

**Knowledge, attitudes and practices of primary caregivers of
foundation phase learners in Bloemfontein regarding breakfast and
lunchboxes.**

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Declaration of independent work

I, Thelma Hansen, identity number 8112210107087, hereby declare that this research project with publishable, interrelated articles that I submit to the University of the Free State is my independent work. This project has not been submitted before to any institution by myself or any other person. I furthermore waive copyright of this research in favour of the University of the Free State.

A handwritten signature in black ink, appearing to read 'T. Hansen', is written above a horizontal line.

Thelma Hansen

Date: 28 June 2019

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List of Abbreviations

AMDR	Acceptable Macronutrient Distribution Range
ASPEN	American Society for Parental and Enteral Nutrition
BMI	Body Mass Index
CVD	Cardiovascular Disease
DBE	Department of Basic Education
FAO	Food and Agriculture Organization
FDI	Food Dudes Intervention
GI	Glycaemic Index
HK	HealthKick
HPS	Health Promoting Schools
IOM	Institute of Medicine of the Academies
KAP	Knowledge, Attitudes and Practices
MUFA	Mono-Unsaturated Fatty Acid
NCD	Non-Communicable Diseases
NFCS	National Food Consumption Survey
NSFP	National School Feeding Programme
PUFA	Poly-Unsaturated Fatty Acid
RDA	Recommended Dietary Allowance
RTEBC	Ready to Eat Breakfast Cereals
SA	South Africa
SAFBDG	South African Food-Based Dietary Guidelines
SANHANES	South African national health and nutrition examination survey
SAS	Statistical Analysis System
SD	Standard Deviation

SDV	Socio-demographic variables
SEB	Socio-economic background
SF	Saturated fat
TE	Total Energy
UF-HSREC	Health Sciences Research Ethics Committee, University of the Free State
UNICEF	United Nations International Children's Emergency Fund
USA	United States of America
USDA	United States Department of Agriculture
USDHHS	United States Department of Health and Human Services
WHO	World Health Organisation

1 CHAPTER 1: Overview of the study

1.1 Introduction and motivation for the study

According to the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) South Africa, as an upper-medium-income country (World Bank, 2017), experiences a double burden of disease, with both under and over nutrition present (WHO, 2016; UNICEF, 2014), often in the same community and even in the same family, with urban families at a higher risk of malnutrition than rural families (WHO, 2017).

According to the WHO, obesity is one of the major health challenges internationally (WHO, 2016), with obesity becoming a growing health concern amongst children (WHO, 2017). The prevalence of obesity among children (both girls and boys) between the ages of five and 19 years increased from four percent in 1975 to more than 18 percent in 2016 (WHO, 2017). Although the average body mass index (BMI) of children in high-income countries is still high, it has plateaued, but according to the Non-communicable Disease (NCD) risk factor collaboration there is still an increase in low and middle-income countries (NCD risk factor collaboration, 2017). In Africa, Southern Africa has the highest rise in the prevalence of obesity in children and adolescents, with a 400 percent rise per decade (NCD risk factor collaboration, 2017: 9).

The increased prevalence of obesity amongst children typically results from inactivity and the inclusion of low cost, energy dense, processed foods (high in fat, sugar and salt) with inadequate amounts of micronutrients (from fruits and vegetables) in the diets of children in low-and-middle-income countries (WHO, 2017; Wilkinson, 2015: V; Vorster *et al.*, 2013).

There are more deaths globally (child and adult) resulting from overweight and obesity than from underweight, and these deaths can in most cases be prevented (WHO, 2017). The prevention of overweight/obesity in children is of utmost importance as overweight/obesity is linked to early onset of diseases of lifestyle including Type 2 diabetes and cardiovascular diseases (CVD), amongst others (WHO, 2016: 1). Overweight or obese children also have a higher risk for becoming overweight adults (WHO 2016: 1; Zahra *et al.*, 2014; Freedman *et al.*, 2007; Jinabhai *et al.*, 2003: 359) with the associated health consequences.

Long-term consequences of obesity do not only influence a child's health but also have psychological consequences, including children taunting and excluding an obese child. Obese children also often

experience difficulty performing optimally in school, which can lead to social ostracization and depression (Lobstein *et al.*, 2004: 28).

Dani *et al.* (2005) published a review on the psychological and neurological consequences that nutrition has in children and adolescents. The authors emphasised the important role of nutrition by stating that some children have an inadequate dietary intake due to lack of resources at home and others due to the food choices they make. These inadequate intakes influence both cognitive and behavioural development of the child (Dani *et al.*, 2005).

Likewise, an inadequate dietary intake also reflects in growth, resulting in stunting (low height-for-age) (Best *et al.*, 2010: 404) amongst undernourished children. A United Nations report has shown that 33 percent of stunted children (under five years of age) live in Africa (UNICEF, 2014: 5). Stunting does not only affect adult height, but impacts population development, as stunting also affects the child's health, cognitive and motor development, thus influencing work potential later in life negatively (UNICEF, 2014: 5; Grantham-McGregor *et al.*, 2012; Best *et al.*, 2010).

The 1999 National Food Consumption Survey (NFCS) in South Africa reported that of the children in the age group 1-9 years, nearly 20 percent were stunted and 10 percent were underweight for age. Despite the high prevalence of undernutrition, the survey also found that 17.1 percent of the same age group was overweight or obese (Labadarios *et al.*, 2005: 535–536). Hoffman *et al.* (2000: 706) and Steyn *et al.* (2005: 12) warned that stunted children have a risk of becoming overweight later in life.

Both obesity and stunting, increase children's risks for micronutrient deficiencies (Gashu *et al.*, 2016; McClung & Karl, 2009; Labadarios *et al.*, 2005). Micronutrient deficiencies, including iron, selenium, iodine, as well as essential fatty acid deficiencies, can lead to decreased cognitive abilities (Dani *et al.*, 2005).

Informing parents (as well as primary caregivers) about better food choices for their children can prevent micronutrient deficiencies. Parents' concern about their own body weight, might affect the attitude they have towards their own healthy eating (Faber & Kruger, 2005), and thus also their children. Therefore, a need exists to educate parents and teachers on the influence of nutrition on children's health and development (De Villiers *et al.*, 2016: 178; Draper *et al.*, 2010: 10; Dani *et al.*, 2005: 261).

1.2 Problem statement

Internationally, several studies on the effect of breakfast consumption have been conducted (Mielgo-Ayuso *et al.*, 2017; Kesztyüs *et al.*, 2017; VanKleef *et al.*, 2016; Michels *et al.*, 2016; Mameli *et al.*, 2014; Alexy *et al.*, 2010; Deshmukh-Taskar *et al.*, 2010; Cheng *et al.*, 2008; Affenito, 2007; Boutelle *et al.*, 2007; Keski-Rahkonen *et al.*, 2003). There are however limited data available on parents' and caregivers' knowledge, attitudes, and practices regarding breakfast. Vereecken and Maes (2010) conducted a study on the nutritional knowledge and attitudes of parents, where the mean age of the children was 3.5 years (SD=0.4), toward healthy food but did not determine the parents' breakfast and lunchbox practices (Vereecken *et al.*, 2010). A study in Australia assessed the factors influencing parents' choices on the contents of the lunchboxes they provided to their children (Bathgate *et al.*, 2011). Healy (2009) also examined whether nutritional knowledge was applied when packing lunchboxes for children.

There are limited data available on breakfast consumption and school lunchbox practices amongst primary school learners in South Africa. Studies conducted on breakfast intake include the NFCS 1999 (Labadarios *et al.*, 2005); the South African National Health and Nutrition Examination Survey (SANHANES) (Shisana *et al.*, 2014); a survey on the evaluation of an in-school breakfast for all learners (6 – 17 years old) in Johannesburg (Hochfeld *et al.*, 2016) and the consumption and nutritional value of breakfast consumed by adolescents in the North West province (Tee *et al.*, 2015: 81).

Wilkinson (2015) completed a Master's degree in applied science on the nutritional value of lunchboxes that learners (9 – 13 years old), brought to school in East London. She concluded that the contents of the learner's lunchboxes correlated to socio-economic status, schooling and the socio-economic status of the learner's caregiver (Wilkinson, 2015: 133). Abrahams (2011) and Temple (2006) investigated the dietary behaviour of learners, aged 10 – 12 years and 12 – 16 years respectively, from a lower socio-economic as well as a mixed socio-economic background in the Western Cape. They reported that most of the food consumed by the learners were considered unhealthy, whether it was brought from home or bought at the school (Temple *et al.*, 2006: 252).

The researcher observed, during her years as a private practicing dietician that parents perceive the lunchboxes they pack for their children to school as healthy, even though they may not be nutritionally adequate. The long term influence of packing unhealthy lunchboxes to school can include developing diseases of lifestyle (WHO, 2016) as well as micronutrient deficiencies (Gashu *et*

al., 2016; McClung & Karl, 2009; Labadarios *et al.*, 2005), which may influence cognitive development and work potential negatively (UNICEF, 2014:5; Grantham-McGregor *et al.*, 2012; Best *et al.*, 2010).

To date, there are no published studies to identify the knowledge, attitudes and practices of primary caregivers regarding breakfast and school lunchboxes of foundation phase learners in Bloemfontein in the Free State. This study will address this knowledge gap in central South Africa.

1.3 Aim and Objectives

In the following section, the aim and objectives of this study are discussed.

1.3.1 Aim

This study aims to describe the knowledge, attitudes, and practices (KAP) of the primary caregivers of foundation phase learners regarding breakfast and lunchbox packing to determine nutritional knowledge; and to identify whether parents' and caregivers' knowledge and attitudes relate to their practices.

1.3.2 Objectives

In order to achieve the main aim, the following was determined:

- The demographic background of the primary caregivers of foundation phase learners;
- KAP of the primary caregivers of foundation phase learners regarding breakfast consumption and the packing of a lunchbox to school; and
- Associations between the demographic background of primary caregivers of foundation phase learners and their KAP regarding breakfast consumption and lunchbox packing.

1.4 Outline of the dissertation

This dissertation is structured into chapters that consist of a series of articles. Chapter 1 provides the introduction and motivation as well as the aims and objectives of the study. Chapter 2 comprises of a literature review of relevant information, researched in the study. Chapter 3 explain the methodology followed in this study. Chapters 4 and 5 consist of two articles, titled: "Breakfast and lunchboxes for foundation phase learners: Do knowledge and intent reflect practices of caregivers?" and "Caregivers attitudes towards healthy eating: Do their attitudes reflect in providing healthy breakfast and lunchboxes to children in their care?" respectively. The articles describe the relationship of knowledge, attitudes and practices of primary caregivers regarding provision of breakfast and packing lunchboxes in relation to different variables. Chapter 6 summarises the

conclusions and recommendations derived from this study and also provides recommendations for parents and schools, as well as for further research opportunities in this area. Chapter 7 concludes with a summary of the conclusions and recommendations for future intervention strategies, based on the research findings.

2 CHAPTER 2: Literature review

In this chapter, a review of the literature on the influence of early food choices and the effect on health is presented.

2.1 Introduction

Malnutrition, which includes both under and over nutrition, affects health. To address malnutrition, it is important to consider a broader scope of changeable social and environmental factors in the development of obesity (Taveras *et al.*, 2005: 900) and probably undernutrition as well. Although genetic variation plays an important role in the aetiology of overweight (40-70 percent can be attributed to genetic susceptibility), it cannot be seen as the sole determinant of obesity and the prevalence thereof (Herrera & Lindgren, 2010: 498; Chung & Leibel, 2008: 33; Taveras *et al.*, 2005: 900). Therefore, environmental factors should also be taken into account (Herrera & Lindgren, 2010: 498; Chung & Leibel, 2008: 33).

In homes where both parents are overweight/obese, the obesogenic stimuli (intake of obesogenic food and low levels of physical activity), creates an environment for children to have a higher risk for becoming obese (Leońska-Duniec *et al.*, 2018: 461).

The food choices parents make for their children does not only affect children's eating behaviours and how they experience food (Ventura & Birch, 2008: 9), but also their future in many ways (Dani *et al.*, 2005: 261). Obese children have an increased risk of becoming obese adults (Singh *et al.*, 2008: 474), resulting in an increased risk of developing a number of comorbid conditions including hypertension, left ventricular hypertrophy, atherosclerosis, insulin resistance, dyslipidaemia, metabolic syndrome, Type 2 diabetes, asthma, obstructive sleep apnoea, non-alcoholic fatty liver disease, gastro-oesophageal reflux, and more (WHO, 2016: 4; Herrera & Lindgren, 2010: 498; Daniels, 2009: 61; Lobstein *et al.*, 2004: 4). However, a recent review done by Llewellyn *et al.* (2016: 64) found that obesity is not a good indicator of developing comorbid conditions in adulthood. Nevertheless, Llewellyn *et al.* (2016: 64) recommend the promotion of healthy eating and physical exercise to reduce the prevalence of childhood obesity in children.

For this reason, parents, primary caregivers and teachers need to know and understand the importance of healthy eating for growing children. Once caregivers understand the importance of healthy eating, they will also be able to teach children the benefits thereof (Dani *et al.*, 2005: 261).

2.2 The role of breakfast and lunchbox foods in growth and development

Breakfast and lunchbox foods typically provide about two-thirds of the daily energy requirements of school children (Bell & Swinburn, 2004: 258; Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 268). Therefore, special consideration should be given to the foods provided to learners and factors affecting the provision thereof should be considered.

2.2.1 *The important role of breakfast for health and cognition*

Breakfast usually contributes 20 – 35 percent of the total daily energy intake (Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 268). It is recommended that a healthy breakfast should include a fibre rich carbohydrate source, fruit and reduced-fat milk or milk product (Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 277). Rampersaud *et al.* (2005: 754) recommended that lean meat or meat products can also form part of a healthy breakfast. It should also be kept in mind that food is not only numbers or nutrients, but that the food offered for breakfast should also be healthy and appetising (Larson *et al.*, 2014: 612; Birch, 1999: 51).

Warren (2003) emphasised the importance of a fibre-rich breakfast by recommending the inclusion of low glycaemic index (GI) food for breakfast. Children eating a low GI breakfast, with or without the addition of sugar, chose a smaller lunch and felt a higher level of satiety compared to those eating a high GI breakfast (Warren *et al.*, 2003). Edefonti *et al.* (2017: 25) further concluded in a review article that eating low GI food have the added benefit of helping to improve brain function.

Even though ready to eat breakfast cereals (RTEBC), advertised for children, might help to aid parents in saving time, it is not necessarily the better nutrition choice. Wiles (2017: 99) compared South African children's branded RTEBC with RTEBC not claimed to be for children. The cereals marketed for children had significantly higher amounts of carbohydrate, sugar and salt per 100g and a lower nutrient quality (Wiles, 2017: 99) when compared to regular RTEBC.

Children are more likely to eat breakfast when parents emphasise the importance of breakfast and the role it plays in cognition (Cheng *et al.*, 2008: 205). Interestingly, younger children, more often males, living with both their parents, eat breakfast more often (Larson *et al.*, 2014: 612).

It is recommended that breakfast be eaten together as a family, to promote breakfast consumption and to prevent obesity (Giovannini *et al.*, 2008). Parents who regularly eat breakfast, have children who eat breakfast regularly, as parents set the example for their children (Larson *et al.*, 2014: 612; Keski-Rahkonen *et al.*, 2003). Nevertheless, time constraints in the morning may result in families

often only eating breakfast together over weekends, and not during weekdays (Jarrett *et al.*, 2016). Children who ate breakfast also seem to choose healthier snacks during the day (eating fruits, unrefined carbohydrates and fibre-rich foods), which has a positive impact on body weight, thus lowering the risk for chronic diseases (Larson *et al.*, 2014: 612; Giovannini *et al.*, 2008; Rampersaud *et al.*, 2005).

There is a link between eating breakfast habitually and improved food choices, cognition (Grantham-Mcgregor, 2012; Giovannini *et al.*, 2008; Kleinman *et al.*, 2002), as well as psychosocial functioning (Burrows *et al.*, 2017; Giovannini *et al.*, 2008). Wesnes and co-authors (2003) emphasised the role of breakfast on cognition by comparing fasting with providing a glucose drink and having a carbohydrate-rich breakfast. The study showed that a carbohydrate-rich breakfast improved short term cognition, in the form of attention and memory, with more than 50 percent (Wesnes *et al.*, 2003: 331).

The importance of breakfast is further supported by the positive effect breakfast has on weight and macro as well as micronutrient intakes by enhancing the intake of fibre, calcium, vitamin A, vitamin C, riboflavin, zinc, and iron (Afeiche *et al.*, 2017; Timlin & Pereira, 2007). Most of these nutrients overlap with the nutrient intakes that were identified as below 66 percent of the Recommended Dietary Allowance (RDA) by the NFCS (Labadarios *et al.*, 2005). Various studies have shown that eating breakfast also decreases the risk of non-communicable diseases, micronutrient deficiencies (Giovannini *et al.*, 2008; Timlin & Pereira, 2007; Rampersaud *et al.*, 2005; Kleinman *et al.*, 2002), as well as constipation (Loening-Baucke *et al.*, 2004: 259).

The NFCS reported that 90 percent of one to nine-year-old children in South Africa eat breakfast regularly (Labadarios *et al.*, 2005: 537). Supporting these findings, another study in the Western Cape reported that 90 percent of learners from a lower socio-economic background ate breakfast, while 69 percent took a lunch box to school (Abrahams *et al.*, 2011: 1755). In contrast, Temple *et al.* (2006) and Shisana *et al.* (2014: 227) reported a lower (compared to the NFCS) breakfast and lunchbox consumption in schools from various income levels in the Western Cape and South Africa respectively. They reported that 77.8 and 68.4 percent of learners respectively ate breakfast before school, while 41 – 56 and 37.6 percent of learners respectively took a lunchbox to school (Shisana *et al.*, 2014: 20,21; Temple *et al.*, 2006: 254).

2.2.2 *The contribution of a school lunchbox to daily nutrient intake*

A school lunchbox can make an essential contribution to a learner's daily energy and nutrient intake (USDHHS and USDA, 2015), since learners spend approximately a third of their day at school. An adequate intake of fruit, dairy products, and fibre-rich, carbohydrate foods are linked to a reduction in the risk for chronic diseases (USDHHS and USDA, 2015). Therefore, in terms of the types of foods that should be included in school lunchboxes, the focus should be on reduced-fat dairy products (Vien *et al.*, 2017; Levine, 2001), fruit and vegetables (WHO, 2015) and fibre containing carbohydrate-rich foods (Temple *et al.*, 2016: 228–229; Vorster *et al.*, 2013: 28). The inclusion of processed food (including crisps, refined carbohydrates, and processed meats) is often convenient, but should be limited (World Health Organisation, 2017; Wilkinson, 2015; Vorster *et al.*, 2013: 71,78,112). Recommendations from the 2015-2020 Dietary Guidelines for Americans state that a healthy eating pattern also includes protein foods (seafood, lean meats, poultry, eggs, legumes, nuts, seeds, and soy products) (USDHHS and USDA, 2015: xiii). Consequently, inclusion of protein foods should also be considered as part of a healthy lunchbox.

Another component of a school lunchbox that should receive attention is the inclusion of fluids. Beverages containing sugar, increase an individual's daily energy intake (Duffey *et al.*, 2016), but do not contribute significantly to micronutrient intake. Some energy containing beverages, like sweetened milk products, can contribute to micro-nutrient intake (Levine, 2001). Vien *et al.* (2017) concluded that dairy products (including sweetened products) ingested before or with a meal are better for appetite control compared to beverages containing sugar (Vien *et al.*, 2017). One must however, keep in mind that all energy containing beverages increase total energy intake when compared to water (Vien *et al.*, 2017).

A healthy lunchbox plays an essential role to promote optimal health (Farris *et al.*, 2015). Habitually taking a lunchbox to school increases the variety of food eaten and improves weight management of children (Abrahams *et al.*, 2011: 1758).

Understanding the factors that influence the primary caregiver's food choices, may help to promote healthy eating. These factors include (Steyn *et al.*, 2005: 10; Sanigorski *et al.*, 2005: 442):

- The adult who fulfils the role as the head of the household;
- The educational level of the primary caregiver;
- The socio-economic status of the family;

- Cost of packing a lunchbox; and
- The time it takes to pack lunchboxes.

Parents and caregivers are often aware of the benefits of packing a healthy lunchbox, but the biggest challenge that caregivers have with packing a healthy lunchbox is lack of preparation time and difficulty in packing the lunchbox (Casado & Rundle-Thiele, 2015: 444). Aforementioned often leads to the packing of convenient, more expensive, pre-packed foods by predominantly caregivers with a lower socio-economic status (Sanigorski *et al.*, 2005: 1313).

Worldwide there is an increased need for parents to pack healthier lunchboxes. An Australian (Sanigorski *et al.*, 2005) and South African study (Temple *et al.*, 2006: 256) concluded that most learners who brought a lunchbox to school, brought less healthy food (such as white bread, sweets and potato chips). Temple (2006: 256) recommended that parents and learners should be trained on healthy eating by inclusion of the South African Food-Based Dietary Guidelines (SAFBDG) as part of the school curriculum, together with the application of the SAFBDG at school tuck shops (Temple *et al.*, 2006: 257).

2.3 The role of nutrients in the growth and development of a child

Good nutrition is important for the development of school-aged children. Both macro- and micronutrients have an individual and/or interlinked effect on the cognitive development of learners (Bryan *et al.*, 2004: 296). It is therefore important to realise that the triple burden of malnutrition, including obesity, undernutrition and micronutrient deficiencies have a negative impact on children's risk for developing diseases throughout their life, their ability to work and quality of life (Best *et al.*, 2010: 411).

Stunting and overweight can both be present in the same child (also known as the double burden of disease) (Jinabhai *et al.*, 2003: 364). Stunted children have lower brain function and delayed social development (Lukowski *et al.*, 2010: 4).

Learners who make healthier food choices, and consequently have a higher nutrient intake (dietary quality), have been reported to experience less hunger and less psychosocial problems (Kleinman *et al.*, 2002: 6). They also attend school more regularly, are less lethargic and have higher grades compared to learners with a low nutrient intake (Kleinman *et al.*, 2002: 6). Fortunately, these discrepancies can be addressed and altered by an increased nutrient intake, emphasising the important role of specific nutrients in cognition (Kleinman *et al.*, 2002: 6).

Macro- and micronutrients that are typically identified to play an important role in brain function and behaviour include protein, essential fatty acids (especially omega-3 highly unsaturated fatty acid), minerals (iron, iodine, selenium and zinc) and vitamins (vitamin B₁₂) (Gashu et al., 2016: 4; Blaauw et al., 2016: 110; Dani et al., 2005: 258–259; Whaley et al., 2003: 3927). However, it is important to note that a healthy balanced diet that includes a variety of fruit, vegetables, fish, nuts, whole grains, lean meats, herbs and spices would provide children with the same benefits (Dani *et al.*, 2005: 259).

2.3.1 Macronutrients

In order to ensure optimal nutrient intakes Acceptable Macronutrient Distribution Ranges (AMDRs) for 4 – 19 year old learners are recommended and indicated as percentages of total energy (TE) intake (Yadrick, 2017: 182; Wenhold *et al.*, 2016: 108; Otten *et al.*, 2006: 110,537) as indicated in Table 2.1 (adapted from Wenhold *et al.* (2016: 108) and Otten *et al.* (2006: 110,537)).

Table 2.1 Acceptable Macronutrient Distribution Ranges for macronutrients (4 – 19 years)
(Wenhold *et al.*, 2016: 108; Otten *et al.*, 2006: 110,537)

Nutrients	Recommended macronutrient distribution/intake per day
Carbohydrates	45 - 65%
Fat	25 - 35%
Protein	10 - 30%
Added sugars	<25% of TE intake (not the recommended amount)
Saturated fat	as low as possible
Trans-fatty acids	as low as possible
Cholesterol	as low as possible
Fibre	25g per day (4 – 8 year old)
	31g per day (9 – 13 year old boys)
	26g per day (9 – 13 year old girls)

2.3.1.1 Carbohydrates

Carbohydrates are the primary source of energy for both body cells and the brain (Institute of Medicine of the National Academies (IOM), 2015: 109) and an adequate intake is important to ensure concentration at school.

Carbohydrates include starches, disaccharides, and monosaccharides (Tappenden, 2017: 11). The main sources of carbohydrates include cereals, whole grains, fruit, legumes, dairy and starchy

vegetables (IOM, 2015: 109; Vorster *et al.*, 2013: 28). Refined carbohydrates include non-diet soft drinks, sweets and high energy, low fibre carbohydrates. The South African food-based dietary guidelines (SAFBDG) suggest to “make starchy foods part of most meals”, consisting of mostly unrefined carbohydrates (Vorster *et al.*, 2013: 28).

2.3.1.2 Fibre

Fibre is an important component of a healthy, varied diet. A healthy, varied diet consists among others of food naturally high in fibre, including unrefined carbohydrates, legumes, fruits and vegetables, which also contributes to improved micronutrient intakes (Vorster *et al.*, 2013: 9; Slavin, 2008: 1716). A diet naturally high in fibre, is typically lower in fat and energy, which assists in achieving or maintaining a healthy body weight (Slavin, 2013: 1424).

In addition, fibre assists in achieving or maintaining a healthy body weight by facilitating satiety through adding bulk to the diet, that causes gastric expansion and prompts vagal signals of satiety (Slavin, 2013: 1424; Buttriss & Stokes, 2008: 32). Furthermore, some fibres improve satiety by reducing the rate of gastric emptying and thereby slowing glucose uptake in the jejunum, resulting in a lower insulin response (Slavin, 2013: 1424; Maki *et al.*, 2007: 793–794).

There is also an association between a diet high in fibre and a lower risk for developing CVD, diabetes and constipation (Slavin, 2013: 1417, 1423). Fibre may reduce C-reactive protein levels, apolipoprotein levels and blood pressure, which are known risk indicators of CVD. Water-soluble fibres (beta-glucan, psyllium, pectin, and guar gum) especially helps with reduction of serum low-density lipoprotein cholesterol levels (Slavin, 2013: 1422–1423; Maki *et al.*, 2007: 793). Additionally, Slavin (2013: 1427) linked β -glucans (present in oats and barley) with improved immunity.

2.3.1.3 Protein

Although adequate protein intake is important for a healthy immune system, as well as maintaining lean body mass (Temple *et al.*, 2016: 180), the amount and type of protein, should be considered for health (Vorster *et al.*, 2013: 74).

A diet that contains too little animal protein increase the risk for nutrient deficiencies, including iron, zinc, calcium, vitamin A and vitamin B₁₂, which are required for growth and brain development (Vorster *et al.*, 2013: 74).

On the other hand, there is a link between obesity and a high protein diet, as a high protein diet is typically high in saturated fat (SF) and energy (DeBruyne & Pinna, 2017: 129; Voortman *et al.*, 2016: 2117; Vorster *et al.*, 2013: 74) and lower in plant-based foods (fruits, vegetables, legumes, nuts and carbohydrates high in fibre) (DeBruyne & Pinna, 2017: 128), thereby affecting gut health negatively.

A diet high in animal proteins can also increase the risk of developing osteoporosis later in life through an increased rate of bone reabsorption (Sukumar *et al.*, 2011: 1344; Buclin *et al.*, 2001: 493). Animal protein (acid-forming foods) increase urinary calcium loss by 74 percent when compared to base-forming foods (fruits and vegetables) (Buclin *et al.*, 2001: 498).

Tharrey *et al.* (2018: 1610) recommend that animal protein sources should be replaced with nuts and seeds to reduce the risk of CVD. Therefore, the SAFBDG recommend that lean meat, poultry, fish, and eggs should be eaten in prudent amounts (Vorster *et al.*, 2013: 66).

