education concerning the mixing of the formula milk, if children cannot be breastfed (which remains the best option). Caregivers in this study had limited education, low employment and poor resources, which may have caused some caregivers to over-dilute the formula milk to make it last longer, as there were some households in the current study whose only income was the CSG, and the CSG alone is not enough to buy appropriate amounts of formula milk.

5.9 Household food security

Households with access to food, together with the ability to maintain a daily nutritious intake, are defined as food secure. Food security is directly linked to income and employment status and, as the United Development Programme (UNDP) indicated in 2006, food insecurity usually occurs where there is unemployment and lack of sufficient income (du Toit et al., 2011).

Less than a quarter of the participants' households in the current study were food secure, whilst 27.7% were at risk of becoming food insecure, and almost half (48.7%) of the households were food insecure. Three quarters of the households ran out of money to buy food, which caused around half of the participants and the parent-caregivers to eat less than they were supposed to eat. The size of the participants' meals were cut and more than 60% of the participants had to rely on a limited number of foods, which corroborates the poor minimum dietary diversity scores and the fact that only 4.5% of participants achieved minimum acceptable dietary intakes.

Other research indicate that female-headed households, households with children under five years and single female headed households, are at risk of food insecurity (du Toit et al., 2011). In the current study, single mothers cared for 30.6% of participants, which may have had an influence on the high food insecurity prevalence.

Data from the NFCS-1999 found that only 25%, and the NFCS-2005 that only 19.8% of South African households were food secure. The results from the four national surveys that have used the CCHIP index to measure household food security indicated that food insecurity did decrease from 1999 to 2008 (from 52.3% to 25.9%). SANHANES-1 in 2012 found that 45.6% of the population was food secure, with the lowest food security (39.3%) amongst black Africans. Specifically, for the Free State province, SANHANES-1 found that only 39.3% of all population groups were food secure (Shisana et al., 2013). According to the Global Hunger Index (GHI), the severity of hunger in South Africa is described as moderate, but still lower than most other African countries (Shisana et al., 2013).

5.9.1 Summary

South Africa has sufficient food supply for its population, but this does not guarantee food security at household level. In the current study, less than a quarter of households were food secure, with more than a quarter at risk of food insecurity and almost half already food insecure. Food insecurity could be associated with the large number of single female parent-caregivers (30.6%), the large number of caregivers who had completed only primary school (55.6%), and the high unemployment rate (74.7%) amongst the caregivers.

Household food insecurity may also contribute to the poor minimum dietary diversity score, as well as the fact that only 4.5% of the participants achieved the minimum acceptable dietary intake. The late introduction of solids in some of the participants may also play a role. As the DLA is mainly rural, food might be produced by farmers around the area, but remain inaccessible to the caregivers due to poor socio-economic status and lack of fresh food grocers. Local shops are often expensive and sometimes lack fresh food products (McIntyre, 2016).

The high unemployment rate also plays a role, as well as education levels (most caregivers had only completed primary school). Mothers are often uneducated as to what to feed their children and are unable to afford healthy foods, especially the group of single parent-caregivers and those who relied on the CSG as their only income. Interventions to improve dietary intake amongst infants, include proper dietary education, as well as access to nutritious food (Jamieson et al., 2017).

5.10 CSG

All 242 participants of the current DLA study, were CSG recipients, in the amount of R350 per month per participant. Results and findings concerning the CSG follows.

5.10.1 Household income, expenditure and the CSG use

Data collection concerning additional social support grants received by the participants' households revealed that 1.2% of the biological parent-caregivers received additional grants apart from the CSG (all 242 participants were CSG recipients). This indicates the high uptake of CSG. Grinspun (2016) reported that the CSG accounts for at least 70% of all social support grants distributed.

The minimum monthly income reported by the parent-caregivers, whether employed or unemployed were as low as R200, which were suspected to be reported wrongly, as the CSG received is R350 per month. The median and especially the maximum monthly income might indicate that in the households where there were income, it was pooled, as the maximum income was R12 350 per household. The monthly median income of less than R3 000 does indicate that the CSG are directed towards the poorest households. Without the CSG, some participants would not have been able to survive (Grinspun, 2016), as there were single parent households as well as households where the CSG were the only monthly income, as previously noted.

Concerning the expenditure on food per month, the median expenditure was R925.50 and the maximum expenditure on food for the household was R3000 per month. The expenditure of food indicates that an amount of R350 CSG per month is much less than what is being spent on food alone.

Even though the CSG of R350 is not enough for a nutritious dietary intake of a young child, food is not a child's only basic need and in the current study, food did not seem as a priority item bought with the CSG. The top three items bought for the participants with the CSG, were toiletries, clothes and medicine. The items that incurred the highest monthly expenditure, were clothes, toiletries and formula milk (44% of participants reported using formula milk).

Most parent-caregivers reported to use the CSG for the participants alone, whilst 5.4% pooled it with the rest of the household's income. Interestingly, most of the caregivers reported that

the CSG was intended for the participants' needs alone, but when reporting whether the CSG was enough, 14.5% reported that it was too little to supply in the entire family's needs. Only 3.4% were satisfied that the CSG was enough to meet the needs of the participant and the household, whilst the rest wanted a 75% increase (R612.50), with some wanting as much as R2000 per month.

Overall, 67 other adults that also contributed to the total monthly income with social support grants (mainly the CSG) were distributed between the households. Few additional adults contributed salary income, as less than 45% of the participants had one to three full time employed adults per household. Moreover, 40% of the participants had one to three unemployed adults staying with them in the household. Employed and unemployed adults were almost equally divided between the households of the participants, thus, the additional income of employed adults in the household versus the additional expense incurred by unemployed adults in the verall household, did not really make a difference to the household wealth.

The current study found 15.7% of participants (n=38) who were completely dependent on the CSG for their household's only income per month. The socio-demographics of these households indicated the availability of assets such as electric stoves, microwaves, fridges, as well as recreational and communication equipment. Some of these households had DSTV, tablets and computers, whilst not all had fridges to store food safely. There were 5% of these households that reported a higher household expenditure than income, which could be related to debt and loans.

Education with regards to budgeting for the basic needs of a child, as a condition for CSG uptake need to be reviewed. The items that were most often procured for the participants from the current study, included toiletries, clothes, medicine and food and drink only ranked fourth (62.4%). The rand value of the items procured, varied. Reported food expenditure was as little as R20 per month to as much as R700 per month. The highest expenditure of the CSG, was on clothes.

Referring back to the UNICEF conceptual framework of malnutrition, discussed in chapter two, the CSG is a monthly cash income which can help households to procure food and other basic needs to ensure food security, healthy dietary intake and healthy children, which are all

causes of malnutrition if not addressed. Patel (2012), who researched CSG and non-CSG beneficiaries from Doornkop, Soweto, reported that poverty did decrease since the implementation of the CSG, and that the CSG do have a positive impact in improving the welfare of recipients and their entire household. Patel (2012) found that the CSG were mainly used for food (74.2%). This was corroborated by Liziwe & Kongolo (2011) in Gugulethu, Western Cape Province, South Africa where the CSG were also found to be mainly used for food (36.6%), followed by education (30%), clothing (13.3%) and health care (6.6%). In both these studies, the respondents complained that the monthly CSG was not enough to meet the basic needs of their children. Importantly, the majority of the grant recipients (caregivers) were not partaking in any other income-generating activities and the CSG was their main source of income (Liziwe & Kongolo, 2011).

5.10.2 Unemployment and the CSG

Referring to the UNICEF malnutrition framework, as was discussed in chapter two, the CSG should be able to assist in preventing the basic causes of malnutrition. The CSG meant to assist with finding employment, as it assists with job searching, providing money if people need to pay travel costs to attend interviews, or leave their children with a caretaker whilst looking for employment. International studies have shown that the CSG, in some instances, leads to higher success rates in finding employment and improved productivity and success, (Neves et al (2009).

The CSG should not replace labour and employment and should not simply substitute employment by choice. Employment needs to be created to decrease social grant uptake, particularly amongst 21 to 30 year old men and women. For the current study, most parent-caregivers were 21 to 30 years old and more than 70% of them were unemployed, with more than 15% of the participants dependent on the CSG. Support grants were supposed to play an integral role in supporting the poor, by assisting with access to health care, basic nutrition, education, job searches, increased work force and other household activities (Phakathi, 2011). Results from the current study indicate that, in a sample with 100% uptake of the CSG, higher education completion, employment status and food security was low, whilst more than one in three infants were stunted.

5.10.3 Household food security, including feeding practices and the CSG

PACSA (2016), a NGO in Kwazulu-Natal, calculated the monthly cost for a young child to eat one nutritious meal per day. This amounted to R540.54 per month per child. This indicates that, even if the whole of the CSG of the participants from the current study was spent on food alone, it would still not be enough to support their nutritional needs. The CSG currently covers less than two thirds of the monthly dietary needs of the participants, as calculated above.

The CSG was an internationally recognised form of intervention to promote child well-being by reducing household poverty (Patel et al., 2012). However, relevant previous research as well as the results from the current study, indicate a short fall, as most participants of the current study did not achieve the minimum dietary diversity score, households were food insecure and participants did not meet the criteria for a minimum acceptable dietary intake. Research during 2014 in Worcester, South Africa, also found that the recipients of the CSG had higher prevalence of food insecurity and higher rates of stunting than non-CSG recipients. Similarly low dietary diversity scores (less than four food groups on a given day) was found amongst CSG and non-CSG recipients (Koornhof, 2014).

5.10.4 Summary

With regards to the spending patterns of the CSG in context with the household food insecurity and dietary intake of the participants from the current study, it is evident that, although all of the participants (100%) received the CSG, food insecurity was still high, dietary intake was non-diverse and expenses was not mainly on food. The household food insecurity and limited income, was associated with dietary intake of mainly more affordable foods, such as “pap and milk”, with limited intake of fresh fruit, vegetables and proteins, necessary for growth.

In 2002, Prof Danie Brand (Brand, 2002), then a senior lecturer in the Faculty of Law, University of Pretoria, expressed the opinion that support grants are by far the most effective way of ensuring immediate and continued access to food, yet very few participants of the current study were food secure. Case et al (2005) elaborated on whether state grants create a certain type of dependency and motivated research to determine the reasons for the high grant uptake in South Africa.

Some parent-caregivers in the current study received the CSG for a number of children per household, but only four received other types of support grants, indicating that CSG was the social support grant with the highest uptake and 15% of the participant's households were dependant on the CSG as their only income. Even though it must be emphasised that the CSG should be used mainly for food, it is not feasible or sustainable, as it was previously indicated that the CSG is too little to supply in the dietary needs of even a single young child, notwithstanding other basic needs. Therefore, it might not be possible for children to survive on R350 a month, whilst hoping that they would follow an adequate dietary intake, be healthy and happy, have clean clothes to wear, medicine when ill and other necessities, as well as get proper education.

