

**THE ASSOCIATION OF MOTHERS' SOCIO-CULTURAL ENVIRONMENT  
WITH THE DIETARY DIVERSITY OF THEIR CHILDREN AGED 6 TO 24  
MONTHS FROM  
OLIEVENHOUTBOSCH TOWNSHIP IN GAUTENG**

by

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## DEDICATION

This study is dedicated to:

- My parents, Mr Peter and Mrs Rose Ndou for their unwavering support and spiritual guidance. Your moral and spiritual support kept me grounded.
- My wonderful husband, Mr Kelechi Ibeagu for always encouraging, listening, motivating me to push through even when I wanted to give up. I thank you for believing in me when I did not believe in myself. Thank you for supporting me and being by my side always. I will always love you.
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- My family and friends for their words of encouragement and well wishes.

## DECLARATION

I **YOLANDE IBEAGU** hereby declare that the dissertation/thesis, which I hereby submit for the degree of **MASTER IN CONSUMER SCIENCE** at the University of South Africa, is my own work and has not previously been submitted by me for a degree at this or any other institution.

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Student signature: *mndouy*

Date: 10 February 2020

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## ABSTRACT

**Background:** Suitable complementary feeding practices in young children can ensure optimal nutrition status and reduce under 5 mortality rates (Jones *et al.*, 2014). Inadequate dietary diversity (DD) of the complementary diet both in quality and quantity is one of the major problems affecting infants and young children worldwide (Ntila *et al.*, 2017). Adequate and appropriate nutrition during infancy and early childhood is vital for the growth and development of every child to reach full human potential (PAHO, 2003; WHO, 2008a; UNICEF, 2016). Nutritional vulnerability increases when other factors are also involved, such as poor breast and complementary feeding practices combined with high rates of infectious diseases (Solomons & Vossenaar, 2013; Ntila *et al.*, 2017). There are pockets of information available on complementary feeding practices and its social determinants from specific areas in South Africa, regarding infant and young child feeding practices beyond six months of age and requires further investigation (Issaka *et al.*, 2015; Seonandan & McKerrow, 2016).

**Aim:** To explore the association between mothers' socio-cultural environment and the dietary diversity of their children between the ages of 6 and 24 months, who attend the health care clinic in Olievenhoutbosch Township, Gauteng.

**Methodology:** A quantitative cross-sectional explorative study was implemented. Data collection was conducted at Olievenhoutbosch clinic in Gauteng during February and March 2019. Mothers of children aged between 6 and 24 months were included and interviewed. Consecutive sampling was applied. The data collection instruments were a set of structured questions to obtain socio-demographic, nutritional knowledge, maternal attitude and feeding practices data. The infant and young child minimum dietary diversity (IYCMDD) questionnaire adapted from the WHO questionnaire was used to determine the DD of each child. Ethical clearance was obtained from the Ethics Committee of the College of Agriculture and Environmental Sciences (CAES) at the University of South Africa. Descriptive and inferential statistics was applied using SPSS version 25 (SPSS Inc, Chicago, IL, USA).

**Results:** The sample of mothers (n=103) were educated (75% completed matric and 18% completed post-school education), unemployed (73%) and mostly single (53%) which are all factors playing a role in child nutrition. The majority (58%) of children were between the ages of 6 and 11 months while 42% were between the ages of 12 and 24 months. The milk feeding practices differed significantly between the younger and older groups of children with 35% of the

younger children receiving breastmilk (in addition to complementary foods), compared to 21% of the older group. Almost half (44%) of the total group reported that maize meal porridge was the first food introduced to their children. Less than half of the mothers (45%) initiated the first foods at the recommended age of 6 months but started as early as one month of age (13%). All children (100%) consumed foods from the “grains, roots and tubers” food group the previous day. Significantly less children from the younger age group were reported to have consumed dairy (38% vs 77%,  $p<0.001$ ) (other than breast or formula milk), animal flesh foods (31% vs 59%,  $p=0.014$ ) and legumes (8% vs 24%,  $p=0.034$ ), compared to the older age group. Significantly more children from the older group met the minimum dietary diversity (MDD) of four food groups compared to the younger group (67% vs 38%,  $p=0.019$ ). No association was found between most socio-cultural factors (maternal age, marital status, education and employment status) and DD. However, there was an association between maternal ethnicity and DD ( $\chi^2=16.62$ ,  $p=0.002$ ). Also, maternal nutrition knowledge and the child’s DD had a significant, positive linear relationship ( $p=0.026$ ). Lastly, maternal attitude towards feeling confident in not overfeeding the child were associated with meeting the MDD.

**Conclusion:** The diets of young children residing in Olievenhoutbosch, do not meet the criteria for a minimally acceptable diet with only 50% meeting the MDD. Legumes and animal source foods are not consumed in sufficient quantities for complementary feeding. Maternal ethnicity and nutritional knowledge were associated with the child’s DD. More emphasis should be placed on DD for young children.

## MANWELEDZO

**Vhubvo:** Maitele o teaho a thikhedzo ya kuñetshedzele kwa zwiñwa kha vhana vhañuku a nga khwañisedza vhuimo ha gumofulu ha pfush na u fhungudza phimo ya dzimpfu dza vhana vha fhasi ha miñwaha ya fhasi ha 5 (Jones *na vhañwe*, 2014). U sa lingana ha u fhambana ha kuñele (DD) ha ndyo thikhedzi kha ndeme na tshivhalo ndi dziñwe dza thaidzo khulwane dzi kwamaho dzitshetshe na vhana vhañuku u mona na shango (Ntila *na vhañwe*, 2017). Mufusho wo lingana ho na wo teaho musi vhe dzitshetshe na kha vuhana thangeli ndi dza ndeme kha nyaluwo na nyaluso ya ñwana muñwe na muñwe uri a vhe na vhukoni hoñhe (PAHO, 2003; WHO, 2008a; UNICEF, 2016). U vha khomboni ha mufusho zwi a ñaña musi hu na zwiñwe zwithu zwi dzhenelelaho, sa maitele a sa fushi a u mamisa na u tikedza zwo ñangana na phimo ya ñña ya malwadze a phirela (Solomons & Vossenaar, 2013; Ntila *na vhañwe.*, 2017). Haya ndi mafhungo u ya nga zwiñwa are hone kha maitele a u ñisa ha thikhedzo na zwivhangiki zwa matshilisano u bva kha vhuñwe vhupo ha Afrika Tshipembe, maelana na u ñisa dzitshetshe na vhana vho no fhirisaho miñwedzi ya rathi, naho ñoho iyi i tshi ñoda u senguluswa hafhu (Issaka *na vhañwe*, 2015; Seonandan & McKerrow, 2016).

**Ndivho:** U itela u lavhelesa u elana ha vhupo ha zwa matshilisano na ikonomi ha mme na DD ya vhana vhavho vha vhukati ha miñwedzi ya 6 na 24, vhane vha ya kiliniki ya ndondola mutakalo ngei kha Tshikolobulasi tsha Olievenhoutbosch, Gauteng.

**Ngona:** Ngudo dza vhubudasia dza ndingedzo dzo shumiswa. Data yo kuvhanganywa ngei kha kiliniki ya Olievenhoutbosch kha ña Gauteng nga Luhui na ñhafamuhwe 2019. Vhomme a vhana vha miñwedzi ya vhukati ha 6 na 24 vho dzheniswa vha vhudziswa. Vhukhethatsumbonanguludzwa ha thevhekano ho shumiswa. Sethe ya mbudziso dzo dzudzanywaho yo shumiswa u wana u phambano dza matshilisano, ndivho ya mufusho, kusedzele kwa vhomme na data ya phatheni dza kuñele. Mbudzisombekanywa ya phambano ya gumofulu ya kuñele kwa dzitshetshe na vhana vhañuku (IYCMDD) u bva kha WHO yo shumiswa u vho na DD ya ñwana muñwe na muñwe. ñhanziela dza vhuñifari dzo wanala u bva kha Komiti ya zwa Vhuñifari ya Kholidzhi ya zwa Vhulimi na Saints dza zwa Mupo (CAES) kha Yunivesithi ya Afrika Tshipembe. Mbalombalo dza ñhalutshedzo na dza u sumbedzisa dzo shumiswa nga u shumisa vesheni ya SPSS 25.

**Mvelelo:** Tsumbonanguludzwa dza vhomme (n = 103) vho funzwaho (75% vho fhedza mañiriki na 18% yo bvelaphanda ya fhedza pfunzo ya ñña ha tshikolo, vha sa shumi ndi (73%) nahone

vhanzhi ndi vha tshilaho vhe vhothe (53%), zwi re zwivhumbi zwothe zwine zwa dzhenelela kha mufusho wa nwana. Vhonzhi (60%) ya vhana vho vha vhe vhukati ha miwedzi ya 6 u ya kha ya 11, 40% vhe vhukati ha ya 12 u ya kha 24. Kumamisele kwo fhambana vhukuma vhukati ha zwigwada zwa vhaswa na zwa vhahulwane, hune 35% ya vhana vhatuku vha vha vha khou wana mikando ya vhomme avho (nthani ha zwiliwa zwa u tikedza), hu tshi vhambedzwa na 21% ya tshigwada tsha vhahulwane. U toda u swika kha hafu (44%) ya tshigwada tshothe vho amba uri mukapu wa mugayo ndi zwone zwiliwa zwo thomaho u divhadzwa vhana vhavho. Vhomme vha re fhasi ha hafu (45%) vho them zwiliwa zwa u thoma kha miwedzi yo themendelwaho ya 6 fhedzi vhanwe vha thoma u tavhanya vhe kha nedzi muthihi (13%). Vhana vhothe (100%) vho vha vho no la liwa zwi fanaho na thoro, midzi na khufhi sa zwigwada zwa zwiliwa divha lo fhiraho. Vha si gathi vhukuma kha vhana vha tshigwada tsha vhatuku vho pfi vho la zwiliwa zwa mafhi (38% i tshi vhambedzwa na 77%,  $p < 0.001$ ) (zwi si mafhi a mikando kana a bogelo), zwiliwa zwa nama ya phukha (31% i tshi vhambedzwa na 59%,  $p = 0.014$ ) lingana (8% vha tshi vhambedzwa na 24%,  $p = 0.034$ ), vha tshi vhambedzwa na zwigwada zwa vhahulwane. Vhonzhi ha vhana vha bvaho kha tshigwada tsha vhahulwane vho swikelela phambano ya gumotuku ya ndyo (MDD) ya zwigwada zwiwa zwi tshi vhambedzwa na tshigwada tsha vhatuku (67% i tshi vhambedzwa na 38%,  $p = 0.019$ ). Ahuna u elana ho wanalaho vhukati ha zwivhumbi zwa mvelele na matshiliso (vhukale ha vhomme, vhuimo ha mbingano, pfunzo na vhuimo ha mushumo) na DD. Fhedzi, ho vha na u elana vhukati ha murafho wa vhomme na DD ( $\chi^2 = 16.62$ ,  $p = 0.002$ ). Zwiwe hafu, ndivho ya mufusho ya vhomme na DD ya nwana zwo vha na vhushaka, ha ndeme hu elanaho huvhuya ( $p = 0.026$ ). Tsha u fhedzisa, kusedzele kwa vhomme kha u dipfa vhe na vhuifufheli na u sa isa nwana u fira tshikalo zwo elana na u swikelela MDD.

**Khunyeledzo:** Ndyo ya vhana vhatuku vha dzulaho ngei Olievenhoutbosch a i swikeleli maga a gumotuku a tangedzwaho a ndyo; ho swikelelwa fhedzi 50% ye ya swikelela MDD. Lingana na tshiko tsha zwiliwa zwa zwipuka a zwi khou liwa lwo lingana kha thikhedzo ya kujele. Murafho wa vhomme na ndivho ya mufusho zwo elana na DD ya nwana. Ho vha na khawhisedzo hafu kha DD ya vhana vhatuku.



## SETSOPOLWA

**Tšweletšo ya taba:** ditiro tša maleba tša phepo ya tlaleletšo mo go bana ba bannyane di ka netefatša maemo a godimo a phepo le go fokotša kelo ya mahu mo go bana ba ka fase ga mengwaga ye 5 (Jones *et al.*, 2014). Go fapafapana ga dijo fao go sa lekanago (DD) ga dijo tša tlaleletšo go bobedi boleng le bontši ke ye nngwe ya mathata a magolo ao a amago masea le bana ba bannyane lefase ka bophara (Ntila *et al.*, 2017). Phepo ye e lekanego gape ya maleba nako ya bosea le bonnyane e bohlokwa go kgolo le tlhabollo ya ngwana yo mongwe le yo mongwe go fihlelela bogolo bjo bo feletšego (PAHO, 2003; WHO, 2008a; UNICEF, 2016). Kgolo ya hlaelela ya dijo ge dintlha tše dingwe le tšona di amega, go swana le ditshepedišo tša go fokola le phepo ya tlaleletšo go hlakanywa le malwetši a mantši a go fetela (Solomons & Vossenaar, 2013; Ntila *et al.*, 2017). Go na le dipotla tša tshedimošo tšeo di lego gona go ditiro tša phepo ya tlaleletšo le dikelo tša leago go tšwa mafelong a go ikgetha mo Afrika Borwa, mabapi le masea le bana ba bannyane ka morago ga dikgwedi tše tshela, mme hlogo ye e nyaka dinyakišišo (Issaka *et al.*, 2015; Seonandan & McKerrow, 2016).

**Nepo:** go nyakišiša dikamano gare ga bomme le tikologo ya leago le setšo le DD ya bana ba gare ga dikgwedi tše 6 le tše 24, bao ba tsenetšego kliniki ya tša maphelo ya Olievenhoutbosch Township, Gauteng.

**Mekgwatshepetšo:** thuto ya diphatišišo tša go hlakanela ga dikgao e phethagadišwe. Kgoboketšo ya tshedimošo e dirilwe kliniking ya Olievenhoutbosch mo Gauteng nakong ya Febereware le Matšhe 2019. Bommago bana ba dikgwedi tša gare ga tše 6 le 24 di akareditšwe le go botšišwa. Sehlopha sa go latelana se šomišitšwe. Sete ya dipotšišo tšeo di hlamilwego di šomišitšwe go hwetša tsebo ya dimokrafi ya leago, dijo, maikemišetšo a bomme le tshedimošo ka ga mekgwa ya go fepa. Masea le mehuta ya go fapana ya dijo tša bana (IYCMDD) letlakalapotšišo go tšwa go WHO le šomišitšwe go ela DD ya ngwana yo mongwe le yo mongwe. Hlakišo ya maitshwaro e hweditšwe go Komiti ya Maitshwaro ya Kholetšhe ya Temo le Disaense tša Tikologo (CAES) mo Yunibesithing ya Afrika Borwa. Dipalopalo tša tlhaloso le taetšo di šomišitšwe ge go diragatšwa mohuta wa SPSS 25.

**Dipoelo:** Sekgao sa bomme (n = 103) ba be go ba rutegile (75% ba phethile mphato wa marematlou le 18% ba tšwetšepele go phetha dithuto tša ka morago ga mphato wa marematlou), ga ba šome (73%) le bontši ga se ba nyalwe (53%), tšeo ka moka e lego dintlha tša go raloka karolo ye kgolo go phepo ya bana. Bontši (60%) bja bana ba magareng ga mengwaga ye 6 le ye

11, le 40% e be e le magareng a dikgwedi tše 12 le tše 24. Ditiro tša go nyantšha di fapana kudu gare ga bana ba bannyane le dihlopha tša bana ba bagolwane, ka 35% tša bana ba bannyane bao ba amogelago maswi a letswele (go tlaleletša dijo tša tlaleletšo), ge go bapetšwa le 21% tša batho ba bagolwane. Go nyaka go ba seripagare (44%) sa palomoka seo se begilego gore bogobe bja mabele ke dijo tša mathomo tšeo di tšweleditšwego go bana ba bona. Ka fase ga seripagare sa bomma (45%) ba thomile dijo tša bona tša mathomo ka mengwaga ye e digetšwego ya dikgwedi tše 6 efela di thomile ka kgwedi ya mathomo (13%). Bana ka moka (100%) ba jele dijo go tšwa go dithoro, medu le sehlopha sa dijo tša digwere mo letšatšing le le fetilego. Palo ye ntši ya bana ba bannyane go tšwa go mengwaga ye mennyane ba begilwe ba jele dijo tša maswi (38% vs 77%,  $p < 0.001$ ) (ntle le maswi a letswele goba a go rekwa), dijo tša nama ya phoofolo (31% vs 59%,  $p = 0.014$ ) le dinawa (8% vs 24%,  $p = 0.034$ ), ge go bapetšwa le batho ba mengwaga ya bagolo. Bontši bja bana go tšwa go sehlopha sa ba bagolo ba kgotsofaditše dinyakwa tša go fapana tša dijo (MDD) ya dihlopha tše nne ge go bapetšwa le dihlopha tše dinnyane (67% vs 38%,  $p = 0.019$ ). Ga go dikamano tšeo di humanwego gare ga dintlha tše dintši tša leago le setšo (mengwaga ya tswalo, maemo a lenyalo, thuto le maemo a mošomo DD. Le ge go le bjalo, go bile le dikamano gare setšo le DD ( $\chi^2 = 16.62$ ,  $p = 0.002$ ). Le, tsebo ya dijo le DD ya bana, tswalano ya maleba ya tatelano ( $p = 0.026$ ). Sa mafelelo, mmono wa bomme go ikwa ba na le boitshepo ka go se fepe ngwana go feta tekanyo tšeo di amanago le go kopana le MDD.

**Thumo:** Diyo tša bana ba bannyane ba go dula Olievenhoutbosch ga ba kgotsofatše dinyakwa tša dijo tše di amogelago; fela 50% e kopane le MDD. Dinawa le dijo tša mothopo ya diphoofolo ga di lewe ka bontši bja go lekana go dira dijo tša tlaleletšo. Mohlobo le tsebo ya dijo di be di amane le DD ya ngwana. Kgatelelo ye kgolo e swanetše go bewa go DD go bana ba bannyane.

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## LIST OF ABBREVIATIONS

ARV	Anti-retro viral
DD	Dietary diversity
DDS	Dietary diversity score
EBF	Exclusive breastfeeding
IYCF	Infant and young child feeding
IYCFMDD	Infant and young child feeding minimum dietary diversity
KAP	Knowledge, attitude and practice
KZN	Kwa-Zulu Natal
MDD	Minimum dietary diversity
SCT	Social cognitive theory

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

The South African Constitution states that every child has the right to basic nutrition and access to health care service (Constitutional Assembly, 1996). In the course of the first two years of life, children may be exposed to growth uncertainty and micronutrient deficiencies (WHO, 2008b). Children have high nutritional requirements due to the demands of growth and development during this period. Thus, nutritional vulnerability increases when other factors are also involved, such as poor breast and complementary feeding practices combined with high rates of infectious diseases (Solomons & Vossenaar, 2013; Ntila *et al.*, 2017).

Appropriate infant and young child feeding practices for children under two years of age are essential for their development and overall health (Faber & Benade, 2007; Kassa *et al.*, 2016). Appropriate practices include breastfeeding exclusively up to six months of age and appropriate complementary feeding, which is the use of solid or semi-solid food in addition to breast milk between the ages of 6 and 24 months (WHO, 2008a; Kimani-Murage *et al.*, 2015; Kassa *et al.*, 2016). The World Health Organization (WHO) clearly states that exclusive breastfeeding is adequate for the first six months of life. However, after six months, exclusive breastfeeding (or other forms of breast milk substitutes alone) is insufficient to meet the nutritional requirements of a growing child (WHO, 2008b). Therefore, the WHO endorses the introduction of safe, adequate and nutritious complementary foods to children at six months of age. The introduction of complementary foods should involve a variety of safe foods while maintaining breastfeeding to ensure that the nutritional needs of the growing child are met (WHO, 2008a). The 2014–2025 USAID Multi-Sectorial Nutrition Strategy was implemented to reduce chronic malnutrition by 20% every 5 years globally until 2025. The strategy supports optimal breastfeeding and appropriate complementary feeding and longitudinally evaluates changes in developing countries, including South Africa (FANTA, 2014). Adequate nutrition during infancy and early childhood is vital to the growth and development of every child to reach full human potential (PAHO, 2003; WHO, 2008a; UNICEF, 2016).