2.3.1.4 Fats

Fats are needed for growth and development and influence the risk of developing diseases of lifestyle later in life (Vorster *et al.*, 2013: 87). An inadequate intake (or absorption) of fats influence the intake of fat soluble vitamins, which in turn affects the learner’s immune system (Temple *et al.*, 2016: 184).

As mentioned before all fats are not equal and consideration should be given to the type of fats included into a child’s diet, with omega-3 fatty acids shown to be essential for optimal concentration (Yadrick, 2017: 182; Blaauw *et al.*, 2016: 229).

Table 2.2 lists the recommended fatty acid intake as a percentage of total energy intake per day (Blaauw *et al.*, 2016: 229).

Table 2.2 Recommendations for fatty acid intake (Blaauw *et al.*, 2016: 229)

Nutrient	Recommended intake as a percentage of TE
SF and trans fatty acids:	7 – 10%
Poly-unsaturated fatty acids (PUFA):	10 – 20%
Omega-3 fatty acids	0.6 – 1.2%
Omega-6 fatty acids	5 – 10%
Mono-unsaturated fatty acids (MUFA):	10 – 20%

2.3.1.5 Fruits and Vegetables

A recently published WHO/Food and Agriculture Organization (FAO) report (WHO, 2015) recommend a minimum of five fruit and vegetable portions per day (excluding starchy vegetables). The report

also recommends that fresh fruits and vegetables form part of healthy snacks and meals to improve the micronutrient status of especially children living in developing countries, as well as improving their daily fibre intakes (WHO, 2015).

Eating fruits and vegetables does not only improve micronutrient intake but also affects the microbiome through the provision of dietary fibre that, reduces the risk for diseases of lifestyle (Brüssow & Parkinson, 2014: 243).

The SAFBDG highlights the important role of fruit and vegetables in the prevention of diseases of lifestyle and recommend the intake of “plenty vegetables and fruit every day” (Vorster *et al.*, 2013: 46). Fruits and vegetables should mostly be eaten fresh and raw, as tinned vegetables contain added sodium, dried fruits may have high amounts of added sugar and fruit juice lacks the fibre contained in whole fruit (Vorster *et al.*, 2013: 50).

The recommendations, “Eat plenty vegetables and fruit every day” encourage the intake of fruits and vegetables of a variety of colours and textures (Vorster *et al.*, 2013: 50). This dietary guideline can be adhered to by eating one portion from each category of vegetables and fruit per day (Vorster *et al.*, 2013: 50). The categories include cruciferous, dark-green leafy, yellow/orange vegetables and one portion of yellow/orange seasonal fruits (Vorster *et al.*, 2013: 50). Subsequently, eating a colourful plate of food should provide adequate amounts of micronutrients important for growth and development.

Ideally, both parents and primary caregivers should promote eating a variety of vegetables and fruit daily to their children by setting an example (Vorster *et al.*, 2013: 50).

2.3.1.6 Fluids

The SAFBDG recommends drinking clean, safe water as fluid source, to optimise health (Wright *et al.*, 2013:84), with an intake of 1.7 litres recommended for children 4-8 years (Vorster *et al.*, 2013: 77). To emphasize the importance of drinking water, the American dietary guidelines (USDHHS and USDA, 2015), recommend that individuals choose water above all other beverages.

Table 2.3 lists the fluid requirements of children according to their body weight as recommended by the American Society of Parenteral and Enteral Nutrition (ASPEN) (ASPEN, 2002: 26).

Table 2.3 Fluid requirements for children according to their body weight (ASPEN, 2002: 26)

Weight of Child	Recommended fluid requirements
11 – 20kg	1000ml +50ml/kg more than 10kg
More than 20kg	1500ml + 20ml/kg more than 20kg

2.3.1.7 Dairy products

Milk and milk products play an essential role in human health, especially by providing calcium in amounts required for bone health. An adequate calcium intake is important for establishing peak bone mass from infancy up to the beginning of maturity (Pereira & Vicente, 2017: 165). To establish peak bone mass calcium, phosphorus and vitamin D work together to promote bone health (Bonjour, 2011: 438), all of which are present in milk (Gaucheron, 2011: 400).

Milk and milk products consist of a variety of micronutrients that are important for human health, such as magnesium, zinc and selenium. Furthermore, vitamins A, D, E and K are present in the fat component of milk and vitamins B₁, B₂, B₃, B₅, B₆, B₈, B₉, B₁₂ and C are present in the watery part of the milk (Gaucheron, 2011: 400). Milk substitutes including soy, almond, coconut and oat drinks are all highly processed foods and do not contain all these micronutrients and can therefore not be classified as milk substitutes but rather as a “beverage” (Pereira & Vicente, 2017: 161).

2.3.2 Micronutrients

Delayed school readiness and poor school performance may be a result of micronutrient deficiencies (Caulfield *et al.*, 2006: 552). Poor school performance may in turn lead to a lower educational level, decreased work capacity and a higher incidence of teenage pregnancies (Caulfield *et al.*, 2006: 552). Thus, a vicious cycle of micronutrient deficiencies, diseases and decreased work capacity often occurs in families, that may hinder economic growth in developing countries (Caulfield *et al.*, 2006: 552). Furthermore micronutrient deficiencies are linked with diseases of lifestyle and renal disease, placing an extra burden on society (Caulfield *et al.*, 2006: 552).

Micronutrients typically associated with malnutrition affecting cognition include iron, zinc, iodine, vitamin B₁₂ (Neumann *et al.*, 2003) as well as the omega-3 PUFA's (Sorensen *et al.*, 2015).

2.3.2.1 Iron

Iron plays a fundamental part in brain functioning. Even when a child has low iron stores without anaemia, the marginal deficiency can cause cognitive impairment (Sorensen *et al.*, 2015: 1623; Lukowski *et al.*, 2010: 54; Neumann *et al.*, 2003: 3928) and anorexia.

It is well known that stunting is closely linked to various micronutrient deficiencies (Gashu *et al.*, 2016: 4), while it is less known (but broadly researched) that obese children have a higher risk for iron deficiency and iron deficiency anaemia. This may occur due to the increased amounts of fat cells causing a chronic state of inflammation (Arshad *et al.*, 2017: 3; El-kerdany *et al.*, 2017: 2209; Jamshidi *et al.*, 2017: 59; Zhao *et al.*, 2015: 1081; Manios *et al.*, 2013: 470; Nead *et al.*, 2004: 107).

Food sources that provide the body with a higher bioavailable form of iron include meat, fish, organ meats and poultry (Mahan & Raymond, 2017: 1079t). Legumes, vegetables (including spinach, and tomato puree) as well as prune juice contain non-haeme iron with a lower bio-availability (Mahan & Raymond, 2017: 636,1079t).

2.3.2.2 Zinc

An adequate intake of zinc is important for brain development in children and optimal intakes improve attentiveness, motor, cognitive and emotional development as well as immunity (Caulfield *et al.*, 2006: 554; Bryan *et al.*, 2004: 298; Whaley *et al.*, 2003: 3929).

Beef, pork, poultry, seafood, nuts, legumes, milk and milk products and breakfast cereals fortified with zinc, are the main, commonly consumed, food sources of zinc (Mahan & Raymond, 2017: 1087).

2.3.2.3 Iodine

Iodine deficiency occurs due to iodine-deficient soil and a lack of intake of iodine-rich food. Food that is rich in iodine includes seafood and vegetables grown in soil rich in iodine (Mahan & Raymond, 2017: 1077; Otten *et al.*, 2006: 321). Iodine affects a learners cognitive function (Caulfield *et al.*, 2006: 554; Dani *et al.*, 2005: 261) and a deficiency thereof can lead to goitre, severe delayed brain development and cretinism (Temple *et al.*, 2016: 160; UNICEF, 2014: 23). Cretinism is a disorder known to cause both cognitive impairment and growth faltering in children (Temple *et al.*, 2016: 160; UNICEF South Africa, 2002: 1; Delange, 1994: 107). Although the damages of hypothyroidism leading to cretinism are believed to be permanent (Delange, 1994:107), the cognitive impairment can be improved, but the stunted growth remains unchangeable (Temple *et al.*, 2016: 160).

The iodisation of salt worldwide was initialised to prevent avoidable cognitive underdevelopment caused by iodine deficiency (Mahan & Raymond, 2017: 1077). The most recent data suggest that 70 percent of the world population have access to iodised salt (Pearce *et al.*, 2013: 523).

According to a UNICEF report (2002: 8), there is an increase of iodised salt usage from 30 to 63 percent in families in South Africa. An article in the Lancet (Zimmermann *et al.*, 2008: 1255) reported that 66.6% of families in Africa had access to iodised salt in 2007. Unfortunately, goitre in children takes longer to recover from iodine deficiency (UNICEF South Africa, 2002: 8).

2.3.2.4 Vitamin B₁₂

Observational studies have shown that vitamin B₁₂ plays a role in the development of cognition, myelinogenesis and linear growth (Venkatramanan *et al.*, 2016: 886; Bryan *et al.*, 2004: 302). Before a child reaches the age of five years, vitamin B₁₂ plays a role in social awareness, visuospatial capabilities and growth (Kvestad *et al.*, 2017: 1122). Venkatramanan *et al.* (2016: 886) suggest that optimal vitamin B₁₂ intake might be necessary to reach a child's full cognitive abilities. Unfortunately not enough research have been done on vitamin B₁₂ and cognition in children to explain the role of vitamin B₁₂ in brain development and to develop policies to protect the people most at risk of a vitamin B₁₂ deficiency (Venkatramanan *et al.*, 2016: 886).

It is important to note that vitamin B₁₂ deficiency is often more prevalent in obese individuals than iron deficiency. This may be due to being obese itself, and the mechanism thereof is unknown (Arshad *et al.*, 2017: 3,7).

Widely consumed food sources that contain significant amounts of vitamin B₁₂ include liver, fortified breakfast cereals, fish, milk and milk products, meat and meat products and eggs. Colonic bacteria also has the ability to produce vitamin B₁₂, but not in adequate amounts as required in the body (Mahan & Raymond, 2017: 1061). Therefore, children who consume inadequate amounts of animal products, including vegans, have a high risk of developing a vitamin B₁₂ deficiency.

2.3.2.5 Omega-3 poly unsaturated fatty acids

Omega-3 PUFA's play an important role in brain and mental development (Bryan *et al.*, 2004: 300), Sorensen and co-authors (2015: 1635) studied the effect of omega-3 fatty acids on cognitive performance and found a positive association between the intake of omega-3 fatty acids and cognition. The most abundant food sources of omega-3 PUFA's include fish, flaxseeds, walnuts, soybeans and canola oil (Mahan & Raymond, 2017: 1048t), which is not typically included in the diet

of a family with a lower income. Although pilchards is a good source of omega-3 PUFA's it is not widely consumed by all children (Oosthuizen, 2010: 156). The SAFBDG recommends eating oily fish 2-3 times a week (Vorster *et al.*, 2013: 75).

2.4 The role of primary caregivers in providing food for their children

A primary caregiver is defined as the person who is providing a learner with breakfast and lunchbox foods (Department: Social Development (Republic of South Africa) & UNICEF, 2001). Published research mostly focuses on parents as primary caregivers.

2.4.1 How parenting practices influence children's food choices

Parents play a multifaceted role within the context of influencing their children's eating habits, through the food choices they make for their children by purchasing certain types of food (Schwartz *et al.*, 2011: 801). Parents also act as role models for their children; and children mostly do what the parents do and not always, what they say. Parents also influence their children's eating behaviour by exerting "parental control" (Vaughn *et al.*, 2016: 99; Schwartz *et al.*, 2011: 803).

There is mostly consensus amongst researchers regarding the influence of "parental control" on children's eating behaviours (Vaughn *et al.*, 2016: 104; Schwartz *et al.*, 2011: 803). The process of restricting a child (by telling him / her not to eat a certain type of food) usually promotes an inclination in the child to want to eat the specific food, even when he / she is not hungry. Conversely, exerting "parental control" by pressurising a child to eat certain foods, is connected with picky eating and affects the child's ability to know when they had enough to eat (Schwartz *et al.*, 2011: 803).

Therefore, there should be a better way to influence children's eating behaviours. A study by Cullen and co-authors (2003: 615) found that the main predictors for the consumption of fruit and vegetables was the availability and accessibility of fruit and vegetables at home. This highlights the influence that the home environment plays in a child's behaviour toward food and healthy eating (Bogl *et al.*, 2017; Yee *et al.*, 2017: 11; Birch, 1999: 57).

Knowing that the availability and accessibility of food are important for the ingestion thereof, we have to ask what is the role that primary caregivers should play in forming children's' eating preferences and behaviour. Primary caregivers should promote an environment that provides for healthy eating, portioning and social behaviour practices for the ideal cognitive as well as physical development of the child (Academy of Nutrition and Dietetics, 2014: 1262; Savage *et al.*, 2008: 22). Caregivers should also provide structured meals suitable for the child's age within the context of

healthy food, without pressurising the child to eat. The child should determine their portion sizes (Academy of Nutrition and Dietetics, 2014: 1263).

Parents and primary caregivers should organise family meals and provide boundaries within mealtimes. They should practice an “authoritative parenting style” in other words, they should be firm but approachable (Berge *et al.*, 2011: 1037).

Not only parenting style plays a role in forming a child’s eating habits. Hampson *et al.* (2007: 124) linked specific personality traits such as “agreeableness”, “conscientiousness” and “intellect-imagination” during childhood to healthier eating, less smoking, and higher physical activity levels and consequently to a healthier lifestyle in adulthood.

Considering all the above-mentioned information, it can be concluded that dealing with children and healthy eating involves a multifaceted approach. This approach should start with the parents and primary caregivers “buying” into healthy eating for themselves and therefore also for their children.

2.4.2 Food Marketing

In order to be able to encourage healthy eating habits from a young age, caregivers should be aware of the influence food marketing may have on their children. Exposing children to limited or no food marketing is important, as children are inclined to change their food preferences in reaction to food commercials (Non-communicable diseases (NCD) risk factor collaboration, 2017). Watching a 10 to 30 second food commercial once or twice can affect the food choices that 2 – 6 year olds make in the short term (Borzekowski & Robinson, 2001: 45).

Screen time exposure affects the weight status of children as well as parents. Pettigrew *et al.* (2013: 2211) confirmed that not only children’s food preferences, but also parent’s preferences are affected by food advertising. Foods advertised are typically obesogenic, and low in micronutrients (Kelly *et al.*, 2016: 159; Boyland & Whalen, 2015: 331; Borzekowski & Robinson, 2001: 45).

A relationship between screen time, time viewing food commercials and food intake (and consequently body fat) have been described (Academy of Nutrition and Dietetics, 2014: 1264). Viewing food commercials promoting healthy foods have positive effects on the intake of the foods advertised (Bathgate & Begley, 2011: 24). Nevertheless, even viewing food commercials promoting healthy food can affect children’s sleep routine, the way they manage stress and physical activity levels (Academy of Nutrition and Dietetics, 2014: 1264). Therefore, screen time should be limited even if the food commercials promotes the intake of healthy food.

Parents should counteract the effect that unhealthy food advertisements have on their children, but they should be mindful of how they promote healthier food choices (Folkvord *et al.*, 2016: 3). Rather than emphasizing the avoidance of the advertised obesogenic food, they should focus on promoting the consumption of healthy foods (Folkvord *et al.*, 2016: 3). Another important way in which a parent can foster healthy eating habits in their children is by providing rules in a positive context regarding eating (Ventura & Birch, 2008: 9).

It is important for parents to realise that they decide what their children eat where and when, thereby affecting their children's attitudes and beliefs regarding food (Schwartz *et al.*, 2011: 801; Birch & Fisher, 1998: 546). Parents' behaviour during meal times will even affect their children's experience towards food (Schwartz *et al.*, 2011: 805), by applying different types of feeding practices (Ventura & Birch, 2008: 4). Harmful practices include forcing children to eat, limiting or eliminating food groups from the diet and using food as an incentive or manipulation tool (Ventura & Birch, 2008: 4).

2.5 Knowledge, attitudes, and practices of primary caregivers regarding healthy eating

Knowledge refers to the understanding that primary caregivers have of healthy breakfast and lunchbox foods, while their practices indicate the foods provided to the children in their care for breakfast and lunchboxes. The primary caregiver's attitude refers to the type of foods they want or would like to provide to their children for breakfast and in their lunchbox to school.

2.5.1 The role of the primary caregiver in establishing healthy eating habits for their children

Primary caregivers play an integral role in their children's perception of healthy eating. Sufficient knowledge regarding healthy eating is one of the key factors for the prevention of the development of malnutrition (Briggs *et al.*, 2010: 361).

Parental education, as well as age, plays an important role in their knowledge and attitudes towards healthy eating (Vereecken & Maes, 2010). Older mothers have a better nutritional knowledge and attitude score towards healthy eating, than mothers younger than 30 years of age (Vereecken & Maes, 2010). Parents with a lower income tend to perceive healthy food as more expensive than parents with a higher income (Vereecken & Maes, 2010). A South African study done by Temple *et al.* (2011: 57) reached the same conclusion as Vereecken and Maes (2010) that healthier food was more expensive, depending on where the food was purchased. However, it was also mentioned in

this study that the cost of healthy food could have been lower if lower cost, healthy food were included into the healthier food category of the study (Temple *et al.*, 2011: 57).

Confirming the role of parents on children's eating behaviours, Osera and co-authors (2015: 78) reported a positive link between a mother's mindfulness of her children to eat vegetables and the variety of food the children consumed. Parents are the providers of food, making the parents' perception of healthy eating a fundamental factor in forming their children's attitudes towards healthy food (Horne *et al.*, 2009: 614). Therefore, it seems that the focus should be on both parents and children when addressing nutritional issues in children (Asakura *et al.*, 2017: 488; Han *et al.*, 2010; Horne *et al.*, 2009).

Another significant factor contributing to establishing healthy eating habits seems to be eating meals together as a family (Vidhyashree *et al.*, 2015: 87; Neumark-Sztainer *et al.*, 2003: 317). Enjoying meals together as a family has benefits for children even later in their life. These benefits include the ongoing consumption through to adulthood of fruits, vegetables, complex carbohydrates (including food with a low glycaemic load), milk and milk products and better nutrient intakes (Bogl *et al.*, 2017; Gillman *et al.*, 2000: 235; Neumark-Sztainer *et al.*, 2003: 317). Children from families that eat meals together also consume less energy containing drinks and foods prepared with excess fat, even into adulthood, with the added benefit of consuming less fatty food (Bogl *et al.*, 2017; Gillman *et al.*, 2000: 235; Neumark-Sztainer *et al.*, 2003: 317). Higher nutrient intakes associated with families eating together include total energy, protein, calcium, iron, folate, fibre, vitamins A, C, E, B₆ and B₁₂ (Neumark-Sztainer *et al.*, 2003: 317; Gillman *et al.*, 2000: 238).

Acknowledging all the benefits of families eating together, families should be encouraged to overcome the obstacles that prevent them from enjoying a meal together (Larson *et al.*, 2014: 612). When it is not possible to eat supper together, a family should plan to eat breakfast together. Eating breakfast together as a family result in healthier eating practices and thereby affecting the child's weight positively (Larson *et al.*, 2014 : 620). Alarmingly family meals among families from a lower socioeconomic status are decreasing (Neumark-Sztainer *et al.*, 2013: 201).

Children's food preferences are also influenced by their primary caregivers and how they connect with the children during meal times (Vollmer & Baietto, 2017: 138; Birch, 1999: 53). When caregivers exert too much control over what children (especially girls) are eating, children will act in precisely the opposite way that the parents want them to (Anzman & Birch, 2009: 651). This act to control

children can even affect a child's self-control and weight negatively (Vollmer & Baietto, 2017: 138; Anzman & Birch, 2009: 651).

Making mealtimes even more challenging is children's inclination to prefer foods high in energy rather than foods high in nutrients and lower in energy. This preference for energy-dense food might have been an adaptive gene that helped to protect children against starvation, but it is an adaptation not needed in the modern environment with an excess of energy dense, obesogenic foods readily available (Hess & Brüning, 2014: 2039; Birch, 1999: 56).

It is therefore important to encourage children to eat healthily and experiment with novel foods. Children would rather eat new food if all the family members are eating the same food, than when they are eating with the family but eating another type of food (Paroche *et al.*, 2017: 26; Addressi *et al.*, 2005: 264).

Eating meals together as a family also provides the opportunity for children to obtain nutrition-related information through discussions with their parents (Gillman *et al.*, 2000: 239). Empowering the parent or caregiver through nutrition education is therefore essential to support a child's healthy eating behaviour.

Parents and primary caregivers can influence their children's intake of healthy food, particularly from an earlier age (Bogl *et al.*, 2017: 15). The more familiar a child is with a type of food, the more prone they are to eating that food (Paroche *et al.*, 2017: 22; Birch, 1999: 46). A healthy lifestyle (including exercise and healthy eating) practiced by a parent influence their child to follow the same type of lifestyle (Academy of Nutrition and Dietetics, 2014: 1264). Therefore, families eating behaviours should be targeted when focussing on establishing healthy eating (and living) behaviours (Bogl *et al.*, 2017: 15; Mushaphi *et al.*, 2015: 103).

2.5.2 *The social and psychological role of food intake for children.*

The Academy of Nutrition and Dietetics (2014: 1257) recommends that 2 – 11 year old children should find pleasure in eating while achieving and maintaining their optimal weight and brain development and reducing their risk for diseases of lifestyle through healthy living.

Although children can be motivated to eat healthily and practice self-control, they still need a support structure to help them and motivate them. These support structures include (Draper *et al.*, 2010:10; Lobstein *et al.*, 2004: 8):

- Cooperation between the family, school and community to be able to help the child to make healthier choices;
- Encouraging health-promoting schools that include physical activity in the curriculum; and
- Promoting healthy eating for all children.

2.6 **Health promoting schools**

Reddy and Singh (2017) concluded that the school environment is ideal for health promotion if adequate funding is available.

Australia has implemented the “Crunch&Sip program” for more than ten years. The programme was implemented to facilitate the promotion of fruits, vegetables and water in primary school children (Sharp *et al.*, 2017: 1491). Sharp *et al.* (2017: 1491) reported that the teachers were positive about implementing the “Crunch&Sip” programme and that parents, as well as children, should be involved in the programme.

The United States of America has implemented programmes to facilitate healthier school lunches (provided at the school), including children from a young age to 14 years of age, in consenting school districts in 2012. Changes included a larger portion of vegetables, an emphasis on reduced-fat dairy, smaller servings of meat and a reduction of sodium as well as trans-fat content of meals (Cullen *et al.*, 2017). By including reduced-fat dairy products in a school lunchbox, intake of calcium and vitamin A improved (Quann *et al.*, 2015).

The Food Dudes Intervention (FDI) study conducted in Ireland was successful with improving parents’ provision as well as children’s (4 – 11 years of age) intake of fruits and vegetables through promoting healthy eating at schools (Horne *et al.*, 2009). The FDI included compulsory educational material (including peer-modelling videos) used for 16 weeks, together with the provision of fruit, vegetables

and rewards for eating healthy. There was also a maintenance phase where parents were motivated to include fruits and vegetables in the lunchbox (Horne *et al.*, 2009).

South Africa has also implemented an intervention programme in the Western Cape, named HealthKick (HK), to promote healthy eating as part of a healthy lifestyle in lower income schools (de Villiers *et al.*, 2015). HK, like the FDI, started with the training of the teachers (De Villiers *et al.*, 2015; Horne *et al.*, 2009). The main difference between the two interventions is that the HK intervention only included a support manual to the teachers at the intervention schools (De Villiers *et al.*, 2015: 1) and the FDI intervention provided the school with free fruits and vegetables during the baseline and intervention studies (Horne *et al.*, 2009: 614). The FDI also promoted the provision of fruits and vegetables in the lunchbox by the parents in the “experimental” school as a maintenance phase (Horne *et al.*, 2009: 614).

The goal of HK was to prevent diseases of lifestyle through education of learners as well as their parents by including nutritional lesson plans in the curriculum (Draper *et al.*, 2010). The intervention was implemented over three years, and after three years the intervention showed improvement in the learners’ nutritional knowledge and self-efficacy, but not necessarily their practices (De Villiers *et al.*, 2016: 176). The failure to improve practices may be attributed to poor parental participation during the study and the lack of change in the food environment at home and at school (De Villiers *et al.*, 2016). It should be kept in mind that the research was done in disadvantaged communities where the learners’ choices of food are influenced by their socio-economic status (Abrahams *et al.*, 2011).

The studies mentioned emphasise the importance of parental nutritional knowledge, desire to change and willingness to change how they provide food to their children (Abrahams *et al.*, 2011), which will assist the parents in improving their children’s eating habits.

Children’s eating habits can improve with the incorporation of more fruits and vegetables into their daily diet (WHO, 2015). Laurie and co-authors (2017: 23) challenged the perception that people dislike fruit and vegetables. In their study, more than 60 percent of educators and learners indicated that they enjoyed eating vegetables and fruit daily and more than 80 percent liked the taste of vegetables and fruit. The majority of both educators and students knew that it is essential to eat a variety of vegetables (Laurie *et al.*, 2017: 23).

HK's intervention goals aligned with some of the SAFBDG goals (Vorster *et al.*, 2013; Draper *et al.*, 2010):

- Eat a variety of foods every day;
- Eat more different kinds of fruit and vegetables every day;
- Eat less fat and oily food;
- Eat less sugar and sweet foods, such as cakes, doughnuts, sweets, etc.;
- Eat a regular healthy breakfast daily; and
- Bring healthy lunchboxes to school as a daily routine (Draper *et al.*, 2010: 3).

The 2012 Integrated School Health Policy implemented the SAFBDG into the curriculum of Health promoting schools (HPS). However, there are challenges to address (Nguyen *et al.*, 2017; Oldewage-Theron & Egal, 2012: 7):

- Lack of training, support and proper guidelines for educators;
- Time constraints;
- Other academic priorities;
- Low levels of educator participation;
- Lifestyle and related factors of educators, parents and learners; and
- Lack of resources.

Ways by which schools can promote healthy eating and improve nutritional knowledge include school vegetable gardens, nutrition classes with instructions on how to cook, after-school cooking classes and an afterschool nutrition curriculum (Laurie *et al.*, 2017: 24; Davis *et al.*, 2015: 2358; Gatto *et al.*, 2012: 913; Parmer *et al.*, 2009: 212).

School vegetable gardens in turn promote vegetable gardens at home which make children more inclined to taste and like vegetables (Gatto *et al.*, 2012: 913; Parmer *et al.*, 2009: 212). The vegetables provide food for the families and the children prepare the vegetables for eating by themselves (Gatto *et al.*, 2012: 913; Parmer *et al.*, 2009: 212). School vegetable gardens can also promote healthy eating through advertisement (Gatto *et al.*, 2012: 213).

Following a community-based approach would help HPS to be sustainable. Role players in the community that should be considered for inclusion when establishing health promoting schools include educators, primary caregivers, doctors, allied health professionals, food manufacturers, merchants, tuck shops, all forms of advertising, political figures and policymakers (Lobstein *et al.*,

2004: 7). Healthy eating should also be combined with increased physical activity, which would also involve role players like city architects and developers (Lobstein *et al.*, 2004: 7).

2.7 Conclusion

Improving healthy eating practices among children is essential for health, growth and development. Therefore, a multi-disciplinary approach should be followed, including improvement of nutritional knowledge of primary caregivers, teachers and learners.

3 CHAPTER 3: Methodology

3.1 Introduction

Chapter 3 details the methodology of the research study and includes a description of the study design and population, the measurement tools used, procedures followed, the statistical analysis of data and ethical considerations applicable to the study.

3.2 Study Design

This descriptive study followed a quantitative, cross-sectional study design.