5.10.5 Growth indicators and the CSG

All the participants in the current study were receiving the CSG, but the prevalence of stunting (33.1%) was high. The National Income Dynamic Survey (NIDS) in 2008 amongst children aged 6-59 months, found 24.6% CSG recipient children stunted and 20.2% non-CSG recipients. Thus, the CSG recipients had a higher prevalence of stunting, suggesting that the CSG did not make a difference in the growth of these children (Devereux et al, 2017). On the other hand, research according to Patel (2012) reported that the CSG did improve the nutritional status of children, as caregivers were able to afford a wider variety of food items.

In the current study, similar to the SADHS 2016 (National Department of Health et al., 2017), many participants still suffer from stunting, food insecurity and hunger, with poor minimum dietary diversity scores and limited acceptable dietary intakes. The CSG is too small to supply nutritious food, also because it does not rise with constantly rising food prices. The CSG is also used for different needs. Therefore, the burden of stunting and poor growth amongst children six to 23 months, remains high (Zembe-Mkabile et al., 2015).

5.10.6 Summary

Devereaux et al (2017) reviewed six different studies between 1993 and 2013, supported by the National Research Foundation of South Africa and the Newton Fund, on the topic of CSG. Different criteria, samples and participants of different ages were used in the research. No relationship was found between social grants and certain nutrition outcomes. Stunting prevalence was higher amongst the CSG recipients than the non-CSG recipients (Devereux et

al., 2017). Figure 2. indicates that both underweight and stunting were higher in children receiving the CSG.

Older research (2006) on the impact of the CSG on nutritional status of South African children, found that early CSG uptake had a positive impact on height-for-age scores (Aguero et al., 2006). Colombian research found that cash transfers did have a noteworthy impact on height-for-age measurements amongst recipients, but only when the cash transfers were started at a young age (Attanasio et al., 2005).

A third of the participants in the current study were stunted, some were wasted and others underweight-for-age, even though all the participants were CSG recipients. This could indicate a lack of proper malnutrition identification by healthcare workers, as well as poor intervention through education of the parent-caregivers on the correct dietary intake.

The dietary intake of the participants where mainly high in starch and dairy, with limited vegetables, fruit and proteins. A diet high in energy, but limited in other nutrients that are essential for growth, will disrupt a child's growth and development. Stunting have long-term implications, as it causes sub-optimum cognitive development and poor academic performances, which in turn, increase school dropouts, decrease the future workforce and increase future unemployment.

Early childhood malnutrition could also have caused the current overweight and /or obesity prevalence. Overweight and obese children are at risk to develop future consequences, including diabetes, high blood pressure and other diseases and defects.

From the discussions in this chapter, it is clear that the CSG is not sufficient to sustain a healthy balanced dietary intake for the participants and especially not for a whole household. Food is not the only basic need of children, and caregivers cannot be blamed for not using the CSG solely for food. Caregivers complained that the CSG is not enough for the needs of the participants, but some also complained that it was not enough for the entire family's needs.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Malnutrition, a vicious cycle aggravated by poverty, hunger and disease, has the most detrimental effect on children's growth and development, as well as on their future health, during the first 1 000 days after conception (WHO, 2018). Malnourished children, especially those who are stunted and wasted, are more likely to die than children with a normal nutritional status (Black et al., 2013; Nyaradi et al., 2013). Children who survive malnutrition often suffer severe long-term consequences that track into adulthood (Black et al., 2013; Nyaradi et al., 2013). Other consequences include decreased cognitive and mental functions, decreased completed education levels, decreased work force, low productivity, poor economic growth and overall poor health, causing a burden on the health care system and government (Black et al., 2013; Nyaradi et al., 2013; Blössner et al., 2005). The current study was the first to describe the nutritional status and the use of the CSG amongst children six to 23 months, in the DLA, Thabo Mofutsanyana District, Free State.

In this chapter, conclusions and recommendations are summarised in terms of the research objectives: socio-demographic information, nutritional status, including growth standards and child feeding practices, as well as household food security and the use of the CSG.

6.2 Conclusions

Based on the results obtained, the following conclusions are drawn:

6.2.1 Socio-demographics

Overall, the convenience sample of 242 participants between six and 23 months, were being raised in household environments that reflected poverty, access to minimum basic household services and assets, and, amongst their primary caregivers, fairly low levels of education, high unemployment and reliance on social grants. In addition, some level of improper planning and prioritising were evident.

In total, two thirds (65.7%) of participants resided in brick houses. One in three (31.4%) infants were being raised in informal, corrugated iron houses (shacks), and 14% of households were

overcrowded. All households, in which participants resided, had access to safe running water, albeit mostly not on-tap inside the homes (two in three homes did not have running water inside). Electrical cooking equipment were available to 85.1% of the households, with a small proportion using gas and paraffin to cook. Seven households (2.9%) had to make exclusive use of an open fire to cook food. Overall 16.1% that did not have any cold storage for food, which poses a serious health risk, as food not properly cooked and not properly stored at correct temperatures, may be dangerous and even lethal, especially to young children aged six to 23 months (US Food and Drug Administration, 2017).

Despite the bare minimum in terms of housing and household facilities, there was a very high uptake of electronic, recreational and communication equipment, which suggest poor planning and/or lack of prioritising of household resources to ensure proper and safe food provision for children. All households had some type of recreational or communication equipment. Notably, 87% of households reported having a television, and half of these households had subscription satellite service (44% of all the households). All but 2% of households owned a cellular phone, whilst almost one in five households (18.5%) reported owning computers and/or tablets. Households may be buying these assets on credit or with loans. Recent evidence suggest that South African households and particularly poor consumers are becoming increasingly over-indebted, owing as much as 75% of their monthly pay to creditors (Gauteng City-Region Observatory Quality of Life Survey, 2016). Regardless, these equipment and services would incur monthly payments, if not for the asset itself, for services in the case of cell phones and satellite television; all of which would leave less money available for food.

6.2.2 Age, Schooling and employment

There were almost 13% underaged biological parent-caregivers and 3.1% were still of school-going age (3.1% between 16 and 17 years of age). Most (53.6%) of the biological parent-caregivers had completed primary school, but only 40% had completed high school and less than 6% had any form of completed tertiary studies. This no doubt contributed to the high unemployment rate (75.5%) amongst these biological parent-caregivers, of which most indicate that they failed to find any employment. Less than 20% had any form of employment. Overall, 15.7% of households (median of 2 adults and 2 children per household) relied on the

CSG as sole income, providing a total of R700 per month (median of two x CSG) amongst four people to supply in their basic needs. These households consisted of 77 adults and 74 children. Interestingly, 3.6% of caregivers reported that they did not have to work because the CSG (R350) they received covered all their expenses, which could be indicative of ignorance with regards to living costs and the basic needs of children. It may also suggest that the use of the CSG of these participants, were not being directed towards the children.

There were 65 biological parent-caregivers who were single parents, either through choice, divorce, death or separation and 70% of these single parents were unemployed with almost 10% still attending school. This group of participants are at high risk of food insecurity and malnutrition.

6.2.3 Education, employment and housing of the 17 participants cared for by non-biological parent-caregivers

There were 17 participants who were cared for by non-biological parent-caregivers who had mostly only completed primary school (82.4%), whilst 5.8% had no form of formal schooling and only one in ten (11.8%) had completed high school. Being primarily cared for by uneducated caregivers, could place these 17 participants at increased risk of food insecurity and malnutrition. Overall, 17.6% of these non-biological parent-caregivers were employed, but unfortunately it was not indicated where the participants stayed when they went to work. It is possible that these participants were amongst the 18.2% of participants who attended a crèche or day care.

Compared to their caregivers, and even compared to the 225 participants staying with their biological parent-caregivers, the biological parents of these 17 participants had better school completion and employment rates. Overall, 41.1% had completed primary school whilst 47.1% had finished high school, 23.5% were still attending school, almost 6% were busy with tertiary education, and only 17.7% were unemployed. These 17 participants, being cared for by non-biological parent-caregivers, might have been better off because their biological parents had assistance from the non-biological caregivers, which enabled them to complete their schooling, as well as seek employment, as to create better lives for themselves and their children.

6.2.4 Other adults in the house

There were also other adults residing in the households of the participants that either contributed with income or burdened the households by adding additional mouths to feed. There were three households (2.8%) who had three additional adults staying with them that were employed full time, whilst most (n=96; 88.9%) households had one additional adult with full time employment. Conversely, there were 79 households (84%) that had one unemployed adult and 16% households that had two to unemployed three adults. This seems to suggest that there was no additional income per household, as the unemployed adults cancelled out the employed adults. There were also few adults who contributed with social support grants in (27.6%) the households.

6.2.5 Nutritional status: growth standards and child feeding practices

The current study found that, 13.2% of the participants were underweight, and 5% were moderately acutely malnourished and 3.3% wasted; all parameters being indicative of acute malnutrition, i.e. acute inadequate nutrition leading to rapid weight loss or failure to gain weight normally. Conversely, 6.2% of these very young children were overweight and/or obese, which does not necessarily reflect over-nutrition in the strict sense, but is rather related to intrauterine malnutrition and stunting (Black, et al., 2013). This rate of stunting (one in three infants) in this study was in line with the results of the recent SADHS 2016, and higher than the global average reported by Save the Children (2012) for the same age group. This is alarming, particularly at such a young age (under two years), as stunted children have a 5.5 times higher mortality risk than children with normal nutritional status, whilst survivors suffer long-term consequences, often tracking into adulthood (Black et al., 2013). Globally and in South Africa, stunting, reminiscent of chronic malnutrition, is also found as the most prevalent form of malnutrition (National Department of Health et al., 2017; UNICEF, 2017). The underlying chronic malnutrition that causes stunting is reflected in the dietary intakes of the participants.

Most participants (above 72%) had a dietary intake that consisted mostly of starches and dairy products, namely the traditional food “pap and milk”. The intake of proteins, fruits and vegetables were limited, which could lead to serious protein and micronutrient deficiencies, causing a delay in growth and poor nutritional status (WHO/PAHO, 2003). Adequate dietary

diversity, a determinant of nutritional status, was achieved by only 7.9% of the participants. This indicates a dietary intake lacking in variety, which is typically low in micronutrients, as well as certain macronutrients, negatively affecting nutritional status. A definite link between dietary diversity score and nutritional status are confirmed in literature (Grobler, 2015; WHO & UNICEF, 2003). A delay in introduction of solids decrease dietary diversity scores and a low dietary diversity scores are associated with stunting (Saaka et al., 2015; Beyene et al., 2015). Specifically, for rural areas, the dietary diversity score is usually low due to poor socio-economic status. Literature states that, when more than 50% of a household's income is derived from social support grants, the dietary diversity scores are low (Grobler, 2015). This could be true in the DLA population, as this study found that DDS were low, whilst 15.7% of the participants were reliant on the CSG as sole income, and unemployment was high amongst both biological parent-caregivers and non-biological parent-caregivers. Only 4.5% (one in twenty) of the participants had a minimum acceptable dietary intake during the previous 24 hours.