Diverse diets and food variety in adequate quality and quantity are essential for children in order to meet their nutrient requirements and health and developmental goals (Nguyen *et al.*, 2013; Amugsi, Mittelmark & Oduro, 2015). Dietary diversity (DD), outlined as the number of different food groups consumed over a period of 24 hours, has been reported to be a valid and reliable



indicator of dietary adequacy in young children (FAO, 2010; Zainal Badari *et al.*, 2012; Thornton, 2016). Consequently, DD is a reasonably easy-to-measure alternative to quantitative measures of nutrient intake of young children (Steyn *et al.*, 2006; Oldewage-Theron & Kruger, 2011). Moreover, the WHO uses DD as one of the essential indicators to evaluate child feeding practices globally (WHO, 2008b). Various studies have indicated that a dietary diversity score (DDS) is emphatically associated with overall dietary quality (including micronutrient intake) of young children and has been found to be an intermediary indicator for household food security and child malnutrition (Steyn *et al.*, 2014; Mitchodigni *et al.*, 2017). A high DD score (DDS) has also been associated with the improved nutritional status of children in developing countries (Arimond & Ruel, 2004; Sawadogo *et al.*, 2006).

Young children's growth and development directly depend on what, when and how they are fed, particularly in the first two years of life (Mitchodigni *et al.*, 2017). Therefore, it is crucial to have optimal infant and young child feeding practices to improve the health, nutrition and development in children aged 0 to 24 months (WHO/UNICEF, 2010; UNICEF, 2016). Families invest money, time and care towards feeding their children, but regardless of their greatest efforts, they face immeasurable challenges (UNICEF, 2016).

Mothers are responsible for shaping their children's family environments, specifically their eating environment and therefore play a significant role in the development of their children's eating habits and weight status (Moreira *et al.*, 2016). These environments include socioeconomic and sociocultural characteristics, child-feeding environments and eating styles (Cutting *et al.*, 1999; Fisher & Birch, 1999). In most cases, children learn their first food experiences from the mother, meaning the mother decides which foods are best for the child, setting the emotional tone of eating occasions, controlling portion sizes, meal or snack frequencies, timing and social context (Moreira *et al.*, 2016). On the other hand, maternal practices and attitudes may restrict the improvement of healthy eating habits and appropriate weight status in children (Powell *et al.*, 2017).

Complementary feeding is embodied in a complex set of behaviours. It is not only about what is fed to the child, but also how, when, where and why they are fed (Craig *et al.*, 2018). Practices such as introduction of first foods, preparation and choice of foods and style of feeding are influenced by various determinants, such as maternal knowledge, perceptions and beliefs, employment and social support (Saksvig *et al.*, 2005). Additionally, unwavering factors such as culture, economy, agriculture and healthcare affect practices and subsequently feeding decisions

(Qar *et al.*, 2013; Berra, 2014). In order to understand the decisive factors in child feeding practices and behaviours, the Social Cognitive Theory (SCT) was used in this study as a determinant of these behaviours. Typically, the SCT is used to predict behaviour change in health settings (McAuley *et al.*, 2003). The theory entails three main concepts that influence health practices, namely behavioural factors, interpersonal factors and socio-cultural factors which are further elaborated in the study (Bandura, 1999).

The practices associated with complementary feeding determine compelling health and development outcomes of infants and young children (WHO, 2008a; UNICEF, 2016). Knowledge on child nutrition as well as hygiene has been found to be fundamental for appropriate practices by caregivers of children under two years of age. Faber *et al.* (2016) state that underlying nutrition information boosts the mothers' nutritional knowledge which brings about the desired changes in their infants' feeding attitude and behaviour.

Education and awareness on child health may increase maternal nutritional knowledge which may bring about the ideal changes in their attitude and behaviour regarding complementary feeding. There are several studies that support this hypothesis that, among other determinants (such as maternal level of education), knowledge, attitude and practices (KAP) significantly interrelate in determining nutritional outcome (Kigaru *et al.*, 2015; Faber, Laubscher & Berti, 2016; Mnyani *et al.*, 2016; Sayed & Schönfeldt, 2018; Owais *et al.*, 2019). Therefore, it is imperative to ensure that mothers have the necessary nutritional knowledge for optimal child health.

## **1.2 Problem Statement**

Young children have high nutritional requirements comparative to body size. However, young children can only consume small amounts of food and thus need nutrient-dense complementary foods (Drimie *et al.*, 2013; Solomons & Vossenaar, 2013). There are pockets of information available on malnutrition and its social determinants from specific areas in South Africa, regarding infant and young child feeding practices beyond six months of age. However, there is no nationally representative data available (Issaka *et al.*, 2015; Seonandan & McKerrow, 2016).

Numerous survey reports (Zezza & Tasciotti, 2010; Schott *et al.*, 2013; Steyn *et al.*, 2014; Gewa and Leslie, 2015), consistently point out that underprivileged child feeding practices are interrelated with economic and cultural factors such as a choice of low-quality complementary foods, taboos, restrictive traditional beliefs and social influences, including caregivers' lack of

knowledge on nutrition and poor knowledge on food diversity in their environment. Eventually, all of these factors contribute to poor dietary diversity, sparse feeding frequency and inadequate food and energy intake among children (Sunguya *et al.*, 2013; Tette *et al.*, 2016; Wanjohi *et al.*, 2017). The WHO (2003) has also stressed the necessity to understand and implement cultural norms and practices in the designing of health and nutrition interventions.

Cultural attitudes, beliefs and norms have been identified as contributing factors to inadequate breastfeeding and less diverse complementary feeding (Kimani-Murage *et al.*, 2015) and as one of the possible reasons of poor breastfeeding practices in informal settlements (Kimani-Murage *et al.*, 2015; Wanjohi *et al.*, 2017). Cultural myths and misconceptions have a powerful dominance on overall human nutrition (Kimani-Murage *et al.*, 2015) and therefore have been found to be a determinant of breastfeeding and complementary feeding practices (Rollins *et al.*, 2016).

Despite the fact that cultural beliefs, myths and misconceptions have been emphasized as some of the obstacles to ideal breastfeeding and complementary feeding in developing countries (UNICEF, 2016), there is a lack of evidence on the specific cultural beliefs and practices with regard to breastfeeding. Considering that most child malnutrition occurs in the vulnerable stages of complementary feeding, additional research is required on determinants that influence feeding practices.

Emphasizing DD in child health promotion helps families to focus their attention on household food items, rather than on the intricate details of nutrient contributions. Therefore, there is increasing recognition of the significance of DD for child health and this calls for research to highlight the ways in which child DD can be promoted (Potts & Sealey-Potts, 2014; Amugsi, Mittelmark & Oduro, 2015; Caswell *et al.*, 2018). Considering that mothers generally play the most decisive role in the healthcare and diet of their children, research is necessary to highlight maternal factors that might influence child DD (Caswell *et al.*, 2018).

It is evident that there are gaps regarding what is known and documented about the child feeding practices of various ethnic and cultural groups in South Africa and the meanings attached to them. This study quantitatively explored the association of mothers' socio-cultural factors with breastfeeding practices and dietary diversity of their young children. Results from this study may provide vital information in facilitating the formulation of interventions to address child malnutrition.

### **1.3 Aim and Objectives**

The aim of this study was to explore the association between mothers' socio-cultural environment and the dietary diversity of their children the ages of between 6 and 24 months, who attend the health care clinic in Olievenhoutbosch Township, Gauteng.

#### **1.3.1 Objectives of the study**

The objectives of this study are to:

1. determine the dietary diversity score of young children between 6 and 24 months who are attending the clinic in Olievenhoutbosch Township, Gauteng.
2. investigate the mothers' socio-cultural environment by determining their knowledge, beliefs, attitudes and values in terms of food choices for feeding their children.
3. determine the mothers' breastfeeding practices.
4. determine the association between the mothers' socio-cultural environment and the dietary diversity of their children.
5. compare the dietary diversity score of breastfed children and non-breastfed children.

### **1.4 Chapter Layout**

This dissertation has five chapters which are arranged as follows:

#### **Chapter one: Introduction**

This chapter is the introduction to the study, providing an overview and background to the study. This section also outlines the problem statement, aim and objectives of the study and explains the layout of the dissertation.

#### **Chapter two: Literature Review**

This chapter supplies a review of existing literature on complementary feeding, dietary diversity and socio-environmental factors.

### **Chapter three: Research Methodology**

Chapter three outlines the study design, study setting, study population and sampling methods, data collection and analyses procedures used as well as ethical considerations.

### **Chapter four: Results**

This chapter focuses on the findings and the results of the study and provides tables and graphs to portray the results.

### **Chapter five: Discussions**

This chapter elaborates and discusses the findings and results of the study.

### **Chapter six: Conclusion and Recommendations**

Chapter six draws the conclusion of the study and discusses outcomes in accordance to the objectives of the study. The recommendations for future actions and research are presented, based on the results of the study. A list of references and the appendices then follow.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

Complementary feeding is the process when an infant gradually transition from breastfeeding to solid foods which can also be referred to as weaning (Okafoagu et al., 2017). This is a crucial stage that lays the foundation for healthy eating habits (Du Plessis, Kruger and Sweet, 2013).

Appropriate weaning is important because it could possibly reduce early infant mortality (De Oliveira *et al.*, 2016). The time of weaning differs from society to society, but are determined by the characteristics, choice, knowledge and perceptions of the mother (Karigi, N.L.; Mutuli and Bukhala, 2016). Although mothers generally follow child health obligations, maternal knowledge may be a hinderance to complementary feeding behaviour (Faber, Schwabe and Drimie, 2009). Mothers are concerned about the weaning practices such as what food should be given, and how and when it should be given to the child (Faber and Benade, 2007).

Considering that no single food can contain all nutrients, the WHO (2008a) stated that the more food groups included in daily diet the greater the chance of meeting the required nutrients. A sufficiently diverse diet may reflect adequate nutrient intake (Kennedy et al, 2009). Therefore, DD can be regarded as a proxy measure of food security (Hoddinott, 2002). Promoting appropriate complementary food has been referred “to as one of the most cost-effective strategies for improving health, reducing morbidity and mortality of young children” (WHO, 2018). A significant number of children could be saved practicing optimal complementary feeding (WHO, 2008b).

The age of introducing solid food is of public health importance because of the associated risk of diseases such as diarrhoea and malnutrition from premature or delayed weaning (Martin-Wiesner, 2018). A review of complementary feeding practices in South Africa shows that the initiation of breastfeeding has improved. However, continued breastfeeding after six months is uncommon (Sayed and Schönfeldt, 2018b), with early introduction to solid foods being a common practice (Seonandan and McKerrow, 2016). -.

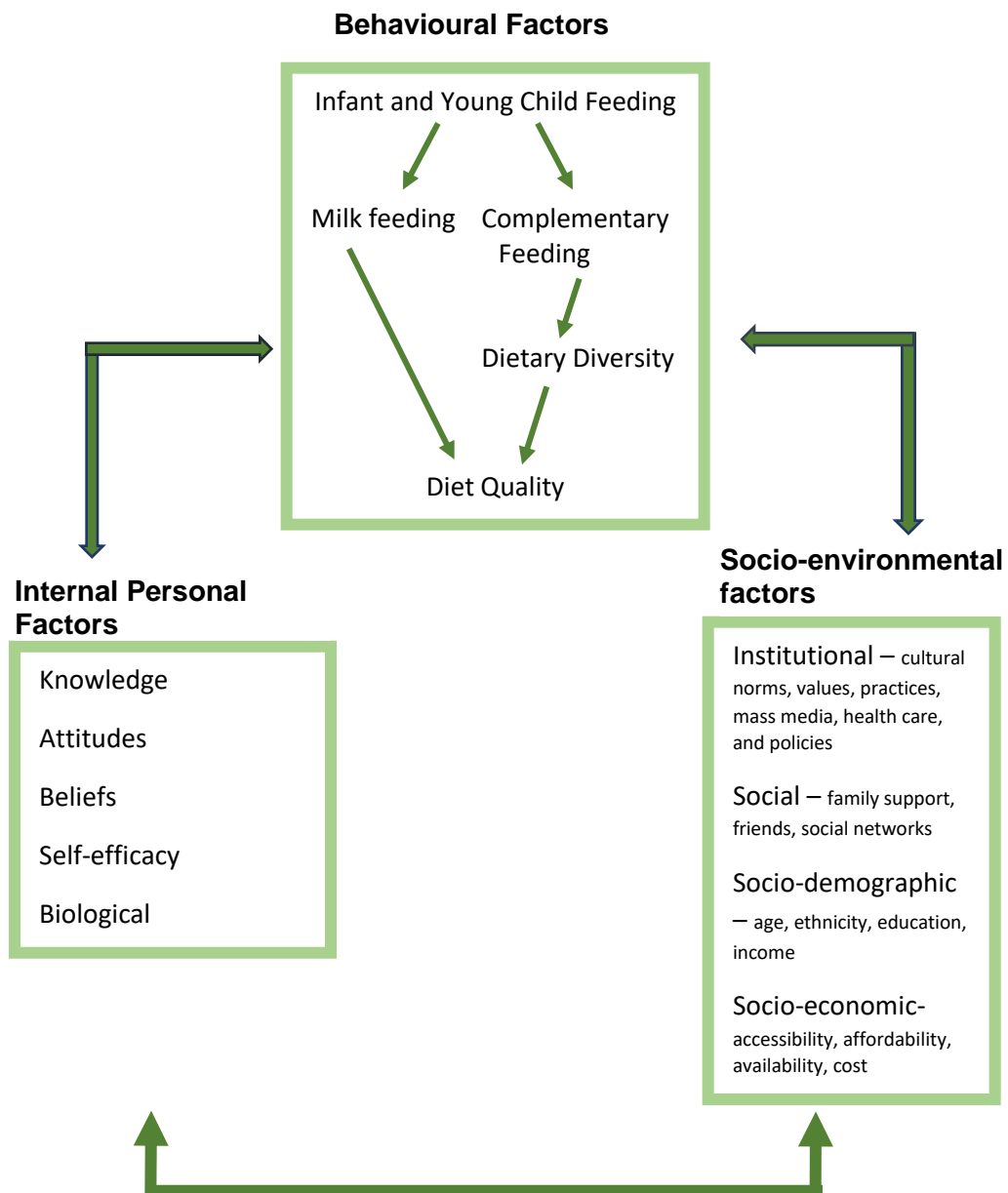
There are various factors that influence and determine maternal food choice for their children which are embodied within behavioural factors, internal personal factors and socio-environmental factors. The following section uses the SCT theory to describe these factors.

## 2.1 The Social Cognitive Theory (SCT) and conceptual framework

In order to promote better child nutrition, it is imperative to understand the determinants of the mothers' behaviour regarding food choice (Doerksen and McAuley, 2014). The SCT is an important theory of behaviour change which has been widely used in the health behaviour literature to predict health behaviours and stimulate behaviour change (McAuley *et al.*, 2003; Saksvig *et al.*, 2005). Primary concepts of this framework include behavioural factors, internal personal factors and socio-environment factors and they have been found to strongly influence health behaviours, including dietary intake (Bandura, 2004).

The main feature of SCT that makes it unique is the emphasis on social influence and its emphasis on internal and external social support (Anjomshoa, Mirzaee and Iranpour, 2018). SCT examines the different ways in which a character obtains and maintains behaviour, in consideration of the social environment in which the character carries out the behaviour. The theory allows for a person's past experiences, which determines whether behavioural action will take place. They also determine whether a person will engage in a specific behaviour and the reasons why a person engages in that behaviour (Bartle and Harvey, 2017). The conceptual framework for this study is based on the SCT. The SCT "provides opportunities for social support through instilling expectations, self-efficacy, and using observational learning and other reinforcements to achieve behaviour change" (Anjomshoa, Mirzaee and Iranpour, 2018).

Figure 2.1. illustrates the application of the SCT on the behavioural factors, internal personal factors and socio-environmental factors that affects infant feeding practices on dietary diversity.



**Figure 2. 1: Suggested Conceptual Framework for the association of mothers' socio-cultural environments and dietary diversity of their children. Adapted from Bandura (1986).**

The following sections will address the main factors related to mothers' behaviour in terms of food choices for their young children within the SCT, namely behaviour, interpersonal factors and socio-environmental factors.



## **2.2 Behavioural factors**

Health and nutrition-related behaviour and practices are acquired over a lifetime and therefore understanding behavioural impacts within the psychosocial setting is significant to the development of dietary recommendations, nutrition programs, and educational messages that may promote healthy diets and encourage dietary diversity (Furst *et al.*, 1996).

Sika-Bright (2010) explained how behaviours are constructed to form a symbolic interactionist's attitude. Instead of viewing behaviour as a product of conditioning and social reinforcement, it is believed that the mind is the most significant consideration in pursuit to understand human behaviour (Sika-Bright, 2010). A mother may mentally recite how and when she will introduce complementary food to her baby, and what people will think of her as a result. The complementary food choice she makes as it is lived out, may become engraved with personal definitions for her accomplishment of the role of mother.

A study observed by Moreira *et al.*, (2016), revealed that feeding behaviours were associated with evident maternal innate characteristics. Especially, 'unperceived monitoring' and 'pressure to eat' were dominantly linked with the socio-economic environment and family background, while the mothers' confining behaviours over child's eating were more linked with maternal health behavioural characteristics (Moreira *et al.*, 2016). In this study, behavioural factors include infant and young child feeding, within the context of milk feeding, complementary feeding and dietary diversity.

### **2.2.1 Infant and young child feeding (IYCF)**

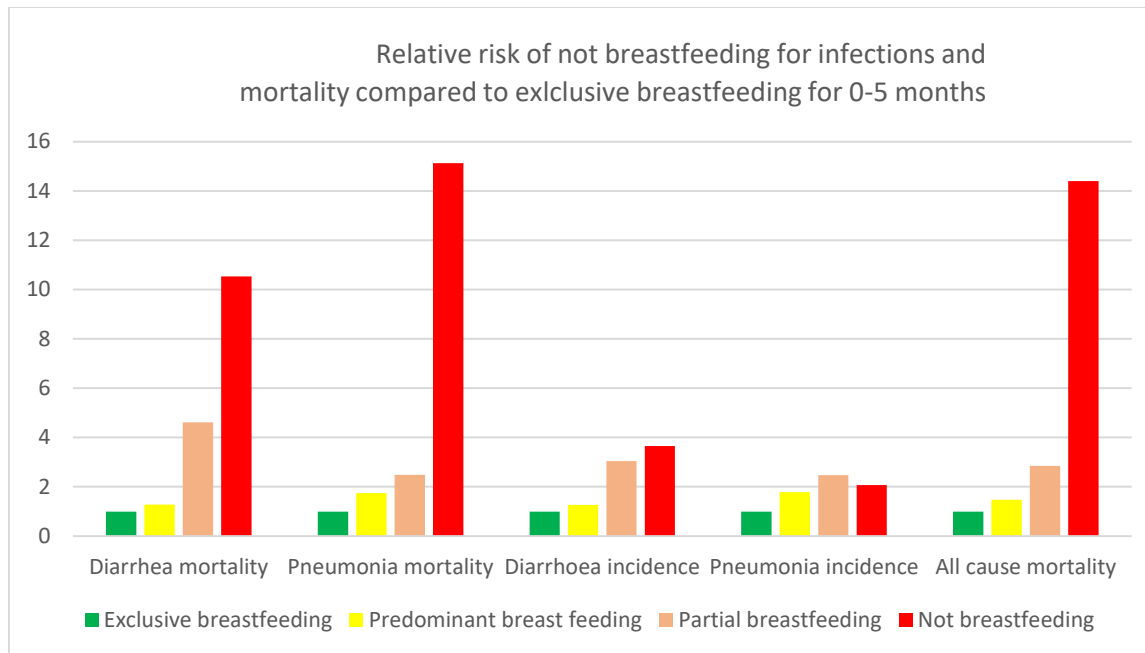
To ensure infants' nutrition needs are met, the IYCF key elements are vital (UNICEF, 2016; Sayed and Schönfeldt, 2018a). Breastfeeding should be initiated within 1 hour of birth, infants should be breastfed exclusively for the first 6 months of life and continue to receive breast milk up to 2 years of age. Age-appropriate complementary foods should be introduced at 6 months of age with optimal feeding frequency with food high in nutrient density (WHO, 2008a; UNICEF, 2016). IYCF practices specifically affect the nutritional status of children 0-23 months of age and, eventually, impact the survival of the child (Gewa and Leslie, 2015; Seonandan and McKerrow, 2016). Bettering IYCF practices is therefore essential for improved nutrition, health and development of children (WHO, 2008; WHO/UNICEF, 2010).