3.2.1 Study population

In order for this study to be comparable to published European studies, only Quintile 5, public and independent schools in Bloemfontein, in the Motheo district, were included in the study. A total of 40 schools were included. Schools from Quintile 1 – 4 were not included as they may have a large number of learners who make use of the school nutrition program (Abrahams *et al.*, 2011: 1753) because of the expected lower socio-economic status, which may influence the results of this study. Time, accessibility, and budget constraints limited the study to Bloemfontein in the Motheo district, Free State province.

Parents help to establish their children's eating habits (Osera *et al.*, 2015: 78). Their perception about healthy eating is fundamental to the establishment of their children's attitudes toward healthy eating and to purchase healthy food (Horne *et al.*, 2009: 614). Consequently, both parents and children should be addressed when there are nutritional issues in children (Han *et al.*, 2010; Horne *et al.*, 2009). However, when collecting data on nutritional intakes, parents and/or primary caregivers are better sources of information (Burrows *et al.*, 2010). According to Livingstone and co-authors (2000), the cognitive abilities of children to recall their food intake is only fully developed when reaching adolescence (Livingstone & Robson, 2000).

Of all the Quintile 5 schools (40 schools) in Bloemfontein approached by the researcher, 16 schools, of which nine were public and seven were independent, granted permission to conduct the study at their school. While the study was conducted, one of the independent schools indicated that the owner of the school did not wish for the study to be conducted at their school resulting in a total of 15 schools participating in the final study.

Of the 3198 learners attending the foundation phase ($\pm 6 - 10$ years old) classes of these schools (2674 from a public and 524 from independent schools), 1286 primary caregivers (40.2 percent) provided consent to participate in the study by completing the questionnaires. The primary caregivers completed a questionnaire for their oldest child in grade 1 – 3.

3.2.2 Study sample

Research has shown that parents and caregivers report food intakes more accurate than children (Burrows *et al.*, 2010). For this reason, primary caregivers were included in the study sample to complete the questionnaires.

3.2.2.1 Inclusion criteria

Primary caregivers of foundation phase (grade 1 – 3) learners that met the following criteria were included in the study:

- Primary caregiver of a learner attending Quintile 5 public and independent schools in Bloemfontein (Motho district) in the Free State province; and
- Willing to complete the questionnaire in English. Quintile 5 schools can include parents and/or caregivers speaking any of the 11 official languages in South Africa and due to financial constraints, questionnaires were made available only in English, the official language of communication.

3.2.2.2 Exclusion criteria

Primary caregivers were excluded from the study if:

- Their children attended schools that did not provide consent to participate in the study;
- They did not wish to participate in the study; and
- They were not willing to complete the questionnaire in English.

3.3 Measurements

In this study a printed questionnaire was used to collect data from primary caregivers.

3.3.1 Operational Definitions

The questionnaire included three main sections of data collection, which covered:

- Demographic information, which were included at the end of the questionnaire to ensure that sensitive information was not collected at the beginning of the questionnaire (Del Greco & Walop, 1987);
- Knowledge, attitudes, and practices regarding providing breakfast; and
- Knowledge, attitudes, and practices regarding packing lunchboxes for school.

In this study the following operational definitions are applicable:

3.3.1.1 Knowledge

Wojtczak (2002: 451) defines knowledge as “The acquisition or awareness of facts, data, information, ideas or principles to which one has access through formal or individual study, research, observation, experience or intuition”.

Knowledge in this study refers to the theoretical (scientific) and/or practical understanding that caregivers have of a healthy breakfast and lunchbox.

3.3.1.2 Attitudes

The definition for attitudes according to the WHO (2008a: 5) is as follows: “Attitude is a way of being, a position. These are leanings or ‘tendencies to...’ This is an intermediate variable between the situation and the response to this situation. It helps explain that among the possible practices for a subject submitted to a stimulus, that subject adopts one practice and not another. Attitudes are not directly observable as are practices, thus it is a good idea to assess them.”

The WHO report points out that attitudes towards a position do not necessarily lead to practicing the attitude towards that position (WHO, 2008a). In this study, the term attitudes refer to the primary caregiver’s tendencies to want to provide a specific type of breakfast and lunchbox to their children.

3.3.1.3 Practices

“Practices or behaviours are the observable actions of an individual in response to a stimulus. This is something that deals with the concrete, with actions” (WHO, 2008b: 5).

In this study, practices refer to what primary caregivers are providing to their children for breakfast and packing into their lunchboxes.

3.3.1.4 Quintile

'Quintile' is a classification, used by the Department of Basic Education (DBE), to rank schools according to the socio-demographic status of the school. Schools from Quintile 1 have the highest poverty level, while Quintile 5 schools have the lowest poverty level (Abrahams *et al.*, 2011: 1753). This however does not mean that there are no children from a lower socio-economic background included in the study.

3.3.1.5 Primary Caregiver

According to the children's act of South Africa (Department: Social Development (Republic of South Africa) & UNICEF, 2001: 16) "a caregiver is someone other than the parent who is taking care of a child."

For the purpose of this study the primary caregiver refers to the parent or caregiver of the child.

3.3.1.6 Demographic Information

Demographic information describes the specific characteristics of a chosen population (Lee, 2012: 2). In this study all Quintile 5 public and independent schools in Bloemfontein (Motheo district), South Africa were invited to participate in the study. Demographic variables collected in this study included the age and gender of the primary caregiver and learner, as well as educational qualifications, occupation, employment status, household income, marital status, ethnicity and family size of the primary caregivers (WHO, 2008a: 16).

3.3.1.7 Breakfast

For the purpose of this study, breakfast was defined as the first meal the learner eats, or consumes in a liquid form, within two hours of waking up and before getting to school and which contributes to the learner's daily energy, macro- and micronutrient intake (Timlin *et al.*, 2007). Breakfast included food ingested on the way to school within two hours of waking up, but excluded coffee or tea.

Healthy breakfast-foods was regarded as (Giovannini *et al.*, 2008: 621; Rampersaud *et al.*, 2005: 754):

- Fibre containing low GI carbohydrates (Glycemic index foundation SA., n.d.), with a low added sugar content;s
- Reduced fat milk and milk products;
- Reduced fat meat and meat products; and

- Fruits and/or vegetables in any form.

3.3.1.8 Lunchbox

For the purpose of this study a lunchbox was defined as any food and/or beverage brought from home and eaten during the day at school (Abrahams *et al.*, 2011), excluding lunchboxes provided for extramural activities. Money provided to purchase food from any vendor at school, was also considered in this study.

3.3.2 Techniques: Questionnaire

A literature search identified relevant questions from other studies, focussing on nutritional knowledge and/or attitudes and/or practices of learners and/or caregivers. Four dietitians and a biostatistician evaluated the content validity of the questionnaire.

Collective administration in the school setting was used to hand out and obtain the self-completed questionnaires. The use of this technique ensures greater anonymity and it is less time consuming than collecting data through an interview. Printed questionnaires are more accessible for all study participants, which is important as research using questionnaires have a lower response rate (20 – 50 percent) and may thus need a bigger study sample (Kamar, 2011: 140). For this reason, all 40 independent and public schools in Bloemfontein were included in the study.

Research has shown a very low response rate (20-50 percent) in studies collecting data through the completion of electronic or online questionnaires (Kamar, 2011: 141). For this reason, printed questionnaires was used and distributed by class teachers. By using class teachers to distribute the questionnaires the questionnaires were more readily accessible to the primary caregivers who fit the inclusion criteria (Hohwü *et al.*, 2013). This method was deemed to be the most time and cost effective.

Even though the questionnaire was eight pages long it only took 10 – 15 minutes to complete, because most questions were closed-ended which reduced the time to complete the questionnaire.

In Table 3.1 the data collected as demographic information are summarised and motivated.

Table 3.1 Data collected to describe the demographic background of primary caregivers

Demographic information			
Measurement	Question asked	Reason why the question was included	Reference
Role of participant in the family	<i>What is your relationship to this child?</i>	To determine if the person who is completing the questionnaire is also providing the child food for breakfast and his/her lunchbox.	(Wilkinson, 2015: 133)
Age: Primary caregiver	<i>What is your birthdate?</i>	To determine whether age affects a primary caregiver's nutritional KAP.	(Vereecken <i>et al.</i> , 2010: 48)
	<i>How old is you?</i>	Control question to verify date of birth and age.	(Del Greco <i>et al.</i> , 1987a)
Age: Learner	<i>What is the child's birthdate?</i>	To determine whether a learner's years of attending school affects a primary caregiver's lunchbox practices.	(Abrahams <i>et al.</i> , 2011: 1757)
	<i>What is your child's age?</i>	Control question to verify date of birth and age.	(Del Greco <i>et al.</i> , 1987a)
Gender: Primary caregiver	<i>What is your gender?</i> <ul style="list-style-type: none"> ▪ Male ▪ Female 	To determine whether there is a difference in nutritional KAP according to gender.	(Vereecken & Maes, 2010: 48)
Gender: Learner	<i>What is your child's gender?</i> <ul style="list-style-type: none"> ▪ Male ▪ Female 	To determine whether nutritional attitudes and practices are different for boys and girls.	(Vereecken & Maes, 2010: 48)
Educational qualification	<i>What is your highest qualification?</i> <ul style="list-style-type: none"> ▪ Grade 8 or less ▪ Grade 9 ▪ Grade 10 ▪ Grade 11 ▪ Grade 12 ▪ Diploma ▪ Bachelor's degree ▪ Honours degree ▪ Master's degree ▪ Doctoral degree 	To determine whether education affects a primary caregiver's nutritional KAP.	(Vereecken & Maes, 2010: 48)

Demographic information			
Measurement	Question asked	Reason why the question was included	Reference
Occupation	<i>What is your occupation?</i> <ul style="list-style-type: none"> ▪ Specify: 	To determine whether occupational influence a primary caregiver's nutritional KAP.	(Vereecken & Maes, 2010: 48)
Employment status	<i>Are you currently employed?</i> <ul style="list-style-type: none"> ▪ Employed full-time (more than 35 hours per week) ▪ Employed part-time (less than 35 hours per week) ▪ Self-employed ▪ Unemployed by choice ▪ Unemployed 	To determine whether employment status affects nutritional KAP.	(Vereecken & Maes, 2010: 48)
Marital status	<i>What is your marital status?</i> <ul style="list-style-type: none"> ▪ Single ▪ Married (legally or traditionally) ▪ Divorced/Separated ▪ Widowed ▪ Living together 	To determine whether marital status affects a primary caregiver's nutritional KAP.	(Vereecken & Maes, 2010: 48)
Ethnicity	<i>What is your home language?</i> <ul style="list-style-type: none"> ▪ Afrikaans ▪ English ▪ isiNdebele ▪ isiXhosa ▪ Sesotho ▪ Setswana ▪ Tshivenda ▪ Xitsonga ▪ isiZulu ▪ Sepedi ▪ siSwati ▪ Other, specify: 	To determine whether there are cultural differences in nutritional KAP.	

Demographic information			
Measurement	Question asked	Reason why the question was included	Reference
Income	<i>What is your total household monthly income, after taxes?</i> <ul style="list-style-type: none"> ▪ <R5 000 ▪ R5 001 – <R10 000 ▪ R10 001 – <R20 000 ▪ R20 001 – >R40 000 ▪ more than R40 001 	To determine whether there is a difference in nutritional KAP in lower and higher income groups.	(Vereecken & Maes, 2010: 48)
Family size	<i>For how many children do you pack a school lunchbox?</i>	To determine whether nutritional attitudes and practices are influenced by the number of children in the household.	(Vereecken & Maes, 2010: 48)

Table 3.2 lists the data collected to describe the knowledge, attitudes and practices regarding breakfast consumption.

Table 3.2 Data collected to determine knowledge, attitudes and practices regarding breakfast consumption

Knowledge			
Measurement	Question	Correct answer	Reference
Primary caregiver's knowledge of healthy breakfast food types	<p><i>What type of milk and milk products are the healthiest for your child?</i></p> <ul style="list-style-type: none"> ▪ Full cream ▪ Reduced fat/Low fat/2% ▪ Fat free ▪ None, my child has a disease e.g. milk allergy 	<ul style="list-style-type: none"> ▪ Low Fat/2% ▪ Fat free 	(Benjamin Neelon & Briley, 2011: 608)
Primary caregiver's knowledge of the importance of breakfast	<p><i>Skipping breakfast is good for your child's concentration at school.</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Unsure 	No	(Abrahams <i>et al.</i> , 2011: 1754; Rampersaud <i>et al.</i> , 2005: 743)
Primary caregiver's knowledge of the role of breakfast	<p><i>Eating breakfast will make you gain weight?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Unsure 	No	(Giovannini <i>et al.</i> , 2008: 615; Rampersaud <i>et al.</i> , 2005: 743)
Primary caregiver's knowledge of the role of breakfast	<p><i>It is important that breakfast foods contain fibre.</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Unsure 	Yes	(Rampersaud <i>et al.</i> , 2005: 743)
Primary caregiver's knowledge of the effect of a diet high in fruit on bodyweight	<p><i>It is important to eat a fruit with breakfast.</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Unsure 	Yes	(Schulz <i>et al.</i> , 2005: 1186-1187)

Knowledge			
Measurement	Question	Correct answer	Reference
Primary caregiver's knowledge of the importance of breakfast	<i>Breakfast is important for growth and development.</i> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Unsure 	Yes	(Ruxton & Kirk, 1997: 199)

Attitudes (Indicated the degree to which the caregiver agree or disagree to the following statements)			
Measurement	Question	Desired answer	Reference
The attitude of primary caregivers towards eating breakfast	<i>It is important to eat breakfast.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Agree	(Vorster <i>et al.</i> , 2013: 7; Vereecken & Maes, 2010: 47)
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<i>You do not give your child breakfast because there is not enough time.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 		(Vereecken & Maes, 2010: 50; Boutelle <i>et al.</i> , 2007: 255)
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<i>You do not give your child breakfast because it is too expensive.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 		(Vereecken & Maes, 2010:50; Boutelle <i>et al.</i> , 2007: 255)

Attitudes (Indicated the degree to which the caregiver agree or disagree to the following statements)			
Measurement	Question	Desired answer	Reference
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<i>You do not give breakfast to your child because he/she does not want to eat.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Disagree	(Vereecken & Maes, 2010: 50; Boutelle et al., 2007: 255)
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<i>You give your child breakfast because it is important for their health.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Agree	(Burrows et al., 2017: 136; Giovannini et al., 2008: 616; Boutelle et al., 2007: 255)
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<i>You give your child breakfast because it is important for concentration.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Agree	(Burrows et al., 2017: 136; Giovannini et al., 2008: 616; Boutelle et al., 2007: 255)

Attitudes (Indicated the degree to which the caregiver agree or disagree to the following statements)			
Measurement	Question	Desired answer	Reference
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<p><i>You give your child breakfast because you grew up eating breakfast.</i></p> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 		(Burrows <i>et al.</i> , 2017: 136; Giovannini <i>et al.</i> , 2008: 616; Boutelle <i>et al.</i> , 2007: 255)
The influence of primary caregiver's attitudes towards a learner's breakfast eating habits	<p><i>You give your child breakfast because your child asks you to have breakfast.</i></p> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 		(Burrows <i>et al.</i> , 2017: 136; Giovannini <i>et al.</i> , 2008: 616; Boutelle <i>et al.</i> , 2007: 255)

Practices			
Measurement	Question	Desired answer	Reference
The effect of breakfast timing on number of meals	<p><i>If your child eats breakfast, when does your child eat breakfast</i></p> <ul style="list-style-type: none"> ▪ When you wake your child up ▪ Within 2 hours after waking up ▪ On the way to school ▪ At school ▪ My child does not eat breakfast 	<ul style="list-style-type: none"> ▪ When you wake your child up ▪ Within 2 hours after waking up ▪ On your way to school 	(Timlin <i>et al.</i> , 2007: 268)
The effect of eating regular breakfasts on mental and physical development	<p><i>How many days in a school week does your child eat breakfast?</i></p> <ul style="list-style-type: none"> ▪ 1 ▪ 2 ▪ 3 ▪ 4 ▪ 5 	Daily	(Ostachowska-Gasior <i>et al.</i> , 2016: 1)
The effect of the primary caregiver's breakfast eating behaviour on children's breakfast eating behaviour	<p><i>Do you mostly eat breakfast together as a family?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No 	Yes	(Pearson <i>et al.</i> , 2009: 5)
Fat content of milk and milk products consumed	<p><i>What type of milk and milk products do you mostly use at home? Choose all the correct answers.</i></p> <ul style="list-style-type: none"> ▪ Full cream ▪ Reduced fat/2%/Low fat ▪ Fat free ▪ None, my child has a disease e.g. milk allergy 	Reduced fat or fat free	(Cullen <i>et al.</i> , 2017; Quann <i>et al.</i> , 2015)
Fluid consumption	<p><i>Should you avoid giving your child something to drink with breakfast?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No 	No	(Vorster <i>et al.</i> , 2013: 7)

Practices			
Measurement	Question	Desired answer	Reference
	<ul style="list-style-type: none"> ▪ Uncertain 		
Type of fluid consumption	If your child drinks something with breakfast, please specify what he or she drinks.	<ul style="list-style-type: none"> ▪ Milk ▪ Water ▪ Tea without sugar ▪ Coffee without sugar 	(Vorster <i>et al.</i> , 2013: 7; Vereecken & Maes, 2010: 47; Warren <i>et al.</i> , 2003)
The effect of a high fibre breakfast on insulin sensitivity and post-prandial satiety	<p><i>What type of breakfast foods do you give your child? Please indicate how many times a week.</i></p> <ul style="list-style-type: none"> ▪ Dairy products <ul style="list-style-type: none"> ○ Yoghurt & drinking yoghurt ○ Milk & maas (including on your porridge) ○ Coffee or tea made with milk instead of water ▪ Fruit ▪ Vegetables ▪ Porridge / cereal <ul style="list-style-type: none"> ○ Oats ○ Maltabella ○ Maizemeal ○ Tastee Wheat ○ All Bran / Bran Flakes ○ Corn Flakes ○ FutureLife ○ Milo cereal ○ Muesli ○ Pronutro (wheat free) ○ Pronutro (whole wheat) ○ Pronutro (Toddler) ○ Pronutro (Pro-light) ○ Rice Crispies ○ Weet-Bix ○ Other (please specify) ▪ Bread or Muffin 	A low GI fibre-containing cereal (excluding Weet-Bix, because it is high GI and muesli, because it is high in fat and high GI), porridge, or low GI bread	(Deshmukh-Taskar <i>et al.</i> , 2010: 871; Giovannini <i>et al.</i> , 2008: 615; Timlin & Pereira, 2007: 227; Warren <i>et al.</i> , 2003)

Practices			
Measurement	Question	Desired answer	Reference
The effect of a high fibre breakfast on insulin sensitivity and post-prandial satiety cont.	<ul style="list-style-type: none"> ○ White ○ Best of Both or low GI white ○ Brown or whole wheat ○ Low GI brown or seeded ○ Bran ○ Sweet ○ Savoury ○ Other (please specify) <ul style="list-style-type: none"> ▪ Protein-rich food ○ Eggs ○ Cheese ○ Bacon ○ Poloni / viennas / ham roll / ham / salami ○ Sausage / mince ○ Baked beans Other (please specify) 	A low GI fibre-containing cereal (excluding Weet-Bix, because it is high GI and muesli, because it is high in fat and high GI), porridge, or low GI bread	(Deshmukh-Taskar <i>et al.</i> , 2010: 871; Giovannini <i>et al.</i> , 2008: 615; Timlin & Pereira, 2007: 227; Warren <i>et al.</i> , 2003)

Table 3.3 provides a summary of the data collected to describe the knowledge, attitudes and practices regarding lunchboxes.

Table 3.3 Data collected to describe the knowledge, attitudes and practices regarding lunchboxes

Knowledge			
Measurement	Question	Correct answer	Reference
Primary caregiver's knowledge of the importance of packing lunchboxes	<p><i>Is it important for your child to eat the food in his/her lunchbox?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(De Villiers <i>et al.</i> , 2016: 174)
Primary caregiver's knowledge of the importance of packing lunchboxes	<p><i>Why is it important to pack a school lunchbox? <u>Please mark all the answers you agree with.</u></i></p> <ul style="list-style-type: none"> ▪ That my child will not go hungry ▪ For better concentration ▪ To make sure that my child eats healthy food ▪ To save money ▪ It is not important 	All except last	
Primary caregiver's knowledge of the impact of healthy food on health	<p><i>Does eating fruits and vegetables daily assist in reducing the risks of developing certain diseases?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(De Villiers <i>et al.</i> , 2016: 174; Abrahams <i>et al.</i> , 2011: 1754)
Primary caregiver's knowledge of the impact of healthy food on health	<p><i>How many helpings of fruit and vegetables should your child eat every day? (One helping of fruit is a small fruit and one helping of vegetables is 1 cup chopped raw vegetables or ½ a cup cooked vegetables)</i></p> <ul style="list-style-type: none"> ▪ 0 ▪ 1 ▪ 2 ▪ 3 ▪ 4 ▪ 5 	5	(De Villiers <i>et al.</i> , 2016: 174,177)

Knowledge			
Measurement	Question	Correct answer	Reference
Primary caregiver's knowledge of healthy food	<p><i>Are foods that contain fibre (roughage) important in your child's diet?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(De Villiers <i>et al.</i> , 2016: 174)
Primary caregiver's knowledge of healthy lunchbox food types	<p><i>Which food do you regard as the healthiest?</i></p> <ul style="list-style-type: none"> ▪ Plain popcorn ▪ A packet of chips (e.g. Simba / Lays) 	Plain popcorn	(Abrahams <i>et al.</i> , 2011: 1754)
Primary caregiver's knowledge of the impact of food on health	<p><i>Can fats help with the absorption of certain nutrients?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(Abrahams <i>et al.</i> , 2011:1754)
Primary caregiver's knowledge of the impact of food on health	<p><i>When you eat lots of fat and fatty foods, you can: (Select all the appropriate answers.)</i></p> <ul style="list-style-type: none"> ▪ Become fat (overweight) ▪ Concentrate better ▪ Feel more energetic ▪ Get high blood pressure ▪ Get a heart attack ▪ Get diabetes 	<ul style="list-style-type: none"> ▪ Become fat (overweight) ▪ Get high blood pressure ▪ Have a heart attack ▪ Develop diabetes 	(De Villiers <i>et al.</i> , 2016: 174)
Primary caregiver's knowledge of healthy food	<p><i>Do chips contain healthy fats?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	No	(Abrahams <i>et al.</i> , 2011: 1754)
Primary caregiver's knowledge of healthy food	<p><i>Do nuts contain healthy fats?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(Abrahams <i>et al.</i> , 2011: 1754)
Primary caregiver's knowledge of healthy food	<p><i>Do avocado pears contain healthy fats?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(Abrahams <i>et al.</i> , 2011: 1754)

Knowledge			
Measurement	Question	Correct answer	Reference
Primary caregiver's knowledge of healthy food	<p><i>Eating a lot of sugar, sweets and sweet foods: (Select all appropriate answers.)</i></p> <ul style="list-style-type: none"> ▪ Is good for health ▪ Can make you fat ▪ Is bad for your teeth ▪ Can cause diabetes 	<ul style="list-style-type: none"> ▪ Can make you fat ▪ Is bad for your teeth ▪ Can cause diabetes 	(De Villiers <i>et al.</i> , 2016: 174)
Primary caregiver's knowledge of healthy food	<p><i>Select all the food group/s that contain fibre (roughage):</i></p> <ul style="list-style-type: none"> ▪ Meat, fish & chicken ▪ Dairy ▪ Fruits ▪ Vegetables ▪ Unrefined starchy foods/carbohydrates ▪ Beans & Lentils ▪ Fats 	<ul style="list-style-type: none"> ▪ Fruits ▪ Vegetables ▪ Unrefined starchy foods/carbohydrates ▪ Beans & Lentils 	(De Villiers <i>et al.</i> , 2016: 174)
Primary caregiver's knowledge of healthy food	<p><i>Do biscuits/cookies contain healthy fats?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	No	(Abrahams <i>et al.</i> , 2011: 1754)

Attitudes			
(Indicated the degree to which the caregiver agree or disagree to the following statements)			
Measurement	Question	Desired answer	Reference
Primary caregiver's attitudes towards healthy eating	<i>It is important to have healthy eating habits.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Agree	(Vereecken & Maes, 2010)
Primary caregiver's attitudes towards their children's healthy eating habits	<i>Healthy food packed into a lunchbox would help reduce the risk of your child developing certain diseases.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Agree	(Vereecken & Maes, 2010:47)
Primary caregiver's attitudes towards their children's healthy eating habits	<i>A healthy lunchbox does not help my child to concentrate at school.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Disagree	(Vereecken & Maes, 2010: 47)
The barriers of the primary caregiver's attitudes towards a learner's healthy eating	<i>To prepare a healthy lunchbox is an extra workload.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 		(Vereecken & Maes, 2010: 47)
The interests of the primary caregiver towards healthy eating	<i>I seldom read the food label before I buy a new food item.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Disagree	(Vereecken & Maes, 2010: 47)

Attitudes (Indicated the degree to which the caregiver agree or disagree to the following statements)			
Measurement	Question	Desired answer	Reference
The barriers of primary caregiver's attitudes towards a learner's healthy eating	<i>Healthy food is more expensive than less healthy food.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Disagree	(Vereecken & Maes, 2010: 47)
The barriers of primary caregiver's attitudes towards a learner's healthy eating	<i>In general, healthy food is tasty.</i> <ul style="list-style-type: none"> ▪ Completely agree ▪ Agree ▪ Sometimes agree ▪ Sometimes disagree ▪ Disagree ▪ Completely disagree 	Agree	(Vereecken & Maes, 2010: 47)

Practices			
Measurement	Question	Correct answer	Reference
Lunchbox packing practices	<p><i>Choose one single criterion that you consider as most important for a school lunchbox</i></p> <ul style="list-style-type: none"> ▪ Quick to prepare ▪ Affordable ▪ Healthy ▪ Filling / Satisfying ▪ A treat ▪ To improve school performance ▪ To restrict tuck shop visits ▪ To save money ▪ It is expected of me ▪ Other (please specify) 		(Vereecken & Maes, 2010; Abrahams <i>et al.</i> , 2011)
Lunchbox packing practices	<p><i>How many days in a school week do you pack a lunchbox for break time?</i></p> <ul style="list-style-type: none"> ▪ 0 ▪ 1 ▪ 2 ▪ 3 ▪ 4 ▪ 5 	5 days a week	(Abrahams <i>et al.</i> , 2011; Draper <i>et al.</i> , 2010)
Time	<p><i>How long does it take you to prepare lunchboxes?</i></p> <ul style="list-style-type: none"> ▪ 0 - 15min ▪ 16 - 30min ▪ 31min - 45 min ▪ More than 46min 	To determine if time plays a role in packing or not packing of lunchboxes	(Vereecken <i>et al.</i> , 2010)
Fibre containing food	<p><i>What do you pack in your child's school lunchbox and indicate how many times a week, on average, (0-5). Please mark the appropriate block with an X.</i></p> <ul style="list-style-type: none"> ▪ Bread <ul style="list-style-type: none"> ○ White ○ Best of Both or low GI white ○ Brown or whole wheat ○ Low GI brown or seeded ○ Wraps / Pita's ○ Other (please specify) ▪ Protein-rich food <ul style="list-style-type: none"> ○ Eggs ○ Poloni / viennas / ham roll / ham / salami 	<ul style="list-style-type: none"> ▪ Fibre containing, starchy foods ▪ Milk ▪ Fruit ▪ Vegetables ▪ Food that does not contain excessive fats ▪ Protein 	(Papanikolaou <i>et al.</i> , 2017: 8; WHO, 2015; Warren <i>et al.</i> , 2003)

Practices			
Measurement	Question	Correct answer	Reference
Fibre containing food cont.	<ul style="list-style-type: none"> <input type="radio"/> Red meat / Biltong / ‘Droë wors’ <input type="radio"/> Chicken <input type="radio"/> Fish <input type="radio"/> Pork <input type="radio"/> Cheese <input type="radio"/> Baked beans <input type="radio"/> Other (please specify) <ul style="list-style-type: none"> <input type="checkbox"/> Biscuits <input type="radio"/> Mini Cheddars, Tuck or Bacon Kips <input type="radio"/> Provita’s <input type="radio"/> Sweet (e.g. Marie and Lemon Creams) <input type="radio"/> Other (please specify) <ul style="list-style-type: none"> <input type="checkbox"/> Muffin <input type="radio"/> Savoury / sweet <input type="radio"/> Bran <input type="radio"/> Other (please specify) <ul style="list-style-type: none"> <input type="checkbox"/> Bars <input type="radio"/> Seeded / Granola / Oats <input type="radio"/> Energy bar <input type="radio"/> Fruit bar <input type="radio"/> Other (please specify) <ul style="list-style-type: none"> <input type="checkbox"/> Take away / fast food (please specify) <input type="checkbox"/> Treats <input type="radio"/> Twinkies / Cake / Cupcakes <input type="radio"/> Sugar sweets / Jelly sweets / Chocolates <input type="radio"/> Dried fruit <input type="radio"/> Nuts <input type="radio"/> Chips <input type="radio"/> Popcorn <input type="radio"/> Other (specify) 	<ul style="list-style-type: none"> <input type="checkbox"/> Fibre containing, starchy foods <input type="checkbox"/> Milk <input type="checkbox"/> Fruit <input type="checkbox"/> Vegetables <input type="checkbox"/> Food that does not contain excessive fats <input type="checkbox"/> Protein 	(Papanikolaou <i>et al.</i> , 2017: 8; WHO, 2015; Warren <i>et al.</i> , 2003)
Type of fluid inclusion	<p><i>What types of beverages do you include in your child’s lunchbox in a typical school week. Please indicate how many times a week (0-5 days). Please mark the appropriate block with an X.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Fruit juice <input type="checkbox"/> Tea or coffee <ul style="list-style-type: none"> <input type="radio"/> With sugar <input type="radio"/> Without sugar 	<ul style="list-style-type: none"> <input type="checkbox"/> Dairy <input type="checkbox"/> Water <input type="checkbox"/> Tea or coffee without sugar 	(Vorster <i>et al.</i> , 2013: 7; Vereecken & Maes, 2010: 47)

Practices			
Measurement	Question	Correct answer	Reference
Type of fluid inclusion <i>cont.</i>	<ul style="list-style-type: none"> ▪ Cool drink concentrate ▪ Fizzy drink (Diet, Zero, Light) ▪ Fizzy drink (Regular sugar sweetened) ▪ Energy drink (Red Bull, Play, Monster etc.) ▪ Dairy (Yogisip, Steri Stumpi, SuperM, Maas, Latté, Yoghurt etc.) ▪ Water ▪ Other, please specify 	<ul style="list-style-type: none"> ▪ Dairy ▪ Water ▪ Tea or coffee without sugar 	(Vorster <i>et al.</i> , 2013: 7; Vereecken & Maes, 2010: 47)
Hygiene	<p><i>Are you concerned about including certain foods because it can go bad in the lunchbox during the day?</i></p> <ul style="list-style-type: none"> ▪ Yes ▪ No ▪ Uncertain 	Yes	(Faber <i>et al.</i> , 2014: 1217)
Food buying practices	<p><i>How many days per week do your child get money to buy food at the school/tuck shop?</i></p> <ul style="list-style-type: none"> ▪ 0 ▪ 1 ▪ 2 ▪ 3 ▪ 4 ▪ 5 	Less days are more positive	(Faber <i>et al.</i> , 2014: 1221)

3.4 Pilot study

A pilot study was conducted and included five primary caregivers to test the procedures as well as the measuring tool. One of the schools who provided consent to partake in the study, was contacted in order to recruit five participants for the pilot study. Participants had two days to complete and return the questionnaire to the school. Minor changes were made to the questionnaire and the information of the pilot study was included in the final study. Changes included adding “rice crispies” to the choice of breakfast cereal and correcting spelling mistakes.