Overall, 59.1% of participants received breastmilk together with complimentary solids (six to 23 months) during the previous day. There were 33.4% participants, six to eight months old, who did not receive solids during the previous 24 hours, indicating a delay in introduction of solids in a third of participants. A delay in solid introduction after the age of six months leads to growth faltering and malnutrition (Horta et al., 2015; National Department of Health, 2003).

A delay in the introduction of solids influence DDS, as well as the minimum meal frequency score. There were 85.4% of the participants aged six to 12 months, and 86% of participants aged nine to 23 months, who achieved a minimum meal frequency score (this include the number of times the participants ate per day whilst still breastfeeding). This indicates that the participants did eat the minimum number of times per day, but that those meals, mainly consisting of 'pap and milk', were not nutritionally balanced to supply for optimal growth and development of the infant. For non-breastfeeding participants (15.8%) to achieve minimum meal frequency score, they need to consume four or more food groups with a milk intake of at least two cups per day. None of the non-breastfeeding participants (15.8%) achieved the minimum meal frequency score, highlighting the vital role of breastmilk as a cost-effective and nutritionally adequate means of supporting the growth and development of young

children growing up in poor socio-demographical environments. Overall, 50% of participants aged 12 months and older and 40% of children older than 20 months were breastfeeding at the time of data collection.

Breastfeeding is an important malnutrition preventative measure, as poor breastfeeding practices results in an increased risk for infant mortality (Black et al., 2013). Inadequate breastfeeding and untimely discontinuation of breastfeeding increase the risk of developing infectious diseases, atopic cardiovascular disease, necrotizing enterocolitis, celiac disease and impaired cognitive development (Black et al., 2013). A quarter of the participants (25%) were never breastfed in their lives, putting them at risk of developing malnutrition and having an increased mortality risk.

Unsuitable breastmilk substitutes included tea (81.6%), diluted porridge drink (73.7%) and fresh cow's milk (76.3%) (under 12 months of age). Cow's milk and porridge drinks contribute to high starch and dairy intake and indicate a total dietary intake high in energy, but limited in many micronutrients. Other unsuitable drinks of poor no nutritional value, including condensed milk, custard and rooibos tea, were given to the participants.

There were 59.6% participants who received formula milk as breastmilk substitute, but alarmingly, only 48.5% received an age appropriate formula milk, only 48.5% received the appropriate concentration and only 27.3% received sufficient amounts. Thus, the formula milk were either over-diluted or over-concentrated, whilst participants were being over- or under-fed. This renders the use of formula milk in this population unsuitable to meet the nutritional requirements of children and rather constitutes a wasteful expenditure. Incorrect mixing of formula milk can be detrimental to children's health (Horta et al., 2015).

The above-mentioned poor dietary intake, inadequate breastmilk substitutes and the incorrect mixing of formula milk, may be linked with household food insecurity, and low employment and education levels of the caregivers.

6.2.6 Household food security

Only 23.6% of the participants were food secure, with an alarmingly high percentage of 48.7% being food insecure (going hungry) and 27.7% being at risk of food insecurity. This indicates that less than a quarter of the households had enough food to eat at all times. Nearly 70% of the caregivers reported running out of money to buy food, whilst 66.5% fed limited food

to the participants and more than 50% had to cut the size of meals or skip a child's meal due to limited money.

The findings of this study highlights poverty as an important cause of food insecurity and malnutrition. Household food security is a direct consequence of socio-economic status and unemployment (Enstrom & Pettersson, 2016; Play Therapy Africa, 2009) and for the participants it was evidently linked with the high illiteracy and limited skills, as well as unemployment, age, gender, illness and disabilities of their caregivers, as specified in literature (Steyn & Labadarios, 2013).

6.2.7 Spending of the CSG and other income and expenditure

The median monthly income (grants and/or employment) per household was R2 897.00, with the minimum income of R200 (which was evidently incorrectly reported as all the participants were CSG recipients), and the maximum income was R12 350.00. The minimum monthly expenses were zero (supposedly under-reported) and the maximum R3 000, whilst the median expenses were R925.50 per month. Caregivers that evidently gave incorrect information regarding expenditure might have reported what they knew was correct, but not what the actual situation at home was. Conversely, some may have underreported in hope of appealing for an increase in the CSG value.

Most caregivers (94.6%) reported that the CSG were spent on the participants alone and only 5.4% reported to pool it with other income for the entire household's use. The most procured items from the CSG were toiletries (1), clothes (2), medicine (3), with food only ranked fourth. Food was procured from the CSG by only 62.4% of the participants caregivers, which was strange, as food is a basic need. Only 2.5% bought food only, whilst 46.7% bought food together with clothes, and 3.3% used it for the needs of the entire family (0.4% using it for food for the entire family). The rand value spent on food, amounted to a minimum of R20.00, a median of R189.06 and a maximum of R 700.00 per month.

Upon being asked whether the CSG of R350.00 was sufficient, 96.7% did not agree, indicating that it is not enough for all the needs of the participants (83.8%), not enough for the participants' food (0.4%), not enough for crèche fees (0.4%), and not enough for the needs of a single mother (0.9%). Even though the CSG was reported to be mainly used for the

participants, caregivers complained it was not enough for the entire family's needs (14.5%). This could be further indication that the CSG was not used for the participants alone

There were 3.3% who reported that the amount of R350 was enough for the participants needs, but some requested an increase of as much as R 2 000.00 per month, with a mean of R612.10 per month, which is almost double the current CSG.

6.3 Summary of conclusions

This study indicated that the CSG is not sufficient to ensure a nutritionally sound dietary intake to prevent malnutrition amongst children under two years of age. Possible reasons for this suggested by this study, is the heavy dependence on the child's CSG to tot entirely support that child, but to support entire households. A grant is supposed to assist in providing for the child, not to keep him completely. The study found very high levels of unemployment and low education levels amongst the primary caregivers, coupled with high percentage of single mothers as caregivers living in households that included numerous unemployed adults.

Many of the participants suffered from stunting, some being underweight, wasted and others overweight and/or obese, all consequences of their poor dietary intake. A diet without variety and diversity, consisting mainly of the local staple food, "pap and milk" were followed. Households suffered from food insecurity, thus already experiencing periods of hunger, whilst many were at high risk of hunger.

The participants' nutritional status and dietary intake did not seem to be priority for the caregivers, as in some households there were more electronic, communication and recreational equipment than equipment for safely storing food or cooking food, and even food itself, whilst 70% reported running out of food during the month.

This study indicates that, currently in the DLA community, one in three infants between six and 23 months, being stunted and malnourished, are set up for a future that is likely to hold poor school completion rates, contributing to future unemployment, low earning capacity, obesity and malnutrition and increased risk for NCDs. A decreased workforce and increased burden of disease produce enormous economic pressure and increased government costs, which, in a developing country like South Africa, is debilitating to the entire country's economic and social growth and development.

6.4 Limitations

Participants were cooperative, staff at the clinics were helpful and ample private office space were available for anonymous data collection, making the data collection process run smooth and without challenges. There were, however, a number of limitations that became evident.

- Firstly, the study was not designed to answer some of the questions that were raised by the findings, such as why school grade completion was so low; exactly what it means to in this community, to be 'unable to find employment' (the actions taken to seek employment); how many children were born due to insufficient family planning; and parents were not getting married; and why they were leaving children with non-biological parent-caregivers. In addition, the parent-caregivers' knowledge with regards to sound dietary intake for children were not assessed. This additional information could have supplied information to better understand the problems and challenges faced by the DLA.
- Other unavoidable limitations were the suspicion that caregivers gave answers accordingly, to what they thought would be the correct answer, especially with regards to the CSG usage and dietary intake of children. Caregivers might have feared telling the truth, due to being interviewed by a dietitian and in a health facility setup, worrying that their child might be sent to hospital or that the CSG would be taken from them. In future, home visits to collect data might be more appropriate and relaxed for the respondents.
- Home visits to collect data instead of sampling participants who attended the clinics, would also make room for observations, such as cleanliness, hygiene, household assets and overcrowding. Sampling and data collection had to be done at the clinics due to time, money and transport constraints, as well as safety reasons.
- Dietary data would have been more complete, making nutrient analysis possible, had at least three consecutive 24 hour recalls been carried out (Hammond, 2012), but due to logistical constraints, only one 24hour recall was carried out for the current study (Marriott et al., 2012).
- All the participants were recipients of the CSG, and thus no comparison, as originally planned, between children who were not CSG recipients, was possible.

6.5 Recommendations

Based on the conclusions, the following recommendations are suggested:

6.5.1 Cash transfers, vouchers and/or food parcels

To ensure that CSG are used for the needs of children and specifically for buying food to prevent malnutrition, stricter control of the CSG programs need to be implemented. This could include cash and voucher transfers, cash and food transfers, or additional food transfers to pre-determined food insecure households. Supplying food parcels to children who are already malnourished, such as the current Zero Hunger Project, (NCOP Social Services, 2012) may assist these households with malnourished children better, and ensure that the food is age-appropriate. Interventions should, however, focus on prevention rather than cure: targeting those at risk before they develop malnutrition.

Even though cash transfers are found in some studies to be preferred above vouchers or food transfers (Fenn et al., 2015; Gelan, 2006), food parcels and vouchers are recommended to ensure that it is directed towards preventing malnutrition.

Government could also consider a voucher system where vouchers have specific monetary value allocated per items needed for children, such as vouchers of a certain amount for toiletries, vouchers for groceries and vouchers for fresh food items. This would ensure that all basic needs are met. These vouchers can then be used at all local supermarkets where they can be exchanged, whilst the caregiver can still choose their brand or product, protecting some sense of dignity and self-respect. In smaller rural areas where there are no chain supermarkets, government could negotiate with local shop owners to implement the voucher system (ACF - International Network, 2007; WFP, 2005).

6.5.2 Conditional cash/food/voucher transfers

Together with issuing the CSG, the Department of Education or Social Development might consider developing conditions that should be met before grants are paid out, such as education programs for caregivers (Sphere Project, 2011) on the importance of the CSG and how to utilise it best.

6.5.3 Education via communication methods

Given the excellent cell phone coverage in this community, another option would be to message recommendations and advice on budgeting, and the prevention of dietary and malnutrition. Radio slots as well as television advertisements could be used, as most of the participants had access to these in their households.

6.5.4 Direct transfer of food parcels to at risk households

Another recommendation could be to transfer food directly to the households in danger of food insecurity, but this may incur many logistical problems and would be costly (The World Food Programme, 2010).

6.5.5 Additional food vouchers paid out with CSG to at risk households

Additional food vouchers might be issued together with the usual CSG transfers, until the risk is minimised. Once a household is identified as being at risk of food insecurity and additional vouchers/CSG/food parcels are being issued, the Department of Social Development should assist the family to obtain additional income through employment. In addition, those who need to finish high school, should be encouraged and assisted to do so, households should be equipped with the basic needs for safe and healthy living, and overcrowding should be address.