A study carried out by the Lancet Nutrition Group (2013) concluded that promotion of adequate IYCF practices in the first 2 years of life could avoid up to 220 000 childhood deaths annually (Qar *et al.*, 2013). Research on IYCF practices in 33 countries located in Asia, Africa, the Caribbean and Latin America, indicated high rates of non-compliance with IYCF recommendations (WHO, 2010, IBFAN, 2015; Amany Mutuli, 2016). Whilst there is information available on the current levels of malnutrition in South Africa, and the social stimulus thereof, there is insufficient knowledge of IYCF practices in addition to complementary breastfeeding (Seonandan and McKerrow, 2016).

### **2.2.2 Milk feeding**

WHO recommends exclusive breastfeeding from birth to 6 months of age (WHO, 2018). Infants' energy and nutrients needs are supplied from breast milk and milk formulas. After 6 months of age these nutrients should come from milk feeds plus complementary food (Du Plessis, Kruger and Sweet, 2013; Kimani-Murage *et al.*, 2015; Frempong and Annim, 2017). Mixed feeding, also called partial breastfeeding, is when a child is given some breast milk together with non-human milk and/or cereal or other food and water. Bottle-feeding refers to feeding the child from a bottle regardless of the contents which could be formula milk, breastmilk or other foods and liquids (BFHI, 2009). Replacement feeding is when the child is fed with artificial milk also known as infant formula and other powdered animal milks. This is also called exclusive replacement feeding (WHO, 2004).

Breastfeeding is considered as the first natural food for infants, it supplies all the energy and nutrients that the baby needs for the first six months of their life (Okafoagu *et al.*, 2017), and it continues to supply more than half of a child's nutritional needs six months to the first year, and up to one-third during the second year (WHO, 2008a). Breastfeeding, particularly the first six months of exclusive breastfeeding, has a compelling effect in the reduction of mortality from the two largest contributors of infant deaths: diarrhoea and pneumonia (Figure 2.2), as well as on all-cause mortality and also aids for a speedy recovery during illness (Black *et al.*, 2008).



**Figure 2. 2: Relative risk of not breastfeeding for infections and mortality compared to exclusive breastfeeding for 0-5 months. Adapted from Lancet (2008)**

In addition, breastfeeding contributes to the well-being of mothers; it reduces the chances of having an unexpected or unplanned pregnancy, lessens the risk of ovarian cancer and breast cancer, amplifies family and national resources, is a secure way of feeding and it conserves the environment ('WHO | Complementary feeding', 2016).

In South Africa, exclusive breastfeeding (EBF) rates has recently substantially improved from 7% in 2003 (DoH, SAMRC, 2007) to 32% in 2015 (DoH, 2017) . Despite the EBF improvements, suboptimal breastfeeding practices, mixed feeding and supplementary feeding before the age of six months are still common practices to South African mothers (Doherty *et al.*, 2012). Most South African infant feeding studies show that approximately 35% to 50% of mothers who are lactating discontinue breastfeeding before 3 months post-partum. Introducing complementary foods as early as six weeks is normative for these mothers (Sibeko *et al.*, 2005).

Factors that have been identified as barriers to EBF and continued breastfeeding in South Africa include maternal self-efficacy, socio-cultural factors, poor breastfeeding experience and the health system (Ijumba *et al.*, 2015; Horwood *et al.*, 2018). Additionally, the rate of HIV infection in South Africa remains on the increase as this being a leading barrier to continued breastfeeding. High rates of formula feeding has been reported among HIV mothers (Mnyani *et al.*, 2016). The

approved recommendation for women with HIV is to breastfeed for up to 12 months, with provision of infant and maternal ARVs administered (DoH, 2014). A study conducted in Langa, Cape Town reported that 90% of mothers that were using mixed feeding has a perception of inadequate production of breast milk. Consequently, these mothers chose to supplement breast milk. Other reasons for mixed feeding include going back to work or school (Sibeko *et al.*, 2005).

### **2.2.3 Complementary feeding**

Complementary feeding starts when breast milk alone is no longer adequate to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk and/or formula milk (Faber and Benade, 2007; Solomons and Vossenaar, 2013; Mukuria *et al.*, 2016; Tette *et al.*, 2016). Infant energy and nutrient requirements increase when they grow older, bigger and become more active (PAHO, 2003; DoH, 2016). The appropriate age for complementary feeding is generally six months of age, while breastfeeding may continue beyond 24 months (Joshi *et al.*, 2012). Complementary feeding practice is an important process that defines the nutritional status of young children (Thulier and Mercer, 2009; Mekonnen *et al.*, 2017). The period of this transition from exclusive milk feeding to complementary feeding is a critical window for optimal growth, health and development of the child. Through this period suitable, safe, adequately nourishing and frequent feeding is critical (DoH, 2016; UNICEF, 2016).

Implementing complementary feeding at the right age is a proven measure to lessen under nutrition among young children (FANTA, 2006; Ochurus, 2007). Khanal *et al* (2013) agrees that complementary feeding practice is a substantial factor that dictates the nutritional status of young children (Khanal, Sauer and Zhao, 2013). Inadequate infant feeding practices are the dominant reasons for childhood under nutrition in developing countries including South Africa (Vorster, Badham and Venter, 2013).

To ensure young children are kept healthy during the period of transition from exclusive milk feeding to a family pot, complementary foods should be nutrient dense, clean and safe, fed in adequate amounts and in appropriate frequencies (WHO, 2003). WHO (2000) recommends that appropriate complementary feeding is:

- Timely – young children should start receiving semi-solid foods in addition to breast milk from 6 months onwards.

- Adequate – the supplementary foods should be varied and includes adequate quantities of all the food groups to provide enough energy, protein and micronutrients to meet the nutritional needs of the child.
- Safe - measures should be taken to ensure safe preparation, feeding and storage of complementary foods to minimize contamination.
- Appropriate – complementary foods should be appropriate texture for the age of the child and consistent with the child's signals of appetite and satiety.

In addition, Table 2.1 shows WHO age specific recommendations for infant and young child feeding.

**Table 2. 1: Recommendations for infant and young child feeding. WHO, (2000b)**

Age of child in months	Frequency of breast feeding	Frequency of feeding per day	Amount in	
			Kcal	Kj
6 – 8	8 times or as often as a child wants	2 – 3 times	200	837
9 – 11	as often as a child wants	3 – 4 times	300	1255
12 and above	as often as a child wants	5 and above	550	2301

The rates of appropriate complementary feeding practices are low in many other parts of the world, including low-middle income countries (UNICEF, 2017). The circumstances surrounding complementary feeding practices are based on various factors such as social and cultural factors (Almarzoki and Abdulkareem, 2015).

Research in South Africa shows that complementary feeding is initiated before the recommended age of 6 months with various inappropriate infant-feeding practices being followed (Drimie et al., 2013). In 2013, the SANHANES-1 revealed that the average age for the introduction of complementary food in South Africa was 4.5 months (Shishana, et al., 2013). Additionally, more than two thirds (64%) of children were given solid or semi-solid food before the age of six months (Seonandan and McKerrow, 2016). These findings are of concern as suboptimal feeding practices carry a high risk of infections, diarrhoea and malnutrition (WHO, 2001) as well as decreasing the amount of breast milk consumed by young children (Sayed and Schönfeldt, 2018a).

A cross-sectional survey was conducted in Kwazulu-Natal (KZN) to establish breastfeeding and complementary feeding practices. The study revealed unsuitable feeding practices such as lack

of EBF and early introduction of complementary feeding. It showed that 61% of infants were given solid food at four months of age (Faber and Benade, 2007). A study conducted in Limpopo province showed alarmingly high rates of early introduction of solid foods. Almost three quarters (71%) of infants were introduced to solid foods before four months of age (Mushaphi *et al.*, 2008). In Langa, Cape Town, researchers it was highlighted inappropriate infant feeding practices where 32% of infants were given weaning foods at one month of age (Sibeko *et al.*, 2005).

Untimely introduction of complementary food is a normative practice in South Africa. In rural areas, the first semi solid food to be introduced is thin maize meal porridge and processed instant cereal in urban areas as reported by Du Plessis, *et al.* (2013). The authors in the same study further mentions that the typical diet of young children in South African is low in food sourced from animals, vegetables, fruit and sources of omega-3 fatty acids. Poor intake of low nutrient content meals in the critical window of six to 24 months of age due to poor and inappropriate complementary feeding practices is the one cause of high stunting rate in South Africa (Du Plessis, Kruger and Sweet, 2013).

#### **2.2.4 Dietary diversity (DD)**

Complementary feeding that is diverse and nutrient dense have a significant impact on optimal growth and adequate development in the first two years of life (Arsenault *et al.*, 2013; Potts and Sealey-Potts, 2014). In addition, a diverse diet, which contains foods from all food groups, is essential for all population groups to meet their requirements for vital nutrients (Frempong and Annim, 2017; Powell *et al.*, 2017; Gausman *et al.*, 2018). An increase in dietary diversity is a key recommendation for young children of 6 to 23 months of age. DD has been recognized as a significant indicator to assess nutritional adequacy, as demonstrated by data of the Demographic and Health Survey on children aged 6 to 24 months in 11 countries in Africa and Latin America (PAHO, 2003).

WHO's (2008) recommendations and guidelines encourage that young children who are 6 to 24 months old should receive foods from 4 or more food groups out of the 7 recommended food groups (WHO, 2008b). The recommended food groups are: 1) grains, roots and tubers; 2) legumes and nuts; 3) dairy products; 4) flesh foods (meat, fish, poultry and organ meats); 5) eggs; 6) vitamin-A rich fruits and vegetables; 7) other fruits and vegetables (WHO, 2008b). Any amount of food consumed from each food group is sufficient to count and there is no minimum quantity, unless if an item was only used as a condiment. The minimum of at least 4 of the above 7 food

groups above is recommended because it is associated with higher quality diets for both breastfed and non-breastfed children (Swindale and Bilinsky, 2006). Minimum dietary diversity (MDD) reflects the quality of foods given to young children and is set at 4 food groups (Mitchodigni et al., 2017).

Research conducted in Southern Ethiopia shows that the recommended MDD and meal frequency is mostly under achieved (Dangura and Gebremedhin, 2017a; Gebremedhin, 2019). Indication of suboptimal dietary diversity has also been found in Tanzania with the results showing that most complementary foods provided are mainly cereal-based (Ogbo, Ogeleka and Awosemo, 2018). Similarly, in a study conducted by Smulders, (2008) in South Africa, it was discovered that the primary introductory food given was porridge (for 46% of the children) and that there were poor DD. Additionally, less than half of the children below the age of two years received the recommended minimum meal frequency within the four different food groups in 24 hours (Smulders, 2008).

These findings resemble results from surveys conducted in Western Cape, South Africa, where only half of the children aged 6 to 23 months received a diverse diet of minimum acceptability. The mean DDS for children aged 6 to 12 months was 3.26, and in the age group 6 to 23 months the DDS was 3.91. Insufficient dietary diversity was indicated in both groups as the values are below the score of 4 (Du Plessis *et al.*, 2016). Maize meal porridges were reported as the most common first complementary foods given to young children followed by family dishes (Mushapi *et al.*, 2008, Chandrasekhar et al., 2017). Mitchodigni et al., (2017) reported that the thin maize meal porridges, as the first food given to infants in Southern Africa, generally provided low nutritional value due to low food diversity.

In developed countries, DD has been shown to be related to improved nutrient adequacy of children and adults (Kiboi, Kimiywe and Chege, 2017). Comparable results were found in developing countries as well, showing that higher DD was associated with better child nutritional status (WHO, 2008a; Mekonnen *et al.*, 2017; Powell *et al.*, 2017; Caswell *et al.*, 2018). Various studies show that low dietary diversity in South Africa is common in different areas (Steyn *et al.*, 2006; Drimie *et al.*, 2013). Additional research is required to enhance the knowledge on DDS and in addition measure effectiveness of DDS to accurately measure quality diets in young children (Ntila *et al.*, 2017).

## **2.3 Internal personal factors**

Internal personal factors are defined as attributes or characteristics of individuals that influence their behaviour and, more specifically, food choice (Furst *et al.*, 1996; Nestle *et al.*, 1998). Complementary food and dietary practices are strongly influenced by a variety of personal factors, such as maternal beliefs, knowledge, attitudes and self-efficacy (Nestle *et al.*, 1998). Furthermore, dietary patterns are determined by personal meaning disposed to certain foods (Contento, 2015). Nestle *et al.*, (2009), explained that parents construct their perceptions, beliefs, and attitudes about complementary feeding their young children based on cultural values, with psychosocial factors shaping their food choices, reflecting the relationship between internal personal and socio-environmental factors. According to De Oliveira *et al.*, (2016), families' eating habits, the parents' knowledge and affective dimension gradually modulate the children's taste and food preferences, teaching them to like what they have learned. (Matusiak, 2004).

The internal personal factors within the SCT are knowledge, attitudes, beliefs, self-efficacy and biological, and will be discussed below.

### **2.3.1 Knowledge**

Knowledge refers to the ability to obtain or receive information, subsequently retaining and using it (Kaliyaperumal, 2004). Maternal knowledge on nutrition refers to the mother's understanding of nutrition including the discernment to remember and recollect nutrition related words (FAO, 2014). IYCF practices implemented by mothers depends on the knowledge, attitude, socio-cultural tradition they are subjected to and cultural dimensions of the community (Subedi and Paudel, 2012; Onah *et al.*, 2014).

Knowledge provides attention, comprehension, memory, and decision-making processes more effectively (Miller and Cassady, 2015). Evidently, knowledge may not translate to practice. A study by Subedi and Paudel, (2012) on IYCF practices in Nepal showed that, only 35% of mothers had knowledge about exclusive breastfeeding initiation within one hour, 62% had knowledge about the recommended period for exclusive breastfeeding and 81% mothers had known about the correct time for introducing complementary foods. Another study in Kosova revealed that a large proportion of the respondents were knowledgeable on the introduction of complementary feeding starting at 6 months of age (Berisha *et al.*, 2017). However, the infant and young child feeding practices rates have not improved in these areas (Subedi and Paudel, 2012). Nestle *et al.*, (1998),



explained that mothers may use knowledge of the links between diet and health to change their behaviour towards infant feeding but knowledge alone is likely not to be effective. Nestle *et al.*, (2009) further states that even if mothers' knowledge of child nutrition are high, they might not know how to apply it, lack motivation to change feeding behaviour or be influenced by socio-environmental factors (Nestle *et al.*, 1998, 2009).

However, Bandura (1999) in his SCT model explains that parents have an advanced capacity for observational learning. The capacity "enables them to develop their knowledge and skills from information conveyed by modelling influences" (socio-environment). Therefore, learning occurs either deliberately or inadvertently by observing the actual behaviour of others and the consequences thereof (Bandura, 1999).

The knowledge of the mother about nutritious meals for the children contributes to how the child is fed. Infants and young children from developing countries are most vulnerable to malnutrition as a result of lack of knowledge on how to feed a child appropriately (Kigaru *et al.*, 2015). Research has evidently shown that lack of knowledge about appropriate foods and feeding practices is often a leading determinant of malnutrition than the lack of food or money (PAHO, 2003). Mothers decide about child feeding (what to feed, when and how) in their own conceptual framework which includes internal personal and socio-environmental factors such as cultural beliefs and ideas of foods (Christian *et al.*, 2015). In South Africa, the main restriction to timely introduction of solid foods is the lack of knowledge. Mothers believe that breastmilk alone is not enough to satisfy their infant, and the perception that they have inadequate supply of breastmilk (Du Plessis, Kruger and Sweet, 2013).

Maternal knowledge and attitudes are significant determinants of child health generally but also particularly for infant feeding practices (Kigaru *et al.*, 2015; Mokori, Schonfeldt and Hendriks, 2017). Nutrition-related knowledge can be improved through nutrition counselling and education that can lead to improved IYCF practices. Subsequently, improving child growth and development, particularly in settings with low maternal literacy (Berra, 2014).

### **2.3.2 Attitudes**

Attitudes refers to the tendency to react pleasantly or unpleasantly, good or badly to certain circumstances (Ajzen, 2001). To have an attitude is to comprehend and interpret situations according to certain inclinations. FAO (2014) explains that attitudes are perceptions, emotional

and psychological beliefs that influence the behaviour or practice favourably or unfavourably (FAO, 2014). The behaviour of people are embedded in their attitudes (Shepherd and Raats, 2006) and therefore helps them to assess and respond to an object, person, institution or event either favourably or unfavourably (Hauser, Jonas and Riemann, 2011; Kittler, Sucher and Nelms, 2011). Consequently, most of the factors that determine complementary food choice are as a result of the mother's attitude and knowledge towards the specific food. A cohort-based evaluation done in Bangladesh shows that a positive attitudes were associated with delayed initiation of complementary feeding (Owais *et al.*, 2019). Attitudes are shaped by personal usage or trust in the attitudes of other dominant consumers (Nestle *et al.*, 2009).

Research showed that maternal attitudes towards complementary feeding were associated with the timing of complementary feeding initiation (Mushaphi *et al.*, 2008; Owais *et al.*, 2019). Particularly, for those infants whom complementary feeding was introduced early on or on time, the mothers had more positive attitude towards complementary feeding. On the other hand, when comparing infants for whom complementary feeding was initiated too late or on time, mothers with better attitudes were more likely to initiate late complementary feeding. This finding is compelling and presents an avenue for future research (Owais *et al.*, 2019).

to promote healthier eating habits, it is necessary to continue investing in complementary feeding. In addition to nutrition knowledge, shaping maternal attitudes on dietary habits can contribute towards a positive pattern on IFYC feeding practices (Kigaru *et al.*, 2015). There are interventions to improve complementary feeding as proposed by Lutter *et al.*, (2013): 1) communication that will impact social and behaviour change, 2) counselling mothers, 3) helping mothers break barriers to feed their children appropriate complementary foods (Lutter *et al.*, 2013).

### **2.3.3 Beliefs**

Fang *et al.*, (2017) describes beliefs as the principles that people hold to be true. Society have specific beliefs, but they also share collective values as a community (Fang *et al.*, 2017). Beliefs are circumstantial, they arise from learned experiences, resulting from cultural and environmental circumstances (Ergenekon-Ozelc, *et al.*, 2001). USAID stated that there is a dearth of understanding how cultural beliefs, behaviours, and perceptions influence maternal, infant, and young child nutrition in most cultural countries (USAID, 2017). A study surveyed in Mozambique revealed that there is a significant gap between mothers' current IYCF practices and optimal practices due to cultural beliefs (USAID, 2017).