3.5 Reliability

The reliability of the questionnaire was improved by conducting a pilot study (Del Greco *et al.*, 1987: 700). Accuracy of the data was ensured by double entry of all data. The data was coded and captured by the primary researcher, and another individual, on two separate Microsoft Excel 2010 sheets, and

compared and verified electronically. Differences between data sheets was corrected after referring to the original questionnaire.

3.6 Validity

To ensure the content validity of the questionnaire verification questions were asked in the questionnaire regarding the child and primary caregiver's age. Questions included in the questionnaire were based on current literature and were adapted from similar studies on the same subject (Boushey *et al.*, 2008: 413). After compilation of the questionnaire by the primary researcher, two senior researchers in the field of nutrition and dietetics edited the questionnaire. Four health professionals and a biostatistician through an internal evaluation committee then evaluated the questionnaire, after which it was sent for ethical approval.

3.7 Procedures

A list of schools with their contact details, was obtained from the DBE in the Free State province, and all the Quintile 5 public and independent schools in Bloemfontein (Motheo district) were identified (Addendum A). Conditional ethical approval was obtained from the Health Sciences Research Ethics Committee of the University of the Free State (UF-HSREC) before permission was requested (Addendum B) and approval obtained from the DBE in Bloemfontein (Motheo District) (Addendum C).

After approval for the study was granted by the DBE, the principals of all Quintile 5 and independent schools were contacted telephonically by the researcher. Six school principals requested an appointment with the researcher and 21 an informational email regarding the study (Addendum D). Of the 21 schools contacted by email, only 10 schools granted permission for the study to be conducted at their school. All seven schools that requested an appointment with the researcher granted permission for the study at their school, although one school withdrew their consent to take part in the study. A total of 15 schools granted permission for the study to be conducted at their school.

Final ethical approval (Addendum E) was granted by the UF-HSREC (Ethics reference number: UFS-HSD2017/1093) after permission was obtained from all the school principals and/or governing bodies of the 15 schools that provided permission to conduct the study at their school.

A pilot study was conducted that included five primary caregivers from a school included in the study, who complied with the inclusion criteria of the study. There were no major changes to the

questionnaire (some food types were added to the food frequency table and spelling mistakes were corrected) and thus the results of these study participants were included in the final study.

The final questionnaires were printed (Addendum F), packed into envelopes according to the number of learners in a class, and distributed to all participating schools. The school receptionists distributed the questionnaires to the foundation phase teachers. The foundation phase teachers distributed the questionnaires to the learners and requested caregivers to return the questionnaires within two days.

After the two-day period, teachers indicated on the envelope the number of learners who brought back the completed questionnaires as well as the total number of learners in their class.

The primary researcher collected the completed questionnaires from the schools after one week. Questionnaires that were not completed, was excluded from the survey. The researcher and an assistant coded and captured the data in duplicate for verification purposes, after which the data was analysed with the help of the Department of Biostatistics, University of the Free State.

The anonymous results of the study will be disseminated to all school principals and/or governing bodies of participating schools as well as the Head of the DBE.

3.8 Limitations

One of the biggest limitations of this study was that mostly parents and schools who have an interest in nutrition were likely to partake in the study. This could have biased the results to an extent. Another factor that should be taken into consideration is that the primary caregivers completed the questionnaire at home, which gave them access to other sources of information that could have helped them with the knowledge part of the questionnaire (Kamar, 2011: 141; Vereecken & Maes, 2010: 51). However, if caregivers answered the question correctly, it means that their knowledge on the topic was improved and the scores are regarded as valid.

Other confounding factors that should be considered are that caregivers might have reported their good practices in order to provide the correct answers and this could have biased the results to an extent. However, no incentives were given for completing the questionnaire. Some knowledge questions may have contributed to over reporting.

Limiting the socio-economic diversity of the study, was the exclusion of the Quintile 1 – 4 schools where the school nutrition programme is often implemented and the use of English questionnaires

due to cost implications, which only English literate primary caregivers could complete (Kamar, 2011 :141).

Another factor contributing to limiting the amount of data received is the poor response rates to questionnaires (Kamar, 2011: 141).

3.9 Statistical analysis

The Department of Biostatistics, University of the Free State analysed the data using Statistical Analysis System (SAS) 9.4 (SAS Institute inc & Cary, 2002).

Primary caregiver's attitudes towards a healthy breakfast and lunchbox was assessed by 15 questions rated on a scale of 5 that consisted of the options: 'completely agree, agree, sometimes agree, sometimes disagree, disagree, and completely disagree' (Temple *et al.*, 2016: 302; Kamar, 2011: 159). In order to calculate the attitudinal scores a score of 5 was given for the highest intensity desired response and a score of 0 for the highest intensity least desired response.

For the knowledge and practice part of the questionnaire 21 and 12 questions were respectively asked, one point was allocated for the correct answer. If there was more than one correct answer, one point was allocated for every correct answer. Missing answers, leaving out questions and "uncertain" scored zero.

The breakfast and lunchbox foods were scored separately, although it formed part of practices section, according to the healthiest type of food given under each category. Missing answers for food choices were regarded as "not allocated", thus 0 times a week. The categories for breakfast were dairy, fruit and/or vegetables, porridge and/or cereal, bread and/or muffin and protein. The highest score that could be attained for breakfast foods was 30 and the lowest -15.

The scoring for categories was done as follow (Vereecken & Maes, 2010: 46):

- Dairy: A score of 5 was given for daily intake and 0 for no intake (score: 0 to 5);
- Fruit: A score of 5 was given for daily intake and 0 for no intake (score: 0 to 5);
- Vegetables: A score of 5 was given for daily intake and 0 for no intake (score: 0 to 5);
- Porridge and/or cereal: A score 5 was given for daily intake of low GI and/ or high in fibre (excluding Weet-Bix because of a high GI and muesli because of a high sugar and fat content). One point was deducted for every "unhealthy day" cereal, up to -5 (score: -5 to 5);

- Bread and/or muffins: A point was given for every fibre rich bread or bran muffin day. One point was deducted for every day that other types of bread or muffins were given (score: -5 to 5);
- Protein: A point was given for every low fat protein (Rampersaud *et al.*, 2005: 754) day and one point was deducted for every high fat and/or processed meat day. Five points were awarded for providing no protein foods (as it was not described in the literature as part of a healthy breakfast foods (Giovannini *et al.*, 2008: 621)) with breakfast and a maximum of five points were deducted for providing high fat and/processed meat (score: -5 to 5).

The categories for the school lunchbox included bread, protein-rich foods, biscuits, muffins, bar, fruit and/or vegetable, takeaway/fast foods and treats. The highest score that could be attained for lunchbox foods was 45 and the lowest -35 (Vereecken & Maes, 2010: 46).

- Bread: A point was given for every fibre rich bread day. One point was deducted for giving another type of bread day (score -5 to 5);
- Protein-rich food: A point was given for every low fat protein and/or cheese day and one point was deducted for every high fat and/processed meat day (score: -5 to 5);
- Biscuits: A point was given for every day of providing low GI biscuits. One point was deducted, per day, for giving any other biscuit. Five points was awarded for giving no biscuits (score -5 to 5);
- Muffin: A point was given for every day of giving a bran muffin. One point was deducted for every day a savoury or sweet muffin was given. Five points was given for giving no muffins (score -5 to 5);
- Bars: A point was given for every day packing a seeded, granola, oats or fruit bar. One point was deducted for every day packing an unhealthy bar. Five points was given for packing no bars to school (score: -5 to 5);
- Fruit: A score of 5 was given for daily intake and 0 for no intake (score: 0 to 5);
- Vegetables: A score of 5 was given for daily intake and 0 for no intake (score: 0 to 5);
- Takeaway / fast foods: Five points was given for giving none. One point was deducted for every day packing takeaway / fast foods (score: -5 to 5);
- Treats: One point was awarded for every day packing dried fruit, nuts and/or popcorn. One point was deducted for every day packing any of the high GI, high in fat and/or sugar options. Five points was given for giving no treats (score -5 to 5).

Table 3.4 lists the scoring points used in the questionnaire.

Table 3.4 Scoring system

Scoring system: For maximum scores			
Measurement	Breakfast (points)	Lunch box (points)	Total score
Knowledge	7	26	33
Attitudes	40	35	75
Practices	12	59	71
Practices Breakfast foods	30		30
Practices Lunchbox foods		45	45
Total Score	89	165	254

Eleven questions were asked to collect the sociodemographic data of the primary caregivers. Associations between the demographic data and the knowledge, attitude and practice scores was assessed during analysis (Leedy & Ormrod, 2015; Katz, 2011).

Sociodemographic variables (gender, age, marital status, highest qualification, occupation and employment of the primary caregiver as well as the family size, income) was compared with primary caregiver's nutritional KAP. Cut-off points for age of primary caregivers was 35 years and younger or above 35 years of age to compare KAP with demographic variables (Vereecken & Maes, 2010).

Primary caregivers' educational level was grouped into highly educated (honour's degree and higher), medium-high education (Diploma and Bachelor's degree), medium education (less than a diploma), low education (completed schooling), very low education (not completed schooling) (Vereecken & Maes, 2010 :45). For associations, the primary caregivers' educational level was further grouped into secondary level (school) education and tertiary level (graduate, technical degree and a postgraduate) education group.

The International Standard Classification of Occupations (ISCO) was used for occupational-level classifications, which is:

- High: Professionals (ISCO 1–2),
- Intermediate: Managerial tasks, technicians, clerks, and service workers (ISCO 3–5),
- Low: Skilled and unskilled workers (ISCO 6–9) (International Labour Office - Geneva, 2012).

For the KAP part of the questionnaire, the median was used as cut-off point for grouping to assess associations with socio-demographic factors. The median was used due to skewed distribution of data, for more accurate reflection of the bulk of the numbers.

3.10 Ethical considerations

Conditional ethical approval was obtained from the UF-HSREC before permission was requested from the DBE in Bloemfontein (Motho District). Final ethical approval was granted (Addendum E) after permission was obtained from the DBE (Addendum C) and all the school principals and/or governing bodies of the school gave permission to conduct the study at their schools.

The results of the study will be presented to the participating schools, but no school will be identified by name or individual schools compared. The information letter (Addendum G) attached to the questionnaire stated that participation in the study is voluntary, that the primary caregiver gave consent to take part in the study by completing the questionnaire and that no remuneration was offered for completing the questionnaire.

3.11 Summary

A total of 1286 primary caregivers of foundation phase learners completed the questionnaire. The data was collected from 15 consenting Quintile 5 and independent schools in Bloemfontein, Free State.

For the purpose of this study questions were asked to determine:

- The knowledge of the primary caregiver with regard to breakfast consumption and lunchboxes;
- The knowledge of the primary caregiver regarding the role and importance of providing a child with a healthy breakfast and school lunchbox;
- The attitudes of the primary caregivers of foundation phase learners with regard to their knowledge regarding providing a healthy breakfast as well as a healthy school lunchbox;
- The practices of the primary caregivers of foundation phase learners with regard to giving breakfast in the morning and packing school lunchboxes; and
- Associations regarding demographics and KAP of breakfast consumption and lunchbox packing practices.

4 CHAPTER 4: Breakfast and lunchboxes for foundation phase learners: Do knowledge and intent reflect practices of caregivers?

Chapter 4 is written in an article format, according to the author instructions for the journal, Public Health Nutrition (with exception of the referencing style). Public Health Nutrition is an international, peer-reviewed journal, publishing articles aimed at health promotion and nutrition-related strategies to prevent diseases.

Breakfast and lunchboxes for foundation phase learners: Do knowledge and intent reflect practices of caregivers?

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Abstract

Objective: The caregivers of a child decide what, when and where the child eats. It is, therefore, important to know whether caregivers' nutritional knowledge regarding healthy foods reflects their practices. We examined caregivers' knowledge, attitudes and practices (KAP) regarding healthy breakfasts and school lunchboxes.

Design: Cross-sectional descriptive study using questionnaires.

Setting: Quintile 5 schools, Bloemfontein, South Africa.

Subjects: A total of 1284 caregivers of learners, aged 6 – 12 years.

Results: The caregivers' median score for knowledge regarding breakfast and lunchboxes was 55.6% and 73.1% respectively. Breakfast and lunchbox food knowledge were higher for caregivers older than 35 years (median=55.6, $P=0.0479$ and median=76.9, $P<0.0001$ respectively) and who possessed a tertiary qualification (median=55.6, $P=0.0009$ and median=76.9, $P<0.0001$ respectively). Caregivers' attitudes were generally positive towards providing healthy breakfast and lunchbox foods (median=71.4% and 82.5% respectively). Caregivers' primary objective when providing a lunchbox was health considerations (54.2%, $n=658$) followed by to be filling (22.8%, $n=277$). The median survey practices score to indicate the provision of healthy breakfast foods was 26.7% and for lunchbox foods 35.6%. Healthier breakfasts ($P=0.0013$) and lunchboxes ($P=0.0001$) were provided to children of caregivers with a tertiary qualification.

Conclusions: Although the majority of caregivers had a positive attitude towards providing healthy breakfast and lunchbox foods, caregivers older than 35 years and caregivers with a tertiary qualification had a higher level of nutritional knowledge and tended to provide their children with healthier foods.

Keywords

Breakfast, Lunchbox, Caregivers, Foundation phase learners, Knowledge, Attitudes, Practices

4.1 Introduction

Children depend on their caregivers to provide them with food and cannot solely determine what they eat (DeCosta *et al.*, 2017: 328). It is therefore essential to investigate the knowledge, attitudes, and practices of caregivers regarding food when addressing the eating patterns of children.

Foundation phase learners are regarded as a nutritionally vulnerable group, because of the impact of nutrition on growth and development during this period of rapid growth (Bryan *et al.*, 2004: 296). This period of rapid growth can be challenging, especially as young children cannot provide for themselves (Patrick & Nicklas, 2005: 84). Inadequate nutrient intake is often the result of socio-economic factors, the food choices children and their caregivers make, and not eating meals together as a family (Afeiche *et al.*, 2017: 409; Dani *et al.*, 2005: 258).

Caregivers play a multifaceted role in influencing the eating habits of children by determining what is offered to children and what children choose to eat. Caregivers influence food intake by purchasing specific types of food, by setting an example as role models, by their interaction with children during meal times and by exerting “parental control” (e.g. using food as reward or punishment) (Paroche *et al.*, 2017; Schwartz *et al.*, 2011: 801–803; Vereecken *et al.*, 2004: 102). It is therefore necessary to acknowledge the role of caregivers’ food choices on children’s attitudes towards food (Hoffmann *et al.*, 2016: 21; Schwartz *et al.*, 2011: 801; Birch & Fisher, 1998: 546).

Various studies have confirmed the importance of informing and educating caregivers about healthy eating and the health benefits thereof (Asakura *et al.*, 2017: 448; WHO, 2018; Dani *et al.*, 2005: 261; Patrick & Nicklas, 2005: 226). Bogl *et al.* (2017) and Birch (1999: 57) emphasise the vital role that the home environment plays in shaping a child’s eating behaviour and food choices. The emphasis should be on encouraging better food choices, even when there are limited resources available, to prevent the development of various forms of malnutrition (Briggs *et al.*, 2010: 361).

Factors that typically influence the food selection of caregivers include their age, marital status, level of education, and employment status (Vereecken & Maes, 2010: 50). Research indicates that caregivers’ nutritional knowledge (Asakura *et al.*, 2017: 486; Pike & Leahy, 2012: 443; Williams *et al.*, 2011: 1400; Beydoun & Wang, 2008: 50) and opinions (WHO, 2018; Patrick & Nicklas, 2005)

influence the types of food they provide to the children in their care. However, in a study by Williams *et al.* (2011: 1399) amongst mothers from a low socio-economic setting in Australia (with children between the ages of 5 and 12 years), there was no association found between primary caregivers' nutritional knowledge and their practices.

Other factors that may influence a child's food choices and intake are the caregiver's attitude towards mealtimes (Cheng *et al.*, 2008: 206) and the caregiver's own intake of healthy foods (Cheng *et al.*, 2008: 205; Boutelle *et al.*, 2007: 248; Dennison *et al.*, 2001: 536). Dennison *et al.* (2001: 540) found that caregivers provided the children under their care with what they perceived to be the healthiest type of milk. This highlights that not only do caregivers' knowledge but also their attitudes towards healthy foods, affect their practices of providing food.

The food offered to children for breakfast is important. Research has shown that breakfast consumption plays an essential role in the total nutritional adequacy of the day, having a positive impact on body weight, thus lowering the risk for diseases of lifestyle (O'Neil *et al.*, 2014: 21; Larson *et al.*, 2014: 612; Giovannini *et al.*, 2008; Rampersaud *et al.*, 2005).

The importance of breakfast is further supported by its positive contribution to macro as well as micronutrient intake. Breakfast is regarded as a primary meal contributing towards calcium, vitamins A and C, riboflavin, zinc, iron and fibre intake (Afeiche *et al.*, 2017; Timlin & Pereira, 2007), which reduces the risk for micronutrient deficiencies (Giovannini *et al.*, 2008; Timlin & Pereira, 2007; Rampersaud *et al.*, 2005; Kleinman *et al.*, 2002), as well as constipation (Loening-Baucke *et al.*, 2004: 259).

It is recommended that breakfast should contribute 20 to 35 percent of the total daily energy needs (Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 277). Breakfast should consist of foods with a low glycaemic index (GI) (Edefonti *et al.*, 2017: 25; Edefonti *et al.*, 2014: 665; Warren *et al.*, 2003), fibre rich carbohydrates, fruit, reduced-fat milk or milk products and lean meat and meat products (Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 277; Rampersaud *et al.*, 2005: 754).

Just as important as the food offered for breakfast, are the choice of food provided for a school lunchbox. Learners in South Africa are spending approximately one-third of their day at school, and therefore a school lunchbox makes a significant contribution to a learner's daily energy and nutrient intake needs (33.3%) (Rao *et al.*, 2016: 654; USDHHS and USDA, 2015). Learners who take a lunchbox to school, consume a wider variety of food throughout the day, and have a lower risk for overweight/obesity (Abrahams *et al.*, 2011: 1758), which in turn reduces the risk for non-communicable diseases later in life.

Even though peer pressure plays a role in the choice of food (positive or negative) that learners take to school, caregivers still have the opportunity to decide what foods to provide (Bathgate & Begley, 2011: 23,24).

It is recommended that a school lunchbox includes fruit and/or vegetables (WHO, 2015), reduced fat dairy products (Vien *et al.*, 2017; Levine, 2001), fibre-rich carbohydrate foods (Temple *et al.*, 2016: 228–229; Vorster *et al.*, 2013: 28) and water (Wright *et al.*, 2013: 84). These healthy options have been proven to have the potential to lower the risk of non-communicable diseases (USDHHS and USDA, 2015). The inclusion of processed food (such as chips, refined carbohydrates and processed meats) should be limited (WHO, 2017; Wilkinson, 2015; Vorster *et al.*, 2013).

Even though several studies stress the importance of a healthy breakfast before school (Littlecott *et al.*, 2016: 1579; O’Neil *et al.*, 2014: 21; Larson *et al.*, 2014: 612; Giovannini *et al.*, 2008; Rampersaud *et al.*, 2005) and make clear recommendations what should be included in a child’s lunchbox (Rao *et al.*, 2016: 650; USDHHS and USDA, 2015; Abrahams *et al.*, 2011: 1758), few studies have examined the relationship between the KAP of primary caregivers regarding the lunchbox content of children in their care. Vereecken & Maes (2010) conducted a study to assess the nutritional knowledge and attitudes of mothers and how this affects children’s (3 - 4 years old) food intake. They concluded that it is important to know the nutritional knowledge and attitudes of mothers to be able to plan more effective nutrition-related interventions to improve the food intake of children.

Rao *et al.* (2016: 651) stated that good nutritional knowledge does not necessarily lead to good dietary practices. When parents understand the importance of proper nutrition, they can improve their children’s nutritional knowledge by discussing healthy eating habits with their children (Rao *et al.*, 2016: 651).

This study aimed to provide more insight into the intention of caregivers to provide children in their care with a healthy breakfast and school lunchbox and to describe whether their practices reflect their knowledge and intent.

4.2 Methods

4.2.1 Study Sample

This study surveyed Quintile 5 public and independent schools in Bloemfontein, South Africa, to be able to compare results with published European studies. A ‘Quintile’ is a classification used by the South African Department of Basic Education (DBE) to rank schools according to socio-demographic status. Quintile 1 schools have the highest poverty level, while Quintile 5 schools have the lowest poverty level (Abrahams *et al.*, 2011: 1753).

Fifteen of the 40 schools approached to participate in the study (37.5%), granted permission for the study to be conducted at their school. The caregivers of all foundation phase learners (grades 1-3) at these schools were invited to participate in the study. Of the 3198 learners attending the grade 1 – 3 classes (age 6–12 years) at the 15 schools, 1284 primary caregivers (40.2%) consented to participate in the study by completing the questionnaire. If more than one child attended the same school, the caregivers were requested to complete the questionnaire for the oldest child.

4.2.2 Questionnaire

Data collection took place via a printed copy of a questionnaire, which was distributed to the primary caregivers at the participating schools. A literature search identified relevant questions from other studies, focussing on nutritional knowledge and/or attitudes and/or practices of learners and/or primary caregivers. Four dietitians and a biostatistician evaluated the content validity of the questionnaire. A pilot study was conducted amongst caregivers at one of the participating schools to test the procedures and to ensure reliability of the questionnaire. No significant changes were made to the questionnaire and the results obtained from the pilot project were included in the final study.

Consenting caregivers with children that attended the participating schools completed the questionnaire, which consisted of three parts. Part 1 of the questionnaire assessed caregivers’ KAP regarding breakfast. Part 2 of the questionnaire assessed primary caregivers’ KAP regarding lunchbox foods and Part 3 consisted of questions on the socio-demographics of the caregivers.

A food frequency table was included to evaluate the nutritional adequacy of breakfast and lunchbox foods provided by the caregiver. The foods provided to the children before school and to school were assessed. The items included in the food frequency table were foods regarded as healthy breakfast and lunchbox food options as described in the literature, as well as alternatives generally available for breakfast and lunchboxes in that food group. The frequency was indicated as the number of days (0-5) in a school week. Twelve questions evaluated the nutrition practices of the primary caregiver.

The primary caregivers' attitudes towards a healthy breakfast and lunchbox were assessed by 15 questions rated on a six-level scale (Table 4.1), where participants could indicate whether they completely agree, agree, sometimes agree, sometimes disagree, disagree, and completely disagree with the given statements (Kamar, 2011: 159). A positive attitude of the caregiver towards healthy eating was regarded as a score of 3 to 5 and a negative attitude towards healthy eating as a score of 0 to 2.