6.5.6 Assistance with employment and job creation

To address unemployment in the DLA, the local government needs to assist with job creation. The DLA is a farming community, with potential for upcoming farmers. The Department of Agriculture might assist by offering skills development training to unemployed youth, including school drop-outs. After finishing their training, these students could be enrolled with local farmers for practical work and internships, funded by the local government.

By making use of the existing trades and infrastructure in the DLA, carpenters, construction workers, drill operators, boilermakers, mechanics, plumbing, electricians, millwrights, drivers, and welders, to name a few, can also be developed. After skills development, the students should ideally be enrolled for practical internships funded by local government to create employment and decrease the burden of a growing community that needs to be supplied of

support grants. By developing a skilled labour force, industry in the area will grow, to generate the income that will be needed to fund such a project.

6.5.7 Enrolment of all pregnant women in malnutrition prevention program

To prevent malnutrition before it occurs all pregnant women can be enrolled to receive additional food vouchers or food parcels, as soon as conception is confirmed. When a mother is healthy, optimal growth of the unborn baby will be achieved, as the first 1 000 days from conception are crucial for overall childhood development (WHO, 2018).

6.5.8 Recommendations for future research

The current study provided baseline data on the nutritional status and the use of CSG among children, six to 23 months, in the DLA, Thabo Mofutsanyana District, Free State, but it was not necessarily representative of all infants in the area. Future research could include quantitative research to determine the magnitude of malnourished children in the DLA for all age groups. A food frequency questionnaire or a three-day 24 hour recall should be used to calculate exact energy, macro- and micronutrient intake. Both qualitative and quantitative research is needed to assess the perceptions, knowledge, attitudes and practices of caregivers with regard to the CSG and the factors associated with malnutrition amongst children in this area.

Future research could also include an impact study: the DLA can be used as a pilot site to test the impact of issuing additional cash transfers, food vouchers or food parcels to at-risk households to prevent malnutrition and improve nutritional status of children. To assess the impact of the CSG further, a study could be done to compare the nutritional status of CSG recipients with CSG non-recipients (although one may have a hard time finding enough of the latter group in this specific community).

A similar impact study could also be done where pregnant women are supplied with cash/food/vouchers to prevent malnourished children and the outcomes of these children and their nutritional status could be compared with other children whose mothers were not enrolled in such a malnutrition prevention program.

Overall, the current study provides valuable baseline data for stakeholders, policy makers and government to develop and implement policies and programs to fight the malnutrition burden, and to ensure a bright future of a healthy adulthood to all children.

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Addendum A: Approval of Health Sciences Research Ethics Committee



IRB nr 00006240
REC Reference nr 230408-011
IORG0005187
FWA00012784

12 July 2016

MRS C SYMINGTON
DEPT OF NUTRITION AND DIETETICS
CR DE WET BUILDING
UFS

Dear Ms Symington

HSREC 15/2016

PROJECT TITLE: NUTRITIONAL STATUS AND THE USE OF CHILD SUPPORT GRANT AMONG CHILDREN 6 TO 23 MONTHS VISITING 3 LOCAL CLINICS IN THE DIHLABENG LOCAL AREA, THABO MOFUTSANYANA DISTRICT, FREE STATE

1. You are hereby kindly informed that the Health Sciences Research Ethics Committee (HSREC) approved the above project after all conditions were met. This decision will be ratified at the next meeting to be held on 26 July 2016.
2. The Committee must be informed of any serious adverse event and/or termination of the study.
3. Any amendment, extension or other modifications to the protocol must be submitted to the HSREC for approval.
4. A progress report should be submitted within one year of approval and annually for long term studies.
5. A final report should be submitted at the completion of the study.
6. Kindly use the **HSREC NR** as reference in correspondence to the HSREC Secretariat.
7. The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act, No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50; 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

Yours faithfully


PROF WJ STEINBERG
VICE CHAIR: HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

Addendum B: Approval letter of the Free State Department of Health



health

Department of
Health
FREE STATE PROVINCE

28 June 2016

Mrs. C Symington
Department of Nutrition and Dietetics
CR De Wet Building
UFS

Dear Mrs. C Symington

Subject: Nutritional status and the use of the Child Support Grant among children 6 to 23 months visiting three clinics in the Dihlabeng Local Area, Thabo Mofutsanyana District, Free State.

- Permission is hereby granted for the above – mentioned research on the following conditions:
- Participation in the study must be voluntary.
- A written consent by each participants must be obtained
- Serious adverse events to be reported and/or termination of the study.
- Ascertain that your data collection exercise neither interferes with the day to day running of Bethlehem Clinic, Bohlokong Clinic, Mphohadi Clinic nor the performance of duties by the respondents or health care workers.
- Confidentiality of information will be ensured and no names will be used.
- Research results and a complete report should be made available to the Free State Department of Health on completion of the study (a hard copy plus a soft copy).
- Progress report must be presented not later than one year after approval of the project to the Ethics Committee of the University of the Free State and to Free State Department of Health.
- Any amendments, extension or other modifications to the protocol or investigators must be submitted to the Ethics Committee of the University of the Free State and to Free State Department of Health.
- **Conditions stated in your Ethical Approval letter should be adhered to and a final copy of the Ethics Clearance Certificate should be submitted to khusemji@fshealth.gov.za or sebeelats@fshealth.gov.za before you commence with the study**
- No financial liability will be placed on the Free State Department of Health
- Please discuss your study with the institution managers/CEOs on commencement for logistical arrangements
- Department of Health to be fully indemnified from any harm that participants and staff experiences in the study
- Researchers will be required to enter in to a formal agreement with the Free State department of health regulating and formalizing the research relationship (document will follow)
- You are encouraged to present your study findings/results at the Free State Provincial health research day
- Future research will only be granted permission if correct procedures are followed see <http://nhrd.hst.org.za>

Trust you find the above in order.

Kind Regards

Dr D Motau

HEAD: HEALTH

Date: 30/06/16

Head : Health

PO Box 227, Bloemfontein, 9300

4th Floor, Executive Suite, Bophelo House, cnr Maitland and, Harvey Road, Bloemfontein

Tel: (051) 408 1527 Fax: (051) 408 1556 e-mail: sebeelats@fshealth.gov.za/chikobvup@fshealth.gov.za

www.fs.gov.za

Addendum C: Information document - Sesotho

Aterese: P.O. Box 1777
Bethlehem
9700

Motsheanong 2, 2016

Lerato la nkang boikarabelo ba ngwana dikgwedi ho tloha 6 ho fihlela 23 (Patlisiso Monkakarolo)

Lebitso laka ke Carol Symington, ya registrarilweng moikutlong a dijo tse nepahetseng mme ke motjheng ho tswa Universithing ya Freistata dithutong tse phahameleng (Master's Degree). Ke lebohela lona ka ho nka nako ya lona ho nthusa ka thuto ya dipatlisiso tse bohlokwa.

Ha bana ba fumana dijo tse fosahetseng, e baka ho kula, ho ba kenyang sepetlele, e lebise ho hlokahaleng. Le ha Africa Borwa e hlahisa dijo tse lekaneng tsa batho, tsebediso ha tjhelete ya mmuso e sebediswang bakeng sa bana ho hlahiswa mmusong wa Africa Borwa ho fana ka dithuso dithlokong, tlala entse e le monahano o moholo.

Dipatlisiso tsena tsa bohlokwa di leka ho re thusa ho thola dikarabo tsa dipotso tse bohlokwa ho isa tlase moikutlo a dijo tse sa nepahetseng ho sebediswang ha tjhelete ya mmuso e sebediswang bakeng sa bana.

Jwale re a le kopa ho nka karolo ya dipatlisiso ka boikgethelo ba hao. Diphetho di tla hla ha empa sephiri e tla etsahala nako tsohle. Ha o no thola mokgolo ha o nka karolo ya dipatlisiso enwa ya bohlokwa.

Ho re thusa ereng:

Ha o le motho a hlokomelang bana pakeng tsa dikgwedi tse 6 (tshelela) ho isa ho kgwedi tse 23 (mashome a mabedi a metso emene) mme o ya klinekeng ya Mphohadi, Bohlokong kapa Bethlehem, ba tla le kopa thuso ena. Ha o la fana ka tumelo ya hao le ha ba se ba shebile hore o ka kgona ho re thusa, o tla iswa kamoreng ke kwetseng hore b aka kgona ho bua le

wena o le mong. Ba tlo sheba boima le botelele ba ngwana. Ditaba tse o di hlahisang, e tla ba ditaba tse tla tsebiswa ke wena le motho e o buang le yena feela. E tla sebediswa feela dipampiring tsena tsa bohlokwa. Ha ho na omong a tla tsebang. Lebitso la hao ha le no hlahiswa.

Ha ba bua le wena, ba tla o botsa dipotso. Nako e ba tla e sebedisang ho o botsa dipotso, e tla nka mohlomong hora nakong ya hao. Tse ba tla etsa le puisano le wena, e tla etswa ke basebetsi ba mmuso ba sebetsang kante le ba motho a sebetsang le motho a batlanang ka dipatlisiso ena e bohlokwa kapa motho ka bo yena ya dipatlisisong. O tla kgona ho araba ka puo ya boikgetho ya hao.

O tla botswa dipotso tsa ngwana hao jwalo ka dilemo, botho ba ngwana, o hlahile neng, o ja eng motsheare (tsatsi le letsatsi), mokgolo wa ntlo (e kopaneng) ke bokae, o a sebetsa na le tjhelete ya mmuso e sebediswang bakeng sa bana o e sebedisa jwang. Dintho tse jwalo.

Yah o qetela, ba tla sheba hore ngwana o nale botelele bo bokae le o boima bo bokae. Ba tla mo beha hodima mata hore ba kgona ho sheba diphaka e ho kae ka botelele ka thaepi e methang. Hore ba kgona ho etsa dintho tsena hantle, ho tlo hloka hore o hlobodisa ngwana diaparo kaofela.

Bothatha e ka o hlahela ha o dumetswe ho araba dipotso tsenwa tsa bohlokwa:

Ha ho na se ka o hlahelang.

Botle ba ho araba dipotso tsena tsa bohlokwa:

Ka ho dumelana ho araba dipotso tsena tsa bohlokwa, re tla kgona ho fana ka ditaba tsa bohlokwa tse o tshwanetseng o di tsebe. Ditaba tsena di tla kgona ho fana ka phetoho bophelong ba ngwana hao ka dijo tse bohlokwa tse nepahetseng bophelong ba hae mme tshebediso ya tjhelete e tswang mmusong e sebediswang bakeng sa bana le ho batho tsohle ba kgona ho fetola bophelo hore ba je dijo tse nepahetseng hore ho seke ha lebisa ho hlokahaleng ha bana haholo.