A study by Mutuli, (2016) revealed a correlation between culture and dietary habits. It was evident that cultural beliefs is an indicator of what people value as important diets, less significant diets as well as diets that should not be consumed (Craig *et al.*, 2018). Another study reflects that culture influence the adopted diets and consequently the status of food security in households (Lindsay, *et al.*, 2008).

Beliefs are one of the factors that influence mothers' perceptions regarding child-feeding practices, which consequently influence their children's early diet and overall nutrition (Lindsay *et al.*, 2008). Various studies conducted in both developed and developing countries suggests that child feeding practices are strongly influenced by maternal cultural beliefs, knowledge, and perceptions (Ergenekon-Ozelc *et al.*, 2001; Brunsø, Scholderer and Grunert, 2004; Honkanen, Verplanken and Olsen, 2006; Gausman *et al.*, 2018). A study by Siegel *et al.*, (2006) in Nepal revealed that mothers were less likely to give animal source foods to infants under one year of age due to a misperception that animal source foods cannot be digested by young children.

Nestle *et al.*, (1998), further revealed that cultural belief is a general foundation that triggers all food choices. Mothers make use of their specific cultures, subcultures, and ethnic groups to constitute what they consider to be acceptable and preferable infant foods, including the amount and combination of foods they choose, and the foods they consider ideal or unsuitable (Nestle *et al.*, 1998).

#### **2.3.4 Self-efficacy**

Self-efficacy is the measure to which an individual believe they are able to perform specific tasks in order to achieve set targets. It is directly associated to health attitude, but it also indirectly affects health behaviours through its impact on goals and intentions (Schwarzer and Luszczynska, 2005). Bandura, (2004), mentions that self-efficacy is the leading component as it affects health behaviour both directly and by its influence on the other determinants. Self-efficacy beliefs is a stimulus for goals and aspirations (Bandura, 1999, 2004). As explained by Ramachudran, (1998), mothers who have a solid sense of efficacy to manage the multiple roles of family and work, experience a positive sense of contented state. However, those who are perplexed by self-doubts in their ability to integrate the multiple roles suffer physical and emotional anxiety (Ramachudran, 1998). Experienced mothers' self-efficacy was a predictor of intentions when it comes to infant feeding. Therefore, this supports Bandura's, (1999) SCT that self-efficacy, intentions, and attitudes are all very highly interrelated (Bandura, 1999; Bartle and Harvey, 2017).

Mothers with high self-efficacy are more likely to master these behaviours than the mothers with low self-efficacy (Minas, 2016). On the contrary, highly efficacious mothers are highly likely to initiate new behaviours and continue in their attempts until mastery is achieved and therefore infant feeding might be perceived as a successful experience (Schwarzer and Luszczynska, 2005).

Research findings on promotion of breastfeeding highlighted that self-efficacy beliefs were a predictor of exclusive breastfeeding among women in Quebec, Canada (Semenic et al 2008). Another study in Nigeria conducted among female healthcare workers in Nigeria linked negative beliefs (breastfeeding is embarrassing, breastfeeding is unacceptable in public) with breastfeeding cessation (Ogunba, 2010; Minas, 2016).

Therefore, maternal self-efficacy is the measurement of the mother's capability to care for the baby. It reflects the mothers' ability to influence the child and their environment in order to promote good health and subsequently the development of the child.

### **2.3.5 Biological**

Physiological needs contribute to the basic determinants of food choice (Shepherd and Raats, 2006). Humans respond to the feelings of hunger and satiety since they need energy and nutrients in order to survive (Furst *et al.*, 1996). Researchers found that taste preference are shaped through their experience, therefore taste preferences for fats and high sugar are acquired either in infancy or early childhood (Nestle *et al.*, 1998).

Biological variables that impact successful breastfeeding include insufficient or no milk supply, infant health challenges, maternal obesity, the physical challenges of breastfeeding, parity, and vaginal or Cesarean delivery. These concerns are present in varying degrees among all women around the world (Thulier and Mercer, 2009).

The first learning about food and eating is inhibited by children's genetic predispositions and by their prior experience with breast milk (Nestle *et al.*, 2009). These predispositions include rejection of sour and bitter taste when introduction to complementary foods begins (Roininen, 2001). Caregivers interpret infants' gusto facial responses to the basic tastes as reflecting likes and dislikes, and use these as a guide to selecting foods for the infants (Nestle *et al.*, 2009). Infants

and young children are predisposed to being neophobic to newly introduced foods. Though this response can be altered with repeated feeding behaviour (Roininen, 2001). However, children's eating behaviour, from breastfeeding to the family's daily diet, is not determined only by their biological needs, but by their interaction with food and by emotional, socioeconomic and cultural factors and the family's learning and adoption of new experiences (De Oliveira *et al.*, 2016).

While breastfeeding is a natural act, it is also a learned behaviour (UNICEF, 2012). Mothers and other caregivers need active support for establishing and sustaining optimal breastfeeding practices (WHO, 2001). Regardless of efforts to improve infant and young child feeding practices, a mother's choice of suitable feeding practices is highly influenced by numerous circles of life, and this is inclusive of the support provided by formal health services and the community she lives in (Sayed and Schönfeldt, 2018b), the attitude of the mother towards breastfeeding and its nutritional value, and the safety of her baby (Brown and Rowan, 2016).

## **2.4 Socio-environmental factors**

The social and cultural environment refers to a community interacting in a common region, who shares a common culture, institutions, and central characteristics (MacIntyre, Venter and Vorster, 2001). According to Larson and Story, (2009), the socio-cultural environment refers to the way that a social group organises people into families, social divisions, communities and other groupings (Larson and Story, 2009). Consequently, this environment has a strong influence on what kind of food is acceptable, the access to that food and consumption practices (Kittler, Sucher and Nelms, 2011).

Socio-cultural factors contribute to infant food selection and feeding practices which affects purchasing behaviours of parents (Larson and Story, 2009). These factors comprises of family, social class, religion, ethnicity, reference group, family, and demographics including sex, age, sex, occupation, education, marital status, income, and geography mediated by individuals' attitudes and beliefs (Haghighian Roudsari *et al.*, 2017). Several studies have been conducted on factors influencing infant feeding and discovered the compelling effects of socio-cultural determinants on selecting variety of foods globally (Devine, 2005; Antin and Hunt, 2012; Belon *et al.*, 2016).

The socio-cultural effects on acceptable infant feeding practices are diverse and intricate, and therefore they vary greatly from one society to another (Matusiak, 2004). Consequently, with

some of these practices, a large number of young children particularly in the developing countries experience poor feeding routines (Karigi, Mutuli and Bukhala, 2016). In all cultures there are a various factors that affect women's decisions on infant feeding behaviours and practices (Matusiak, 2004). Ordinarily, cultural factors such as health beliefs and food taboos may either limit feeding or offer alternate practices during illnesses of which both affects nutrition (Karigi, N.L.; Mutuli and Bukhala, 2016). These cultural practices are attributed to various knowledge, attitude and practices of different caregivers. A study in Kenya showed that women have valuable knowledge regarding the nutritional and medicinal value of certain fruits and traditional vegetables (Chweya & Eyzaguirre, 1999), Because these women were the main caregivers, understanding their knowledge and practices around child health benefits research regarding child health and nutrition. (Kimani-Murage *et al.*, 2015).

The socio-environmental factors include institutional, social, socio-demographic and socio-economic and will be discussed below.

#### **2.4.1 Institutional**

Food choice is not only determined by hunger cues and nutritional needs. Institutional factors such as culture, health care, mass media and policies lead to differences in accepted consumption of certain foods (Higgs and Thomas, 2016). Humans live in a social and cultural context and experience society-wide social norms and cultural expectations, which can be extraordinarily influential (Hauser, Jonas and Riemann, 2011). Mothers and caregivers feel compelled to subscribe to these norms and expectations to varying extent (Nestle *et al.*, 2009). Thus, the choice of foods may be greatly influenced by the social and cultural expectations from a common society (Karigi *et al.*, 2016). Values regarding food choice are learned through the process of socialization and are imposed on mothers who then steadily adopts them (Furst *et al.*, 1996).

De Oliveira *et al.*,(2016), explained that infant feeding practices, food choices, food preparation, and eating patterns all have deep cultural roots (De Oliveira *et al.*, 2016). Beliefs, attitudes, and practices surrounding foods and eating are some of the most vital factors of cultural identity, and therefore, it is expected that in multicultural societies, great diversity exists in the cultural characteristics of the food behaviour (Karigi, N.L.; Mutuli and Bukhala, 2016). Economic considerations and social values may also influence or constitute hindrances to dietary behaviour.

These barriers suggest that dietary advice is much easier to give than to receive and carry out (Nestle *et al.*, 1998).

Studies in Ghana showed that mothers' cultural practices and other perceptions like perceived lack of breast milk within the first hours postpartum, the beliefs that mothers and the new born babies need to rest after birth, new born babies should not be given breast milk if they are not crying for milk, and performing postpartum activities such as bathing were found to be the main reasons for delaying timely initiation of breastfeeding (Amugsi, Mittelmark and Oduro, 2015; Tette *et al.*, 2016).

Different studies carried out in the Mpumalanga province (Ratekin, 2016), as well as at study sites in the Western Cape, Eastern Cape and KwaZulu-Natal (Siziba and Jerling, 2015) found that the decisions by most mothers regarding infant feeding choice were made based on the information that was supplied by healthcare workers. In view of the fact that internal personal factors (attitudes, knowledge and personal preferences) and resources available to healthcare workers influenced the mothers' decisions, the authors concluded that attention should be paid to appropriate and adequate training of healthcare workers. Healthcare policies should therefore encompass such factors.

#### **2.4.2 Social**

Social influences on food choice refer to the effect that individuals have on the eating behaviour of others directly or indirectly. Maternal food choice is greatly impacted by social factors considering that attitudes and habits develop through the interaction with others (Higgs and Thomas, 2016). Child feeding is necessary part of parenting that entails reciprocal action between parents and children (Al-Marzoki, Almarzoki and Abdulkareem, 2015). Adequate feeding supports the child's growth and development physically, socially and emotionally (FANTA, 2014). Brunsø, *et al.* (2004) states that mothers influence their children's dietary practices through modelling and imparting beliefs, norms and values (Brunso, Scholderer and Grunert, 2004). Socially, the cultural practices of family and friends, particularly at times of special celebrations and holidays, provide occasions to eat culturally, religiously, traditionally or ethnically determined foods and emphasize the importance of these foods (Contento, 2015).

Haghighian *et al.*, (2017), describes that mothers may experience family members' expectations that they feed their child a certain way. The decision to breastfeed may be influenced by the

desires of a woman's family or her husband's family, depending on the culture (Honkanen, Verplanken and Olsen, 2006). The findings of a study conducted in Cairo showed that mothers breastfeed exclusively for the first 40 days except for the mint- or cumin-flavoured sugar water fed to the infants when they have colic. Subsequently the infant begins to be fed bread soaked in teas and milk, yogurt sweetened with honey, and the water from the family pot of rice, fava beans, and whole wheat cereal (Pak-Gorstein, Haq and Graham, 2009). Another study in Zaire, breastfed infants are fed cassava, banana, sorghum, millet, and cassava-maize flour during the first postnatal weeks because of a belief that human milk alone is not sufficient (Bentley *et al.*, 2014). On the other hand, African Americans supplement their breastfed infants with cereal mixed with formula in a bottle as early as 2 weeks of age with the believe that they are always hungry and milk alone is insufficient (Black *et al.*, 2008).

Therefore, social influences largely impact on infant feeding choice because most mothers receive social support from family and relatives on feeding practices.

### **2.4.3 Socio-demographic**

Socio-demographic characteristics include, age, sex, education, ethnicity, religious affiliation, marital status, and household income (Andrew and Harvey, 2011; Craig *et al.*, 2018). Different index variables are formed on the basis of socio-demographic variables of which the details are often used to describe realised samples (Bartle and Harvey, 2017). According to Wen *et al.*, (2014), distinct dietary patterns are common among infants as early as age 6 months. These patterns depend on socio-demographics, especially by maternal education, race and ethnicity (Wen *et al.*, 2014). Thus, influencing IYCF practices and consequently shaping the health status of children (Subedi and Paudel, 2012).

Kabir *et al.*, (2012) observed that a low level of maternal education was related with untimely introduction of complementary feeds, with lower meal frequency, lower dietary diversity and minimum acceptable diet in comparison to those mothers who had secondary and higher levels of education. (Kabir *et al.*, 2012). In Uganda, Kabahenda (2006) found that the maternal education remained a dominant independent predictor of stunting growth even after altering socio-economic indicators (Kabahenda, 2006). Additionally, the same study highlighted that children born to educated women experience less malnutrition. A study conducted in Nepal, where assessment of complementary feeding practices in young children aged 6–23 months by Joshi *et al.*, (2011) analysed that mothers with poor education were significantly less likely to give complementary



foods that met the recommended dietary diversity, minimum meal frequency and nutrient dense diet.

Studies revealed that the number of siblings in a household had a significant association with poor nutritional status; with children having more siblings experience reduced diverse diets and food variety (Kearney and Napier, 2016). However, in Ethiopia, a cross-sectional study revealed that the number of siblings in a household were not associated with DD (Dangura and Gebremedhin, 2017).

In a similar study, it was found that the age of mothers was strongly associated with stunting, the children of mothers who were 24 years and younger were more stunted than those whose' mothers who were older (Korir, 2014). Sawadogo et al., (2006), in Burkina Faso also found that mothers who are 25 year or less frequently introduced complementary foods late. Research conducted in Addis Ababa found that mothers who are working are highly likely to introduce complementary foods before 6 months in comparison to stay-at-home mothers (Gessese *et al.*, 2014).

#### **2.4.4 Socio-economic**

The socio-economic environment within a nutrition context refers to production, buying and consumption of products and the way they are managed (Furst *et al.*, 1996; Larson and Story, 2009; Jong Ho Lee, 2016). The economic factors are measured by determining education, income and occupation or a combination of these dimensions (Fombong *et al.*, 2016). The household's economic status is a barometer of access to adequate food supplies, use of health services, availability of improved water sources, and sanitation facilities, which are vital determinants of child and maternal nutritional status (WHO, 2008b). Socio-economic standing is a strong determinant of malnutrition in South Africa. Poor rates of household food and the prevalence of stunting and underweight among children both vary strongly according to socio-economic status (Labadarios *et al.*, 2011). Food access is an equitable measure of food insecurity. Food access is when a household's amount of money spent on food is inadequate to purchase a basic, nutritionally sufficient diet (Smulders, 2008). Food availability has been described by Contento (2015) as the array of food options that are present in the food industry that are acceptable and affordable while accessibility may be referred to as immediate availability, referring to the readiness and convenience of a food (Contento, 2015).

A study in Kenya revealed that there was a significant association between parental monthly income and child wasting, showing that parents of children earning low income were more wasted than those earning higher income (Wanjohi *et al.*, 2017). Consequently, the socio-economic status of urban households is likely to influence food access and the nutritional status of children because urban households' main source of food is through purchase (Kiboi, Kimiywe and Chege, 2017). A study that was conducted in 2008 showed that sub-Saharan Africa has disparities in child nutrition between rich and poor urban communities, and these differences were greater than those between urban and rural areas (WHO, 2008a). The proportion of poverty in the high-density urban settlements has been rising steadily (Van Deventer, Robert and Wright, 2016).

Okafoagu *et al* (2017) described numerous determinants associated with suboptimal breastfeeding and complementary feeding practices and have been identified with varied environments (Okafoagu *et al.*, 2017). These consist of maternal demographics such as age, occupation, marital status and education level; antenatal and maternity health care, health education and media exposure; socio-economic status and area of residence (Ickes, Hurst and Flax, 2015; Beckerman *et al.*, 2017).

## **2.5 Concluding remarks**

Suitable complementary feeding practices can ensure optimal nutrition status and prevent under 5 mortality in significant rates (Jones *et al.*, 2014). Dietary diversity is key to ensuring that young children get adequate quantity and quality of essential nutrients (Unicef, 2012). Inadequate dietary diversity of the complementary diet both in quality and quantity is one of the major problems affecting infants and young children worldwide (Ntila *et al.*, 2017). Although there are various strategies to improve dietary diversity in South Africa (DoH, 2013), majority of complementary feeding practices are substandard with a large number of children receiving complementary foods too early and at a lower frequency than recommended while the diet is often limited in variety. The literature cited above have reflected that complementary feeding practices are influenced by multiple determinants from mothers' knowledge, skills and attitudes to household and community beliefs.

Dietary diversity is key to ensuring that young children get adequate quantity and quality of essential nutrients (Unicef, 2012). To promote variety in diets, mothers' knowledge on the nutritional benefits of various foods needs to be enhanced. Albeit malnutrition is associated with

both economic and socio-demographic factors, mother's nutrition knowledge, attitude and practices has been found to have great effects on the status of child nutrition.

The literature revealed that there are significant gaps in information on the factors associated with the mothers' socio-cultural environment and the dietary diversity of their children aged 6 to 24 months in peri-urban South Africa. As a result, there is a need to investigate the mothers' socio-cultural environment by establishing their knowledge, attitudes and practices in terms of maternal food choice for their young children.

## **CHAPTER THREE: METHODOLOGY**

### **3.1 Introduction**

Research methodology is a process that provides an outline on how the research study will be carried out in order to meet the objectives of a study (Creswell, 2007). The focus of this chapter is on the study design, study population, sample, data collection methods and the measures that were taken to ensure validity and reliability.

It is important to note that the study used the term “child/children” to refer to infants and young children aged 6 to 24 months and not “infants and young children” for ease of reading.

### **3.2 Study design**

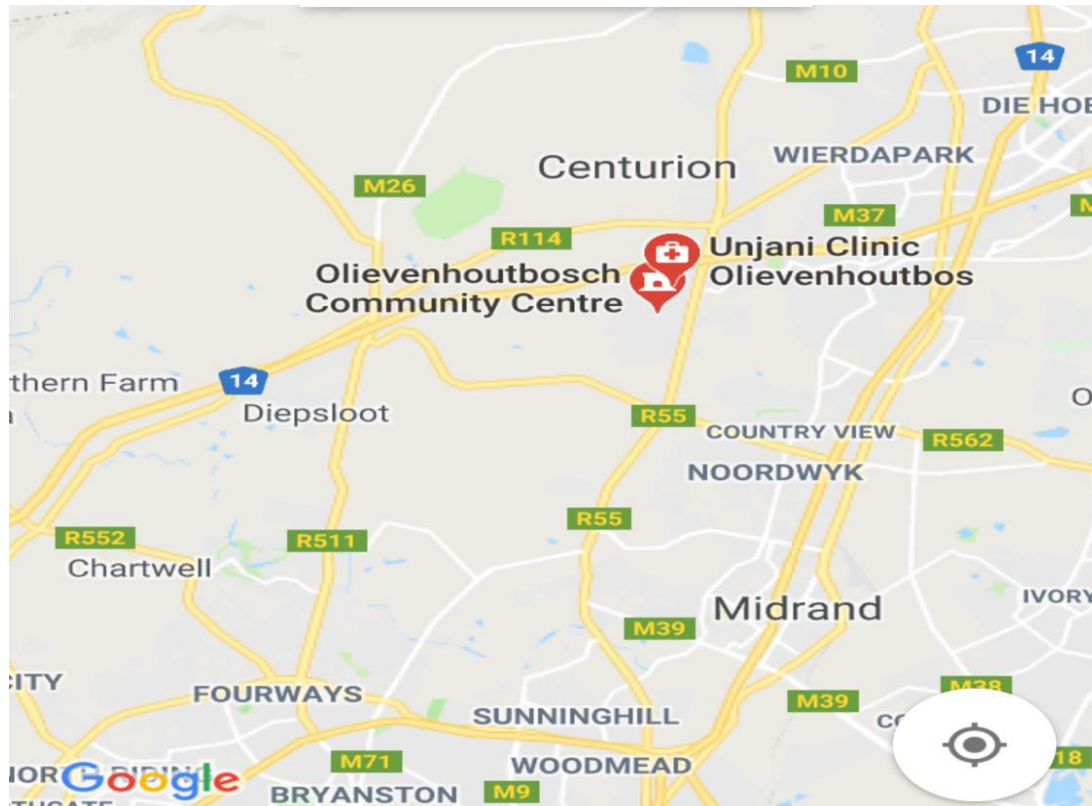
A quantitative cross-sectional explorative study was conducted to investigate the dietary diversity of children aged 6 to 24 months and its association with the mothers’ socio-cultural environment. A cross-sectional study is a type of observational research that examines data at one point in time. This may include the determination of a relationship between variables of interest that exist in a defined population at one particular time (Creswell, 2007). An exploratory study is undertaken to better understand the nature of the problem in a specific setting since very little previous information is available (Creswell, 2007). This design is utilised to determine the nature of the problem and not intended to provide conclusive evidence but rather helps to have a better understanding of the problem.