Table 4.1 Questions included in the questionnaire to assess caregivers' attitudes towards breakfast and lunchboxes

Question / Statement	Scientific reference for the question
It is important to eat breakfast.	(Vorster <i>et al.</i> , 2013: 7; Vereecken & Maes, 2010: 47)
You do not give your child breakfast because there is not enough time.	(Vereecken & Maes, 2010: 50; Boutelle <i>et al.</i> , 2007: 255)
You do not give your child breakfast because it is too expensive.	(Vereecken & Maes, 2010: 50; Boutelle <i>et al.</i> , 2007: 255)
You do not give breakfast to your child because he/she does not want to eat.	(Vereecken & Maes, 2010: 50; Boutelle <i>et al.</i> , 2007: 255)
You give your child breakfast because it is important for their health.	(Burrows <i>et al.</i> , 2017: 136; Giovannini <i>et al.</i> , 2008: 616; Boutelle <i>et al.</i> , 2007: 255)
You give your child breakfast because it is important for concentration.	(Burrows <i>et al.</i> , 2017: 136; Giovannini <i>et al.</i> , 2008: 616; Boutelle <i>et al.</i> , 2007: 255)
You give your child breakfast because you grew up eating breakfast.	(Burrows <i>et al.</i> , 2017: 136; Giovannini <i>et al.</i> , 2008: 616; Boutelle <i>et al.</i> , 2007: 255)
You give your child breakfast because your child asks you to have breakfast.	(Burrows <i>et al.</i> , 2017: 136; Giovannini <i>et al.</i> , 2008: 616; Boutelle <i>et al.</i> , 2007: 255)
Healthy food packed into a lunchbox would help reduce the risk of your child developing certain diseases.	(Vereecken & Maes, 2010: 47)
A healthy lunchbox does not help my child to concentrate at school.	(Vereecken & Maes, 2010: 47)
To prepare a healthy lunchbox is an extra workload.	(Vereecken & Maes, 2010: 47)
I seldom read the food label before I buy a new food item.	(Vereecken & Maes, 2010: 47)
Healthy food is more expensive than less healthy food.	(Vereecken & Maes, 2010: 47)
In general, healthy food is tasty.	(Vereecken & Maes, 2010: 47)
It is important to have healthy eating habits.	(Vereecken & Maes, 2010: 47)

To obtain data on the knowledge of the participants, 21 questions were asked (Table 4.2) and one point was given for each correct answer. If there were more than one correct answer, one point was given for every correct answer. Missing answers, omitting questions and "uncertain" answers scored zero.

Table 4.2 Questions included in the questionnaire to assess the nutritional knowledge of primary caregivers

Question / Statement	Scientific reference for the question
What type of milk and milk products are the healthiest for your child?	(Benjamin Neelon & Briley, 2011: 608)
Skipping breakfast is good for your child's concentration at school.	(Abrahams <i>et al.</i> , 2011: 1754; Rampersaud <i>et al.</i> , 2005: 743)
Eating breakfast will make you gain weight.	(Giovannini <i>et al.</i> , 2008: 615; Rampersaud <i>et al.</i> , 2005: 743)
It is important that breakfast foods contain fibre.	(Rampersaud <i>et al.</i> , 2005: 743)
It is important to eat fruit with breakfast.	(Schulz <i>et al.</i> , 2005: 1186–1187)
Breakfast is important for growth and development.	(Ruxton & Kirk, 1997: 199)
Is it important for your child to eat the food in his/her lunchbox?	<i>(De Villiers et al., 2016: 174)</i>
Why is it important to pack a school lunchbox?	
Does eating fruits and vegetables daily assist in reducing the risks of developing certain diseases?	<i>(De Villiers et al., 2016: 174; Abrahams et al., 2011: 1754)</i>
How many helpings of fruit and vegetables should your child eat every day?	<i>(De Villiers et al., 2016: 174,177)</i>
Are foods that contain fibre (roughage) important in your child's diet?	<i>(De Villiers et al., 2016: 174)</i>
Which food do you regard as the healthiest?	<i>(Abrahams et al., 2011: 1754)</i>
Can fats help with the absorption of certain nutrients?	<i>(Abrahams et al., 2011: 1754)</i>
When you eat lots of fat and fatty foods, you can: (Select all the appropriate answers.) <ul style="list-style-type: none"> ▪ Become fat (overweight) ▪ Concentrate better ▪ Feel more energetic ▪ Get high blood pressure ▪ Get a heart attack ▪ Get diabetes 	<i>(De Villiers et al., 2016: 174)</i>
Do chips contain healthy fats?	<i>(Abrahams et al., 2011: 1754)</i>
Do nuts contain healthy fats?	<i>(Abrahams et al., 2011: 1754)</i>
Do avocado pears contain healthy fats?	<i>(Abrahams et al., 2011: 1754)</i>
Eating a lot of sugar, candy, and sweet foods: (Select all appropriate answers) <ul style="list-style-type: none"> ▪ Is good for health ▪ Can make you fat ▪ Is bad for your teeth ▪ Can cause diabetes 	<i>(De Villiers et al., 2016: 174)</i>
Select all the food group/s that contain fibre (roughage): <ul style="list-style-type: none"> ▪ Meat, fish & chicken ▪ Dairy ▪ Fruits ▪ Vegetables ▪ Unrefined starchy foods/carbohydrates ▪ Beans and lentils ▪ Fats 	<i>(De Villiers et al., 2016: 174)</i>
Do biscuits/cookies contain healthy fats?	<i>(Abrahams et al., 2011: 1754)</i>

4.2.3 Ethical considerations

The DBE provided approval for the study to be conducted in the identified schools. Ethics approval was granted by the Health Sciences Research Ethics Committee of the University of the Free State (UF-HSREC) (Ethics reference number: UFS-HSD2017/1093) after permission was obtained from the school principals and governing bodies to conduct the study at their schools. Primary caregivers were invited to participate and implied consent by completing the questionnaire. No identifiers or names were noted on the questionnaires, thereby ensuring that the study participants stay anonymous.

4.2.4 Data analysis

Data were captured in duplicate and verified, after which the data were analysed with the help of the Department of Biostatistics, the University of the Free State using Statistical Analysis System SAS[®] software, version 9.4 (SAS Institute inc & Cary, 2002).

In this study, the level of education was divided into low (secondary level education) and medium/high (tertiary level education). To test for possible associations between variables, income was grouped as low (\leq R20 000 (\pm \$1 380)/month) and high ($>$ R20 000 (\pm \$1 380)/month). Marital status was grouped as living with life partners and others. When comparing the age of primary caregivers with knowledge scores, \leq 35 years and $>$ 35 years were used as a cut-off point, similar to a study by Vereecken and Maes (2010: 48).

The data are described using descriptive statistics, and continuous variables are summarised by medians, minimum, maximum or percentiles. Categorical variables are summarised by frequencies and percentages. Differences between groups were compared using the Wilcoxon Two-Sample test for unpaired data or the chi-square test. Findings are defined as statistically significant at a P-value of <0.05 .

4.3 Results

4.3.1 Study population

Of the 3198 primary caregivers invited to participate in the study, 1286 (40.2%) participated. Primary caregivers with more than one child in the foundation phase completed only one questionnaire for their children (the oldest child). Table 4.3 provides a summary of the study population and study participants.

Table 4.3 Study population and participant distribution

Schools	Total schools (n)	School participation n (%)	Total learners (n)	Caregiver participation n (%)
Independent	16	6 (38%)	524	308 (59%)
Public	24	9 (38%)	2674	978 (37%)

The mean age of the primary caregivers was 38.6 years (SD=±6.99) and that of the learners 7.7 years (SD=±1.00). The gender distribution of learners leaned towards male learners ($n=653$, 51.9%). The majority of the primary caregivers surveyed, were the mother of the learner (84.8%, $n=1077$), followed by the father (9.8%, $n=125$). Of the caregivers in the study, 1001 (79.8%) were living with a life partner, and 253 (20.2%) were single, divorced, or separated. The caregivers participating in the study included 386 (30.9%) with a secondary qualification or less and 863 (69.1%) with a tertiary qualification.

Most of the primary caregivers 761 (61%) were employed full time (>35 hours/week), 584 (53.9%) had an income of >R20 000 (±\$1 380)/month, and 571 (48.9%) had an intermediate to high occupational skills level.

The median knowledge scores of the caregivers were 55.6% for breakfast, and 73.1% for lunchboxes.

4.3.2 Breakfast providing practices

The median score for eating a healthy breakfast was 8 out of a maximum score of 30 (26.7%).

Table 4.4 indicates the associations of breakfast practices in younger and older caregivers.

Table 4.4 Breakfast practices according to the age of the caregiver

Breakfast practices	Age of primary caregiver (N=1286)				P
	≤35 years		>35 years		
	n	%	n	%	
Providing breakfast five days per week	308	77.2	700	83.8	0.0048
Eating breakfast together as a family	118	29.7	270	32.3	0.3562
Using low-fat milk at home	46	11.5	150	17.8	0.0040
Using full cream milk at home	358	89.3	721	85.7	0.0836
Using fat-free milk at home	13	3.2	30	3.6	0.7694
It is important that breakfast foods contain fibre	339	87.6	740	91.3	0.0483
Breakfast is important for growth and development	387	98	818	98.7	0.3554

P values <0.05 are indicated in bold

The majority of the primary caregivers (81.7%, $n=1043$) provided their children with breakfast before school daily, while 63 (4.9%) did not provide breakfast before school at all. Caregivers older than 35 years provided breakfast every school day, preferred to provide low-fat milk and knew that fibre is an

important component of breakfast foods, statistically more than in the case of younger caregivers (Table 4.4).

The main food and beverage items reported in the food frequency tables for breakfast are presented in Table 4.5. The caregivers indicated, as part of an open-ended question, that a child received milk as a beverage. This did not include the dairy options as part of the food frequency questionnaires.

Table 4.5 Breakfast foods and beverages

Food / beverage type	N=1286	
	n	%
Beverages		
Tea	380	29.6
Water	307	23.9
Juice	292	22.7
Milk	195	15.2
Dairy 5 days/week	965	75
Fruit 5 days/week	304	23.6
Porridge		
*Weet-Bix	660	51.4
*Corn Flakes	575	44.8
*Oats	566	44.1
*Bran Flakes	302	23.5
Bread		
*Brown or low glycaemic index (GI)	763	59.4
*White	604	47
Protein-rich foods		
*Eggs	812	63.2
*Cheese	734	57.2
*Processed meat	537	41.8
*Sausage/mince	546	29.9

**Primary caregivers are providing their children with the specific food item anything between one to five days in a school week. The respondents were allowed to indicate more than one choice per week.*

The food and beverages that were mostly provided (four main food/beverage provided) were included in the table.

Ready to eat breakfast cereals (RTEBC) was the primary type of cereal-based breakfast consumed, with Weet-Bix being the most popular (51.4%, $n=660$) type of RTEBC. The bread provided for breakfast was mostly brown and low GI bread (59.4%, $n=763$) with eggs (63.2%, $n=812$) and cheese (57.2%, $n=734$) as most popular protein choices.

4.3.3 Lunchbox practices

One thousand two hundred and twenty-four (95.7%) caregivers provided their children with a lunchbox to school every day, and only 17 (1.3%) did not provide their children with a school lunchbox any day of the week. Although caregivers older than 35 years were more knowledgeable about how many servings of fruits and/or vegetables should be eaten daily (27.3%, $n=223$), only a quarter of the

1286 primary caregivers (24.9%, $n=306$) knew that five servings (or portions) of fruit and/or vegetables per day is recommended.

Six hundred and fifty-eight (54.2%) primary caregivers provided their children with a lunchbox mainly with the intent that it should be healthy, 277 (22.8%) wanted their child’s lunchbox contents to be “filling/satisfying”, 85 (7%) wanted the lunchbox to be quick to prepare and 61 (5%) indicated that the food in the lunchbox should be affordable. Most caregivers restricted their child’s tuck shop visits to less or equal to one day per week (87.5%, $n=1124$), with no significant association between the age groups of the caregivers and the provision of tuck shop money.

Table 4.6 Lunchbox foods and beverages provided

Food / beverage type	N=1286	
	n	%
Beverages		
*Fruit juice	745	57.9
*Cool drink concentrate	415	32.3
*Dairy	547	42.6
*Water	1000	77.9
Fruit		
Fruit 5 days/week	431	33.6
Fruit 1-4 days/week	561	44.7
Vegetables		
Vegetables 5 days/week	54	4.2
Vegetables 1-4 days/week	324	25.2
Protein-rich food		
*Cheese	797	62.1
*Processed meat	737	57.4
*Red meat	553	43.1
*Pork	212	16.5
Bread		
*Bread (brown or low GI)	978	76.2
*Bread (white)	726	56.5
Crackers		
*Savoury	671	52.3
*Low GI cracker	307	23.9
*Sweet (Lemon creams or Marie biscuits)	354	27.6
Muffin		
*Savoury/sweet	363	28.3
*Bran	250	19.5
Bars		
*Seeded/Granola/Oats	292	22.7
*Energy	159	12.4
*Fruit	275	21.4
*Fast food	248	19.3
Treats		
*Potato crisps	665	51.8
*Dried fruit	460	35.8
*Candy	480	37.4
*Nuts	412	32.1

**Primary caregivers are providing their children with the specific food item anything between one to five days in a school week. They were allowed to indicate more than one choice per week.*

As indicated, caregivers' intent was mainly to provide the children in their care with a healthy or filling lunchbox. Most caregivers provided water (77.9%, $n=100$), brown or low GI bread (76.2%, $n=978$) and cheese (62.1%, $n=797$), but did not include a fruit or vegetable daily in the school lunchbox as indicated in Table 4.6.

4.3.4 Associations between socio-demographic characteristics and the knowledge, attitudes, and practices of primary caregivers

The median knowledge score of caregivers regarding breakfast was 40% ($n=29$) and 68.6% ($n=1257$) for those with a negative and positive attitude respectively ($P<0.0001$). The median score for lunchbox knowledge was 51.4% ($n=89$) and 71.4% ($n=1197$) for caregivers with a negative and positive attitude respectively ($P<0.0001$).

Table 4.7 Knowledge of healthy breakfast and lunchbox food types according to socio-demographic characteristics

Socio-demographics	Knowledge							
	Breakfast (%)			<i>P</i>	Lunchbox (%)			<i>P</i>
	median	LQ*	UQ*		median	LQ*	UQ*	
<i>Age of primary caregiver</i>								
≤ 35 years	55.6	44.4	66.7	0.0479	73.1	57.7	80.8	<0.0001
> 35 years	55.6	55.6	66.7		76.9	65.4	84.6	
<i>Family structure</i>								
Single	55.6	44.4	66.7	0.601	73.1	57.7	80.8	0.0002
With support	55.6	55.6	66.7		73.1	61.5	84.6	
<i>Qualification of primary caregiver</i>								
Low	55.6	44.4	66.7	0.0009	69.2	53.8	76.9	<0.0001
Medium-high	55.6	55.6	66.7		76.9	65.4	84.6	
<i>The income of primary caregiver</i>								
Low	55.6	55.6	66.7	0.1639	73.1	57.7	80.8	<0.0001
High	55.6	55.6	66.7		76.9	69.2	84.6	

*Data are presented as the median of the percentage, lower quantile (LQ) and upper Quintile (UQ) of the percentage. *P* values <0.05 are in bold

Caregivers with an income of less than R20 000 (\pm \$1 380) per month, who live in a single structure family had a lower knowledge score for lunchbox foods (Table 4.7).

Table 4.8 Breakfast and lunchbox practice scores according to socio-demographic characteristics

Socio-demographics	Practices							
	Breakfast (%)			<i>P</i>	Lunchbox (%)			<i>P</i>
	median	LQ*	UQ*		median	LQ*	UP*	
<i>Age of primary caregiver</i>								
≤ 35 years	7.0	3.0	13.0	0.1034	15.0	8.0	21.0	<0.0001
> 35 years	8.0	4.0	24.0		17.0	10.0	24.0	
<i>Family structure</i>								
Single	7	3	13	0.1246	15	9	23	0.3549
With support	8	4	13		16	9	23	
<i>Qualification of primary caregiver</i>								
Low	7	3	12	0.0013	15	8	20	<0.0001
Medium-high	9	5	13		17	10	24	
<i>Income of primary caregiver</i>								
Low	7.5	3.0	12.0	0.0117	15.0	8.0	23.0	0.0406
High	9.0	5.0	14.0		16.0	10.0	23.5	

*Data are presented as the median, lower quantile (LQ) and upper Quintile (UQ)

P values <0.05 are in bold

The lowest knowledge and median practices scores were for younger caregivers (≤35 years) with a low education (completed only secondary level education). The median practice scores for both breakfast and lunchbox foods were lower for the caregivers with an income of less than R20 000 (±\$1 380) per month and who had a secondary qualification. Younger caregivers (≤35 years) had a lower median practice score for lunchboxes than older caregivers (Table 4.8).

Table 4.9 Attitudes towards providing breakfast and a school lunchbox according to socio-demographic factors

Socio-demographics	Attitudes					P
	Breakfast (%)		P	Lunchbox (%)		
	Positive	Negative		Positive	Negative	
<i>Age of primary caregiver</i>						
≤ 35 years	99.0	1.0	0.0984	94.3	5.7	0.9840
> 35 years	97.6	2.4		94.3	5.7	
<i>Family structure</i>						
Single	98.4	1.58	0.8017	92.09	7.9	0.1687
With support	98.0	2.0		94.41	5.6	
<i>Qualification of primary caregiver</i>						
Low	97.15	2.9	0.1100	91.5	8.6	0.0114
Medium-high	98.49	1.5		95.1	4.9	
<i>Income of primary caregiver</i>						
Low	98.2	1.8	0.1701	92.6	7.4	0.0086
High	99.1	0.9		96.2	3.8	

*Data are presented as the median of the percentage

P values <0.05 are in bold

Most caregivers had a positive attitude toward providing breakfast and lunchbox foods. Caregivers with tertiary education ($P=0.0114$) and those earning more than R20 000 ($\pm\$1\ 380$) a month ($P=0.0086$) were more positive about healthy lunchbox foods than those earning less (Table 4.9).

4.4 Discussion

This study investigated various socio-demographic factors that could influence the KAP of caregivers regarding breakfast and lunchboxes, and also whether their intent reflected in their practices.

Independent and Quintile 5 schools with a lower poverty level and higher income were surveyed.

Money should therefore less likely be a limiting factor when providing breakfast and lunchboxes.

Breakfast

The nutritional quality score of provided breakfast foods was better for caregivers with a higher qualification and income, with the average median nutritional quality score for breakfast foods being 26.7%. The attitudes towards a healthy breakfast were positive with no differences in the attitudes for the different socio-demographic groups.

Research has shown that breakfast intake in foundation phase learners is better than those of adolescents (Koca *et al.*, 2017: 1253; Fayet-Moore *et al.*, 2016: 6; Purttiponthanee *et al.*, 2016: 88;

Sirichakwal *et al.*, 2015: 942). In this study, most caregivers (81.6%, $n=1043$) provided breakfast on every school day. This is more and similar to other studies in the United States of America (USA), reporting daily intakes of 62.6% and 83% respectively (Koca *et al.*, 2017: 1253; Afeiche *et al.*, 2017: 404), but less than studies conducted in Thailand (97%) (Purttiponthanee *et al.*, 2016: 88). Our study results are similar to another study conducted in South Africa, where 81% of adolescents had eaten breakfast the previous day (Tee *et al.*, 2015: 83), but less than a survey done on grade 4 learners in Cape Town (>90%) (Abrahams *et al.*, 2011: 1755). More learners in this study consumed breakfast when compared to the South African Health and Nutrition Examination Survey (SANHANES) results, where only 68% of children regularly consumed breakfast (Shisana *et al.*, 2014: 20). Keeping in mind that caregivers from schools with a higher income took part in the present study.

Even though only 81.6% ($n=1043$) indicated that their child received breakfast five days a week, 88% ($n=1124$) indicated that they completely agree that “it is important to eat breakfast”. Therefore, the intent of a caregiver does not always seem to lead to good practices.

Sirichakwal *et al.* (2015: 939) reported that children whose parents woke up earlier and prepared breakfast were more likely to consume breakfast before school, indicating that time constraints in the morning influence breakfast intake. Children younger than 18 years whose parents eat breakfast with them in the morning are also more likely to eat breakfast themselves (Yee *et al.*, 2017: 10). Only 389 (32%) of caregivers in this study ate breakfast with the children in their care on most school mornings. Caregivers older than 35 years were more inclined to adhere to their child’s request not to eat breakfast before school, because “they do not want to eat”. However, caregivers older than 35 years provided their child with breakfast daily (83.3%, $n=700$) significantly more, and tended to eat together as a family more regularly (32.3%, $n=270$) than caregivers younger than 35 years of age (29.7%, $n=118$). Purttiponthanee *et al.* (2016: 89) stressed the importance of the type of breakfast consumed, to provide the recommended amount of nutrients. Russell *et al.* (2015: 1024) indicated that parents with a lower qualification included food types according to their children’s preferences, doubtless unhealthy (Russell *et al.*, 2015: 1023; Campbell *et al.*, 2003: 558).

Lunchbox

More than half of the caregivers (54.2%, $n=658$) intended to provide their children with a healthy school lunchbox, and the average median nutritional quality score for lunchbox foods was 35.6%.

The quality of the lunchbox foods associated positively with age older than 35 years, higher qualification and higher income of the caregiver. The attitudes of the caregivers with higher education and income were more positive towards a healthy lunchbox, although the attitudes from all socio-demographic groups were positive.

Most caregivers in our study packed a lunchbox to school for their child (95.7%, $n=1224$). This number is higher when compared to 37.6% (29.7% in the Free State) indicated in the South African national health and nutrition examination survey (SANHNES) and 69% in other studies done in South Africa (Shisana *et al.*, 2014: 20; Abrahams *et al.*, 2011: 1756). Keeping in mind that in our study no National School Feeding Programme (NSFP) was implemented at the selected schools.

Similar to a study done by Casado & Rundle-Thiele (2015: 446), our study shows that caregivers rarely pack vegetables into their child's lunchbox on a daily basis (4.2%, $n=54$) and seldom at any other time of the week (25.2%, $n=324$) and less often than fruit (Casado & Rundle-Thiele, 2015: 441). However, in our study vegetables may be provided at home as part of lunch or supper. In comparison, 33.6% ($n=431$) caregivers provided fruit, 21.4% ($n=275$) a fruit bar and 35.8% ($n=460$) dried fruit in their child's lunchbox five days a week; and 44.7% (561) a fruit at any day in the school week (keeping in mind that the fruit bar and dried fruit may have added sugars). Hubbard *et al.* (2014: 1424) evaluated children's lunchboxes in the USA where 3% ($n=19$) and 30% ($n=185$) of school children brought vegetables and fruit respectively to school daily (keeping in mind that 52.8% of these children bought their lunch at school).

4.5 Conclusion

The results from this study indicate that caregivers have a positive attitude about providing healthy breakfast and lunchbox foods, but that their intent does not always seem to lead to practices, which might be due to a knowledge gap when considering the knowledge scores obtained. Caregivers will therefore benefit from nutrition education to improve their nutrition knowledge and practices.

4.6 Limitations of the study

It is possible that the majority of schools and caregivers interested in nutrition took part in the study, which could have biased the results to an extent. Caregivers could have used resources at home to obtain the correct answers to questions in the knowledge part of the questionnaire. As this would have improved their knowledge on the topic, the scores remain valid.

Another limitation was that the questionnaire was only available in English, which was not the home language of most of the caregivers. It was therefore possible that caregivers could have misunderstood instructions or questions.

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4.8 References

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5 CHAPTER 5: Caregivers' attitudes towards healthy eating: Do their attitudes reflect in providing healthy breakfast and lunchboxes to children in their care?

Chapter 5 will be submitted to the journal, Public Health Nutrition, to consider for publication. This article is written according to the author instructions for the journal, Public Health Nutrition (with exception of the referencing style). Public Health Nutrition is an international, peer-reviewed journal, publishing articles aimed at health promotion and nutrition-related strategies to prevent diseases.

Caregivers' attitudes towards healthy eating: Do their attitudes reflect in providing healthy breakfast and lunchboxes to children in their care?

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Abstract

Objective: Caregivers play a pivotal role in the provision and intake of healthy food of children. Children also adopt and learn food practices (healthy and unhealthy) from caregivers. This impact of caregivers on eating habits emphasises the importance of a positive attitude towards healthy eating practices. This study investigated if caregivers' attitude towards healthy eating impacted on the provision of healthy breakfasts and school lunchboxes.

Design: A cross-sectional, descriptive study using self-reported questionnaires.

Setting: Quintile 5 schools in Bloemfontein, South Africa (SA).

Subjects: Caregivers (n=1286) of learners, aged 6 – 12 years.

Results: Caregivers with an income of more than R20 000 (\pm \$US1 380)/month more often provided breakfast daily ($P=0.0014$) but ate breakfast less often with their children ($P=0.0296$). Caregivers with a higher qualification also more often provided a daily breakfast ($P=0.0011$) and fruit/vegetables in the lunchbox ($P<0.0001$ and $P=0.0027$ respectively). Caregivers with lower income more often provided tuck shop money ($P<0.0001$) and fast foods ($P=0.0006$), and were less positive towards healthy eating habits ($P=0.0089$). Caregivers with higher income and those living with a life partner were more likely to perceive healthy food as being more expensive than less healthy food ($P=0.0003$ and $P=0.0045$ respectively) and were of the opinion that preparing lunchboxes increased their workload ($P=0.0027$ and $P=0.003$ respectively).

Conclusions: Caregivers mostly had a positive attitude towards providing healthy breakfast and lunchbox foods. Discrepancies existed between caregivers with higher income and qualification and those with lower income and qualification and the food they provided.

Keywords

Caregiver attitudes, healthy eating, breakfast, lunchbox, feeding practices,

5.1 Introduction

Caregivers are the gatekeepers responsible for ensuring healthy food provision and optimal feeding practices of children. Children can only choose from the food provided to them. They also mimic their caregivers' food choices and would rather accept food provided when the health benefits of the food are explained by their caregivers (Vollmer & Baietto, 2017: 137; Yee *et al.*, 2017: 1; Vorster *et al.*, 2013: 51; Patrick & Nicklas, 2013: 84). Caregivers can promote healthy eating by involving children in the preparation of meals (Vollmer & Baietto, 2017: 136) or through their example, by eating healthy themselves (Davison *et al.*, 2017; Yee *et al.*, 2017: 1). The strong association between the consumption of healthy food by parents and how it filters through to children (2 – 10 years old) is emphasised by Bogl *et al.* (2017: 13). It is therefore important to know what the attitudes of caregivers are towards healthy eating, since their attitude towards healthy eating will likely affect their children's attitude towards healthy food.

Children must meet their nutritional requirements through including healthy food in their diet for various reasons, amongst others cognitive and behavioural development (Dani *et al.*, 2005: 258; Bryan *et al.*, 2004: 296). Learners with a better nutrient intake have also been reported to experience less psychosocial problems and feelings of hunger (Kleinman *et al.*, 2002: 6).

Nutrients identified to play a significant role in brain function and behaviour, include protein, essential fatty acids (especially omega-3 unsaturated fatty acids), minerals (iron, iodine, selenium and zinc) and vitamins (vitamin B₁₂) (Gashu *et al.*, 2016: 4; Temple *et al.*, 2016: 110; Dani *et al.*, 2005: 258–259; Whaley *et al.*, 2003: 3927) . A healthy, balanced diet that comprises of a variety of fruit, vegetables, fish, nuts, whole grains and lean meats (including beef, lamb, pork and poultry) would be adequate to provide children with the required nutrients (Dani *et al.*, 2005: 259).

When a child's intake of nutrients are insufficient, their risk for malnutrition, including obesity (Gashu *et al.*, 2016; Vorster *et al.*, 2013: 13; McClung & Karl, 2009; Labadarios *et al.*, 2005), stunting, undernutrition, and micronutrient deficiencies increases (Gashu *et al.*, 2016: 4). Poor nutrition not only affects current health and performance, but also negatively affects work potential and quality of life later in life (Best *et al.*, 2010: 441; Lukowski *et al.*, 2010: 4).

Unfortunately, parents (especially mothers) with a lower level of education, have a lower “health-attitude” (Vereecken & Maes, 2010: 48), which may influence health messages to their children. Jarman *et al.* (2012: 444) reported that mothers who have a lower education tend to eat less healthy food and assign a lower significance to food and the importance thereof. Additionally, children from a family with a lower socio-economic background (SEB) tend to consume less fruit and vegetables and more fats (Patrick & Nicklas, 2013: 87; Sanigorski *et al.*, 2005: 1314). Sanigorski *et al.* (Sanigorski *et al.*, 2005: 1314) reported from an Australian study that children (5 - 12year old) from a low SEB were provided with more “convenient” type of food (energy dense and low in nutrients) in their lunchboxes compared to children from a higher SEB. Caregivers from a lower SEB also perceive healthy foods as more expensive than “unhealthy” foods (Temple *et al.*, 2011: 57; Vereecken & Maes, 2010: 48).