Ho araba dipotso tsa di patlisiso ke ka boikgethelo ba hao:

Ha o no kgola ha o araba di patlisiso ya bohlokwa. Ha o sa batle ho araba dipotso tsa dipatlisiso tse bohlokwa, o tla ba jwetsa feela hore ha o batle. Ha o no dumetsi kgetho la pele ho araba dipotso tsa di patlisiso, o bone hore ha o sa batle ho tswela pele da diputso tsena, o tla ba

jwetsa feela hore ha o batle. Ha o no tejahelwa klinekeng. Dipatlisiso tsena di tlo sebediswa ke klineke moo o yang teng feela mme hore ha ontso hloka thuso, ba tla o thusa, kapa o ba thusa ka dipatlisiso kapa tjhe.

Ditaba tsa hao tsohle tse sa demelleng ho qoqela le batho babang.

Ditaba tsohle tsa hao tse o di hlahesitseng, ha di no qoqelwa batho babang. Dintho tse ba o botsang, ha ba no di kopanya lebitsong la hao nakong e o fanang ka ditaba dipatlisisong tsa bohlokwa. Basebetsi ba tla sheba dikarabo tsa hao, e tla ba bona ba kgethilweng mosebetseng ona hore ba kgone ho thola qeto ya hore ba fana ka meriana efeng neng le hore ba ka etsa eng hape ho thusa batho.

Ho tloha moo, ha le nale dipotso, le ka kgona ho botsa kapa ha ho nale dintho tse le tla thabelang ho se tseba.

Hape le ka kgona ho letsetsa ofisi ya Komiti ya Boitshwaro, mohala 051 401 7795.

Ke leboha haholo ka nako e o inkileng ho re thusa ka dipotso le di karabo dipatlisisong tsena tse bohlokwa.

Ke a le dumedisa ka kgotso

Carol Symington

Monga ya tokomana ya tsebiso ya ho dumelana duphuputso

Mohala: 072 386 2948

Addendum D: Information Document - English

PO Box 1777

Bethlehem

9700

02 May 2016

Dear Primary Caregiver/legal guardian of child 6 to 23 months (Research Participant)

My name is Carol Symington, a registered Dietician and I am busy with my Master's Degree through the University of the Free State. Thank you for taking the time to assist me with this important research study.

I am conducting a research study with the title: Nutritional status and the use of the Child Support Grant among children 6 to 23 months visiting three clinics in the Dihlabeng Local Area, Thabo Mofutsanyana District, Free State.

Malnutrition occurs when children's dietary intake is insufficient, leading to illness, concurrent hospital admissions and even death. Even though South Africa produces enough food for its people and Child Support Grant was introduced as one of the South African Government's resources to assist in providing in children's basic needs, hunger and malnutrition is still of great concern.

This research aims to try and answer some very important questions that can assist in preventing and decreasing malnutrition and supplying very important insight into Child Support Grants.

You are herewith invited to voluntarily include the child in your care to participate in this very important research study. Results might be published/presented but confidentiality will be maintained at all times. There will be no remuneration when participating. There are no costs involved for you to enter the child in the research study.

What does participation entail?

If you are a primary caregiver/parent/legal guardian of a child aged 6 to 23 months and attending either Mphohadi, Bohlokong or Bethlehem Clinic, you will be asked to voluntarily include the child in the research. Once you have been screened according to the inclusion and exclusion criteria and have given your written consent to allow the child to participate, you and the child will be taken to a private room in the clinic for an interview and anthropometric measurements will also be carried out on the child. The interview will be confidential, no information that you give will be made public or shared with anyone. The information gathered will only be used and published for the purpose of the research study and neither your details nor the child's details will ever be mentioned next to the given information.

The interview consists of a question-answer session will be conducted by a fieldworker. You will also be able to answer all the questions in either SeSotho or English, whichever one you prefer.

The interview consists of questions with regards to the child's basic information (age, gender date of birth), dietary intake of child (what does your child eat on a daily basis), household income and spending of Child Support Grant (what is your total household income, employment status, spending of grant) as well as a few questions related to you as primary caregiver/parent/legal guardian.

The anthropometry measurements will be carried out by the trained fieldworker. For this session you will have to remove the child's clothes and nappy and heavy hair pieces. The child will be weighed naked on a scale, length measurements will be taken with a length mat and the child's mid-upper arm will be measured with a measuring tape. This procedure is exactly the same as the process you go through at the clinic on the child's monthly follow up visits.

This whole process, from the questionnaire to the anthropometry, will take up approximately 30 minutes of your time.

Risks of participating in the research study

There are no risks involved when participating in this research study.

Benefits of partaking in the research study

By voluntarily allowing the child to participate in this research study, you will assist in supplying some very important information. This information will give insight into nutritional status and Child Support Grant in this specific community and can be used in future to assist the community in preventing malnutrition and prevent unnecessary death amongst children.

Participation is voluntary

There will be no remuneration for participating in the research study. You can refuse to let the child participate or you can withdraw the child from the research study at any time, without being penalized in any way. This research study is independent of the local clinic you attend and you will still receive the same service at the clinic, whether or not you participate.

Confidentiality

The child's and your personal information will be kept confidential. Interviews will be conducted in a private room and information supplied will never be linked with your details at any stage during the research. The only organizations that may inspect and/or copy the research records for quality assurance and data analysis, include the Ethics Committee for Medical Research and the Medicines Control Council.

If afterwards you have any questions, please contact me for more information.

You can also contact the University of the Free State Health Sciences Research Ethics Committee office for more information, telephone 051 401 7795.

Thank you for taking the time to participate in this research study.

Kind regards

Carol Symington

Researcher

Contact details: 072 386 2948

Addendum E: Informed consent -- Sesotho

TUMELO E NGOTSWENG BAKENG SA HO FANA KA DIPATLISISO TSE BOHLOKWA

Sehloho sa ho ithuta: Moikutlo a dijo tse nepahetsweng le ho sebediswa ha tjhelete ya mmuso sebediswang bakeng sa bana ho tloha di kgwedi tse 6 ho isa ho kgwedi tse 23 ba yang di klinekeng tse haufi le Dihlabeng, Thabo Mofutsanyane, Freistata.

Re kopa o fana ka tumelo e ngotsweng ka boikgetho ba hao ho ho fan aka dipatlisiso tse bohlokwa

Nna..... (lebitso la hao e felletseng le seboko ya motho a hlokomelang ngwana) ke la ka kopwa ho fana ka dipatlisiso tse bohlokwa le ngwana o ke mo hlokomelang

..... (lebitso la ngwana e felletseng le seboko sa ngwana). Ke la ka hlaloeswa bakeng sa ho fana ka dipatlisiso tse bohlokwa le hore ke moemong efeng mme kea utlisisa lebaka la ho fana ka dipatlisiso tse bohlokwa. Ke fana ka tumelo yaka le ngwana e ke salang le yena ka boikgeto baka ho ba thusa ka dipatlisiso tse bohlokwa. Ke tla araba diputso ka nnete e ke e tsebang.

Ho saena motho a hlokomelang ngwana

Letsatsi, kgwedi le selemo

Ho saena motho ya dipatlisiso / a kgethilweng

Letsatsi, kgwedi le selemo

Addendum F: Informed consent - English

WRITTEN CONSENT TO VOLUNTARILY INCLUDE THE CHILD IN YOUR CARE AND YOURSELF TO PARTICIPATE IN A RESEARCH STUDY

Study title: Nutritional status and the use of Child Support Grant among children 6 to 23 months visiting 3 local clinics in the Dihlabeng Local Area, Thabo Mofutsanyana District, Free State.

Please give your written consent to include the child and yourself for voluntary participation in above mentioned research study:

I..... (full name and surname of the primary caregiver) and child(full name and surname of the child) have been asked to participate in the above mentioned research study. The researcher explained the procedure of the study to me and I understand what the research study entails. I hereby give my voluntary written consent to include myself and the child who is in my primary care, in the research study, which includes answering the questions in the interview and allowing the researcher/field worker to carry out anthropometric measurements on the child. I will answer all questions truthfully and to the best of my knowledge.

Signature of Primary Caregiver/Legal Guardian

Date

Signature of Researcher/Fieldworker

Date

Addendum G: Questionnaire Sesotho

A. Dipotso tsa bophelo le bodulo												
Name of clinic												
Lebitso la motho a butsang dipotso												
					Y	Y	M	M	D	D		
Deiti ya dipatlisiso										1-6		
Nomoro ya motho a arabang dipotso										7-9		
<p><u>Mongolo ho motho a butsang dipotso:</u> dipotso kaofela tse butswang mme/ntate/motho a hlokomelang ngwana e tla hla-ha e le "Wena". "Ngwana" e tla ba a tla sheba botelele le boima:</p>												
<p>1. Ngwana ke: 10</p> <p>1. Moshenyana</p> <p>2. Ngwananyane</p>												
					Y		M	M				
2. Ngwana o nale dilemo le dikgwedi tse kae?						.				11-14		
3. O a tseba nna hore ngwana o hlahile neng?										15		
1. Ee												
2. Tje												
4. Ha o dumetse ka potso ya boraro, ngwana o hlahile neng					Y	Y	Y	Y	M	M	D	D
____/____/____												16-23
5. O eng ho ngwana?										24		
1. Mme												
2. Ntate												
3. Nkgono												
4. Ntate moholo												
5. Ausi												
6. Mangwane												
7. Hohong (re kopa o hlalosa)												
<p><u>Mongolo ho motho a butsang dipotso:</u> Ha motho a arabang dipotso e le mme/ntate ya nnete ya ngwana, tswela pele ka dipotso ho tloha 6-17</p> <p>Ha motho a arabang dipotso e se mme/ntate ya nnete ya ngwana, fitela ho potso 18</p>												
Dipotso tsa mme/ntate ya ngwana:												
6. O nale dilemo tse kae?											25-26	
7. O a tseba hore o hlahile neng?										27		
1. Ee												
2. Tje												
8. Ha ho dumetswe ka putso e supa, o hlahile neng?					Y	Y	Y	Y	M	M	D	D
____/____/____												28-35
9. Bana ba bakae tlasa ho dilemo tse 18 ba sala ho wena - ntle ho ngwana enwa?												36-37
10. Ho bana ba, bana likokoana-hloko ba bakae?												38-39
11. Ontso batla ho ba nale bana babang ho wena?										40		
1. Ee												
2. Tie												