### **3.3 Study setting**

The study and data collection were conducted at a primary health care facility, Olievenhoutbosch health clinic, in Tshwane, Gauteng. According to the Census 2011, the healthcare facility falls under Region 4 of the City of Tshwane municipality. The township covers an approximate area of 11.39 square kilometres with a total population of 70,863 people and 23,777 households (StatsSA, 2011). This study location was chosen because it represents the rapid urbanization in the City of Tshwane which is a risk factor for dietary diversity (Ntila *et al.*, 2017). The healthcare facility setting was preferred over the household setting for recruitment and data collection, firstly because the surrounding living areas are not considered safe for female researchers and

fieldworkers to conduct interviews And secondly, because women may feel more secure to respond to the researcher in a healthcare environment than at their homes.

Figure 3.1 shows the location of the Olievenhoutbosch primary health-care facility where data collection was done.



**Figure 3. 1: Map indicating the location of the study setting within Gauteng**  
(source: Google Map, 2018)

### **3.4 Study population and sample**

The population of interest was the mothers of children aged between 6 and 24 months attending the Olievenhoutbosch health care facility.

The sample size for this study was calculated by means of a priori sample size calculation in the G\*Power 3.0.10 statistical programme. The statistical calculation involved a correlation statistical test: the simple t test. The calculation was based on a medium effect size F2 of 0.3, probability of error (alpha) of 5% and a power of 85%. The result was that 93 subjects were required. Therefore, 103 mother-child (6-24 months old) pairs in a healthcare facility setting were recruited.

Consecutive sampling was applied. Suresh (2014) describes consecutive sampling as total enumerative sampling, a technique in which every subject that meets the criteria of inclusion is selected until the required sample size is reached (Suresh, 2014). Subsequently, sampling bias is controlled.

### **3.4.1 Inclusion criteria**

Mothers attending the Olievenhoutbosch primary healthcare facility were recruited for participation on the following basis, making use of a recruitment checklist:

- Having a child aged 6 to 24 months. Mothers who had two children within this age category were still included in the study, however, data was collected on the youngest child in this age category.
- Aged 18 years or older.
- Able to communicate effectively in English, Zulu, Sotho, Venda or Tsonga.

### **3.4.2 Exclusion criteria**

The only exclusion criterion was if the child was sick during the previous 2 days and it affected his/her eating.

## **3.5 Recruitment and consent procedures**

A female fieldworker, with a university degree in Social Work, was recruited because she had experience with surveys and speaks six South African official languages. The fieldworker underwent a two-day training facilitated by the researcher in data collection which included role play interview exercises. The researcher and the fieldworker administered the questionnaires to the mothers that consented to the survey in a face to face interview. The languages used were English, then also interpreted in Zulu, Pedi, Tsonga and Venda as needed.

The objectives and purpose of the study were explained to women who were interested to take part in the study and who fit the inclusion and exclusion criteria according to the information sheet (Appendix A). Participants were given the opportunity to ask questions and to withdraw from the study without consequences. Those who agreed, signed the written informed consent form before data collection commenced (n=110) (Appendix A).

### 3.6 Data collection and instruments

Data on the mothers' socio-demographic status and the children's feeding practices was collected. The data collection instruments were a set of structured questions which were administered during an interview process. Table 3.1 summarizes the study objectives, variables and instruments.

**Table 3. 1: Operationalization of the study objectives, variables and instruments**

<b>Objectives</b>	<b>Variable</b>	<b>Instrument</b>
<i>Determine and describe the dietary diversity score of young children, aged between 6 and 24 months, who are attending the clinic in Olievenhoutbosch Township, Gauteng.</i>	Children's dietary diversity score	The infant and young child minimum dietary diversity questionnaire (IYCMDD)
<i>Determine and describe the mothers' breastfeeding practices.</i>	Mothers' breastfeeding practices	KAP Questionnaire-Section C: Practices on infant feeding
<i>Investigate the mothers' socio-cultural environment by determining their knowledge, beliefs, attitudes and values in terms of food choice for feeding their children.</i>	Maternal knowledge on feeding food choice  Maternal beliefs on feeding food choice	KAP Questionnaire-Section A: Knowledge of mothers on infant feeding and dietary diversity.  KAP Questionnaire-Section B: Attitude of mothers on infant feeding and dietary diversity
	Maternal attitudes on feeding food choice	KAP Questionnaire-Section B: Attitude of mothers on infant feeding and dietary diversity  KAP Questionnaire-Section B: Attitude of mothers on infant feeding and dietary diversity

	Maternal values on feeding food choice	
<i>Determine the association between the mothers' socio-cultural environment and the dietary diversity of their children.</i>	Socio-cultural environments (knowledge, beliefs, attitudes and values)  Dietary diversity of the children	KAP Questionnaire-Section A: Knowledge of mothers on infant feeding and dietary diversity.  KAP Questionnaire-Section B: Attitude of mothers on infant feeding and dietary diversity
<i>To compare the dietary diversity score of breastfed children and non-breastfed children.</i>	Dietary diversity score    Breastfeeding	IYCMDD- The infant and young child minimum dietary diversity questionnaire  KAP Questionnaire- Section C: Practices on infant feeding.

**3.6.1 Dependent variables**

The dependent variable for this study is the dietary diversity score. The infant and young child minimum dietary diversity (IYCMDD) score is a diet quality indicator designed by the World Health Organization to assess complementary infant and young child feeding practices among children who are aged 6 to 23 months (WHO, 2008b, 2010). The questionnaire used in this study was adapted from the World Health Organization (WHO) article “Indicators for assessing infant and young child feeding practices (Part 2 Measurement)” to provide simple, valid and reliable metrics for assessing infant and young child feeding (IYCF) practices at population level (WHO, 2010).

The child’s mother was interviewed to collect the child’s dietary intake data. Mothers were asked to indicate whether their children consumed any food over the previous 24 hours from each of the seven food groups. The food groups included:

- 1) Grains, roots and tubers
- 2) Legumes and nuts
- 3) Dairy products (breastmilk and formula milk excluded)



- 4) Flesh foods
- 5) Eggs
- 6) Vitamin-A rich fruits and vegetables
- 7) Other fruits and vegetables

The analysis of responses to the IYCMDD questionnaire is explained below in section 3.8.

The IYCMDD questionnaire was used to determine the dietary diversity of the child. Therefore, for each child, a score is an indicator on whether a food was consumed from one particular food group. If only foods from one food group were consumed, the DDS would be 1. Thus, a child can have a score of 1 to 7. Any amount of food from each food group that is consumed regardless of quantity was applied, except if an item is only used as a condiment (WHO, 2008b). Please see Appendix B.

### **3.6.2 *Independent variables***

The independent variables for this study are socio-environmental factors which include social, socio-demographic and socio-economic factors.

#### **3.6.2.1 *Socio-demographic data***

The socio-demographic data was collected by means of a questionnaire developed by the researcher. This questionnaire collected data on the demographic characteristics of the mothers, including age, education level, employment status and marital status. The children's birth details, including birth date and sex were collected from the Road-to-Health card of consented mothers (Appendix B).

#### **3.6.2.2 *Knowledge, attitude and practices (KAP)***

The KAP survey was adapted from guidelines for assessing nutrition-related knowledge, attitudes and practices (FAO, 2014). According to FAO (2014), "evaluating nutrition-related knowledge, attitudes and practices offers an opportunity to better understand a given situation by providing insights into the social, psychological and behavioural determinants of nutritional status" (FAO, 2014). The KAP survey was suitable for this research as it was a useful method for gaining an insight into the mothers' personal determinants of their children's dietary habits.

- The KAP survey comprised of predefined questions that captured information on critical knowledge, attitudes and practices related to the dietary diversity of young children. KAP questionnaires help to reveal behaviour, misconceptions and misunderstandings and also to identify what is known, believed and done about various nutrition-related subjects (FAO, 2014). The survey consisted of a questionnaire on the following:
- Knowledge of mothers on dietary diversity of their child and the mother's intellectual capacity to remember and recall food and nutrition related terminology. The questions were based on a three-point scale of either "yes", "no" or "not sure". Questionnaires were scored as codes of 1 for a correct response and 0 for an incorrect response
- Attitudes are perceptive, cognitive, emotional and motivational beliefs that positively or negatively influence the behaviour or practice of individuals (USAID, 2017). The questions were based on a five-point scale where the responses would be measured on dietary diversity, food preferences and food taboos.
- Practice is the observable action of individuals that affects their nutrition, such as preparing food, cooking, feeding and selecting foods (FAO, 2014). The questionnaire consisted of four or five possible answers where respondents were asked to select only one applicable answer.

The KAP questionnaire has partially categorized questions which the mothers were required to provide short answers to. Predefined options make an analysis easier by listing expected responses.

### 3.6.2.3 *Infant and young child feeding practices*

In order to address objectives two and five, questions regarding the mothers' breastfeeding practices and introduction of complementary food were included in the questionnaire. The section comprised of twelve closed ended questions which included duration of breastfeeding, mixed feeding, person responsible for primarily feeding the child and the variety and diversity of the child's diet. Responses to these questions reveal the practices of the mothers regarding infant and young child feeding practices.

## 3.7 **Quality control**

Gleason *et al.* (2010) describe quality control as the efforts and procedures that the researcher puts in place to ensure the quality and accuracy of the collected data (Gleason *et al.*, 2010).

### **3.7.1 Reliability**

Reliability refers to the extent to which the instrument can be relied on to produce dependable results if it is used repetitively over time on the same person, or if used by two different researchers. An instrument is regarded as reliable if it is used more than once to evaluate constant behaviours and still produces the same results (Gleason *et al.*, 2010). Cronbach's alpha is the effective way to test the internal reliability (Tavakol & Dennick, 2011). In this study, the questionnaires were sent to two independent nutritional professionals for review and input.

### **3.7.2 Validity**

Khalid *et al.* (2012) outlined validity as the degree to which the data collection instruments will measure what they are supposed to measure and that the score truly represents the theory (Khalid, Hilman & Kumar, 2012).

To ensure that the validity of this research was met, researchers with specialized knowledge in this field were requested to read through and comment on the instrument (questionnaire). In addition, three potential respondents read through the questionnaire and gave some comments. They were further asked if they understood the instructions of the questionnaire, question formulation and if there were sufficient alternative options within relevant questions.

## **3.8 Data analyses**

As stated earlier, data was collected by means of questionnaires. The collected data was screened for accuracy, consistency and completeness. It was then coded and captured into an excel spreadsheet. After data cleaning, it was converted into the Statistical Package for the Social Services (SPSS) software, version 25 (SPSS Inc, Chicago, IL, USA). As required, the quantitative data was transcribed and coded by assigning labels to various categories. Descriptive analyses were conducted for objectives 1 to 3 (frequencies and proportions). For objectives 4 and 5, inferential statistics were conducted, using the Chi-square test for categorical data, while the Kruskal Wallis and Wilcoxon/Mann tests were conducted for ordinal data. Internal consistency of responses for attitude questions was assessed using Cronbach's alpha.

### **3.9 Limitations**

The limitation of the study is the fact that the study location has only one primary health care facility. This study cannot be generalized to all South African mothers since the sample size was relatively small and only focused on a specific informal settlement in Gauteng. Future research may therefore use a sample of several different informal settlements in Gauteng. Further limitations of this study were the time restrictions and limited financial resources which also restricted the sample size and magnitude of the study. However, the study was adequate to address the aspects in question in an explorative nature.

### **3.10 Ethical considerations**

Ethical clearance was obtained from the Ethics Committee of the College of Agriculture and Environmental Sciences (CAES) at the University of South Africa (Ethics number 2018/CAES/163) (See appendix D for the clearance certificate). Permission was obtained from the Department of Health and Tshwane Health District (See appendix E for the permission letter). During recruitment, the researcher and field workers explained the purpose and objectives of the research to potential respondents.

Written informed consent was obtained before the researcher and trained fieldworkers started conducting interviews (See appendix A for the informed consent form). The potential respondents were allowed to ask questions before the forms were signed. The privacy and confidentiality of collected information were ensured at all times. Participant names were not written down and their identities were protected by assigning consecutive respondent numbers to the forms.

Hard copies of the data collected would be stored by the researcher for a period of five years in a locked cabinet in Centurion and the electronic data would be stored on a password protected computer. Future use of data will be subject to further research ethics reviews and approval if applicable. Finally, the hardcopies would be shredded, and the electronic information permanently deleted.

### **3.11 Conclusion**

This chapter provided the rational and motivation for the selected methodology. It described the research design, study population, the sample, data collection procedures and instruments, data analysis and ethical procedures. Measures taken to ensure reliability and validity were outlined.

An overview of how a statistical analysis of data was conducted was also given. The results of the data analysis are presented in Chapter four.

## CHAPTER FOUR: RESULTS

### 4.1 Introduction

This chapter presents the research results. The aim of the study was to explore the association between mothers' socio-cultural environment and the dietary diversity (DD) of their children between the ages of 6 and 24 months. The results are portrayed in tables and graphs. Firstly, the characteristics of the respondents are presented, followed by reported dietary intakes and by DD as well as mothers' knowledge, attitudes and practices on infant feeding. Associations of mothers' knowledge and attitudes with their children's dietary diversity are provided in the final tables.

### 4.2 Socio-demographic characteristics of the mothers

A total number of 110 mothers were interviewed for the study. Out of the 110 interviewed mothers, seven did not complete the interview (three were due to illness of their babies and four due to baby's age being out of the inclusion range). Therefore, 103 mothers were included for this study.

Table 4.1 presents a summary of the included mothers' socio-demographic characteristics (n=103). Of the 103 respondents, 29 (28%) were between the ages of 18 and 24 years. The majority (59%) of the mothers were between the ages of 25 and 34 years. There was only 1 (1%) mother who was over the age of 45 years. A large proportion (75%) of mothers completed Grade 12 schooling and, in addition, 18% had tertiary education, while only 7% had Grade 10 and below. The ethnicity of the mothers interviewed were varied, but mainly Pedi (27%), Sotho (21%), Zulu (19%) and Xhosa (15%).

Many (47%) of the mothers were single, while almost a third (31%) were living with their partner and 17% were married. Most of the mothers (72%) were unemployed while only 17% were employed on a full-time basis. Only 3% had four or more children in the household while the most households (60%) had only one child. The gender of the children on which the mothers reported was almost equally represented with 54% being females and 46% males. The majority (58%) of children were between the ages of 6 and 11 months old while 42% were between the ages of 12 and 24 months.

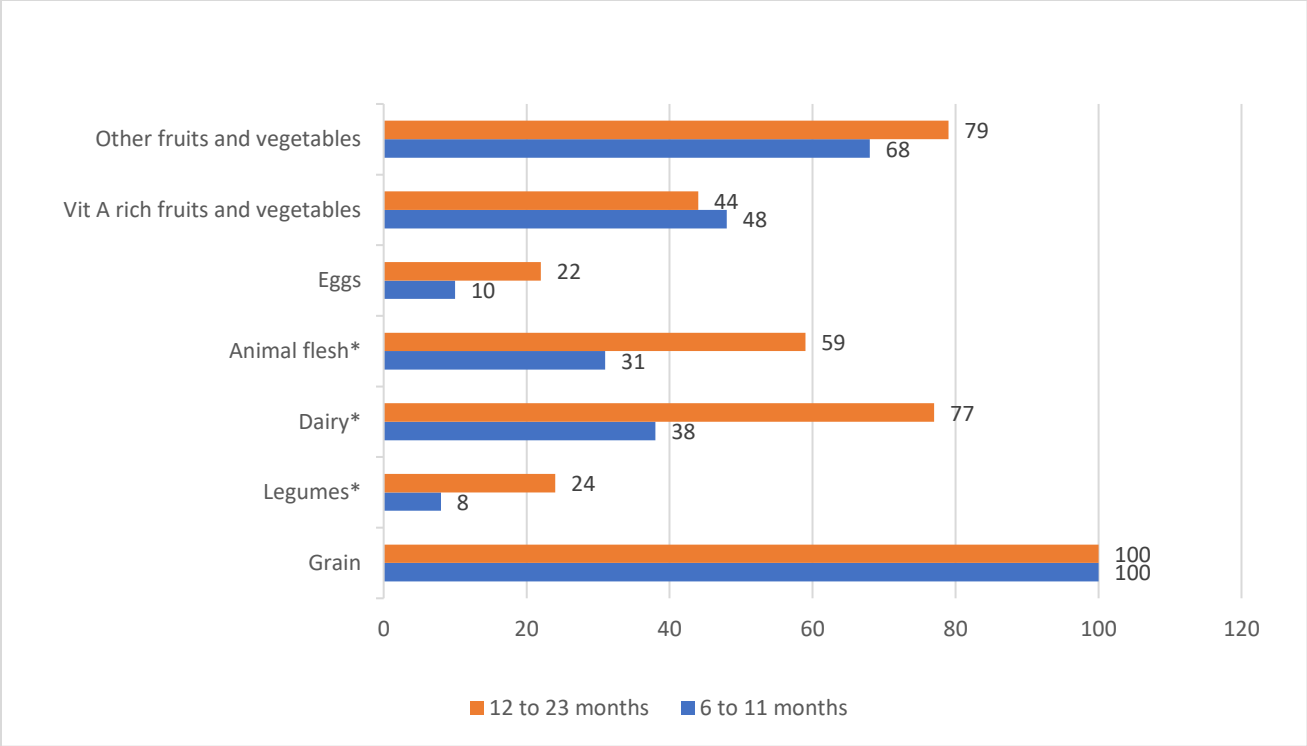
**Table 4. 1: Characteristics of mothers of children between the ages of 6 and 24 months in Olievenhoutbosch township, Gauteng (n=103)**

<b>Characteristic</b>	<b>n (%)</b>
<b>Mothers' age (years)</b>	
18-24	29 (28)
25-34	61 (59)
34-44	12 (12)
>45	1 (1)
<b>Mothers' Education</b>	
None / Primary	0 (0)
Grade 8-10	7 (7)
Grade 11-12	77 (75)
Tertiary Education	19 (18)
<b>Ethnicity</b>	
Zulu	20 (19)
Sotho	22 (21)
Tswana	7 (7)
Tsonga	4 (4)
Venda	3 (3)
Xhosa	15 (15)
Pedi	28 (27)
Other	4 (4)
<b>Marital status</b>	
Married	17 (17)
Living with partner	32 (31)
Divorced/separated	4 (4)
Single	48 (47)
Widowed	2 (2)
<b>Employment status</b>	
Yes (full time)	17 (17)
Yes (part time)	8 (8)
Self-employed	3 (3)
No	75 (72)
<b>No. of children in household (0 – 18 years)</b>	
1	62 (60)
2	22 (21)
3	16 (16)
4	3 (3)
<b>Child's gender</b>	
Male	47 (46)
Female	56 (54)
<b>Child's age (months)</b>	
6 to 11	60 (58)
12 to 23	43 (42)

### 4.3 Infant and young child dietary diversity (DD)

The mothers reported that all children in this study had been introduced to complementary foods in the last 24 hours prior to the interview. The DD determined was based on reported intake within the preceding 24 hours of the interview and the DDS was calculated out of the standard seven food groups as explained in Chapter 3. As shown in Figure 4.1, all the children consumed foods from the “grains, roots and tubers” group the previous day. The second most consumed food group from both age groups was “other vegetables and fruits” (68% of the 6-11 months group and 79% of the 12-24 months age group). Almost half (48%) of the younger age group consumed vitamin A rich fruits and vegetables and 44% of the older group consumed food from this group. Dairy was mostly consumed by the older group (77%), while only 38% of the younger group consumed dairy other than breastmilk of formula milk. Almost two thirds (59%) of the older group consumed animal flesh foods and only 31% of the younger group consumed animal flesh foods in the preceding 24 hours. Legumes were the least consumed by the younger group (8%) and while almost a quarter of the older group (24%) consumed legumes. For the older group of children, eggs were the least consumed food group (22%). Only 10% of children in the younger group consumed eggs the previous day. Significantly less children from younger age group were reported to have consumed dairy ( $p<0.001$ ), animal flesh foods ( $p=0.014$ ) and legumes ( $p=0.034$ ) the previous day, compared to the older age group.