Although there are various factors that negatively influence healthy eating, there are proven ways to increase the consumption of healthy food amongst children. One of these, is eating meals together as a family. If it is not possible for families to eat all meals together, they should at least plan to eat breakfast together, as research has shown that eating breakfast together as a family results in healthier eating practices and higher nutrient intakes amongst children (Ostachowska-Gasior *et al.*, 2016: 1,2; Larson *et al.*, 2014: 620). Unfortunately, eating meals together as a family seems to be on a decreasing trend (especially among adolescents) (Walton *et al.*, 2016: 1), with the lowest incidence amongst families from a lower SEB (Larson *et al.*, 2014: 7; Neumark-Sztainer *et al.*, 2013: 201).

It is essential to promote healthy eating and good feeding practices and therefore important to understand the factors that influence the food choices that caregivers make, which include amongst others who the provider is in the household, the educational level of the caregiver, the SEB of the family, the funds available to spend on a lunchbox and the time it takes to pack the lunchbox (Steyn *et al.*, 2005: 10; Sanigorski *et al.*, 2005: 442).

Understanding the influence that caregivers’ knowledge and attitudes may have on the healthy eating habits of children, can assist with the planning of intervention programs to train caregivers on what healthy food are, and why they should provide healthy food to children in their care (Hart *et al.*, 2015: 2). This paper aims to describe how the attitudes of primary caregivers towards healthy eating practices associate with feeding practices of the child(ren) under their care.

5.2 Methods

5.2.1 Study Sample

For this study we invited forty independent and Quintile 5 schools in Bloemfontein, SA. The Department of Basic Education in SA uses the ‘Quintile’ system to rank schools according to their

SEB. Quintile 1 schools include learners from more disadvantaged areas and typically make use of the National School Feeding Programme (NSFP), while Quintile 5 schools include learners from a higher SEB (Abrahams *et al.*, 2011: 1753). This study surveyed independent and Quintile 5 schools, to be able to compare results with similar European studies.

5.2.2 Questionnaire

Consenting caregivers of foundation phase (grade1-3) learners attending the participating schools completed a paper copy of the questionnaire. The questions included in the questionnaire were compiled based on a literature search of studies that focused on nutritional knowledge, attitudes towards food and practices of the learner and/or primary caregivers. Four health professionals and a biostatistician evaluated the content to ensure content validity of the questionnaire. A pilot study was conducted to test comprehension of the questions. Since no significant changes were made to the questionnaire, the results obtained from the pilot study were included in the final study.

The questionnaire was used to assess attitudes of caregivers towards healthy breakfast and lunchbox foods. An attitude score below 50% was regarded as an unfavourable attitude and above 50% as a positive attitude towards healthy breakfast and lunchbox foods and practices.

For this study, we did not measure the portion sizes of food items selected for breakfast and lunchboxes. We defined breakfast as the first meal the learner eats or drinks within two hours of waking and before arriving at school, while the meal must contribute to the learner's daily energy, macro- and micronutrient intake (Timlin & Pereira, 2007). Lunchbox food was defined as food and beverages brought from home and consumed during the day at school (Abrahams *et al.*, 2011).

We recorded the breakfast and lunchbox foods provided to the learner, as reported by the caregiver in the questionnaire, using a food frequency table. The food items listed in the food frequency table included foods regarded as healthy breakfast (Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 267; Warren *et al.*, 2003) and healthy lunchbox foods (USDHHS and USDA, 2015; Vorster *et al.*, 2013: 112). We also listed alternative, less healthy, local breakfast and lunchbox food choices that are commonly included for breakfast and lunchboxes. On the food frequency table, respondents had to indicate the breakfast and lunchbox food options for the five days of the school week. The food frequency table contained twelve questions that evaluated the breakfast and lunchbox nutrition practices of the primary caregiver.

The food for breakfast were categorized as dairy, fruit and vegetables, porridge and cereal, bread and muffins, and protein-rich foods. The highest score that could be attained for breakfast foods was 30 and the lowest -15. For lunchbox foods, food categories included bread, protein-rich foods, biscuits,

muffins, bar (fruit, snack or commercial), fruit and vegetables, takeaway/fast foods and treats. The highest score that could be attained for lunchbox foods was 45 and the lowest -35.

A positive score was allocated for every day that a healthy choice was provided, in each category, for breakfast and lunchbox foods. A negative score was allocated for every day that an unhealthy option, in each category, were provided for breakfast and lunchboxes, based on a similar study by Vereecken and Maes (2010: 46). The scores could only range between -5 to 5 per category, limited by the five school days in a week. Missing answers and incomplete questions scored zero.

5.2.3 *Ethical considerations*

Approval to conduct the study in the identified schools was obtained from the DBE and the Health Sciences Research Ethics Committee of the University of the Free State (UF-HSREC) granted ethical approval for the study (Ethics reference number: UFS-HSD2017/1093). Caregivers were invited to participate and implied consent when completing the questionnaire. No names or other personal identifiers were included in the questionnaire.

5.2.4 *Data analysis*

Data was captured in duplicate in a Microsoft Excel spreadsheet and verified, after which the data were analysed with the assistance of Department of Biostatistics, University of the Free State, using Statistical Analysis System SAS[®] software, version 9.4 (SAS Institute, Cary, NC, USA).

The socio-demographic information of the caregivers were grouped to examine possible links between different variables observed in this study. Caregivers' education were grouped into low (secondary level education) and medium/high (tertiary level education). The caregivers' income was grouped as low (\leq R20 000 (\pm \$1 380)/month) and high ($>$ R20 000 (\pm \$1 380)/month). Family structure was categorised as living with life partners (married and living together) and others (single, divorced/separated and widowed). The age of the caregivers was divided into younger or equal to 35 years and older than 35 years of age, similar to a study by Vereecken and Maes (2010: 48).

To determine associations of socio-demographic variables (SDV) and attitudes towards the provision of healthy breakfast and lunchbox foods, the six choices of agreement was categorised into "agree" (completely agree and agree), "sometimes agree", "sometimes disagree", "disagree" (completely disagree and disagree).

The data were analysed using descriptive statistics and continuous variables were summarised by medians, minimum, maximum or percentiles, for asymmetric data. The means and standard deviation were used if the variable had a symmetric distribution. Categorical variables were summarised by

frequencies and percentages. Groups were compared using the Wilcoxon Two-Sample test for unpaired data or the chi-square test. A P-value of <0.05 was used to indicate statistical significance.

5.3 Results

5.3.1 Study population

Of the 40 schools approached to participate, 15 (38%) agreed to take part in the study. One thousand two hundred and eighty-six (40.2%) of the caregivers invited to participate in the study, completed and returned the questionnaire.

Just more than half of the learners were male (51.9%, $n=653$), with the mean age of the learners 7.7 years ($SD=\pm 1.00$) and the caregivers 38.6 years ($SD=\pm 6.99$). The questionnaire was mostly completed by the mother of the learner (84.8%, $n=1077$), followed by the father of the learner (9.8%, $n=125$). Of the caregivers participating in the study, 1001 (79.8%) were living with a life partner (married or living together), and 253 (20.2%) were single, divorced or separated (other). The majority of caregivers had a tertiary qualification (69.1%, $n=863$), were employed more than 35 hours per week (61%, $n=761$) and had an income above R20 000 ($\pm \$1 380$) per month (53.9%, $n=584$).

5.3.2 Breakfast

The attitudes of the caregivers were mostly positive towards healthy breakfast foods and practices, with a median attitude score of 82.5% (range 75%-90%) for breakfast.

Attitudes

The general attitudes of caregivers regarding breakfast is displayed in Figure 5.1. One thousand one hundred and twenty-four (88%) caregivers completely agreed with the statement, “it is important to eat breakfast” while five (0.4%) caregivers did not fully agree (Figure 5.1). Mostly caregivers (80.3%, $n=1004$) did not feel that breakfast is too expensive to provide, while only 23 (1.8%) agreed (to an extent) with the statement (Figure 5.1). Generally, caregivers provided breakfast to their children because “it’s important for their health” with 1061 (88.4%) indicating that they agreed with this statement, and only 15 (1.2%) indicating that they sometimes agree (Figure 5.1).

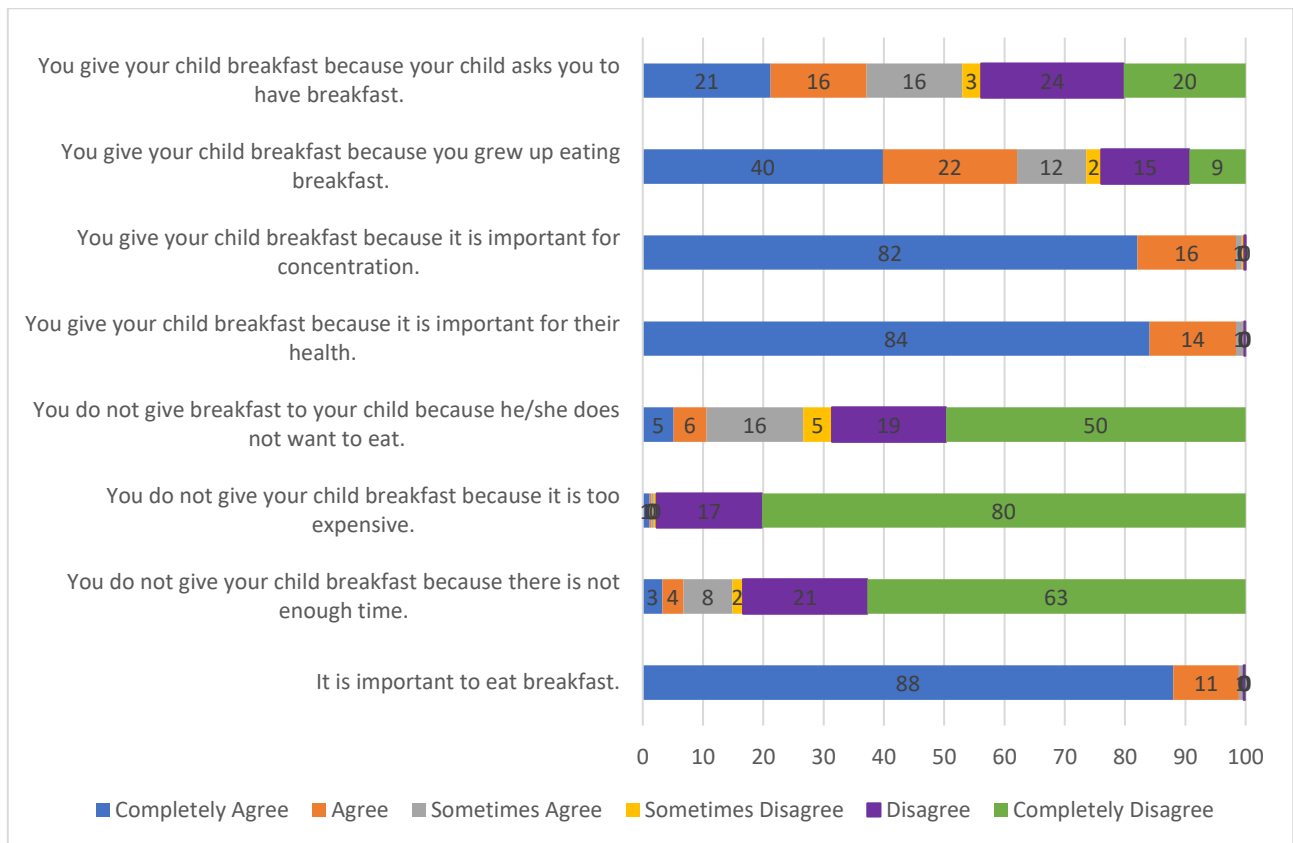


Figure 5.1 Caregivers’ attitudes towards healthy breakfast food.

Table 5.1 describes the associations between SDVs and the attitudes of the caregivers towards breakfast. No SDVs affected the caregivers’ attitude towards the importance of breakfast, the cost of breakfast foods, the importance of eating breakfast for health and concentration. Caregivers with a higher income ($P=0.0093$), ≥ 35 years ($P=0.0285$) and those with a tertiary qualification ($P=0.0003$) disagreed to a greater extent that time constraints affect them when providing their children with breakfast.

Table 5.1 Socio demographic variables influencing the breakfast attitudes of the caregivers

Statement	Response n (%)	Income (n=1025)		Marital status (n=1182)		Age (n=1169)		Qualification (n=1177)	
		≤R20 000 (±\$1 380) (n=469)	>R20 000 (±\$1 380) (n=556)	With life partner (n=941)	Other (n=241)	≤35 years (n=370)	>35 years (n=799)	Secondary (n=357)	Tertiary (n=820)
It is important to eat breakfast	A	463 (98.7)	553 (99.5)	935 (99.4)	237 (98.3)	365 (98.7)	793 (99.3)	353 (98.9)	814 (99.27)
	S-A	4 (0.9)	2 (0.4)	4 (0.4)	2 (0,8)	4 (1,1)	2 (0,3)	2 (0.6)	4 (0,5)
	S-D	0 (0)	1 (0.2)	1 (0,1)	0 (0)	0 (0)	1 (0,1)	0 (0)	1 (0,1)
	D	2 (0.4)	0 (0)	1 (0,1)	2 (0,8)	1 (0,3)	3 (0,38)	2 (0,6)	1 (0,1)
	P	0.2039		0.1075		0.2481		0.558	
You do not give your child breakfast because there is not enough time	A	29 (6.3)	26 (4.7)	48 (5.2)	13 (5.5)	15 (4.1)	47 (6)	14 (4)	46 (5.7)
	S-A	48 (10.5)	35 (6.3)	69 (7.4)	23 (9.7)	36 (9.8)	51 (6.5)	41 (11.8)	51 (6.3)
	S-D	11 (2.4)	5 (0.9)	15 (1.6)	4 (1.7)	9 (2.5)	8 (1)	11 (3.2)	8 (1)
	D	371 (80.83)	487 (88.1)	796 (85.8)	197 (83.1)	306 (83.6)	678 (86.5)	281 (81)	708 (87.1)
	P	0.0093		0.6989		0.0285		0.0003	
You do not give your child breakfast because it is too expensive	A	10 (2.2)	7 (1.3)	15 (1.6)	2 (0.9)	3 (0.8)	14 (1.8)	5 (1.45)	12 (1.5)
	S-A	2 (0.4)	1 (0.2)	3 (0.3)	1 (0.4)	4 (1.1)	1 (0.1)	1 (0.3)	2 (0.3)
	S-D	3 (0.7)	2 (0.4)	5 (0.5)	0 (0)	1 (0.3)	4 (0.5)	3 (0.9)	2 (0.3)
	D	442 (96.7)	540 (98.2)	900 (97.5)	233 (98.7)	356 (97.8)	761 (97.6)	335 (97.4)	794 (98)
	P	0.5309		0.6699		0.0682		0.4842	
You give your child breakfast because it is important for their health	A	457 (98.5)	548 (99.1)	922 (98.7)	237 (99.6)	364 (98.6)	781 (99.1)	349 (99.2)	805 (98.8)
	S-A	4 (0.9)	5 (0.9)	9 (1)	0 (0)	4 (1.1)	5 (0.6)	2 (0.6)	7 (0.9)
	S-D	1 (0.2)	0 (0)	1 (0.1)	1 (0.4)	0 (0)	1 (0.1)	0 (0)	2 (0.3)
	D	2 (0.4)	0 (0)	2 (0.2)	0 (0)	1 (0.3)	1 (0.1)	1 (0.3)	1 (0.1)
	P	0.3389		0.2201		0.6199		0.7628	
You give your child breakfast because it is important for concentration	A	455 (98.3)	548 (99.1)	925 (99)	232 (98.3)	364 (98.9)	778 (98.9)	346 (98.9)	806 (98.9)
	S-A	5 (1.1)	4 (0.72)	7 (0.8)	2 (0.9)	2 (0.5)	7 (0.9)	2 (0.6)	7 (0.9)
	S-D	1 (0.2)	1 (0.2)	1 (0.1)	1 (0.4)	1 (0.3)	1 (0.1)	0 (0)	2 (0.3)
	D	2 (0.4)	0 (0)	1 (0.1)	1 (0.4)	1 (0.3)	1 (0.1)	2 (0.6)	0 (0)
	P	0.497		0.3084		0.6254		0.2019	

Abbreviations used: Agree (A), Sometimes agree (S-A), Sometimes disagree (S-D), Disagree (D)
P values <0.05 are in bold

Practices

Only 389 (32.2%) respondents indicated that they eat breakfast together as a family, with families with a lower income eating breakfast together statistically ($P=0.0296$) more often (34.5%, $n=172$) than those with a higher income (28.4%, $n=164$).

Most learners (81.7%, $n=1043$) ate breakfast every school day, and 1176 (91.4%) ate breakfast shortly after waking up 1 – 5 days in a school week (when they wake up, within two hours of waking up and on the way to school). Caregivers with a higher income (45.7%, $n=492$) and qualification (58%, $n=720$) provided breakfast daily more often ($P=0.0014$ and $P=0.0011$, respectively). Nonetheless, older caregivers and caregivers with a higher qualification did not eat breakfast together more often than younger caregivers and those with a lower qualification ($P=0.3562$ and $P=0.4552$, respectively).

The preferred breakfast food was ready to eat breakfast cereals (RTEBC) including Weet-Bix (51.4%, $n=660$), corn flakes (44.7%, $n=575$), puffed cereal (36.2%, $n=466$), and bran flakes (23.5%, $n=302$). Table 5.2 lists the food group items consumed by the learners for breakfast and the median intake within each food group.

Table 5.2 Reported breakfast intake per food group

Food group	N=1286	
	Median	Range
Porridge and RTEBC	-1	-5 to 1
Bread	0	-3 to 2
Dairy	5	5
Fruit	2	0 to 4
Vegetable	0	0 to 3
Protein-rich foods	2	0 to 5

The preferred beverages served for breakfast was tea (29.6%, $n=380$), water (23.9%, $n=307$), fruit juice (22.7%, $n=292$) and milk (15.2%, $n=195$). Most families used full cream milk (86.4%, $n=1111$), with 206 (16%) using reduced fat and 43 (3%) using fat-free milk. The majority of caregivers (80.2%, $n=1029$) believed that full cream milk is the healthiest option for their child.

5.3.3 Lunchbox

The attitudes of the caregivers were mostly positive towards healthy lunchbox foods and practices, with a median attitude score of 71.4% (range 62.9%-80%).

Attitudes

Caregivers generally agreed that it is important to have healthy eating habits, with 1095 (87.7%) indicating that they completely agree with this statement and only 5 (0.4%) disagreeing to an extent with this statement. Most caregivers (97.7%, $n=1213$) agreed that healthy food packed into a lunchbox would help reduce the risk of their child developing certain diseases, and only 29 (2.3%) disagreed. Most caregivers agreed (to an extent) that healthy food is tasty (85.6%, $n=1062$), while 179 (14.4%) did not think healthy food is tasty (to an extent) (Figure 5.2).

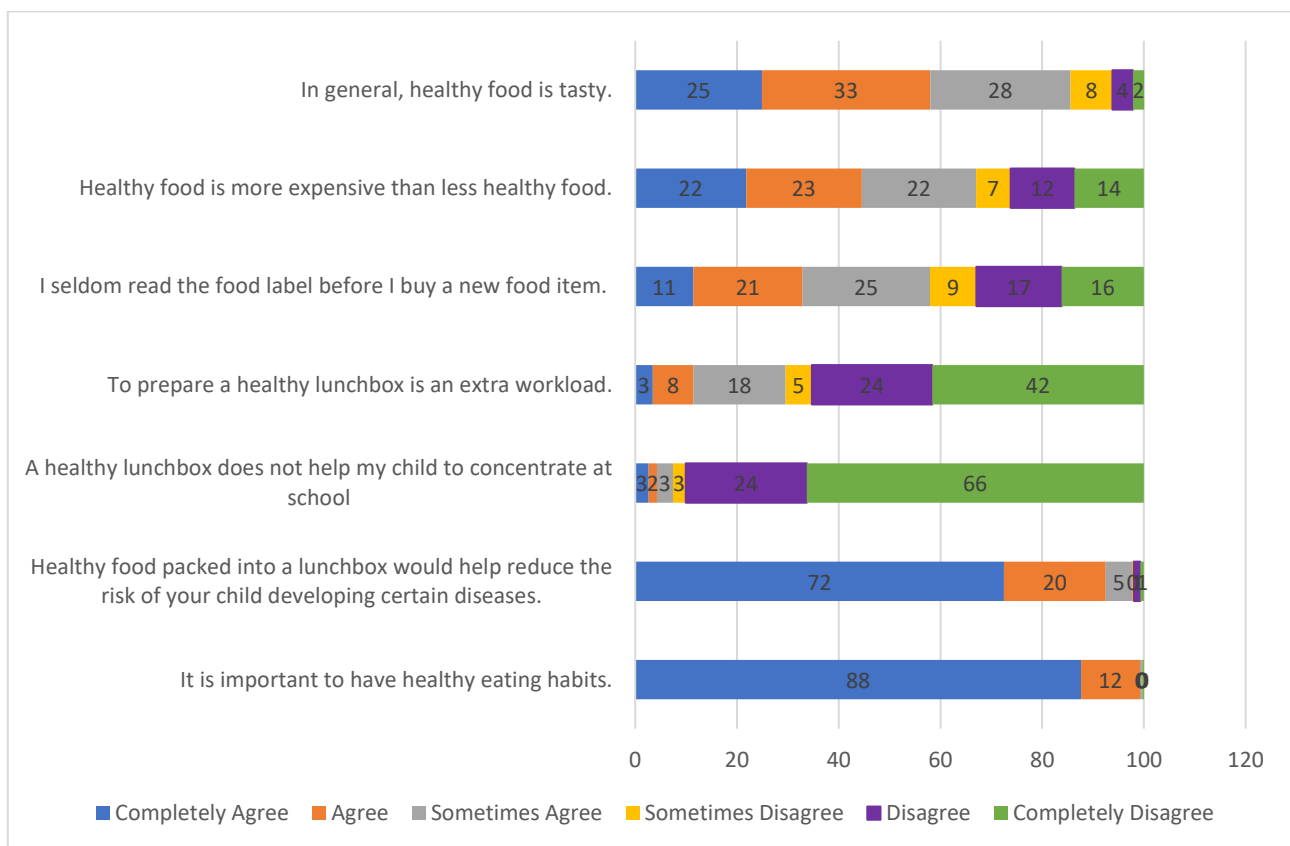


Figure 5.2 Caregivers' attitudes towards healthy lunchbox food

The attitudes of caregivers with higher incomes were more positive towards healthy eating habits ($P=0.0089$) than any of the other SDVs. Although most caregivers perceived packing a lunchbox as an extra workload, caregivers with a higher income, those living with a life partner and older caregivers perceived packing a healthy lunchbox as being more of an extra workload, at a statistically significant level ($P=0.0027$, $P=0.003$ and $P=0.0052$ respectively), than caregivers with lower income, living without a partner and those being younger than 35 years.

Although caregivers from all categories read the food label before buying a new food item, caregivers with higher income, a life partner and a tertiary education more often read the food labels before buying new foods. Interestingly, caregivers with a higher income and those living with a life partner perceive healthy food as more expensive than less healthy food more often than caregivers with lower income and those living without a life partner, at a statically significant level ($P=0.0003$ and $P=0.0045$). There was a statistically significant difference between caregivers younger and equal to 35 years and older than 35 years perceiving that healthy food is tasty. Younger caregivers indicated that healthy food is tasty to a greater extent than older caregivers ($P=0.0246$). There was no difference between SDVs and the attitudes of the caregivers regarding whether a healthy lunchbox helps their child to concentrate at school (Table 5.3).

Table 5.3 Socio demographic variables influencing lunchbox attitudes of caregivers

Statement	Response n (%)	Income (n=1025)		Marital status (n=1182)		Age (n=1169)		Qualification (n=1177)	
		≤R20 000 (±\$1 380) (n=469)	>R20 000 (±\$1 380) (n=556)	With life partner (n=941)	Other (n=241)	≤35 years (n=370)	>35 years (n=799)	Secondary (n=357)	Tertiary (n=820)
It is important to have healthy eating habits	A	455 (98.7)	549 (100)	926 (99.6)	231 (98.7)	363 (99.2)	786 (99.5)	348 (99.2)	803 (99.4)
	S-A	3 (0.7)	0 (0)	1 (0.1)	2 (0.9)	2 (0.6)	1 (0.1)	1 (0.3)	3 (0.4)
	S-D	0 (0)	0 (0)	1 (0.1)	0 (0)	0 (0)	1 (0.1)	1 (0.3)	0 (0)
	D	3 (0.7)	0 (0)	2 (0.2)	1 (0.4)	1 (0.3)	2 (0.3)	1 (0.3)	2 (0.3)
	P	0.0089		0.1492		0.6028		0.5028	
A healthy lunchbox does not help my child to concentrate at	A	24 (5.3)	20 (3.6)	45 (4.9)	5 (2.2)	14 (3.9)	35 (4.5)	17 (5)	32 (4)
	S-A	17 (3.7)	11 (2)	24 (2.6)	11 (4.8)	11 (3)	22 (2.8)	15 (4.4)	20 (2.5)
	S-D	8 (1.8)	15 (2.7)	25 (2.7)	5 (2.2)	8 (2.2)	21 (2.7)	9 (2.6)	21 (2.6)
	D	406 (89.2)	505 (91.7)	832 (89.9)	210 (90.9)	333 (91)	704 (90)	302 (88.1)	736 (91)
	P	0.1431		0.1017		0.9076		0.3003	
To prepare a healthy lunchbox is an extra workload	A	38 (8.3)	78 (14.3)	119 (12.9)	16 (6.8)	26 (7.1)	108 (13.9)	36 (10.5)	98 (12.2)
	S-A	75 (16.5)	110 (20.1)	176 (19.1)	31 (13.2)	69 (18.9)	134 (17.2)	48 (14)	158 (19.6)
	S-D	22 (4.8)	32 (5.9)	42 (4.6)	15 (6.4)	24 (6.6)	34 (4.4)	16 (4.7)	40 (5)
	D	321 (70.4)	327 (59.8)	583 (63.4)	173 (73.6)	246 (67.4)	503 (64.6)	24 (70.9)	510 (63.3)
	P	0.0027		0.003		0.0052		0.069	
I seldom read the food label before I buy a new food item	A	169 (37)	148 (26.8)	290 (31.4)	84 (35.9)	133 (36.5)	238 (30.3)	142(40.9)	233 (28.9)
	S-A	121 (26.5)	146 (26.5)	245 (26.5)	51 (21.8)	104 (28.6)	186 (23.7)	78 (22.5)	215 (26.7)
	S-D	41 (9)	48 (8.7)	81 (8.8)	25 (10.7)	36 (9.9)	69 (8.8)	28 (8.1)	75 (9.3)
	D	126 (27.6)	210 (38.04)	308 (33.3)	74 (31.6)	91 (25)	292 (37.2)	99 (28.5)	283 (35.1)
	P	0.0009		0.2933		0.0008		0.0011	
Healthy food is more expensive than less healthy food	A	214 (47)	227 (41.3)	406 (43.9)	105 (45.3)	160 (43.8)	350 (44.7)	165 (48)	344 (42.6)
	S-A	80 (17.5)	160 (29.1)	228 (24.7)	39 (16.8)	93 (25.5)	170 (21.7)	64 (18.6)	201 (24.9)
	S-D	32 (7)	36 (6.6)	65 (7)	10 (4.3)	22 (6)	51 (6.5)	24 (7)	52 (6.4)
	D	130 (28.5)	127 (23.1)	226 (24.4)	78 (33.6)	90 (24.7)	212 (27.1)	91 (26.5)	211 (26.1)
	P	0.0003		0.0045		0.526		0.1202	
In general, healthy food is tasty	A	262 (57.6)	333 (60.6)	550 (59.4)	131 (57)	195 (53.4)	478 (61.1)	213 (61.9)	467 (57.9)
	S-A	124 (27.3)	149 (27.1)	255 (27.5)	63 (27.4)	123 (33.7)	197 (25.2)	90 (26.2)	225 (27.9)
	S-D	38 (8.4)	40 (7.3)	70 (7.6)	20 (8.7)	29 (8)	61 (7.8)	21 (6.1)	70 (8.7)
	D	31 (6.8)	28 (5.1)	51 (5.5)	16 (7)	18 (5)	46 (6)	20 (5.8)	45 (5.6)
	P	0.5717		0.7625		0.0246		0.3966	

#Abbreviations used: Agree (A), Sometimes agree (S-A), Sometimes disagree (S-D), Disagree (D)

P values <0.05 are in bold

Practices

One thousand two hundred and twenty-four (95.2%) learners received a lunchbox to school daily. It took most caregivers (61.1%, $n=764$) 0 – 15 minutes and 16 – 30 minutes (33.3%, $n=417$) to pack lunchboxes. There was no statistical difference between the income of the caregiver and whether they provide a lunchbox to school ($P=0.0757$). However, children of caregivers with lower incomes received tuck shop money and fast foods significantly more often ($P<0.0001$ and $P=0.0006$ respectively) and received less water, significantly less often ($P=0.0010$) than children of caregivers with higher incomes.