17. Ha o itse ha ho hirilwe ho potso ya boraro, re kopa o araba dipotso tse latelang:									
Hobaneng ha ho a hirwa: (re kopa o kgethe)									
1. Tjhelete ya ngwana ya tswa mmusong e a lekana									53
2. Ke fuwa ke monnaka/molekane									54
3. Ha ke thole mosebetsa									55
4. Ke kula haholo jwale ha ke kgone ho sebetisa									56
5. Lebaka seseng - hlalosa									57
Fitela ho potso 43									
Mongolo ho motho a butsang dipotso: Ha motho a arabang dipotso ha se mme/ntate ya ngwana, tswela pele ho dipotso tsa 18									
18. Ha o le mohlakomedi ya ngwana, empa o se mme ya hae, hobaneng ho jwalo? (re kopa o									
1. Mme o hloka hetsi									58
2. Mme o sekolong									59
3. Mme o mosebetseng									60
4. Mme o k'holejeng/univesiteng									61
5. Mme o tlohetse lelapa a siya ngwana le wena									62
6. Mme o kula haholo jwale ha kgone ho hlokomela ngwana.									63
7. Mme o nyametsi									64
8. Hohong (hlalosa) _____									65
kgethe)									
1. Ntate o hloka hetsi									66
2. Ntate o sekolong									67
3. Ntate o mosebetseng									68
4. Ntate o k'holejeng/univesiteng									69
5. Ntate o tlohetse lelapa a siya ngwana le wena									70
6. Ntate o kula haholo jwale ha kgone ho hlokomela ngwana									71
7. Ntate o nyametsi									72
8. Hohong (hlalosa) _____									73
20. Wena o nale dilemo tse kae? _____									
									74-75
21. O tseba hore o hlahile neng na?									
1. Ee									
2. Tje									
Y Y Y Y M M D D									
22. O hlahile neng: ____/____/____									
									1-8
23. Ha mme o ntsa phela, o nale dilemo tse kae? _____									
									9-10
24. Ha ntate o ntsa phela, o nale dilemo tse kae? _____									
									11-12
25. O tseba hore mme ya ngwana o hlahile neng nna?									
1. Ee									
2. Tje									
Y Y Y Y M M D D									
26. Deiti a hlahileng: ____/____/____									
									14-21
27. O a tseba hore ntate o hlahile neng?									
1. Ee									
2. Tje									
Y Y Y Y M M D D									
28. Deiti a hlahileng: ____/____/____									
									23-30
29. Ho nale bana ba bakae tlasa ho dilemo tse 18 o ba hlokomelang - kopanya le ngwana enwa.									
									31-32
30. Ho nale bana ba bakae ba hao tlasa ho dilemo tse 18 o ba hlokomelang?									
									33-34
31. Ha o dumetse ho potso 30, o ntso batla bana babang na?									
									35
1. Ee									
2. Tje									

44. Batho ba bakae ba dula ntlong le ngwana?											
1. Batho ba baholo (ha ba kopane le wena)											59-60
2. Bana tlasa ho dilemo tse 18(ha ba kopane le ngwana) _____											61-62
45. Mo ntlong ngwana a dulang teng, ho nale eng le phehang ka tsona (re kopa le kgethe)											
1. Stofo e sebetsang ka mtlakase											63
2. Stofo e sebetsang ka parrafene (praemase)											64
3. Stofo e sebetsang ka gase.											65
4. Ontong											66
5. Microwave e											67
6. Hohong (hlalosa) _____											68
46. Mo ntlong ngwana a dulang teng, ho nale seseng le beha dijo ho sona (re kopa le kgethe)											
1. Sehatsetsi											69
2. Leqhoa ea sehatsetsi											70
47. Mo ntlong ngwana a dulang teng, ho nale seseng kapa seseng (re kopa le kgethe)											
1. Thelevishene											71
2. Multichoice DSTV											72
3. Sathelaete engwe ya thelevishene											73
4. Seea-le											74
5. Khomphuteng											75
6. Tablete											76
7. Selefounu											77
48. Le thola metsi ho kae?											
1. Pompong kahara ntlo											78
2. Pompong kantle ho ntlo ka jareteng ya rona											79
3. Pompong ya kopanetsweng											80
4. ula tanka ya metsi											1
5. Letamong / Nokeng											2
B. Mokgolo wa lelapa le tsehetso ngwana thuso											
1. Ho batho babang babaholo ba dulang le ngwana lelapeng la hao, ba bakae ba:											
1. Hiriloe nako e tletseng _____											3-4
2. Hiriloe karolo nako _____											5-6
3. Ba sa hirilwe _____											7-8
4. Ba kgolang phenshene _____											9-10
2. O thola/kgola hohong ho selatlang: (kgetha)											
1. Phenshene mo o hirilweng pele?											11
2. Phenshene ya Boqheku											12
3. Thuso ya boqhwalala											13
4. Alimony											14
5. Tsehetso ngwana thuso											15
6. Hlokomela ba itshetlehleng thuso											16
7. Ha ho dithuso											17

3. Ho batho babang babaholo ba dulang le ngwana lelapeng la hao, kante ho wena, ba bakae ba thola:												
1. Phenshene mo o hirilweng pele? _____												18-19
2. Phenshene ya Boqheku _____												20-21
3. Thuso ya boqhwalala _____												22-23
4. Tshehetso ngwana thuso _____												24-25
5. Hlokomela ba itshelehileng thuso _____												26-27
6. Thuso engwe _____ hlalosa _____												28-29
4. Ha o thola tshehetso ngwana thuso, o thola ya bana ba bakae? _____												30-31
5. O thola tsehetso ngwana enwa thuso?												32
1. Ee												
2. Tje												
6. Ha o dumetse ho potso ya bo hlano, o thola bokae ka thuso?												
_____												33-38
7. H o no sa dumelwe ho potso ya bo nne, hobaneng?												39
1. Ngwana ha dumelwe hobane mokgolo wa mohlakomedi e hodimo haholo.												
2. Ha ho dumelwe hobane ha ho na tokomane ya boitsebiso le/kapa setifikeiti sa tsoalo.												
3. Ha ke so leke ho e thola.												
4. Ke lekile empa kopo ha e a dumelwa.												
5. Ha ke moahi wa Africa Borwa.												
6. Hohong (hlalosa) _____												
8. Ha o arabile potso ya bobedi ho potso ya tselela, re kopa o kgetha e nepahetseng.												
1. Mohlakomedi ke moahi wa Africa Borwa empa ha na tokomane ya boitsebiso.												40
2. Ngwana ha na setifikeiti sa tsoalo.												41
3. Mohlakomedi ha se moahi wa Africa Borwa.												42
4. Hohong (hlalosa) _____												43
9. Ha o dumetse ka potso 5 Tsehetso ngwana thuso e fuwe mang?												44
1. Wena (sehlooho sa ngwana o se motsoali tsa likokoana-hloko)												
2. Wena (me tsoalo)												
3. Wena (ntate Tsoalo)												
4. Motho e mong (hlalosa)												
10. Ha o dumetse potso ya bo hlano, tsehetso ngwana thuso e:												45
1. Kopanya le tjehele ya ya lelapa kaofela kapa												
2. E sebediswa ngwaneng ena feela												

C. Dipotso tsa dijo ha ngwana ha ile hlokomelong									
1. Ngwana o ya Crecheng / hlokomelong letsatsi le letsatsi									62
1. Ee									
2. Tje									
Ho motho a botsang dipotso: Ha sa ye chrecheng, fitela ho D									
2. Ha karabo ke e dumetsweng, o ya matsatsi ama kae hara beke?									63-64
3. Nako ena ha ngwana a ya crecheng kapa hlokomelong letsatsi le letsatsi, ngwana o ja(kgetha ka kopo)									
1. Dijo tse wena o mo kenyeditse tsona									65
2. Dijo tse a di fuwa crecheng, hlokomelong letsatsi le letsatsi, hlokomelong omong									66
4. Ha o fuwa dijo crecheng, hlokomelong letsatsi le letsatsi, o ja hakae ka letsatsi									67-68
5. O tseba mofuta wa dijo tse a di fuwang crecheng, hlokomelong letsatsi le letsatsi?									69
1. Ee									
2. Tje									
D. Dipotso tse fapaneng le ngwana a nyanya letswele									
1. Ngwana o nyanya letswele hona jwale?									70
1. Ee									
2. Tje									
2. Ha ngwana a sa nyanye letswele hona jwale, o la e nyanya pele?									71
1. Ee									
2. Tje									
3. Ha o dumetse ka potso 2(pele ngwana o la nyanya letswele) o la nyanya letswele nako e kae - o sa mo fe ditemi, sthetsa, metsi, tee dijo, trinki)									72-73
4. Ha o dumetse ka potso 2, ngwana o la nyanya letswele nako e kae pele o mo tlosa letsweleng?									74-75
5. Ha o arabile tje ho potso 2, hobaneng o sa nyantsa ngwana letswele hohang?									76
6. Ha o arabile tje potsong 1/2, ngwana o nwa lebese la mofuta efeng? (Re kopa o kgethe)									
1. Lebese la formula									77
2. Lebese la kgomo									78
3. Lebese la kondens									79
4. Lebese jwalo ka cremora/ellis brown									80
5. Custard									1
6. Metsi feela									2
7. Metsi ya tsekere									3
8. Tee									4
9. Motoho / lesjelesjele (diluted pap drink)									5
10. Trinki ya mofuta efeng?									6
11. Hohong (hlalosa)									7

8. If answered yes in Q7, what is your birthdate?				Y	Y	Y	Y	M	M	D	D				
____/____/____												28-35			
9. How many children <18 years of age is in your care? Including this child _____														36-37	
10. How many of these children are your biological children? _____														38-39	
11. Do you want to have more children?														40	
1. Yes															
2. No															
12. If yes, how many? _____														41-42	
13. What is your relationship status? Are you:														43	
1. Married to the child's biological parent															
2. Married to someone other than the child's biological parent															
3. Single															
4. In a relationship with the child's biological parent															
5. In a relationship with someone other than the child's biological parent															
6. Divorced															
7. Separated															
8. Widowed															
14. Where is this child's other parent? (mark all applicable)															
1. They passed away														44	
2. At school														45	
3. At work														46	
4. At College / University														47	
5. Too ill to care for the child														48	
6. Absconded														49	
7. Other(specify)_____														50	
15. What is your highest COMPLETED level of education?														51	
1. Primary school															
2. High school															
3. College															
4. University															
5. No education															
16. What is your current state of employment?														52	
1. Employed full time															
2. Employed part time (do piece jobs)															
3. Unemployed															
4. Pensioner															
5. Attending school															
6. Attending college/university															

17. If you answered number 3(unemployed) in Q15, then answer the following question:							
Why are you unemployed: (mark all applicable)							
1. The social grants I receive is enough							53
2. My husband/partner is providing for me							54
3. I cannot find any work							55
4. I am too ill to work							56
5. Other reason, specify _____							57
Go to question 43							
Note to the interviewer: If the respondent is <u>NOT</u> the biological Mother/Father,continue with questions 18							
18. If you are the Primary Caregiver, but not the Mother, why is this so?(mark all applicable)							
1. The Mother passed away							58
2. The Mother is in school							59
3. The Mother is at work							60
4. The Mother is at College / University							61
5. The Mother left the home, and left the child in your care							62
6. The Mother is currently too ill to care for the child							63
7. The Mother absconded							64
8. Other(specify)_____							65
19. If you are the Primary Caregiver, but not the Father, why is this so? (mark all applicable)							
1. The Father passed away							66
2. The Father is in school							67
3. The Father is at work							68
4. The Mother is at College / University							69
5. The Father left the home, and left the child in your care							70
6. The Father is currently too ill to care for the child							71
7. The Father absconded							72
8. Other(specify)_____							73
20. How old are you? _____ years							
							74-75
21. Do you know your birthdate?							
							76
1. Yes							
2. No							
22. Birthdate: ____/____/____							
							1-8
23. If the mother is alive, how old is she? _____ years							
							9-10
24. If the Father is alive, how old is he? _____ years							
							11-12
25. Do you know the mother's birthdate?							
							13
1. Yes							
2. No							
26. Birthdate: ____/____/____							
							14-21