**Figure 4. 1: Percentage of children reportedly consuming different food groups in the previous 24 hours, per age group**  
*\* p < 0.05*

The DDS, as shown in Table 4.2, was classified using a score of four or more as being adequate and less than four food groups as inadequate (WHO, 2016). Half of the total group of children did not meet the minimum dietary diversity (MDD) of four food groups per day. Significantly more children from the older group consumed MDD compared to the younger group (67% vs 38%,  $p=0.019$ ).

**Table 4. 2: Reported Food Groups consumed in the last 24 hours (n=103)**

DDS (24 hours)	Total group n (%)	Young group (<12 months) (n=60) n (%)	Older group (12 - 23 months) (n=43) n (%)	p
<b>Inadequate</b>	<b>50%</b>	<b>62%</b>	<b>33%</b>	<b>0.019</b>
1	12 (12)	12 (20)	0	
2	12 (12)	7 (12)	5 (12)	
3	27 (26)	18 (30)	9 (21)	
<b>Adequate</b>	<b>50%</b>	<b>38%</b>	<b>67%</b>	
4	28 (27)	14 (23)	14 (33)	
5	17 (16)	7 (12)	10 (23)	
6	6 (6)	2 (3)	4 (9)	
7	1 (1)	0	1 (2)	

#### **4.4 Mothers' reported practices on breastfeeding and complementary feeding**

Table 4.3 indicates the responses regarding feeding methods as at time of the survey. There were significant differences in terms of milk-feeding between the younger and older groups of children ( $p < 0.001$ ). The results indicated that 35% of the younger group and 21% from the older group of children received breastmilk as the only milk feed. Children that were fed only formula were 32% of the younger group and 28% from the older group. Only 12% of the older group of children were mixed fed while 32% of the younger group were mixed fed. More than a third of the mothers fed their babies milk on demand (36%) while 33% of the mothers indicated that they followed a routine. There was no significance between the two groups on frequency of feeding ( $p = 0.118$ ). Most of the mothers indicated that they measured the quantity of milk feeds based on the baby's appetite (60%). Regarding the mothers that fed their baby formula, when asked who gave them advice on how to prepare the formula, most mothers (44%) said they used the information provided on the formula milk packaging and only 12% obtained advice from healthcare personnel. Only 5% reported to have taken advice from family. The mothers were asked which foods they first initiated to their babies and almost half (44%) of the total group reported maize meal porridge as the first food. Cream of maize was reported by 29% of mothers as the first food given to their babies, while 15% of the mothers initiated instant porridge to their babies.

Subsequent to the first foods question, the mothers were also asked at what age did they introduce complementary foods to their babies. A considerable number of mothers (13%) from the total group reported to have fed their babies as early as one month of age and 4% reported to have introduced foods to their babies at two months of age. Less than half of the mothers (45%) initiated the first foods at the recommended age of 6 months. We had one (1%) mother from the

older group that reported to have delayed the introduction of complementary foods to 7 months of age.

**Table 4.3: Maternal responses on infant feeding practices**

	<b>Total group n=103 n (%)</b>	<b>Young group (&lt;12 months) (n=60) n (%)</b>	<b>Older group (12 - 23 months) (n=43) n (%)</b>	<b>P-value</b>
<b>Current feeding methods</b>				<0.000
Breastmilk only	30 (29)	21 (35)	9 (21)	
Formula feeding only	31 (30)	19 (32)	12 (28)	
Mixed feeding	24 (23)	19 (32)	5 (12)	
Other	18 (18)	1 (1)	17 (39)	
<b>Frequency of feeding</b>				0.118
Feed on demand	19 (18)	13 (22)	6 (14)	
Follow routine	34 (33)	15 (25)	19 (44)	
Combination of 1 and 2	50 (49)	32 (53)	18 (42)	
<b>Feeding size</b>				0.650
Depends on baby's appetite	62 (60)	35 (58)	27 (63)	
Depends on baby's growth	41 (40)	25 (42)	16 (37)	
<b>Formula preparation advice</b>				0.121
Do not feed formula milk	34 (33)	19 (32)	15 (35)	
Midwife	2 (2)		2 (5)	
Health personnel	12 (12)	9 (15)	3 (7)	
Friends	2 (2)		2 (4)	
Family	6 (5)	4 (6)	2 (4)	
Formula milk tin or packet	45 (44)	28 (47)	17 (40)	
Other	2 (2)		2 (5)	
<b>First foods given to baby</b>				0.144
Maize meal porridge	45 (44)	22 (37)	23 (53)	
Cream of maize	30 (29)	21 (35)	9 (21)	
Instant cereal	16 (15)	11 (18)	5 (12)	
Mabele porridge	10 (10)	6 (10)	4 (9)	
Rice porridge	2 (2)		2 (5)	
<b>Age (months) at which first foods were given</b>				0.724
1	13 (13)	7 (12)	6 (14)	
2	4 (4)	3 (5)	1 (2)	
3	13 (13)	7 (12)	6 (14)	
4	15 (14)	11 (18)	4 (9)	
5	10 (10)	6 (10)	4 (9)	
6	47 (45)	26 (43)	21 (50)	
7	1 (1)		1 (2)	

#### 4.5 Mothers' knowledge on complementary feeding and dietary diversity

The knowledge questionnaire included knowledge questions regarding breastfeeding practices, complementary feeding, dietary diversity as well as on hygiene practices. The mothers' knowledge is presented as percentage answered correctly. Table 4.4 indicates that the overall mean knowledge score was 78% ( $\pm 8.2$ ). There was no significant difference in knowledge scores between mothers of the younger group and the older group of children (77% vs 79%,  $p=0.30$ ). The mothers' knowledge was broken down into four categories. On breastfeeding knowledge, they had a mean score of 70% in both groups ( $p=0.22$ ). The overall complementary feeding knowledge mean score was 75% ( $\pm 16$ ). The mean score for the older group was 77% ( $\pm 17$ ) and for the younger group was 74% ( $\pm 15$ ) with no significant difference between the two groups ( $p=0.30$ ). The knowledge on dietary diversity mean score for the mothers of the younger group was 72% ( $\pm 17$ ) while the older group was 75% ( $\pm 12$ ) ( $p=0.09$ ). The hygiene knowledge score for the mothers of the younger group was higher at 94% ( $\pm 13$ ) and the older group was 91% ( $\pm 15$ ) ( $p=0.05$ ).

**Table 4. 4: Mothers' knowledge scores on complementary feeding and dietary diversity**

Knowledge score (%)	Total group (n=103)	Mothers of young children (6 – 11 months) (n=60)	Mother of older children (12 – 23 months) (n=43)	<i>p</i>
Mean (SD)				
Overall knowledge score (%)	78 (8.2)	77 (7.8)	79 (8.8)	0.30
Knowledge score – breastfeeding (%)	70 (18)	70 (16)	70 (20)	0.22
Knowledge score – complementary feeding (%)	75 (16)	74 (15)	77 (17)	0.30
Knowledge score – dietary diversity (%)	73 (15)	72 (17)	75 (12)	0.09
Knowledge score – hygiene (%)	93 (14)	94 (13)	91 (15)	0.05

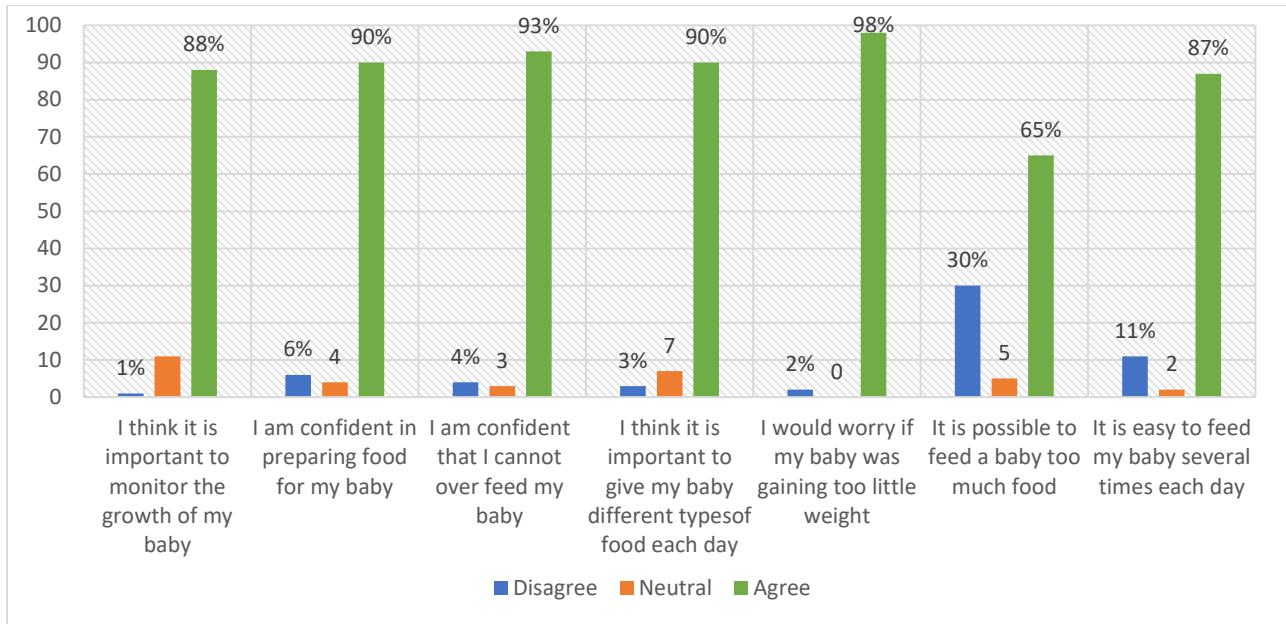
## 4.6 Mothers' attitude towards complementary feeding and dietary diversity

The reliability of the attitude questionnaire was assessed using Cronbach's Alpha. When assessed including all nine questions, the Cronbach Alpha value was low ( $\alpha=0.58$ ). Based on the statistical results, it was indicated that if two specific questions were removed, the Cronbach Alpha value would improve (Figure 4.2). Therefore, the Cronbach Alpha value for the seven questions were 0.66 and the reliability of these seven questions to assess maternal attitude towards complementary feeding and dietary diversity is considered acceptable. The two questions removed from the questionnaire were both related to the mother asking feeding advice from nurses or relatives.

**Table 4.5: Coefficient alpha reliability estimates for the attitudes question items (n=103)**

Attitude questionnaire	Items excluded	Cronbach Alpha	Reliability
Nine questions	None	0.58	Low
Eight questions	Q42: Feeding advice from nurses	0.60	Acceptable
Seven questions	Q42: Feeding advice from nurses Q43: Feeding advise from relatives	0.66	Acceptable

Responses to each of the seven items were grouped as positive (agreement), negative (disagreement) and neutral or unknown (not sure) and are presented in Figure 4.2. The majority of the mothers (88%) agreed that they think it is important to monitor the growth of their baby. Most mothers (90%) were confident in preparing food for their baby and that they cannot over feed their babies. Positive attitude reflected on dietary diversity as 90% of the mothers think it is important to give their baby different types of foods each day. Most of the mothers (98%) agreed that they worry if their baby was gaining too little weight. A small number of mothers (5%) did not know if it was possible to feed a baby too much food while 30% disagreed.



**Figure 4.2: Mothers' attitude on complementary feeding and dietary diversity**

Table 4.6 reflects the results from the two questions that were removed to assess attitude towards dietary diversity. A considerable number of mothers (37%) disagreed that they ask for advice about which foods is appropriate for their baby from the nurses at the clinic, while 41% of the mothers agreed that they ask the nurses. Almost a third of the mothers (29%) disagreed that they ask advice from their family about what to feed their babies.

**Table 4. 6: The mothers' attitude on getting complementary food advice**

Item	Disagree n (%)	Neutral n (%)	Agree n (%)
I ask the nurses at the clinic about which food is appropriate to feed my baby	38 (37)	25 (24)	40 (41)
I ask my family about which food to feed my baby	30 (29)	23 (22)	50 (49)

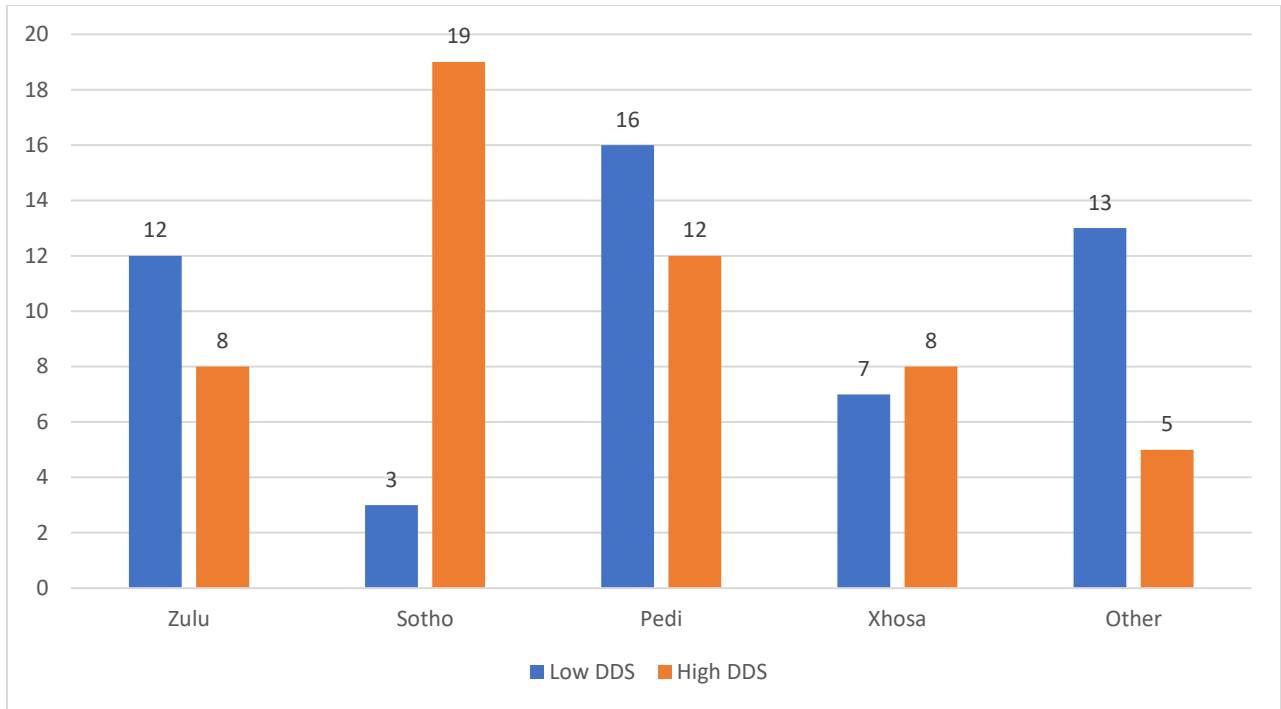
#### 4.7 The associations between socio-cultural factors and their children's dietary diversity

Table 4.7 shows that based on the results of the Pearson's correlation test, maternal knowledge and the child's DDS had a statistically significant linear relationship ( $p=0.026$ ). The magnitude of this positive relationship is small ( $r=0.22$ ). Only this overall knowledge score was associated with the DDS, while the divided topics of maternal knowledge (breastfeeding, complementary feeding, dietary diversity and hygiene) were not associated with DDS.

No association was found between MDD and maternal age, education, maternal marital status and maternal employment status ( $\chi^2 =1.73, p=0.42$ ;  $\chi^2=0.62, p=0.73$ ;  $\chi^2=1.17, p=0.28$  and  $\chi^2=0.004, p=0.95$ , respectively). However, maternal ethnicity was associated with MDD ( $\chi^2=16.62, p=0.002$ ). More mothers from the Sotho and Xhosa groups reported dietary intake that met the MDD (Figure 4.3). In the Sotho group, 19% reported to meet the MDD while 3% did not meet the MDD. In the Xhosa group the difference was much smaller with 8% reporting to meet the MDD vs 7%. On the other hand, fewer mothers from the Zulu, Pedi and Other ethnic groups reported dietary intake that met the MDD.

Regarding maternal attitude, no association was found between MDD and the attitude towards importance of monitoring baby's growth, baby not gaining weight, confidence in preparing baby's food, confidence in appropriate feeding, the importance of dietary diversity, family advice on appropriate feeding methods and feeding frequency of baby.

However, maternal attitude towards the possibility of overfeeding the baby was associated with MDD ( $\chi^2=12.87, p=0.002$ ). The mothers that met the MDD and agreed that they are confident about not overfeeding their baby (26 vs 41, mothers that disagreed 24 vs 7 and mothers that were not sure 2 vs 3, respectively). The mothers that had a positive attitude towards advice from nurses and family about appropriate feeding were associated with MDD ( $\chi^2=15.78, p<0.001$ ;  $\chi^2=7.24, p=0.02$ ). Table 4.8 shows that there was no significant difference in DD score for the breastfed and non-breastfed group of children. The breastfed children had a mean score of 3.43 ( $\pm 1.61$ ) and non-breastfed children 3.48 ( $\pm 1.33$ ) ( $p=0.17$ ).



**Figure 4. 32: Maternal ethnicity and their children's dietary diversity score**

**Table 4. 8: The association between breastfed/non-breastfed children and their dietary diversity**

	Breastfed Babies n=30	Non-breastfed Babies n=73	P-value
Low DDS (1-3)	16	35	
High DDS (4-7)	14	38	
Chi-square			0.62
Mean (SD)	3.43 (1.61)	3.48 (1.33)	0.17

## 4.8 Conclusion

The study sample included 103 mothers who attended Olievenhoutbosch primary healthcare clinic with their young children. Our results support the SCT as we used it to predict the health behaviour of our sample. The primary concepts of the theory were socio-environmental factors which influence dietary intake and how they carry out the behaviours. The results of the children were divided into two groups - the young group (6 to 11 months) and the older group (12 to 24 months). Most of the mothers were between the ages of 25 to 34 years and most of them had grade 12 schooling. The majority were single and unemployed.