Most caregivers (80.4%, $n=1034$) indicated that it is essential to pack a lunchbox to school to ensure that their child will not go hungry, while only 63 caregivers (4.9%) considered lunchboxes as not essential. Nine hundred and two caregivers (70.1%) indicated that a lunchbox ensures better concentration, 838 (65.2%) provide a lunchbox to make sure that their child eats healthy food and 206 respondents (16%) provide lunchboxes to save money.

Caregivers with a higher qualification provided fruit ($P<0.0001$) and vegetables ($P=0.0027$) in their child's lunchbox more often than those with a secondary qualification. Table 5.4 indicates the median intakes of the different food groups measured. The median intake of fruit (median=3) was higher than vegetables (median=0). Four hundred and thirty-one (33.5%) caregivers provided fruit five days a week, and only 4.2% included a vegetable in the lunchbox five days a week. Caregivers with a tertiary qualification provided fruit more often ($P<0.0001$) 5 days a week and vegetables more often ($P=0.0038$) 1-4 days a week than those with a secondary qualification. Most caregivers did not include a fibre-rich bread (median=0) in the lunchbox. Seven hundred and twenty-six (56.5%) of caregivers packed white bread, 339 (26.4%) white bread with added fibre, 479 (37.2%) brown or whole wheat bread and only 160 (12.4%) brown low glycaemic index (GI) bread, 1-5 days of the school week. Protein foods included in the lunchbox were mostly cheese (62%, $n=797$), processed meat (57.3%, $n=737$), red meat (43%, $n=553$) and chicken (33.2%, $n=427$). Dairy products were included in the lunchbox by 547 (42.6%) caregivers, and water by 1000 (77.9%) caregivers, on one to five school days.

Table 5.4 Reported lunchbox intake per food group

Food group	N=1286	
	Median	Range
Fruit	3	1 to 5
Vegetables	0	0 to 1
Bread	0	-5 to 5
Biscuits	-1	-3 to 5
Muffins	5	0 to 5
Bars	5	2 to 5
Treats	0	-3 to 3
Protein-rich foods	1	-1 to 3

The treats typically provided in the lunchbox included potato crisps, candy, dried fruit, nuts, cake and popcorn (Table 5.5). Caregivers were generally aware that popcorn is regarded as a healthier snack than potato crisps (96.3%, $n=1152$).

Table 5.5 Treats provided in lunchboxes

Treats	N=1286			
	0 days		1 – 5 days	
	n	%	n	%
Cake Tinkies, cupcake, and cake	876	68.1	410	31.9
Candy Sugar or jelly candy and chocolate	806	62.7	480	37.3
Dried fruit	826	64.2	460	35.8
Nuts	874	68	412	32
Potato crisps	621	48.3	665	51.7
Popcorn	926	72	360	28

Eleven per cent of learners that received money for the tuck shop 2-5 days a week, while 33.6% of learners did not receive tuck shop money and 54.8% received tuck shop money only once a week.

There was no statistically significant difference between the breakfast ($P=0.1246$) and lunchbox ($P=0.3539$) practices of caregivers with life partners and those without life partners.

5.4 Discussion

Attitudes towards breakfast and lunchbox practices

To our knowledge, there are no studies available on the attitudes and practices of primary caregivers regarding the provision of breakfast and lunchboxes to primary school learners in Bloemfontein, SA. There are also limited national and international research on the provision of breakfast and lunchbox food of foundation phase learners.

Generally, the attitudes of the caregivers were positive towards healthy breakfast (Median=82.5%) and lunchbox (Median=71.4%) foods and practices. This finding is similar to the findings in a study by Vereecken & Maes (2010: 47) on the dietary habits, knowledge, attitudes of mothers with children aged 3-4 years.

Time constraints in the morning were less of an obstacle for providing breakfast for caregivers older than 35 years, with a higher income and a tertiary qualification. Caregivers with a tertiary qualification also gave breakfast more often than those with a secondary qualification.

In contrast to the study by Vereecken and Maes (2010: 48), caregivers with a lower income, age and qualification were more prone to read the food label before purchasing a new type of food.

Caregivers with a higher income's attitude were more positive towards healthy eating habits. Nonetheless, caregivers with a higher income and those living with a life partner were of the opinion that healthy food were expensive and packing a healthy lunchbox for school entailed extra workload.

Most caregivers completely agreed that it is important to eat breakfast, that breakfast foods are not expensive and that eating breakfast is important for health. Furthermore, they completely agreed that it is important to have healthy eating habits and that a healthy lunchbox reduces the risk of developing certain diseases. Generally, caregivers perceived healthy food to be tasty to some extent, with younger caregivers being more positive about the taste of healthy food.

Breakfast foods

Benefits of breakfast consumption include improved cognition (Grantham-Mcgregor, 2012; Giovannini *et al.*, 2008; Kleinman *et al.*, 2002), better psychosocial functioning (Burrows *et al.*, 2017; Giovannini *et al.*, 2008) and the intake of more nutritious snacks throughout the day (fruits, unrefined carbohydrates, and fibre-rich foods). Healthier snacks throughout the day improve body weight and consequently, health positively (Larson *et al.*, 2014: 612; Giovannini *et al.*, 2008; Rampersaud *et al.*, 2005). In our study we did not consider anthropometrical measurements.

In our study, 1043 (81.7%) of learners ate breakfast daily before going to school. This data is comparable with other studies conducted in SA (Tee *et al.*, 2015: 83; Shisana *et al.*, 2014: 20; Abrahams *et al.*, 2011: 1755) and in other countries (Koca *et al.*, 2017: 1253; Afeiche *et al.*, 2017: 404; Purttiponthanee *et al.*, 2016: 88). Learners who ate breakfast (1 – 5 days a week), ate it when they woke up, within two hours of waking up and on the way to school, which is consistent with the recommendation made by Rampersaud *et al.* (2005: 754) that children who do not eat breakfast at home (due to time constraints) should eat breakfast on their way to school or at school.

Breakfast should provide about a third of the child's daily requirements, and a balanced breakfast consists of a fibre-rich carbohydrate, reduced-fat milk or milk product, fruit and a lean protein (Vorster *et al.*, 2013: 32,34; Giovannini *et al.*, 2008: 621; Timlin & Pereira, 2007: 268,277; Rampersaud *et al.*, 2005: 754). When focussing on a fibre-rich carbohydrate option for breakfast, it might seem to caregivers that RTEBC, advertised for children, is a good option as a carbohydrate source for breakfast to save time. However, it is higher in carbohydrates, sugar, and salt when compared to RTEBC not advertised specifically for children (Wiles, 2017: 99) and therefore, often not a better option for breakfast.

In our study, most caregivers provided their children with an RTEBC low in fibre and nutrients (Median -1), and although the RTEBC of choice was Weet-Bix (51.3%, $n=660$) which is high in fibre, it unfortunately has a high GI. Warren (2003) suggests that children consume low GI breakfast food to improve satiety and improve portion control during lunch. Low GI foods also assist in improving cognition (Edefonti *et al.*, 2017: 25) and can consequently help with concentration at school. The provision of RTEBC for breakfast can improve the intake of protein, fibre, and micronutrients including B-vitamins, calcium, magnesium, and phosphorus and reduce the intake of fat and sugar (but it does not necessarily improve the intake of fibre) (Michels *et al.*, 2016: 771).

Reduced fat milk and milk-derived products are seen as an essential component of a healthy breakfast (Giovannini *et al.*, 2008: 621; Rampersaud *et al.*, 2005: 754). The calcium derived from dairy contributes to more than 50% of the total daily calcium intake and is necessary for growth and development (Dror & Allen, 2014: 78). In this study, the consumption of milk for breakfast was considered adequate, with a median intake of 5. The majority of caregivers provided full cream milk (86.4%, $n=1111$) and considered it as the healthiest option for their child (80%, $n=1029$).

The intake of milk with breakfast in our study is comparable with other European studies' RTEBC milk intake where 92.5% ($n=971$) of the adolescents consumed milk with their RTEBC (Michels *et al.*, 2016). However, only 50.4% of adolescents consuming bread for breakfast had milk with their bread breakfast and only 60.2% of adolescents who consumed other types of breakfast foods (breakfasts containing no RTEBC or bread) had milk with breakfast (Michels *et al.*, 2016: 776). In an intervention study in SA by Oosthuizen *et al.* (2010: 78) on 55 children (9-13 years old), 56.4% consumed milk *daily* before the intervention and 47.4% after the intervention in this experimental group.

In addition to fibre-rich carbohydrate and reduced fat milk or milk-derived product as part of a balanced breakfast, fruit is also an important component of a healthy breakfast (Giovannini *et al.*, 2008; Timlin & Pereira, 2007: 268,277; Rampersaud *et al.*, 2005: 754). A recent report compiled by the

WHO/Food and Agriculture Organization recommends that fresh fruits and vegetables should form part of healthy snacks and meals (WHO, 2015). Fruits and vegetables should mostly be eaten fresh and raw, as tinned vegetables contain added salts, dried fruits may have high amounts of added sugar, and fruit juice lacks the fibre present in whole fruit (Vorster *et al.*, 2013: 50). In our study, the median fruit intake was 2 for breakfast; while 37.3% ($n=480$) of caregivers gave no fruit at all for breakfast, 23.7% ($n=304$) of caregivers gave their child a fruit on every school morning, 39% ($n=502$) of caregivers gave their child a fruit 1-4 days a week, and 22.7% ($n=292$) of children were given fruit juice with breakfast. Michels *et al.* (2016: 776) reported that 13.4% of adolescents eating RTEBC and that 9.5% of those not eating an RTEBC for breakfast, consumed a fruit with breakfast. In a study in Ghana, 56% of adolescents ate fruit or vegetables *daily* (Doku *et al.*, 2013: 866).

To encourage children to eat breakfast, it is recommended that families eat breakfast together (Giovannini *et al.*, 2008: 621). Caregivers set the example by eating breakfast themselves (Larson *et al.*, 2014: 612; Keski-Rahkonen *et al.*, 2003), however less than a third of caregivers (32.2%, $n=389$) in our study ate breakfast with their children before school. Time constraints in the morning may influence a family's opportunity to eat breakfast (Jarrett *et al.*, 2016).

In contrast with a study by Neumark-Stainer *et al.* (2013: 201) where family meal frequency in adolescents from a lower SEB were lower than those from a higher SEB ($n=1168$ compared to $n=1072$), in our study families with a lower income ate breakfast together significantly ($P=0.0296$) more often (34.5%, $n=172$) than families with a higher income (28.4%, $n=164$).

Lunchbox food

International (Sanigorski *et al.*, 2005) as well as national (Temple *et al.*, 2006: 256) studies conclude that there is a need for parents to prepare healthier lunchboxes. The foods learners take to school are mainly processed foods including white bread, candy and potato chips (Temple *et al.*, 2006: 256).

Learners are spending approximately a third of their day at school in South Africa. Consequently, a school lunchbox provides an essential contribution to the daily nutrient intake of a learner (Bell & Swinburn, 2004: 258) and promotes optimal health (Farris *et al.*, 2015). Regularly taking a lunchbox to school increases the variety of food eaten and improves weight management of children (Abrahams *et al.*, 2011: 1758).

In our study most (96.2%, $n=1224$) learners received a lunchbox to school, which was more than described in a study by Abrahams *et al.* (2011: 1756) and Shisana (2014: 21) where 69% and 37.6% of learners respectively took a lunchbox to school. Abrahams *et al.* (2011: 1753) completed a study on grade 4 (10-year-old learners) and Shisana (2014: 231) on children aged 10 – 14 years at schools from

lower SEB in Cape Town. Our study was done at schools from a higher SEB and therefore the National School Feeding Programme (NSFP) was not implemented at these schools.

A healthy lunchbox should include a fruit or vegetable or both (WHO, 2015), a dairy product (preferably reduced fat) (Vien *et al.*, 2017; Hubbard *et al.*, 2014: 1430; Levine, 2001), water (Hubbard *et al.*, 2014: 1430; Wright *et al.*, 2013: 84) and a fibre-rich carbohydrate-rich food (Temple *et al.*, 2016; Vorster *et al.*, 2013). Recommendations from the 2015-2020 Dietary Guidelines for Americans state that a healthy eating pattern should also include protein foods (seafood, lean meats, poultry, eggs, legumes, nuts, seeds, or soy products) (USDHHS and USDA, 2015: xiii). The inclusion of processed foods into the lunchbox, although convenient, should be limited (WHO, 2017; Wilkinson, 2015; Vorster *et al.*, 2013: 28,71,112).

Although most of the components of the lunchboxes in our study were scored to be unhealthy, the majority of the caregivers provided fruit in the lunchbox at some or all days of the school week (median 3). In our study, 33.5% ($n=431$) of caregivers provided fruit five days a week and 43.2% ($n=555$) provided fruit one to four days in a school week, while 22.9% ($n=294$) provided no fruit at all. This is higher than a study by Hubbard *et al.* (2014: 1429) where 29% of learners received a fruit for lunch and 25% for a snack, keeping in mind that school times are longer in the United States of America (USA) than in SA. For SA, Abrahams *et al.* (2011: 1755) reported that 9% of the learners brought fruit to school.

In our study, 25.2% ($n=324$) of caregivers included a vegetable one to four days of a school week while 4.2% ($n=54$) included a vegetable in the lunchbox five days a week. Furthermore, caregivers with a higher qualification provided fruit and vegetables more often in the lunchbox. This is higher compared to the study by Hubbard *et al.* (2014: 1429) where only 3% received vegetables for their lunch and 1% received vegetables as snacks to school.

Farris *et al.* (2015: 278) evaluated the fruit and vegetable intake of pre-school children in Virginia in the USA. Only children bringing a lunchbox from home were evaluated. Just more than half (58.3%) brought either a fruit or vegetable, or both, to school on the day of the study, which is more than in our study. However, they did not evaluate fruit and vegetable intake over a period of five school days. In other international studies, children from a lower SEB tend to eat fewer fruits and vegetables and more “convenient” type of foods (Patrick & Nicklas, 2013: 87; Sanigorski *et al.*, 2005: 1314).

In our study, less than half of the learners received dairy products (42.6%, $n=547$) in their lunchbox, but most learners received water (77.9%, $n=1000$). The provision of water as part of the school lunchbox in our study is higher when compared to the study done by Hubbard *et al.* (2014: 1429) where only 3% provided dairy and 28% provided their child with water.

In our study bread and biscuits provided for lunchboxes were low in fibre (median=0 and 1 respectively). Better choices that are higher in fibre such as muffins and bars were provided (median=5 for both), but less healthy treats were packed into the lunchbox (median=0), such as potato crisps and candy.

In our study, potato crisps (51.7%, $n=665$) were the most popular treat to include in the lunchbox, followed by candy (37.3%, $n=480$), dried fruit (35.8%, $n=460$) and nuts (32%, $n=412$). In the study by Hubbard *et al.* (2014: 1429), learners brought the following amounts of treats for snacks comparable to our study: potato crisps 18%, candy 11%, dried fruit 1% and nuts <1%. This is significant if one considers that in the USA, learners are provided with lunch and snacks and therefore do not need to take snacks to school. In our study, children from homes with a lower income receiving tuck shop money and fast foods more often than children from homes with a higher income.

In our study protein foods packed in lunchboxes were mostly cheese (62%, $n=797$), processed meat (57.3%, $n=737$), red meat (43%, $n=553$) and chicken (33.2%, $n=427$). The study by Hubbard *et al.* (2014: 1429) only measured whether the bread provided had a protein filling, and if a protein food was provided in the school lunchbox. The amounts of our study are more than the study done by Abrahams *et al.* (2011: 1755), especially the intake of processed meat which was only 36% in the Abrahams study, compared to ours that was 57.3%.

Although caregivers in our study provided their children with more potato crisps and candy, the percentage of caregivers providing dried fruit and nuts was also higher than the study in the USA by Hubbard *et al.* (2014).

Parents and caregivers are generally well aware of the benefits of packing a healthy lunchbox, but the biggest challenge that caregivers seem to have with packing a healthy lunchbox, is lack of preparation time and the effort that it takes to pack lunchboxes (Casado & Rundle-Thiele, 2015: 444). In our study, it took most caregivers (61.1%, $n=786$) less than 15 minutes to pack lunchboxes.

5.5 Conclusion

Most caregivers seem to have a positive attitude towards healthy food and perceived healthy food as tasty, but were not providing their children with healthy food for breakfast or in their lunchboxes. Provision of less healthy breakfast and lunchbox foods might be due to a nutritional knowledge gap, as described in the researcher's previous article (Hansen *et al.*, n.d.).

Numerous studies indicate that parental involvement and leading by example, help to establish healthy eating habits in children (Vollmer & Baietto, 2017: 136,137; Yee *et al.*, 2017: 1; Vorster *et al.*, 2013: 51).

It therefore seems that intervention studies should focus on improving nutritional knowledge of not only the learners but also their caregivers.

5.6 Limitations of the study

The following limitations of the study are acknowledged: the questionnaire, used to collect the data was not available in all 11 official languages of SA, and caregivers could have misunderstood some instructions, consequently not responding accurately to the questions; and the portion sizes of the food selected for breakfast and lunchboxes were not measured, and intake could therefore not be compared to the recommended dietary allowances.

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5.8 References

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6 CHAPTER 6: Conclusions and Recommendations

6.1 Introduction

This research study examined the KAP of primary caregivers of foundation phase learners regarding breakfast and packing lunchboxes, to determine nutritional knowledge; and to identify relationships between parents' and caregivers' KAPs.

Optimal nutrition is important during the rapid period of growth that foundation phase learners undergo. Malnutrition as well as micronutrient deficiencies during this phase negatively affect immunity, risk for developing diseases as well as working potential later in life.

In addition, young children are dependent on their primary caregiver to provide them with food. The food choices primary caregivers make for the children in their care does not only influence their eating behaviours and how they experience food during childhood but also their eating behaviours later in life (Schwartz *et al.*, 2011). Factors that influence the nutrient intake of learners include the food choices they and their primary caregivers make, socio-economic factors and eating family meals together (Patrick & Nicklas, 2013; Davison *et al.*, 2017).

The conclusions of the current study will be discussed according to the main aims of this study. Gaps in the nutritional knowledge, as well as inconsistencies between primary caregivers' knowledge, attitudes and practices were identified.

6.2 Knowledge, Attitudes and Practices

Knowledge in this study referred to the understanding that the primary caregivers had of healthy breakfast and lunchboxes, while their attitudes referred to their inclination to want to provide specific breakfast and lunchbox foods to their children. The food provided to the children reflected their practices.

The median breakfast knowledge score of the caregivers was 55.6% and median lunchbox knowledge score 73.1%. The attitudes of caregivers were generally positive towards providing healthy breakfast and lunchbox foods for the children in their care, with a median of 82.5% for breakfast and 71.4% for lunchbox foods. The median practice score to indicate the provision of healthy breakfast foods was 26.7% and for lunchbox foods 35.6%.

The low median practice score for breakfast was mostly due to the provision of RTEBC low in fibre, low provision of fruit and the inclusion of processed meat for breakfast. The lunchbox median

practice score was low due to the minimal provision of fruit and vegetables and inclusion of processed foods like “polony” and “vienna’s”, as well as biscuits and treats low in fibre and micronutrients in the lunchbox.

Overall, older caregivers with a higher qualification had a significantly higher nutritional knowledge than younger caregivers and caregivers with a lower qualification. The nutritional knowledge about lunchboxes was higher for caregivers from a family with support and with a higher income than for those from a family without support and with a lower income. Given the importance of consuming five servings of fruit and vegetables per day, it is notable that less than a quarter of the caregivers (24.9%) had this knowledge, with older caregivers being more knowledgeable.

The median knowledge score for primary caregivers regarding breakfast and lunchboxes was significantly higher for those with a positive attitude. Caregivers with a positive attitude had a median knowledge score of 68.6% ($n=1257$) for breakfast and 71.4% ($n=1197$) for lunchboxes and those with a negative attitude had a score of 40.0% ($n=29$) for breakfast and 51.4% ($n=89$) for lunchboxes. Families with a higher income and caregivers with a tertiary education were more positive about healthy lunchboxes than those with a lower income and secondary education.

SDV’s that affected both the breakfast and lunchbox practices significantly, included the qualification and income of the primary caregiver. Caregivers with a tertiary education and those with a higher income reported better practices. Older caregivers provided their children with significantly healthier lunchbox foods than younger caregivers.

6.2.1 Breakfast

Most caregivers (88.0%) agreed that it is important to eat breakfast and that breakfast is important for health (88.4%). Older caregivers and those with a higher income and qualification agreed to a greater extent that time constraints in the morning affect them less when providing their children with breakfast. Most learners (81.7%) ate breakfast every school day, with caregivers with a higher income, qualification and age providing breakfast daily more often. However, only 32.2% of primary caregivers indicated that they eat breakfast together as a family, with families with a lower income eating breakfast together statistically more often.

Older caregivers provided the children in their care with low fat milk and knew that fibre is an important component of breakfast foods more when compared to younger caregivers. Every school morning 23.9% of learners received water for breakfast, 75% dairy and 23.6% a fruit. The breakfast

cereals and porridge of choice were Weet-Bix (51.4%), Corn flakes (44.8%), Oats (44.1%) and Bran flakes (23.5%), with Weet-Bix and Corn flakes having a high GI. Regarding bread, mostly brown and low GI bread (59.4%) was provided. The main protein-rich food provided for breakfast included eggs (63.2%), cheese (57.2%) and processed meat (41.8%).

6.2.2 Lunchboxes

Caregivers with a higher income, those living with a life partner and older caregivers experienced packing a lunchbox as more of an extra workload than their counterparts, keeping in mind that most caregivers perceived packing a lunchbox as an extra workload.

Caregivers with a higher income and those living with a life partner perceive healthy food as more expensive than less healthy food more often than caregivers with lower income and those living without a life partner, at a statically significant level ($P=0.0003$ and $P=0.0045$). Of all the SDVs, there was a statistically significant difference in younger caregivers perceiving that healthy food is tasty ($P=0.0246$).

The majority of primary caregivers (95.7%) provided children in their care with a school lunchbox on a daily basis. It is positive to note that most caregivers (87.5%) restricted tuck shop visits to less or equal to one day per week, with no significant correlations with SDV's. The intent of the caregivers regarding the type of food provided in the lunchbox was that it should be healthy (54.2%), "filling/satisfying" (22.8%), quick to prepare (7%) and affordable (5%). Caregivers with a tertiary education and those with a higher income had a more positive attitude towards healthy lunchbox foods.

Overall 77.9% of caregivers provided water, 42.6% dairy, 76.2% brown or low GI bread and 33.6% a fruit in the lunchbox five days in a school week. Protein-rich foods mostly included in the lunchbox were cheese (62.1%) and processed meat (57.4%). Mostly biscuits high in fat and low in fibre was provided as part of the lunchbox with muffin and snack bars being the higher fibre options provided. As treats, 51.8% of learners received potato crisps, 37.4% candy, 35.8% dried fruit (with or without added sugar) and 32.1% nuts five days in a school week.

South Africa can learn from international intervention studies, like the FDI study. The FDI study was conducted in Ireland, and it was successful in improving parents' provision, as well as children's (4 – 11 years of age) consumption, of fruits and vegetables through promoting healthy eating at schools (Horne *et al.*, 2009).

Obligatory educational material (including peer-modelling video's) was included in the curriculum for 16 weeks in combination with rewards for eating healthy (Horne *et al.*, 2009). The learners received free fruit and vegetables during this phase. After the initial 16 weeks the parents were motivated to include fruits and vegetables in the lunchbox as part of a maintenance phase (Horne *et al.*, 2009).

Results from the present study indicate that although most caregivers want to provide healthy breakfast and lunchbox food to the children in their care, but that their intent does not reflect in their practices. This might be due to a knowledge gap and future studies should focus on interventions to improve the knowledge of caregivers as well as learners.

6.3 Recommendations

Numerous studies indicate that parental involvement and example help to establish healthy eating habits in children (Vollmer & Baietto, 2017: 136,137; Yee *et al.*, 2017: 1; Vorster *et al.*, 2013: 51). It seems that primary caregivers in our study have a positive attitude towards providing the children in their care with healthy food, therefore with adequate nutritional knowledge, they would be able to put their intent into practice.

Strategies to improve parental involvement and therefore also knowledge and practices include strategies that can be implemented at government level, at schools and at home.

6.3.1 Recommendations for the government

As mentioned before, primary caregivers want to provide the children in their care with healthy food, but do not have adequate knowledge to put their intent into practices. Making use of social media might play an important role in helping to bridge the knowledge gap.

The WHO (2016: 89) considers food advertisements (of obesogenic food) through social media as a significant and independent causal factor playing a role in the development of childhood obesity. The association between obesity and screen time was the highest for children viewing advertisements as part of the television program (Kelly *et al.*, 2016: 158). Folkvord *et al.* (2016: 1) recommend that healthy food should be advertised to improve the intake of healthy food by children.

Consequently, it is recommended that government and other stakeholders (Boyland & Whalen, 2015: 3) implement a policy for the advertisement of healthy food (including fruit, vegetables, low fat milk, meat and meat alternatives) at a low cost (or free), to improve knowledge of the primary caregiver and child and thereby improving the nutrient intake of children.

6.3.2 Recommendations for schools

Nationally and internationally, intervention studies have been implemented to improve the nutrient intake (especially the intake of fruits and vegetables) of learners. Providing low cost fruits and vegetables to foundation phase learners may improve their intake thereof (Davis *et al.*, 2015: 2358) and improve the provision of fruits and vegetables in the lunchbox by their caregivers. Low cost vegetables can be provided through vegetable gardens at school. Laurie *et al.* (2017: 20) recommend that teachers and support personnel should be trained how to start and maintain a vegetable garden and other support structures should be put into place to maintain sustainability of the food garden projects.

De Villiers *et al.* (2016: 171) conducted the HK intervention study in the Western Cape, South Africa (children aged 10-12 years) where the teachers received a guide with the SAFBDG and a specific content booklet that included (amongst other) topics on tuck shops, vendors, lunchboxes, nutrition education and vegetable gardens. The HK intervention study's outcomes were that although the intervention improved the nutritional knowledge and self-efficacy of the learners, it did not improve the learner's food practices. This might be due to poor parental involvement (De Villiers *et al.*, 2016: 173, 178).