36. If you answered number 3 in Q35, then answer the following question:											
Why are you unemployed: (mark all applicable)											
1. The social grants I receive is enough										<input type="checkbox"/>	41
2. My husband/partner is providing for me										<input type="checkbox"/>	42
3. I cannot find any work										<input type="checkbox"/>	43
4. I am too ill to work										<input type="checkbox"/>	44
5. Other reason, specify _____										<input type="checkbox"/>	45
37. How many children does this child's biological mother have?										<input type="text"/>	46-47
Note for the interviewer : If the biological mother is alive, answer the following:											
38. What is the Mother's relationship status?										<input type="checkbox"/>	48
1. Married to the child's father											
2. Married to someone other than the child's father											
3. Single											
4. In a relationship with the child's father											
5. In a relationship with someone other than the child's father											
6. Divorced											
7. Separated											
8. Widowed											
9. I don't know											
39. What is the mother's highest COMPLETED level of education?										<input type="checkbox"/>	49
1. Primary school											
2. High school											
3. College											
4. University											
5. No education											
6. I don't know											
40. What is the mother's current employment status?										<input type="checkbox"/>	50
1. Employed full time											
2. Employed part time (do piece jobs)											
3. Unemployed											
4. Pensioner											
5. Attending school											
6. Attending college/university											
7. I don't know											
41. If you answered number 3(unemployed) in Q40, then answer the following question:											
Why is the mother unemployed: (Mark all applicable)											
1. The social grants she receive is enough										<input type="checkbox"/>	51
2. Her husband/partner is providing for her										<input type="checkbox"/>	52
3. She cannot find any work										<input type="checkbox"/>	53
4. She's too ill to work										<input type="checkbox"/>	54
5. Other reason, specify _____										<input type="checkbox"/>	55

Note to the interviewer: To be Completed from here onwards for everyone														
The house were this child lives in :														
42. What is the house made of:														
1. Brick														56
2. Corrugated iron sheets														
3. Other (specify) _____														
43. How many rooms does the house have in total? _____														
														57-58
44. How many people live in the same house as the child?														
1. Adults (including you) number: _____														59-60
2. Children <18 years (including child) number: _____														61-62
45. In the house where the child lives, do you have any of the following to cook food: (mark all applicable)														
1. Stove top (plates) that work with electricity														63
2. Stove top (plates) that work with paraffin (a primus)														64
3. Stove top (plates) that work with gas														65
4. Oven														66
5. Microwave														67
6. Other (specify) _____														68
46. In the house where the child lives, do you have any of the following in your house to store food: (mark all applicable)														
1. Fridge														69
2. Freezer														70
47. In the house where the child lives, is any of the following available? (mark all applicable)														
1. Television														71
2. Multichoice DSTV														72
3. Other Satellite TV														73
4. Radio														74
5. Computer														75
6. Tablet														76
7. Cellphone														77
48. Where do you get water from? (mark all applicable)														
1. Tap inside your home														78
2. Tap outside home but on your property														79
3. Communal tap														80
4. Rain water tank														1
5. Dam / river														2

B. Household income and child support grant

1. How many other adults that stay with the child in your household are:

- | | | | | |
|---------------------------------------|---------------|----------------------|----------------------|------|
| 1. Employed full time | number: _____ | <input type="text"/> | <input type="text"/> | 3-4 |
| 2. Employed part time (do piece jobs) | number: _____ | <input type="text"/> | <input type="text"/> | 5-6 |
| 3. Unemployed | number: _____ | <input type="text"/> | <input type="text"/> | 7-8 |
| 4. Pensioners | number: _____ | <input type="text"/> | <input type="text"/> | 9-10 |

2. Do you receive any of the following?: (mark all applicable)

- | | | |
|-----------------------------------|--------------------------|----|
| 1. Pension from former employment | <input type="checkbox"/> | 11 |
| 2. Old age grant | <input type="checkbox"/> | 12 |
| 3. Disability grant | <input type="checkbox"/> | 13 |
| 4. Alimony | <input type="checkbox"/> | 14 |
| 5. Child support grant | <input type="checkbox"/> | 15 |
| 6. Care dependency grant | <input type="checkbox"/> | 16 |
| 7. No grants | <input type="checkbox"/> | 17 |

3. How many other adults that stay with the child in your household, besides you, receive:

- | | | | | |
|-----------------------------------|---------------|----------------------|----------------------|-------|
| 1. Pension from former employment | number: _____ | <input type="text"/> | <input type="text"/> | 18-19 |
| 2. Old age grant | number: _____ | <input type="text"/> | <input type="text"/> | 20-21 |
| 3. Disability grant | number: _____ | <input type="text"/> | <input type="text"/> | 22-23 |
| 4. Child support grant(s) | number: _____ | <input type="text"/> | <input type="text"/> | 24-25 |
| 5. Care dependency grant | number: _____ | <input type="text"/> | <input type="text"/> | 26-27 |
| 6. Other grant, specify _____ | number: _____ | <input type="text"/> | <input type="text"/> | 28-29 |

4. If you receive child support grant - for how many children? _____ children

<input type="text"/>	<input type="text"/>	30-31
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5. Do you receive child support grant for this specific child?

- | | | |
|--------|--------------------------|----|
| 1. Yes | <input type="checkbox"/> | 32 |
| 2. No | <input type="checkbox"/> | |

6. If answered yes at Q5, how much is the child support grant that you receive?

_____	<input type="text"/>	<input type="text"/>	<input type="text"/>	.	<input type="text"/>	<input type="text"/>	33-38
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7. If answered No at Q5, what is the reason?

- | | | |
|--|--------------------------|----|
| 1. The child does not qualify based on caregiver's income being too high | <input type="checkbox"/> | 39 |
| 2. Unable to apply due to no ID and/or birthcertificate | <input type="checkbox"/> | |
| 3. Haven't tried to apply yet | <input type="checkbox"/> | |
| 4. Applied, but application was denied | <input type="checkbox"/> | |
| 5. Not a South African Citizen | <input type="checkbox"/> | |
| 6. Other: _____ | <input type="checkbox"/> | |

8. If answered number 2 at Q7, give a reason: (mark all applicable)

- | | | |
|--|--------------------------|----|
| 1. Primary caregiver is SA citizen but does not have an ID | <input type="checkbox"/> | 40 |
| 2. Child does not have a birth certificate | <input type="checkbox"/> | 41 |
| 3. Primary caregiver is not a SA citizen | <input type="checkbox"/> | 42 |
| 4. Other: _____ | <input type="checkbox"/> | 43 |

9. If answered yes at Q5,										<input type="text"/> 44	
To who is this child's CSG paid out to ?											
1. You (as primary caregiver that is not the biological parent)											
2. You (as the birth mother)											
3. You (as the birth father)											
4. Someone else (specify) _____											
10. If answered yes at Q5, does the CSG money received for this child:										<input type="text"/> 45	
1. Go into the money pool used for the whole household											
2. Get spent on this child only											
11. Can you estimate how much money you have available per month in this child's household?											
R _____										<input type="text"/> 46-53	
12. Can you estimate how much of this money you spend on food for the household in one month?											
R _____										<input type="text"/> 54-61	
13. In a typical month, how much money do you spend on this child alone for:											
1. Toiletries (nappies, powder,shampoo, vaseline,soap)										<input type="text"/> 62-68	
2. Clothes										<input type="text"/> 69-75	
3. Milk formula										<input type="text"/> 1-7	
4. Food and drink										<input type="text"/> 8-14	
5. Medicine										<input type="text"/> 15-21	
6. Transport (to or from creche)										<input type="text"/> 22-28	
7. Creche / daycare / other caregiver										<input type="text"/> 29-35	
8. Entertainment (toys, activities, birthday parties etc)										<input type="text"/> 36-42	
9. Any other expenses for this child (specify) _____										<input type="text"/> 43-49	
14. For who and for what use do you think the CSG is intended for?											
_____										<input type="text"/> 50	
15. Do you use it for the above given reasons in Q14?											
1. Yes										<input type="text"/> 51	
2. No											
16. If answered No at Q15, please explain why not:											
_____										<input type="text"/> 52	
17. Do you think the current amount of CSG is enough to take care of your child's needs?											
1. Yes										<input type="text"/> 53	
2. No											
18. If answered no at Q17, why? _____											
										<input type="text"/> 54	
19. If answered no at Q17,how much would be enough? _____											
										<input type="text"/> 55-61	

C. Dietary questions related to meals away from home											
1. Does the child go to a creche/day care centre?											62
1. Yes											
2. No											
Note to the interviewer: If not attending creche, skip to part D											
2. If Yes, how many days of the week: _____ days											63-64
3. On these occasions, does the child eat: <i>(Tick all applicable)</i>											
1. Food that you pack for him/her											65
2. Food that the creche/day care/ other caregiver provides											66
4. If the creche/day care centre provides meals, how many meals do they provide? _____											67-68
5. Do you know what food the child receives to eat at the creche/day care centre?											69
1. Yes											
2. No											
D. Dietary questions related to breastfeeding status											
1. Is the child currently breastfeeding?											70
1. Yes											
2. No											
2. If not, was the child previously breastfed?											71
1. Yes											
2. No											
3. If answered Yes in Q2 (was breastfeeding previously)for how long was the child exclusively breastfed(no teats,dummies,water,tea,food,drinks) _____ months											72-73
4. If answered Yes in Q2, for how long was the child breastfed before stopped? _____ months											74-75
5. If answered No in Q2, give a reason why never breastfed: _____											76

E. Household food security

1. Does your household ever run out of money to buy food?

☐ 32

1. Yes

2. No

2. Do you ever rely on a limited number of foods to feed the child because you are running out of money to buy food?

☐ 33

1. Yes

2. No

3. Do you ever cut the size of meals or skip meals of the child because there is not enough money for food?

☐ 34

1. Yes

2. No

4. Do you ever eat less than you should because there is not enough money for food?

☐ 35

1. Yes

2. No

5. Does the child ever eat less than he/she should because there is not enough money for food?

☐ 36

1. Yes

2. No

6. Does the child ever say that he/she is hungry because there is not enough food in the house?

☐ 37

1. Yes

2. No

7. Do you ever cut the size of the child's meals or does he/she ever skip meals because there is not enough money to buy food?