The study revealed that all children consumed grains the previous day, while only 59% of the older group consumed animal flesh foods. More children of the older group obtained the MDD compared to the younger group (67% vs 38%). The results showed that maternal knowledge regarding complementary feeding and DD had an overall mean score of 78% ( $\pm 8.2$ ). Additionally, the study findings showed that the complementary feeding attitude of the mothers was positive. Their attitude towards the importance of dietary diversity was high at 90% of mothers who agreed to give their babies a diverse diet. A third of the mothers practiced exclusive breastfeeding and another third gave their babies only formula milk. The study also indicated the first foods given to the babies were maize meal porridge (44%), followed by cream of maize (29%) then instant cereal (15%). The age at which the food was initiated was mostly at six months (45%), then at four months (14%), followed by one month (13%).

The association between the knowledge of the mothers and DDS had a statistically significant linear relationship ( $p=0.026$ ). Maternal ethnicity was associated with MDD ( $\chi^2=16.62$ ,  $p=0.002$ ). Maternal attitude that was associated with DDS was towards the possibility of overfeeding the baby ( $\chi^2=12.87$ ,  $p=0.002$ ) as well as when obtaining advice from either family or the clinic.

## CHAPTER FIVE: DISCUSSION

### 5.1 Introduction

The purpose of this cross-sectional study was to explore the association between mothers' socio-cultural environment and the dietary diversity of their children between the ages of 6 and 24 months, who attend the health care clinic in Olievenhoutbosch Township, Gauteng. The sample were mostly unemployed single mothers who were fairly educated. The results indicated that breastfeeding rates were low and that the younger group did not meet the MDD. The results also highlighted that most socio-cultural variables were not associated with the child's dietary diversity except for ethnicity and maternal knowledge. In this chapter, these observations are discussed in more detail and compared to available literature.

### 5.2 Socio-demographic characteristics

The study findings indicated most of the women in our study were between the ages of 25 and 34 years which reflects the peak age-specific fertility rates of South Africa at 25-29 years of age (SADHS, 2019). For South Africa, the median age at which women are bearing their first child is 21.3 years (SADHS, 2019) while 18% of women have given birth by age 18. Almost a third of the study sample were 24 years or younger. Childbearing at a very young age is associated with an increased risk for child mortality (Neal, *et al.*, 2018).

The ethnicity in the study group was diverse with many of the mothers speaking Northern Sotho (Pedi) followed by Zulu, Sotho and Xhosa. These findings relate to South African ethnic demographics. According to the census of 2011, the first languages spoken in South Africa were Zulu (28%), Xhosa (19%), Northern Sotho (11%) and Sotho (9%) (StatsSA, 2011).

The study sample were well educated with 93% having matric or higher. In South Africa, the median number of years of schooling is higher in urban areas and in Gauteng compared to rural areas and other provinces (SADHS, 2019). In addition to these, only 18% had tertiary education. Even though the mothers had good education, the majority (73%) were unemployed and dependent on social grants as a source of income. The high rate of unemployment is expected to be attributed to the high rate of unemployment in the country. These indicators are in line with existing reports in other Townships in South Africa (Faber, *et al.*, 2016; Ntila *et al.*, 2017).

Less than half of the study sample were supported by a partner in terms of parenting (17% married and 31% living with a partner). More than half of the mothers were single and heading a household with only one income which illustrates the economic situation young mothers face in peri-urban settings. More than half of the women (60%) had only one child in the household and 21% of the mothers had two children per household. The majority were raising children on their own and, in addition, were unemployed (73%) which poses challenges financially and subsequently on food security and overall health. Our sample of mothers were therefore fairly educated, mostly unemployed and generally single which are all factors playing a role in child nutrition in a low socioeconomic community. A study conducted in public clinics within Cape Town revealed that because of these factors, it is not uncommon for mothers to make poor food choices (Enstrom and Pettersson, 2016). Therefore, the adequacy of the complementary foods is expected to depend on the availability and affordability of foods in the household (Faber, Laubscher and Berti, 2016).

### **5.3 Infant and young child minimum dietary diversity**

The recommendations and guidelines from WHO (2008) encourage that young children should receive foods from 4 or more food groups out of the 7 recommended food groups over a period of 24 hours (WHO, 2008b). A varied diet may provide the child with the required amounts of nutrients that are necessary for growth and development. A study conducted in peri-urban Cape Town shows that children aged 6-23 months did not meet the minimum dietary diversity (Du Plessis *et al.*, 2016). High energy-dense diet like maize meal porridges were the most common supplementary foods given to young children (Mushaphi *et al.*, 2008, Chandrasekhar *et al.*, 2017). Mitchodigni *et al.*, (2017) reported that the thin maize meal porridges, as the first food given to infants in Southern Africa, generally provided low nutritional value. This was reflected in our study with most of the children to have received maize meal porridge (44%) and cream of maize (29%) as the first food and all of the children (100%) receiving grains the previous day.

In this study, the food groups reported on were: 1) grains, roots and tubers; 2) legumes and nuts; 3) dairy products; 4) flesh foods (meat, fish, poultry and organ meats); 5) eggs; 6) vitamin-A rich fruits and vegetables; and 7) other fruits and vegetables (WHO, 2008b).

The results reflected that all children consumed grains which can be attributed to the fact that these foods are the staple foods in South Africa. However, to achieve a quality diet, the diet should be diverse and inclusive of all food groups (Ogunba, 2010). In this study, the majority of the younger children (6-11 months) did not achieve the MDD (62%). The results concur with a study done in Western Cape where almost half of the children between the ages of six and twelve months had a mean DD score of 3.26. The low score could be attributed to the fact that a third of babies (6 – 8 months) in the before mentioned study did not receive complementary foods in the preceding 24 hours (Du Plessis *et al.*, 2016). Our study showed that majority of the older group of ages 12 to 24 months met the adequate dietary diversity score. From the low DDS and indication of what food groups are provided (Figure 4.1) it seems that young children are seldomly provided with sufficient vitamin A rich foods and protein rich foods, including eggs, legumes and meats. From six months, breastmilk does not provide adequate iron, protein and vitamin A to meet the infant's needs. Therefore, a nutrient dense diet which includes protein, vitamin A and iron rich foods should be introduced as part of complementary foods (DoH, 2013). However, the younger group in our study showed a low (31%) intake of animal flesh foods. This mirrors the results of a review of complementary food in South Africa where DD was poor in many older infants and young children and the use of animal source foods appears to be low (Sayed and Schönfeldt, 2018a). The diet of South African children is not diverse according to a study by Steyn (2013). The diet was mainly from the cereal, grain and tubers group. The other groups were not sufficiently consumed (Steyn and Ochse, 2013). Factors contributing to low DD include the cost of nutrient dense food. People with a low income usually opt for a high energy dense diet with low intake of micronutrients. A high DDS has been associated with higher food costs (Steyn and Ochse, 2013). Our study concurs with these findings.

#### **5.4 Mothers' practices on breastfeeding, complementary feeding and dietary diversity**

The first two years of life is considered to be a critical period for growth and development and is also the period where growth faltering can occur. Young children are vulnerable to nutritional deficiencies mainly caused by improper breastfeeding and complementary feeding practices (Faber and Benade, 2007). In most peri-urban communities, it is uncommon for complementary feeding to meet the requirements of a diverse diet since most initiated food is maize meal porridge and cereal based diets (Faber, Laubscher and Berti, 2016).

Poor breastfeeding and complementary feeding practices remain a concern in South Africa. With children aged 6- 24 months being vulnerable to these practices (Faber and Benade, 2007). The results in our study indicates that a third of the mothers (29%) provided breastmilk as the only milk feed, while 23% percent mixed feed (breastmilk and other milks) and another 30% formula fed. These results are similar to a cross sectional study done by Faber and Benade, (2007) where 41% of infants were formula-fed. One of the WHO (2018) guidelines states that mothers should continue to breastfeed frequently and on demand until 2 years of age and beyond (WHO, 2018). However, our results show that only 18% of the mothers breastfeed on demand and 33% follow a routine. Half of the mothers (49%) followed a combination of the two. Mothers that breastfeed for longer are associated with a reduced risk of childhood chronic illness and improved cognitive outcomes (WHO, 2018).

Mothers that provide their babies formula were asked about the sources of information regarding formula preparation. Almost half (44%) indicated that they read the guidelines from the formula milk packaging. While 12% indicated that they asked healthcare professionals. In another South African study where children were formula fed, results showed that one third of the formula feeds were prepared incorrectly – 14% were concentrated and 54% were diluted (Faber and Benade, 2007). The information on the packaging is therefore important to be clear and accurate to assist mothers to prepare the feeds correctly. Incorrect preparation may result in diluted or concentrated milk which can cause nutritional deficiencies and dehydration (WHO, 2006).

The WHO (2018) further recommends that optimal complementary feeding not only depends on what is fed, but also on how, when, where and by whom the child is fed (WHO, 2018). The diet during the complementary feeding phase should be diverse. The foods should include vegetables, fruits, grains, meats and other protein-rich foods (including legumes and eggs) modified to a texture appropriate according to age (Ogunba, 2010). Almost half (44%) of the mothers in our study indicated that the first foods introduced to their babies were maize meal porridge, while a third of the mothers (29%) introduced cream of maize. Then followed by instant porridge (15%) and Mabele (10%), respectively.

These practices are not uncommon in South Africa. Results from a study in KwaZulu Natal, indicated that 51% of mothers introduced maize meal porridge to their infants. Which was followed by infant cereal at 32% (Faber and Benade, 2007). In a separate study, data showed that staple food were frequently consumed with the majority of the children (90%) being fed maize meal porridge (Faber *et al.*, 2016). These results confirm that the Department of Health needs to take

cognisance when evaluating the national food fortification programme that consumers of maize meal include infants and young children.

Complementary foods should be introduced at the age of six months with continued breastfeeding. Ensuring adequate nutrition during complementary feeding by nutrient-dense foods and frequent feeding, thus focusing on quality rather than quantity (WHO , 2016). The data in our study revealed that some mothers (13%) introduced solid foods as early as one month and others 13% at the age of three months. The results confirm the common practice in South Africa where most mothers introduce solid foods before the age of six months. The study done by Faber *et al.* (2016) also confirms that the mean age for introducing solid food was 3.5 months and the most popular food was maize meal porridge (Faber *et al.*, 2016). Another study resembles these results where infants were introduced to solid foods at the mean age of 3.3 months. Maizemeal porridge was given to 61% of infants before the age of four months (Faber and Benade, 2007). These findings are similar to a cross sectional study done in Kosovo, Southern Eastern Europe. This study also found that despite the fact that 57% of mothers have knowledge of appropriate feeding methods, 61% still introduced solid foods before six months of age (Berisha *et al.*, 2017).

## **5.5 Mothers' knowledge on complementary feeding and dietary diversity**

Research has shown that lack of knowledge regarding infant feeding practices is often a leading determinant of malnutrition than the lack of food or money (PAHO, 2003). IYCF practices implemented by mothers depends on the knowledge and socio-cultural tradition they are subjected to in the community (Subedi and Paudel, 2012).

The results in our study revealed that the mothers had reasonable knowledge of complementary feeding and DD. The overall mean knowledge score was 78%, which is good. This result resembles that of SANHANES-1, (2013), where 22% of participants achieved high knowledge score and 62.9% achieved medium knowledge scores. We did not report a significant knowledge difference between the mothers with younger and older children. The knowledge result regarding breastfeeding practices indicated a mean score of 70% on both groups. These results are similar to those of a study done in Johannesburg where the greater percentage of women (89%) had breastfeeding knowledge (Mnyani *et al.*, 2016). The complementary feeding knowledge mean score was reported to be 75%. The high rate of knowledge is common when compared to other studies (Faber and Benade, 2007; Seonandan and McKerrow, 2016; Berisha *et al.*, 2017). Low

rates of DD is not uncommon in South Africa across all ages (Steyn *et al.*, 2006; Faber, Schwabe and Drimie, 2009; Labadarios *et al.* 2011).

However, the DD knowledge in our study showed a mean score of 73%. Although the score is high, the knowledge may not be practiced. Our results also revealed a very high mean score (93%) on hygiene knowledge. Despite the fact that a high percentage of mothers (78%) had good nutritional knowledge, there were those mothers that showed very low nutritional knowledge which is concerning.

## **5.6 Mothers' attitude towards complementary feeding and dietary diversity**

The mother's attitude and knowledge towards specific foods determines complementary food choice (FAO, 2014). Positive maternal attitudes towards complementary feeding have been associated with timely complementary feeding initiation (Mushaphi *et al.*, 2008). The results in our study revealed that many of the mothers (88%) had a positive attitude towards the importance of their baby's growth and 98% would worry if their babies were not gaining weight. Bahorski *et al.*, (2019) reported that mothers who have a high self-efficacy are more likely to appropriately practice infant feeding which align with proper recommendations and guidelines. The mothers in our study showed a high sense of self-efficacy towards preparing food for their babies (90%). They were also confident that they couldn't over feed their babies (93%).

Although half of the mothers in our study did not provide their children with at least four food groups the day prior to the survey (MDD), their attitude towards a diverse diet was different. The results indicate that a high proportion of the mothers (90%) agree that it is important to give their babies different types of foods each day. The WHO (2003) guidelines states that the frequency of feeding should be timely. Mothers should start at six months with small amounts and increase the quantity as the child gets older (WHO, 2003). Our results showed that many of the mothers (87%) had a positive attitude towards feeding their babies several times a day. Less than half (41%) of the mothers agreed that they ask for advice at the clinic regarding the appropriate foods to give their baby. Nearly half of the mothers (49%) indicated that they ask advice from their family members on what food to give their babies. However, a study done in Johannesburg revealed that healthcare facilities were the main source of information on infant feeding and it influenced the intent of feeding and practices (Mnyani *et al.*, 2016).

## **5.7 The associations between socio-cultural factors and their children's dietary diversity**

The study assessed associations between MDD and demographic data, maternal knowledge and maternal attitude. A study by Mutuli, (2016) revealed a correlation between culture and dietary habits (Mutuli *et al.*, 2016). Mothers make decisions about complementary feeding (what to feed, when and how) in their own conceptual framework which includes internal personal and socio-environmental factors such as cultural beliefs, rules and ideas of foods and feeding (Christian *et al.*, 2015). Our data supports this as it revealed that maternal ethnicity was associated with MDD. More mothers from the Sotho and Xhosa groups reported their children's dietary intake that met the MDD, while the more mothers from Pedi, Zulu and other ethnic groups indicated that their children's diets did not meet the MDD. However, no association was found between the MDD and maternal age, education, maternal marital status and maternal employment status. These results, therefore, partly supports the SCT in that some, not all, socio-environmental factors were associated with DD.

Our study showed that maternal attitude towards the possibility of overfeeding the baby was associated with MDD. The mothers that were confident of not overfeeding their babies were 41% compared to 27% The mothers that took advice from nurses regarding appropriate infant feeding had a positive attitude and were associated with meeting the MDD ( $\chi^2=15.78$ ,  $p<0.000$ ). Our study also indicated that there was no significant difference in DDS for the breastfed and non-breastfed group of children.

## **5.8 Conclusion**

The chapter discussed the findings and compared it to literature. The study sample was fairly educated, mostly unemployed and single mothers. The research findings indicated that more of the younger group of children did not meet the MDD. Breastfeeding rates were low although the mothers indicated a positive attitude and were knowledgeable about breastfeeding. Maternal knowledge on complementary feeding practices were also good. The results uniquely showed that maternal socio-cultural variables were not associated with the child's dietary diversity, except for maternal ethnicity and maternal knowledge. Also, a positive attitude towards complementary feeding was associated with meeting the MDD.



## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

In the previous chapters, results were reported and discussed. In this chapter, a summary of the findings is provided in conjunction to the objectives of the study. A conclusion of the study is drawn, followed by the limitations of the study. The recommendations of the study are also presented.

### **6.2 Background**

Malnutrition is a universal challenge that affects every country. In 2011, 6.9 million children under the age of five years died and 33% percent of these deaths are malnutrition related (UNICEF, 2017). During the first two years of life, children are vulnerable to nutrient deficiencies and common childhood illnesses. Diverse diets and food variety in adequate quality and quantity are essential for young children in order to meet their nutrient requirements and health and developmental goals (FAO, 2014). Socio-cultural factors contribute to infant food selection and feeding practices which affects purchasing behaviours of parents (Larson and Story, 2009).

### **6.3 Purpose of the research**

The aim of this study was to explore the association between mothers' socio-cultural environment and the dietary diversity of their children between the ages of 6 and 24 months, who attend the health care clinic in Olievenhoutbosch Township, Gauteng.

### **6.4 Summary of the findings per objectives of the study**

In order to establish the contribution, the data made to achieve the objectives of the study, each objective is discussed. The discussion is based on the data presented regarding DD, complementary feeding and maternal knowledge, maternal attitude and maternal practices while using the SCT as the conceptual framework in order to understand the socio-cultural factors that influence maternal infant feeding choice and practices. Three structured questionnaires were used and included an overall of 49 questions. The three questionnaires included demographic questions, 24-hour recall and KAP questions.

**6.4.1 Objective 1: Determine and describe the dietary diversity score of young children between 6 and 24 months who are attending the clinic in Olievenhoutbosch Township, Gauteng.**

A diverse diet, which contains foods from all food groups, is essential for all age groups to meet their requirements for required nutrients. However, complementary feeding that is diverse and nutrient dense have a significant impact on optimal growth and adequate development in the lives of young children (Arsenault *et al.*, 2013). The DD determined was based on reported intake within the preceding 24 hours of the interview and the DDS was calculated out of the standard seven food groups (see chapter 3, section 3.6.1 for the methods). Although the results showed that the children in all age groups consumed grains, the other food groups were not adequately consumed. Significantly less children from younger age group were reported to have consumed dairy ( $p < 0.001$ ), animal flesh foods ( $p = 0.014$ ) and legumes ( $p = 0.034$ ) the previous day, compared to the older age group. The results of the DDS revealed that half of the children (50%) did not achieve the adequate DD score of four food groups. Significantly more children from the older group consumed the minimum dietary diversity (MDD) of four groups compared to the younger group (67% vs 38%,  $p = 0.019$ ).

**6.4.2 Objective 2: Investigate the mothers' socio-cultural environment by determining their knowledge, beliefs, attitudes and values in terms of food choices for feeding their children.**

IYCF practices implemented by mothers depends on the knowledge, attitude, socio-cultural tradition they are subjected to and cultural dimensions of the community (Subedi and Paudel, 2012; Onah *et al.*, 2014). Maternal knowledge and attitudes are significant determinants of child health generally but also particularly for infant feeding practices. There is a correlation between culture and dietary habits as mothers make use of their specific cultures and subcultures to constitute what they consider to be acceptable and preferable infant foods, (Mutuli, 2016). The KAP survey was used and is adapted from guidelines for assessing nutrition-related knowledge, attitudes and practices (FAO, 2014). The KAP survey comprised of predefined questions that captured information on critical knowledge, attitudes and practices related to the dietary diversity of young children.

The survey consisted of three separate questionnaires of knowledge, attitude and practices. The knowledge questionnaire included knowledge questions regarding breastfeeding practices, complementary feeding, dietary diversity as well as on hygiene practices. The knowledge survey

revealed that the overall mean knowledge score was 78% ( $\pm 8.2$ ). This shows that the mothers had reasonable knowledge of complementary feeding and DD. The mothers had greater knowledge (78%) of breastfeeding practices. The knowledge also holds true for complementary feeding practices as the mothers scored 75%. Although there was a high percentage of mothers (78%) had good nutritional knowledge, there were those mothers that showed very low nutritional knowledge which is concerning.

The attitude questionnaire was based on a five-point scale where the responses were measured on DD, food preferences and food taboos. Most of the mothers (88%) in our study had a positive attitude on the importance of their baby's growth and 98% would worry if their babies were not gaining weight. The mothers also showed a high sense of self efficacy towards food preparation. The results revealed that the mothers had a positive attitude towards DD and feeding frequency.

The feeding practices questionnaire consisted of four or five possible answers where respondents were asked to select only one applicable answer. Almost half of the mothers in the study indicated that they fed their babies maize meal porridge as the first food, while a third of the mothers (29%) reported cream of maize. Then followed by instant porridge (15%) and Mabele (10%) respectively. The study also showed that mothers introduced solid foods at one month (13%) or before and another 13% introduced solid foods at three months. The majority introduced first foods before the recommended age of 6 months.

#### **6.4.3 Objective 3: Determine and describe the mothers' breastfeeding practices.**

WHO recommends exclusive breastfeeding from birth to 6 months of age (WHO, 2018). Breast milk is the first natural food for infants. It supplies the energy and nutrients that the baby needs for the first months of their life (Okafogun et al., 2017) and it continues to supply up to half or more of a child's nutritional needs during the second half of the first year and up to one-third during the second year of life (WHO, 2008a).

The survey showed that a third of the mothers only breastfeed and other third only formula feed while 23% practice mixed feeding. Of those that breastfeed, only 18% feed on demand and 33% follow a routine. To the mothers that formula feed, 44% indicated that they read how to prepare formula from the tin package. Our result confirms the poor breastfeeding practices which still remain a concern in South Africa.

#### **6.4.4 Objective 4: Determine the association between the mothers' socio-cultural environment and the dietary diversity of their children.**

The associations between the mothers' socio-cultural environment and the dietary diversity of their children was derived from section A and section B of the KAP questionnaires. The sections surveyed were between MDD and maternal demographic data, MDD and maternal knowledge and MDD and maternal attitude. The study showed that maternal ethnicity was associated with MDD ( $\chi^2=16.62$ ,  $p=0.002$ ). However, no associations were found between MDD and maternal age, education, marital status and employment status.

The mothers that had positive attitude towards not overfeeding their babies were associated with MDD. The mothers that showed positive attitude in self-efficacy were associated with MDD.

#### **6.4.5 Objective 5: Compare the dietary diversity score of breastfed children and non-breastfed children.**

The comparison of DDS of breastfed and non-breastfed children was taken from the IYCMDD questionnaire and section C of the KAP survey (breastfeeding practices). The study revealed that out of 103 children, only 30 were being breastfed at the time of the survey. Of the breastfed children, 16 had a DD score of between 1 and 3 and only 14 met the MDD DDS (4-7). The non-breastfed children were 73 at the time of the survey and 35 did not meet the DDS (1-3). The mean DDS was 3.43 for breastfed children and 3.48 for non-breastfed children.

### **6.5 Limitations of the study**

The first limitation of the study is related to the geographical area of data collection. The study was conducted in Olievenhoutbosch and thus does not represent the larger population of South African mothers and their children. Therefore, the results cannot be generalised in the broader context. Secondly, even though the sample size is large enough for the purposes of this study, it is small considering the population size of greater than 70 000 people (Census, 2011). Therefore, results should be interpreted with caution. In addition, some knowledge, attitude and practices questions were phrased negatively and may have impacted the responses. Fourthly, diet history obtained from the 24-hour recall is limited by maternal recall ability. A 24-hour recall is also not reflective of habitual dietary intake. It should be noted that the observational design does not allow to draw conclusions on causality from the associated factors.

## **6.6 Recommendations**

Policy makers and the Department of Health should implement interventions at community level to improve the promotion of IYCF practices and nutrition knowledge. The organisations concerned should emphasize appropriate complementary feeding, the importance of DD and frequency of feeding to promote good health and optimal growth of young children.

The Department of Health and organisations involved in child healthcare should investigate factors that influence food choice. These factors include socio-cultural and socio-environment factors. Further research on beneficial and detrimental cultural beliefs regarding complementary feeding practices is needed.

Our study showed that the majority of mothers are knowledgeable and had a positive attitude towards complementary feeding and DD. However, the results revealed a lower percentage regarding breastfeeding and complementary feeding practices which is a concern. The government and child healthcare agencies should intervene by exploring ways to bridge the gap between the mothers' knowledge of IYCF practices and the implementation thereof.

The study was conducted in poor resource peri-urban community, with mothers recruited from only one healthcare facility and therefore the results may not represent the mothers from such a setting. It is recommended that further and similar research at a larger scale in a community setting be conducted to compare the results.

## **6.7 Conclusion**

The study findings support the SCT in that maternal ethnicity and knowledge was associated with MDD and DDS, respectively. The Xhosa and Sotho groups reported that more of their children's dietary intake met the MDD compared to the other ethnic groups. The younger group reported a low DDS, and this could be attributed to the mothers' poor complementary feeding practices. Although there was no significant difference in DDS for the breastfed and non-breastfed group of children. The results of the study indicate suboptimal breastfeeding practices where only a third of the mothers were breastfeeding. The study findings were of mothers who were mostly between the ages of 25 to 34 years of age. They were mostly educated, unemployed and single, however these factors were not associated with MDD or DDS. The results of the study could help policy makers improve

complementary feeding interventions. These interventions should focus on nutrition education at schools, counselling about child feeding at local clinics and awareness through media.

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## **APPENDIX A**

### **PARTICIPANT INFORMATION SHEET**

Ethics clearance reference number: **2018/CAES/163**

Research permission reference number: **GP\_201812\_008**

**February 2019**

**Title: The association of mothers' socio-cultural environment with the dietary diversity and their children aged between 6 and 24 months from Olievenhoutbosch Township in Gauteng.**

**Dear Prospective Participant**

My name is Yolande Ibeagu and I am doing research with Ms. Elize Symington a lecturer in the Department of Life and Consumer Sciences towards a Masters' degree in Consumer Science at the University of South Africa. We are inviting you to participate in a study entitled: The association of mothers' socio-cultural environment with the dietary diversity and their children aged between 6 and 24 months from Olievenhoutbosch Township in Gauteng.

#### **WHAT IS THE PURPOSE OF THE STUDY?**

The study aims to explore the association between mothers' socio-cultural environment and the dietary diversity of their children aged 6 to 24 months, who attend health care clinics in Olievenhoutbosch. The study is also being conducted as my requirement for the award of Master of

Consumer Science in Food and Nutrition and possibly for publication in academic journals and presentations at academic conferences.

The study will help in formulation of government nutritional programs aimed at improving the performance of frontline workers and volunteers in delivering timely and quality counselling to mothers while reinforcing interpersonal counselling with mass media campaigns and community mobilization. The benefits of this study will enable policy makers to contribute and update the policies to ensure effectiveness of information, education, and counselling interventions aimed at improving complementary feeding and dietary diversity in children aged 6–23 months.

### **WHY AM I BEING INVITED TO PARTICIPATE?**

You were chosen because you fall within the group of interest for this study project by conducting the research to know how and what you feed your baby. We are only selecting mothers with babies of ages between 6 and 24 months who attend the local healthcare clinic. A total of 100 mothers will have been sampled at the end of the study to represent the others in Olievenhoutbosch. Permission to conduct interview has been sought from the Department of Health and the Ethics committee from the University of South Africa.

### **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

In this study, I will be asking some questions to you the mother on your baby dietary practices, your knowledge and attitudes. There are three questionnaires to this research project, first one is the demographic information and it will take less than 10 minutes to complete, the second one entails what your baby ate in the last 24 hours and that should not take more than 20 minutes. The last one, I will be asking about what you know regarding infant feeding and baby dietary practices, which will be less than 20 minutes. The total time for the interview will be 1 hour. Please note that there are no right or wrong answers and you are free to ask for clarity anytime during the interview.

### **CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**



Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time during the interview and without giving a reason. However, kindly note that once your interview is complete and we have collected your information, you may not withdraw as we are using non-identifiable questionnaires and therefore cannot be able to pull out your answer sheet.

### **WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

You will receive no direct benefit from participating in this study; however, your participation may help understand the community levels of the lack of baby dietary diversity and possible causes. The public health service may use the information to enhance implementation of health pro-grams together with policy changes in health care provision.

### **ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

There are no known negative consequences in participating in this research project. However, it will be time consuming and therefore it will take up to 1 hour of your time.

### **WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Your name will not be recorded anywhere and no one, apart from the researcher and identified members of the research team, will know about your involvement in this research and no one will be able to connect you to the answers you give. Your answers will be given a code number and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

The findings of this study will be processed into a research report, journal publications and/or conference proceedings, but your participation will be kept confidential. And if the report of study is to be submitted for publication, the individual participants will not be identifiable in such a report.

#### **HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

All data will be stored responsibly and safely. Hard copies of the answers will be stored by the supervisor Ms. Symington, for a period of five years at the Department of Life and Consumer Sciences while the electronic information will be stored on an external hard drive. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. All data will be destroyed responsibly after the required retention period which is five (5) years of which hard copies will be shredded and electronic data permanently deleted from the computer.

#### **WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

You will not receive any payment nor incentives for participating in this study.

#### **HAS THE STUDY RECEIVED ETHICS APPROVAL**

This study has received written approval from the Research Ethics Review Committee of the College of Agriculture and Environmental Sciences, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

#### **HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact Yolande Ibeagu on 076 175-7702 or email [myibeagu@gmail.com](mailto:myibeagu@gmail.com). The findings are accessible for 1 year.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact the researcher on the above-mentioned contact details.

Should you have concerns about the way in which the research has been conducted, you may contact Ms. Elize Symington on 011 471-3438 or [syminea@unisa.ac.za](mailto:syminea@unisa.ac.za). Contact the research

ethics chairperson of the CAES General Ethics Review Committee, Prof EL Kempen on 011-471-2241 or [kempeel@unisa.ac.za](mailto:kempeel@unisa.ac.za) if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

Name -----

Sign-----

## CONSENT TO PARTICIPATE IN THIS STUDY

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the <insert specific data collection method>.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname..... (please print)

Participant Signature.....Date.....

Researcher's Name & Surname..... (please print)

Researcher's signature.....Date.....

## APPENDIX B: Structured Questionnaire

### DEMOGRAPHIC AND SOCIO- ECONOMIC INFORMATION

Respondent No. ----- Name of interviewer----- Date-----

Circle the appropriate answer

Code	Respondent number	-----	Variable Code	For office use only
1. Mother's age	How old are you?	18-24 25-34 35-44 ≥45	V1_Age	
2. Education level	What is the highest school you completed?	None Primary school Grade 8 - 10 Grade 11 – 12 Tertiary education	V2_Edu	
3. Ethnicity	Which ethnic do you fall under?	Zulu Sotho Tswana Tsonga Venda Xhosa Other (-----)	V3_Ethn	
4. Marital status	Are you married?	Married: customary or traditionally Living with a partner Divorced/ separated Single Widowed Other (-----)	V4_Mar	
5. Employment status	Are you currently employed?	Yes (Full time) Yes (Part time) Self-employed No	V5_Empl	
6. Child	Sex of the child	Male Female	V6_Gen	
7. Date of birth	When was your child born	YYYY/MM/DD  Age of child in months	V7_Dob	
8. The number of children in the house	How many children are living with you?	< 6 years 6 – 12 years 12 – 17 years	V8_Chil	

**APPENDIX B**

**INFANT AND YOUNG CHILD MINIMUM DIETARY DIVERSITY QUESTIONNAIRE (7 FOOD GROUP)**

Respondent no. ----- Name of interviewer----- Date-----

**Instruction**

Please explain to the mother that there is no right or wrong answer and there are no consequences to any answer. She must please answer truthfully. Ask for each food item, one at a time, how often the child usually eats the specific food item in the last 24 hours. Make a cross on the option that describes the mother's answer the best. The options are as follows:

<b>Number</b>	<b>Food Group</b>	<b>Examples</b>	<b>Answer:</b>	<b>Variable Code</b>	<b>For office use only</b>
1.1.	Grains	Maize meal porridge / pap Cream of maize / creamy meal Instant cereal e.g. Nestum/Cerelac Mabele porridge Rice Oats Bread Mealie rice Samp Noodles / Spaghetti / Macaroni Wheat		V9_Grain	

1.2.	Roots and tubers	Potatoes Sweet potatoes		V9_Roots	
2.	Legumes and nuts	Cowpea (dinawa) Lentils Peanuts Dry beans Dry peas Peanut butter		V11_Legu	
3.	Dairy products	Fresh Milk (1 year and above) Sour milk (Maas) Cheese Yoghurt Custard Breastmilk / formula milk		V12_Dairy	
4.1.	Flesh foods	Beef Pork Goat Lamb Chicken Duck or other Organ meat e.g. liver, kidney, heart Viennas Polony		V13_Flesh	

4.2.	Fish	Frozen fish, fish fingers Fresh fish Canned fish Dried fish		V13_Fish	
5.	Eggs	Chicken eggs Duck eggs		V15_Eggs	
6.	Vit A rich Veg and Fruit	Pumpkin Orange sweet potato Butternut Carrots Spinach / Morogo Naartjie Apricots Watermelon Mango		V16_VitA	
7.	Other Veg and Fruits	Cabbage Green beans Beetroot Avocado Banana Orange Peach Apples		V17_FruitVeg	



## APPENDIX B

### KNOWLEDGE, ATTITUDE AND PRACTICE QUESTIONNAIRE (KAP)

Name of interviewer----- Date-----

#### SECTION A: Knowledge of mothers on infant feeding and dietary diversity

No.	Question	Yes =1	No =2	Don't know =0	Variable Code	For office use only
1.	Babies should receive breastmilk only and other food or drink for the first 6 months of life				V18	
2.	Babies should be breastfed up to 2 years or longer				V19	
3.	Should a baby be breastfed only when they are crying				V20	
4.	Feeding bottles are the best option for feeding babies who have refused to breastfeed				V21	
5.	Solid foods should be introduced at 6 months				V22	
6.	The mother should be the only one feeding the baby				V23	
7.	Foods such soft porridge made from mabele and maize meal are good to give babies because they are nutritious				V24	
8.	Adding margarine or peanut butter to the baby's porridge is advisable				V25	
					V26	

9.	At 6 months, a baby should be fed thin foods					
10.	Mother or a caregiver should feed a baby when they are hungry				V27	
11.	Mothers/caregivers should wash hands before preparing the food of the baby				V28	
12.	A 12 months old baby who is breastfed should be fed solid foods twice per day				V29	
13.	Water used to prepare food and drinks for a baby should be boiled or treated				V30	
14.	Sick and recovering babies should be fed porridge or diluted fruit juices only				V31	
15.	Babies who are 1 year and above should eat from the family pot				V32	
16.	Vegetables and fruits like carrots, mangoes, pawpaw and green leafy vegetables are suitable complementary foods				V33	
17.	Mothers don't have to give their breastfed or bottle-fed child other protein foods such as poultry, eggs, fish even after 6 months since milk is adequate in proteins				V34	
18.	The main meal of a child should be a mixture of many food items from grains/cereals, meats/eggs/poultry, fish,				V35	

	legumes, roots/tubers, fruits/vegetables, fats/oils					
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**Section B: Attitude of mothers on infant feeding and dietary diversity**

**Five-point Likert scale**

No.	Question	With 1 being least and 5 being best	Variable Code	For office use only
1)	Do you think it is important to monitor the growth of your baby?	1. Not all important 2. Somehow important 3. Important 4. Slightly important 5. Very important	V36	
2)	Would you worry if your baby was gaining too little weight?	1. Not worried 2. Slightly worried 3. Not sure 4. Worried 5. Very worried	V37	
3)	Is it possible to feed a baby too much food?	1. Strongly disagree 2. Disagree 3. Don't know 4. Agree 5. Strongly agree	V38	
4)	How confident are you in preparing food for your child?	1. Not at all confident 2. Slightly confident 3. Moderately 4. Very confident 5. Extremely important	V39	
5)	Are you confident that you can feed your baby food so that they do not gain too much weight?	1. Not at all confident 2. Slightly confident 3. Moderately 4. Very confident 5. Extremely important	V40	

6)	How important do you think it is to give different types of food to your baby each day?	<ol style="list-style-type: none"> <li>1. Not all important</li> <li>2. Somehow important</li> <li>3. Important</li> <li>4. Slightly important</li> <li>5. Very important</li> </ol>	V41	
7)	Do you ask the nurse at the clinic about which appropriate foods to feed your baby?	<ol style="list-style-type: none"> <li>1. Never</li> <li>2. Rarely</li> <li>3. Occasionally</li> <li>4. Often</li> <li>5. Always</li> </ol>	V42	
8)	Do you ask your relative or friends about which foods to feed your baby?	<ol style="list-style-type: none"> <li>1. Never</li> <li>2. Rarely</li> <li>3. Occasionally</li> <li>4. Often</li> <li>5. Always</li> </ol>	V43	
9)	How difficult or easy is it for you to feed your baby several times each day?	<ol style="list-style-type: none"> <li>1. Very difficult</li> <li>2. Difficult</li> <li>3. Don't know</li> <li>4. Easy</li> <li>5. Very easy</li> </ol>	V44	

### Section C: Practice on infant feeding

No.	Question	Possible answer	Variable Code	For office use only
1.	What milk feeding methods are you currently using	<ol style="list-style-type: none"> <li>1. Breast milk from breast only</li> <li>2. From breast and expressed breast milk only</li> <li>3. Formula milk only</li> <li>4. Breastmilk and formula</li> <li>5. Other</li> </ol>	V45	
	<b>Interviewer instructions</b>	<p>If mom responded 1 or 2 above, skip to 4 and 5.            If mom responded 3 or 4, skip question 9.</p>		
2.	When deciding to feed your baby, you usually?	<ol style="list-style-type: none"> <li>1. Feed your baby on demand</li> <li>2. Follow a routine</li> <li>3. Do a combination of A and B</li> </ol>	V46	
3.	How do you measure how much to feed your baby	<ol style="list-style-type: none"> <li>1. Depends on baby's appetite</li> <li>2. Depends on baby's growth</li> </ol>	V47	
4.	Did you receive advice on formula preparations if yes which do you follow?  (you can select more than one answer)	<ol style="list-style-type: none"> <li>1. Midwife</li> <li>2. Health personnel</li> <li>3. Friends</li> <li>4. Family</li> <li>5. Formula milk tin or packet</li> <li>6. Leaflet</li> <li>7. Other</li> </ol>	V48	
5.	What other feeds do you give your baby?	<ol style="list-style-type: none"> <li>1. Cow's milk</li> <li>2. Infant formula</li> <li>3. Water</li> <li>4. Home-made porridge</li> <li>5. Porridge/Cereal from a box</li> </ol>	V49	

	(you can select more than one answer)	6. Mashed solid foods 7. Other (specify)		
6.	What was the first solid food you gave your baby? At how many weeks or months?	1. Food: 2. Weeks: 3. Months:	V50	
7.	Why did you decide to introduce additional foods to your baby?  (you can select more than one answer)	1. Doctor/health visitor advice 2. Friend advice 3. Family or relative advice 4. Previous experience 5. Baby was hungry 6. Baby was not gaining enough weight 7. Baby milk not enough 8. Family traditions / cultural beliefs 9. Other	V51	
8.	Who advised you or suggested that you stop breastfeeding?  (you can select more than one answer)	1. No one 2. Mother / mother in-law 3. Husband 4. Relative 5. Doctor 6. Midwife 7. Friends 8. Other	V52	
9.	Who usually feeds your baby?  (you can select more than one answer)	1. Mother 2. Father 3. Sibling 4. Relative 5. Caregiver	V53	

10.	Do you feed your baby food containing vegetables	Yes: Name vegetables <hr/> No (why) -----	V54	
11.	Do you feed your baby food containing eggs, meat and fish?	Yes: Name foods.....  No (why).....	V55	
12.	Do you give your baby other dairy products?	Yes: Name dairy foods .....  No (why).....	V56	

**We have completed all the questions. Thank you for your time.**