☐ 38

1. Yes

2. No

8. Does the child ever go to bed hungry because there is not enough money to buy food?

☐ 39

1. Yes

2. No

F. Anthropometry		<i>Take all the measurements three times and record.</i>											
1. Weight (round off to one decimal)												kg	74-77
												kg	1-4
												kg	5-8
2. Length (round off to nearest cm)												cm	9-12
												cm	13-16
												cm	17-20
3. MUAC (round off to nearest cm)												cm	21-24
												cm	25-28
												cm	29-32

Summary

South Africa, a country that produces enough food for its population, loses 63.5% of children yearly due to malnutrition. Although South Africa produces imports and retains sufficient food to support a nutritionally balanced per capita dietary intake for its population, malnutrition, closely linked to poverty and household food insecurity, remains unacceptably high. In South Africa, one of the nine provinces, namely the Free State Province, 43.8% of children under five years of age, suffered from stunting, a chronic form of malnutrition. The Dihlabeng Local Area where the research was conducted, is situated within the Thabo Mofutsanyana District, in the Free State province.

Despite the implementation of the Child Support Grant (CSG) in 1998 to minimise food insecurity and prevent malnutrition amongst children, approximately 14 million people in South Africa are still affected by food insecurity, with the majority being black South African citizens residing in rural areas. Malnutrition, particularly during the first 1 000 days of life, causes poor cognitive development, higher susceptibility to infections, poor health, decreased completed school grades and future unemployment, all of which are carried into adulthood. The validity of the South African CSG, thus, whether it is enough to meet basic needs and if it is being used for children's needs and food, remain of concern.

The aim of this study was to assess the nutritional status and the use of CSG amongst children, 6 to 23 months, visiting 3 local clinics in the Dihlabeng Local area, Thabo Mofutsanyana District, Free State.

A descriptive observational quantitative study using convenience sampling, was conducted from September 2016 to November 2016. Data were collected from a sample size of 242 consenting children, aged six to 23 months, who attended these clinics with their primary caregiver. Sample size were calculated per clinic and distributed as follows: 97 participants from Mphohadi Clinic, 72 participants from Bohlokong Clinic and 73 participants from Bethlehem Clinic. Data with regards to socio-demographic status, household food security, dietary intake and spending patterns of the CSG, were collected via questionnaire administered in structured interviews with the primary caregiver and the anthropometry of the children were measured.

The participants were black South Africans (100%) and almost equally distributed between males and females, all of whom were CSG recipients. There were 17 participants who were cared for by non-biological parent-caregivers and 225 were cared for by their biological parents. Two thirds (65.7%) of participants resided in brick housing, but one in three (31.4%) infants were being raised in informal, corrugated iron houses (shacks), whilst 14% of households were overcrowded.

All households, in which participants resided, had access to safe running water and electrical cooking equipment were available to 85.1%, whilst 2.9% had to use an open fire to cook. Overall, 16.1% did not have access to cold storage and despite the bare minimum in terms of housing and household facilities, there was a high uptake of electronic, recreational and communication equipment, suggesting poor planning and lack of prioritising, as well as high debt occurrence, because cellular telephones and satellite television, requires monthly repayments for the service. Thus, leaving limited money left for food procurement. The highest completed educational levels were mainly primary school, with high unemployment rates amongst the biological parent-caregivers (75.5%) as well as the non-biological parent-caregivers (64.7%).

In 15.7% of households the participant's CSG was the only income. Household food insecurity was experienced by 48.7% of the households and 27.7% were at risk of becoming food insecure. This helps to explain the fact that only 7.9% of participants had adequate dietary diversity scores, whilst only 4.5% achieved the minimum acceptable dietary intake. Most participants had a daily diet of mainly starch and dairy, with limited proteins, vitamins and minerals. This sheds light on the fact that 33.1% was stunted, 3.3% wasted and 6.3% overweight.

The CSG was reportedly spent on the children alone (almost 100%), yet 14.5% caregivers reported the CSG was too little to supply in needs of the entire households. Food ranked only fourth amongst the basic needs of the child on which the CSG was reportedly being spent.

The results of the current study indicate the urgent need to establish a more effective type of CSG, whether cash, food parcels, vouchers or a combination, supplied to infants growing up in at-risk household to curb the high prevalence of malnutrition with its detrimental long-term consequences in this community and in South Africa as a whole.

Opsomming

Suid-Afrika, 'n land wat genoeg kos vir sy bevolking produseer, verloor jaarliks 63.5% kinders as gevolg van wanvoeding. Suid-Afrika produseer en voer voldoende hoeveelhede voedsel in om 'n voedingstofryke dieetinname te verseker, maar wanvoeding statistieke, wat verband hou met armoede en huishoudelike voedselsekerheid, onaanvaarbaar bly steeds hoog. In die Vrystaat Provinsie, een van die nege provinsies in Suid-Afrika, ly 43.8% kinders onder vyf jaar aan groei-inkorting, 'n kroniese vorm van wanvoeding. Die Dihlabeng Plaaslike Area waar die studie uitgevoer is, is geleë in die Thabo Mofutsanyana Distrik, in die Vrystaat Provinsie.

Ten spyte die implementering van die Kindersorgtoelaag in 1998 met die doel om voedselsonsekerheid te verminder en wanvoeding te voorkom, is daar steeds 14 miljoen Suid-Afrikaners (meestal swart bevolkingsgroepe in landelike gebiede) wat deur voedselsonsekerheid geraak word. Wanvoeding in die eerste 1 000 dae van lewe, veroorsaak verswakte kognitiewe ontwikkeling, verhoogde vatbaarheid vir infeksies, laer voltooide skool grade en toekomstige werkloosheid; wat alles deurtrek na die volwasse lewe. Die geldigheid van die Suid-Afrikaanse Kindersorg toelaag en of dit genoeg is om in die basiese behoeftes van kinders te voorsien en wel daarvoor gebruik word, bly rede tot kommer.

Die doel van hierdie studie was om die voedingstatus en die gebruik van die Kindersorg toelaag van kinders ses tot 23 maande, wat drie plaaslike klinieke in die Dihlabeng Plaaslike Area, Thabo Mofutsanyana Distrik, Vrystaat, besoek, te ondersoek.

'n Beskrywende kwantitatiewe studie met geriefs steekproefneming, is uitgevoer by drie plaaslike klinieke, vanaf Septebmer 2016 tot November 2016. Inligting van 242 kinders ses tot 23 maande oud, is ingesamel. Die aantal kinders wat ingesluit is in die studie, is bereken per kliniek: 97 kinders was van Mphohadi Kliniek, 72 van Bohlokong Kliniek en 73 van Bethlehem Kliniek. Inligting met betrekking tot die kinders se sosio-demografiese status, huishoudelike voedselsekerheid, dieetinname en gebruik van die Kindersorgtoelaag, is ingesamel met vraelyste wat in persoonlike gestruktureerde onderhoude met die versorgers ingevul is. Groeiparameters os op die kinders gemeet.

Die kinders was almal swart Suid-Afrikaners, ongeveer ewe veel uit beide gelagte en almal ses tot 23 maande oud. Al die kinders het die Kindersorg toelaag ontvang. Altesaam 17 kinders

is deur nie-biologiese ouer-versorgers, en 225 deur hul biologiese ouers. Twee-derdes (65.7%) van die kinders was woonagtig in baksteen behuising, maar een uit elke drie (31.4%) het in informele, sink huisies grootgeword. Ongeveer 14% van huishoudings was oorbevolk.

Veilige watertoevoer was by meeste huise beskikbaar en elektriese kooktoerusting by 85.1%, terwyl 2.9% gebruik moes maak van 'n oop vuur om kos te kook. Ongeveer 16% van die huishoudings het geen ys- of vrieskasgeriewe gehad nie, maar almal het wel elektroniese onstpannings- en kommunikasietoerusting gehad. Dit dui moontlik op swak beplanning en swak prioriteite, omdat sellulêre telefone en satelliet-TV, maandelikse subskripsiefooie behels, wat minder geld vir voedsel beteken.

Die meeste versorgers het net primêre skool voltooi, en werkloosheid wat 75.5% onder die biologiese ouers en 64.7% onder nie-biologiese ouers-versorgers was.

Kindersorgtoelaes was vir 15.7% van die huishoudings die enigste bron van inkomste. Huishoudelike voedselonsekerheid het voorgekom in 48.7% van die huishoudings en 27.7% het die risiko geloop om voedselonsekerheid te ervaar. Net 7.9% van die kinders in die studie het 'n diverse diëtinname gehad en net 'n skamele 4.5% het 'n minimum aanvaarbare diëtinname gehad. Die meeste kinders se daaglikse dieet het uit stysel en suiwelprodukte bestaan, met 'n beperkte inname van proteïene, vitamienes en minerale. Altesaam 33.1% van die kinders het groei-inkorting gehad, 3.3% wat uitgeteer en 13.2% was oorgewig.

Die versorgers het aangedui dat die Kindersorgtoelaag slegs vir die kinders aangewend word, maar 14.5% het gesê dit is heeltemal te min vir die behoeftes van die hele huishouding is. Die Kindersorgtoelaag is gebruik vir basiese behoeftes van die kinders en vir kos, alhoewel kos slegs vierde op die lys van uitgawes uit die toelaag was.

Die resultate van hierdie studie beklemtoon die dringendheid van 'n meer voldoende tipe Kindersorgtoelaag, hetsy kontant, kospakkies, koeponne, of 'n kombinasie daarvan, wat aan hoë risiko huishoudings verskaf word, om die voorkoms van wanvoeding onder kinders en die langtermyn nagevolge in die gemeenskap en in Suid-Afrika as 'n geheel, aan te spreek.

10 Key Terms

Anthropometry: The study and technique for measuring the body by taking measurements to compare or classify (Cogil, 2001).

Child Support Grant: The largest anti-poverty mechanism ever to be introduced in South Africa as a monthly allowance per child from birth until 18 years (Ferreira, 2017; Nkosi, 2011).

Household food security: When a household have access to adequate nutritious and safe food at all times (De Lannoy et al., 2015).

Malnutrition: A State of being poorly nourished that can refer to both undernutrition and overnutrition, resulting from either deficiencies, excesses or imbalances of macro and micronutrients (WHO Regional Office for Africa, 2017; Blossner & De Onis, 2005).

Minimum acceptable diet: When the least minimum dietary diversity and minimum meal frequency are met according to specific age (Marriott et al. 2012).

Minimum dietary diversity: A score indicating children aged 6-23 months who received food from four or more different food groups during the previous 24hours (Saaka et al., 2015).

Minimum meal frequency: A score indicating the number of children at a certain age who received solid, semi-solid or soft foods the prescribed minimum number of times or more during the previous 24 hours (Marriott et al., 2012).

Stunting: Being too short for age, caused by long term malnutrition (WHO, 2018).

Wasting: Being too thin for height, an acute form of malnutrition (WHO,2018)

Z-scores: Standard deviation scores, used to interpret anthropometric measurements (WHO, 2018).