Bekker *et al.* (2017: 1257) conducted an intervention study, regulating school tuck shops, at selected primary schools in Bloemfontein, South Africa. They concluded that improving the quality of food sold at tuck shops alone cannot improve the school environment. The parents preparing the lunchboxes should also be aware of healthy eating and the importance of packing healthy food.

Cooking classes at schools may improve the intake of fruit and vegetables through tasting of the novel food (DeCosta *et al.*, 2017: 329). This approach may not be practical in primary school settings in SA that does not have kitchens available for cooking classes.

6.3.3 Recommendation's for primary caregivers

Education of primary caregivers is a key factor to improving the nutrient intake of children. Primary caregivers should be educated on healthy food and healthy eating practices, as well as the importance of having healthy food available (and accessible to children) at home. Caregivers should involve the children in their care in the preparation of meals, eat healthy food themselves, enjoy meals together as a family and discuss healthy eating and why it is important during mealtimes.

Dietitians can educate primary caregivers at school meetings and prepare nutrition-related articles for the school newspaper and popular magazines to improve the nutritional knowledge of caregivers. Empowering the parent or caregiver through nutrition education is therefore essential to support children's healthy eating behaviours.

6.4 Recommendations for further research

The results from the present study can be used to plan an intervention study where the primary caregivers of foundation phase learners are educated through social media, at school meetings and through the school newspaper.

7 CHAPTER 7: Summary

Healthy breakfasts and school lunchboxes contribute to optimal nutrition during the school day and also influences the development of healthy eating habits in children over the long term. Caregivers are the most important role players in the food intake of their child, as they decide what the children in their care eat through food procurement and the meals they prepare. Children are also dependent on their caregiver to learn about healthy food practices from them. It is therefore important to determine whether caregivers are informed about healthy eating and practices and whether they have a positive or negative attitude towards providing healthy food to the children in their care. The aim of this study was to examine caregivers' knowledge, attitudes and practices regarding healthy breakfasts and school lunchboxes and to determine whether the attitudes of the caregivers reflected in their practices regarding the provision of breakfast and lunchbox foods. The knowledge, attitudes and practices of the caregivers were also compared to socio-demographic variables to determine aspects that may affect the practices of caregivers.

A cross-sectional, descriptive study was conducted, using in a sample of 1286 caregivers of foundation phase learners (aged 6 – 12 years) attending independent and public Quintile 5 primary schools in Bloemfontein, South Africa. Data on knowledge, attitudes and practices regarding breakfast and lunchbox provision were collected through printed questionnaires and caregivers had to be willing to complete the questionnaire in English.

The median breakfast knowledge score of caregivers was 55.6% and median lunchbox knowledge score 73.1%. Breakfast and lunchbox food knowledge were higher for caregivers older than 35 years (median=55.6, $P=0.0479$ and median=76.9, $P<0.0001$ respectively) and those who possessed a tertiary qualification (median=55.6, $P=0.0009$ and median=76.9, $P<0.0001$ respectively), than for caregivers younger than 35 years and those without a tertiary qualification.

The attitudes of caregivers were generally positive towards providing healthy breakfast and lunchbox foods to the children in their care (median=71.4% and 82.5% respectively), except for caregivers with an income of less than R20 000/month that had a lower attitude score towards providing lunchboxes ($P=0.0086$).

Caregivers with a higher income provided a daily breakfast more often ($P=0.0014$) than caregivers with a lower income. Higher income caregivers however ate breakfast together with children less often ($P=0.0296$). Caregivers with a higher qualification also provided children more often with a daily

breakfast ($P=0.0011$) than those with lower qualifications; and provided children with fruit ($P<0.0001$) and vegetables ($P=0.0027$) in the lunchbox more often than those with a secondary qualification. In contrast, caregivers with a lower income provided tuck shop money ($P<0.0001$) and fast foods ($P=0.0006$) more often than those with a higher income and were less positive towards healthy eating habits ($P=0.0089$).

Caregivers with a higher income and those living with a life partner perceived healthy food to be more expensive than less healthy food ($P=0.0003$ and $P=0.0045$ respectively) and that lunchbox preparation results in an extra workload ($P=0.0027$ and $P=0.003$ respectively).

Caregivers' primary objective when providing a lunchbox was health considerations (54.2%, $n=658$) followed by to be filling (22.8%, $n=277$). The average practices score for the provision of healthy breakfast foods was 26.7% and for lunchbox foods 35.6%. Even though the practice scores were low, healthier breakfast ($P=0.0013$) and lunchbox foods ($P=0.0001$) were provided to children with caregivers that had a tertiary qualification.

Overall, caregivers had a positive attitude towards providing children in their care with healthy breakfast and lunchbox foods. Unfortunately, differences still exist between the nutritional knowledge of caregivers older than 35 years and those with a tertiary qualification and younger caregivers and those with a lower qualification and the food they provide to their children. Caregivers with a higher level of nutritional knowledge tended to provide the children in their care with healthier breakfast and lunchbox foods. Therefore, the focus should be on the improvement of the nutritional knowledge of primary caregivers.

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ADDENDUM A
Names of quintile 5 schools

Institution name	Sector	Telephone	Cell no	email
ACADEMY OF EXCELLENCE CI/S	INDEPENDENT	051-4323230	0848478975	academyblm@gmail.com
ACCELERATED CHRISTIAN COLLEGE II/S	INDEPENDENT	0514083846	0824459799	accget@shisas.com
AURUM IC/S	INDEPENDENT	051-5226848	0833100636	aurumprimary@gmail.com
BLOEMFONTEIN P/S	PUBLIC	051-4331913	0835119519	info@lsbfn.com
BRANDWAG P/S	PUBLIC	051-4442276	0824597783	info@brandwagps.co.za brandwagps@mweb.co.za
BREBNER P/S	PUBLIC	051-4363097	0832600097	brebnerp@internet.co.za
C&N P/MEISIESKOOL ORANJE	PUBLIC	051-4476845	0725959061	kantoor@oranjeprimer.co.za
CALCULUS BLOEMFONTEIN CI/S	INDEPENDENT	051-4300093		annelize@calculusschools.co.za
CASTLEBRIDGE CI/S	INDEPENDENT	051-4476516	0837894244	jacques@castlebridgeschool.co.za info@castelbridgeschool.co.za
CHRISTIAN BROTHERS COLLEGE CI/S	INDEPENDENT	051-4366550	0835134996	stjoe@mweb.co.za
CURRO BLOEMFONTEIN IC/S	INDEPENDENT	051-4513002		jannie.l@curro.co.za
DANKBAAR CVO CI/S	INDEPENDENT	051-4511334	0782254381	admin@cvodankbaar.co.za
DR CF VISSER P/S	PUBLIC	051-4331213	0834627515	visserskool@iburst.co.za drcfvisser@gmail.com
DR VILJOEN C/S	PUBLIC	051-4443301	0827735377	info@drviljoenskool.co.za
EDUPLUS PI/S	INDEPENDENT	051-4460527	0832335472	ad.eduplus@gmail.com

Institution name	Sector	Telephone	Cell no	email
EMET CHRISTIAN COLLEGE CI/S	INDEPENDENT	076-0545565	0760545565	emetchrc77@gmail.com
EUNICE P/S	PUBLIC	051-4441761	0826516397	m.dale@euniceps.co.za ericgrobelaar@gmail.com
EZRA CHRISTIAN SCHOOL CI/S	INDEPENDENT	051-4512599	0825640334	principal@ezracs.co.za
FICHARDTPARK P/S	PUBLIC	051-5228166	0822009349	info@fichies.co.za fichpos@fichparkfs.school.za
GREY-KOLLEGE P/S	PUBLIC	051-4443150	0785614652	mherbst@gcpb.co.za gcb@gcpb.co.za
JIM FOUCHÉ P/S	PUBLIC	051-5225951	0833886159	info@psjf.co.za jfprimer@saschools.co.za
KRUITBERG P/S	PUBLIC	051-4332336	0845505506	kruitberg@mweb.co.za
KYRIOS IC/S	INDEPENDENT	082-8597739	0814753326	admin@kyriosschool.co.za
LOURIER PARK I/S	PUBLIC	051-4380579	0833048206	lourierparkis@gmail.com
MARYVALE IC/S	INDEPENDENT	051-5261813	0847265108	maryvalecombined@vodamail.co.za maryvalecombined@gmail.com
OLYMPIA P/S	PUBLIC	051-4324406	0834539357	olympiaps@telkomsa.net
ONZE RUST P/S	PUBLIC	051-5226901	0827820633	admin@onze-rust.co.za
OUR FATHER'S ACADEMY IC/S	INDEPENDENT	081-5812765	0732073076	principal@ourfathersacademy.com
PRESIDENT BRAND P/S	PUBLIC	051-4224941	0823375500	info@presidentbrand.co.za pbrand@schoolink.co.za
PRESIDENT STEYN C/S	PUBLIC	051-4452364	0827052377	admin@steyners.co.za vantondermavis@yahoo.com

Institution name	Sector	Telephone	Cell no	email
ROSEVIEW P/S	PUBLIC	051-4480317	0767985114	roseview@mweb.co.za roseview@bfn.co.za
SAND DU PLESSIS P/S	PUBLIC	051-5225461	0822912193	jvdm@iburst.co.za sdp@vodamail.co.za
SENTRAAL P/S	PUBLIC	051-4475581	0828503313	principal@sentraal.org.za trali@internext.co.za
ST ANDREW'S C/S	PUBLIC	051-4442639		admin@sasb.co.za
ST MICHAEL'S C/S	PUBLIC	051-4015700	0828254082	adie@stms.co.za sms@stms.co.za
ST PATRICK'S PI/S	INDEPENDENT	078-0392929	0720462682	patricklynchfield@gmail.com
TJHABELANG PI/S	INDEPENDENT	083-2296035	0837404313	tjhabelang@gmail.com
UNIVERSITAS P/S	PUBLIC	051-5221371	0823379446	office@tjokkies.fs.school.za hennie@tjokkies.fs.school.za
WILGEHOF P/S	PUBLIC	051-5225211	0835004797	admin@wilgehof.co.za wilgehof@mjvn.co.za
WILLEM POSTMA P/S	PUBLIC	051-4362730	0731845649	panikadt@wpps.co.za wpps@wpps.co.za

ADDENDUM B

DEPARTMENT OF NUTRITION AND DIETETICS

FACULTY OF HEALTH SCIENCES

UNIVERSITY OF THE FREE STATE

September 2017

Department of Basic Education

Attention: Mr Moloji,

KNOWLEDGE, ATTITUDES AND PRACTICES OF PRIMARY CAREGIVERS OF FOUNDATION PHASE LEARNERS IN BLOEMFONTEIN REGARDING BREAKFAST AND LUNCHBOXES.

Dear Mr. Moloji

I am conducting a research study under the auspices of the Department of Nutrition and Dietetics, Faculty of Health Sciences, University of the Free State. The aim of my study is to determine the knowledge, attitudes and practices of the primary caregivers of grade 1-2 learners regarding the provision of breakfast and lunchboxes.

Micronutrient deficiencies, especially iron and selenium, can lead to decreased cognition, thus school performance. Eating breakfast has shown to improve cognition, psychosocial functioning, food choices, as well as micronutrient intake. Studies have also shown that parents play an integral part in their children's perception of healthy eating. Children are more likely to eat breakfast when their parents eat breakfast with them and emphasise the importance of breakfast and the role it plays in cognition. Children who eat breakfast also seem to eat healthier snacks during the day, which has a positive impact on cognition and bodyweight.

Taking a lunchbox to school increases the variety of food eaten and improves weight management of a child.

Unfortunately, some parents perceive healthy food as generally more expensive. Empowering the parent or caregiver through education of healthy eating is therefore essential for a child's healthy eating behaviour.

I hereby request your permission to perform this study in Bloemfontein schools. The study will make use of printed questionnaires to determine the knowledge, attitudes and practices

regarding breakfast consumption and lunchbox packing practices of the primary caregivers of grade 1 – 3 learners.

The study will also be submitted for ethical approval to the Health Sciences Research Ethics Committee from the Faculty of Health Sciences, University of the Free State, who can be contacted at 051 401 7795 or EthicsFHS@UFS.ac.za. All responses will be treated as confidential and data will not be presented in a way in which individual answers can be linked back to a specific person.

This questionnaire consists of three parts:

Part 1 • consists of questions that will help us to understand what type of food parents or caregivers give to their child for breakfast and reasons why they give, or do not give, breakfast to their child.

Part 2 • will help us understand what and why parents or caregivers pack, or do not pack in a lunchbox for their child to school.

Part 3 • is a section consisting of questions that will help me understand the profile of the respondents in this study.

The study will make use of convenience sampling of volunteering schools and parents or caregivers of foundation phase learners who are prepared to participate in this study. In order for this study to be comparable to other studies, only the forty Quintile 5 public and private schools in the Motheo district, Bloemfontein will be invited to participate in the study. Time, accessibility, and budget constraints limit the study to Quintile 5 schools in the Motheo district (Bloemfontein area) in the Free State province. A report of the study findings will be provided to the participating schools and the Department of Basic Education.

The results of this study may provide important information for making recommendations to improve any shortcomings in nutritional knowledge of primary caregivers of foundation phase learners that might exist.

Your approval to conduct this study will be appreciated.

Yours sincerely,



Thea Hansen
MSc (Dietetics) student

Mr Moloji

ADDENDUM C

Letter of approval to conduct the study from the Free State Department of Basic Education, Bloemfontein (Motheo district)

Enquiries: BM Kilching
Ref: Notification of research: T. Hansen (nee van Nickerk)
Tel. 051 404 9221 / 082 454 1519
Email: berthakilching@gmail.com and B.Kilching@fseducation.gov.za



District Director
Motheo District

Dear Mr Moloi

NOTIFICATION OF A RESEARCH PROJECT IN YOUR DISTRICT BY T HANSEN

1. The abovementioned candidate was granted permission to conduct research in your district as follows:

Research Topic: Knowledge, attitude and practices of primary caregivers of foundation phase learners in Bloemfontein regarding breakfast and lunch boxes.

Schools: 24 primary schools Motheo District: Bloemfontein, Brandwag, Brebner, Oranje Meisioskoo, Dr CF Visser, Dr Viljoen, Eun ce, Fichardpark, Grey College, Jim Fouche, Kruitberg, Lourier Park, Olympia Onse Rust, President Brand, President Steyn, Roseview, Sand du Plessis, Sentraal, St Andrews, St Michaels, Universitas, Wilgehof and Willem Postma.

Target Population: Primary caregivers of Grade 1 – 3 learners.

Period: From the date of signature of this letter until 30 September 2018. Please note the department does not allow any research to be conducted during the fourth term / academic quarter of the year nor during normal school hours.

2. **Research benefits:**
3. Logistical procedures were met, in particular ethical considerations for conducting research in the Free State Department of Education.
4. The Strategic Planning, Policy and Research Directorate will make the necessary arrangements for the researcher to present the findings and recommendations to the relevant officials in your district.

Yours sincerely


DR JEM SEKOLANYANE
CHIEF FINANCIAL OFFICER

DATE: 07/02/2018

RESEARCH APPLICATION NOTIFICATION DISTRICT
Strategic Planning, Research & Policy Directorate
Private Bag 920505, Bloemfontein, 9500 - Old CMA Building, Room 318, 3rd Floor, Charlotte Maxeke Street, Bloemfontein
Tel: (051) 404 9263 / 9221 Fax: (0866) 6678 678

Enquiries: BM Kitching
Ref: Research Permission: T Hansen (nee van Niekerk)
Tel. 051 404 9283 / 9221 / 082 454 1519
Email: berthakitching@gmail.com and B.Kitching@edu.fs.gov.za



T Hansen
74 Constantia Park
Henriette Grover Street
LANGENHOVENPARK, 9330

082 878 9372

Dear Mrs Hansen

APPROVAL TO CONDUCT RESEARCH IN THE FREE STATE DEPARTMENT OF EDUCATION

1. This letter serves as an acknowledgement of receipt of your request to conduct research in the Free State Department of Education.

Research Topic: Knowledge, attitude and practices of primary caregivers of foundation phase learners in Bloemfontein regarding breakfast and lunch boxes.

Schools: 24 primary schools Motheo District: Bloemfontein, Brandwag, Brebner, Oranje Meisieskool, Dr CF Visser, Dr Viljoen, Eunice, Fichardpark, Grey College, Jim Fouche, Kruitberg, Lourier Park, Olympia, Onse Rust, President Brand, President Steyn, Roseview, Sand du Plessis, Sentraal, St Andrews, St Michaels, Universitas, Wilgehof and Willem Postma.

Target Population: Primary caregivers of Grade 1 – 3 learners.

2. **Period of research:** From the date of signature of this letter until 30 September 2018. Please note the department does not allow any research to be conducted during the fourth term (quarter) of the academic year nor during normal school hours.
3. Should you fall behind your schedule by three months to complete your research project in the approved period, you will need to apply for an extension.
4. The approval is subject to the following conditions:
 - 4.1 The collection of data should not interfere with the normal tuition time or teaching process.
 - 4.2 A bound copy of the research document or a CD, should be submitted to the Free State Department of Education, Room 319, 3rd Floor, Old CNA Building, Charlotte Maxeke Street, Bloemfontein.
 - 4.3 You will be expected, on completion of your research study to make a presentation to the relevant stakeholders in the Department.
 - 4.4 The attached ethics documents must be adhered to in the discourse of your study in our department.
5. Please note that costs relating to all the conditions mentioned above are your own responsibility.

Yours sincerely


DR JEM SEKOLANYANE
CHIEF FINANCIAL OFFICER

DATE: 07/02/2018

ADDENDUM D

DEPARTMENT OF NUTRITION AND DIETETICS

FACULTY OF HEALTH SCIENCES

UNIVERSITY OF THE FREE STATE

February 2018

Dear *(Name of school principal)* and Chairperson of the School Governing Body

(Name of school) Primary School

**KNOWLEDGE, ATTITUDES AND PRACTICES OF PRIMARY CAREGIVERS OF FOUNDATION
PHASE LEARNERS IN BLOEMFONTEIN REGARDING BREAKFAST AND LUNCHBOXES.**

Dear *(Name of school principal)*

I am conducting a research study in association with the Department of Nutrition and Dietetics, Faculty of Health Sciences, University of the Free State. The aim of my study is to determine the knowledge, attitudes and practices of the primary caregivers of grade 1-3 learners regarding the provision of breakfast and lunchboxes.

Micronutrient deficiencies, especially iron and selenium, can lead to decreased cognition, thus school performance. Eating breakfast has shown to improve cognition, psychosocial functioning, food choices, as well as micronutrient intake.

Studies have also shown that parents play an integral part in their children's perception of healthy eating. Children are more likely to eat breakfast when their parents eat breakfast with them and emphasise the importance of breakfast and the role it plays in cognition. Children who eat breakfast also seem to eat healthier snacks during the day, which has a positive impact on cognition and bodyweight.

Taking a lunchbox to school increases the variety of food eaten and improves weight management of a child.

Unfortunately, some parents perceive healthy food as generally more expensive. Empowering the parent or caregiver through education of healthy eating is therefore essential for a child's healthy eating behaviour.

I hereby request your permission to perform this study in Bloemfontein schools. The study will make use of printed questionnaires to determine the knowledge, attitudes and practices regarding breakfast consumption and lunchbox packing practices of the primary caregivers of grade 1 – 3 learners. The study will also be submitted for ethical approval to the Health Sciences Research Ethics Committee from the Faculty of Health Sciences, University of the Free State, who can be contacted at 051 401 7795 or MaraisMGE@ufs.ac.za.

All responses will be treated as confidential and data will not be presented in a way in which individual answers can be linked back to a specific person.

This questionnaire consists of three parts:

Part 1 • consists of questions that will help us to understand what type of food parents or caregivers give to their child for breakfast and reasons why they give, or do not give, breakfast to their child.


Part 2 • will help us understand what and why parents or caregivers pack, or do not pack in a lunchbox for their child to school.

Part 3 • is a section consisting of questions that will help me understand the profile of the respondents in this study.

The results of this study may provide important information for making recommendations to improve any gaps in nutritional knowledge of primary caregivers of foundation phase learners that might exist.

Your approval of this project will be highly appreciated.

Kind regards,



Thea Hansen MSc (Dietetics) student

I _____ from _____ primary school, give permission to Mrs T Hansen to conduct her study on the knowledge, attitudes and practices of primary caregivers of foundation phase learners in Bloemfontein regarding breakfast and lunchboxes in my school.

(Name of school principal)

Date: _____

Chairperson: School Governing Body

Date: _____

ADDENDUM E

Ethical approval

Health Sciences Research Ethics Committee, University of the Free State



Health Sciences Research Ethics Committee

07-Mar-2018

Dear Ms Thelma Hansen

Ethics Clearance: Knowledge, attitudes and practices of primary caregivers of foundation phase learners in Bloemfontein regarding breakfast and lunchboxes.

Principal Investigator: Ms Thelma Hansen

Department: Nutrition and Dietetics (Bloemfontein Campus)

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is: **UFS-HSD2017/1093**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act, No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

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Knowledge, attitudes and practices of primary caregivers of foundation phase learners in Bloemfontein regarding breakfast and lunchboxes.

Dear Parent/Caregiver,

Thank you for your willingness to participate in this study.

Please mark the appropriate block with an X or write your answer in the space provided.

Part 1: Questions concerning breakfast

1.1 *How many days in a school week does your child eat breakfast?*

0	0
1	1
2	2
3	3
4	4
5	5

1.2 *If your child eats breakfast, when does your child eat breakfast?*

1	When you wake your child up
2	Within 2 hours after waking up
3	On the way to school
4	At school
5	My child does not eat breakfast

1.3 *Do you mostly eat breakfast together as a family?*

1	Yes
2	No

1.4 *What type of milk and milk products do you mostly use at home? Choose all the correct answers.*

1	Full cream
2	Reduced fat/2%/Low fat
3	Fat free
4	Other (please specify):

1.5 *What type of milk and milk products is the healthiest for your child?*

1	Full cream
2	Reduced fat /Low fat/2%
3	Fat free
4	None, my child has a disease e.g. milk allergy

1.6 *Should you avoid giving your child something to drink with breakfast?*

1	Yes
2	No
3	Uncertain

1.7 *If your child drinks something with breakfast, please specify what he or she drinks.*

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1.8 What type of breakfast foods and drinks do you give your child, on average, during a typical school week? Please indicate how many times a week. Please mark the appropriate answer with an X.

Breakfast	Times per week					
	0	1	2	3	4	5
Example: Chicken (if the child receives chicken 3 times per week)				X		
Dairy:						
Milk and Maas (Including on cereal)	0	1	2	3	4	5
Yoghurt and drinking yoghurt	0	1	2	3	4	5
Coffee/Tea made with milk instead of water	0	1	2	3	4	5
Fruit	0	1	2	3	4	5
Vegetables	0	1	2	3	4	5
Porridge / Cereal						
Oats	0	1	2	3	4	5
Maltabella	0	1	2	3	4	5
Maizemeal	0	1	2	3	4	5
Tastee Wheat	0	1	2	3	4	5
All Bran/ Bran Flakes	0	1	2	3	4	5
Corn Flakes	0	1	2	3	4	5
FutureLife	0	1	2	3	4	5
Milo cereal	0	1	2	3	4	5
Muesli	0	1	2	3	4	5
Pronutro (wheat free)	0	1	2	3	4	5
Pronutro (whole wheat)	0	1	2	3	4	5
Pronutro (Pro-light)	0	1	2	3	4	5
Pronutro (Toddler)	0	1	2	3	4	5
Rice Crispies	0	1	2	3	4	5
WeetBix	0	1	2	3	4	5
Other (please specify):						
Bread or Muffin						
White	0	1	2	3	4	5
Best of Both or low GI white	0	1	2	3	4	5
Brown or whole wheat	0	1	2	3	4	5
Low GI brown or seeded	0	1	2	3	4	5
Bran muffin	0	1	2	3	4	5
Sweet muffin	0	1	2	3	4	5
Savoury muffin	0	1	2	3	4	5
Other (please specify):						
Protein-rich foods						
Eggs	0	1	2	3	4	5
Cheese	0	1	2	3	4	5
Bacon	0	1	2	3	4	5
Polony / viennas / ham roll / ham /salami	0	1	2	3	4	5
Wors / Mince	0	1	2	3	4	5
Baked beans	0	1	2	3	4	5
Other (please specify):						

1.9 Please mark the appropriate block with an X.

	Yes	No	Uncertain
It is important to eat fruit with breakfast.	1	2	3
Skipping breakfast is good for your child's concentration at school.	1	2	3
Eating breakfast will make children gain weight	1	2	3
It is important that breakfast foods contain fibre.	1	2	3
Breakfast is important for growth and development	1	2	3

1.10 Indicate the degree to which you agree or disagree with the following statements. Please mark the appropriate block with an X.

	Completely Agree	Agree	Sometimes Agree	Sometimes Disagree	Disagree	Completely Disagree
It is important to eat breakfast.	1	2	3	4	5	6
You do not give your child breakfast because there is not enough time.	1	2	3	4	5	6
You do not give your child breakfast because it is too expensive.	1	2	3	4	5	6
You do not give breakfast to your child because he/she does not want to eat.	1	2	3	4	5	6
You give your child breakfast because it is important for their health.	1	2	3	4	5	6
You give your child breakfast because it is important for concentration.	1	2	3	4	5	6
You give your child breakfast because you grew up eating breakfast.	1	2	3	4	5	6
You give your child breakfast because your child asks you to have breakfast.	1	2	3	4	5	6

Part 2: Questions concerning school lunchboxes:

2.1 How many days in a school week do you pack a lunchbox for break time?

0	0
1	1
2	2
3	3
4	4
5	5

2.2 For how many children do you pack lunchboxes?

2.3 On the days that you prepare lunchboxes, how long does it take you?

1	0 - 15min
2	16 - 30min
3	31min - 45 min
4	More than 46min

2.4 Choose **one** single criterion that you consider as most important for a school lunchbox.

1	Quick to prepare
2	Affordable
3	Healthy
4	Filling / Satisfying
5	A treat
6	To improve school performance
7	To restrict tuck shop visits
8	To save money
9	It is expected of me
10	Other (please specify):

2.5 Why is it important to pack a school lunchbox? Please mark all the answers that you agree with.

1	That my child will not go hungry.
2	For better concentration.
3	To make sure that my child eats healthy food.
4	To save money.
5	It is not important

2.6 How many days per week do your child get money to buy food at the school/tuck shop?

0	0
1	1
2	2
3	3
4	4
5	5

2.7 What types of beverage do you include in your child's school lunchbox in a typical school week? Please, indicate how many times a week (0-5 days). Please mark the appropriate blocks with an X.

Beverages in Lunchbox	Days of the school week					
	0	1	2	3	4	5
Fruit juice	0	1	2	3	4	5
Tea or coffee (with sugar)	0	1	2	3	4	5
Tea or coffee (without sugar)	0	1	2	3	4	5
Cool drink concentrate	0	1	2	3	4	5
Light fizzy drink (e.g. Coke light / 7 up Free)	0	1	2	3	4	5
Regular fizzy drink (e.g. Cream Soda / Pepsi)	0	1	2	3	4	5
Energy drink (Red bull/Play/Monster etc.)	0	1	2	3	4	5
Dairy (Yogisip / Steri Stumpi / SuperM / Maas / Latté / Yoghurt etc.)	0	1	2	3	4	5
Water	0	1	2	3	4	5
Other (please specify):						

2.8 What do you pack in your child's school lunchbox and indicate how many times a week, on average, (0-5). Please mark the appropriate block with an X.

Lunchbox	Days of the school week					
	0	1	2	3	4	5
Example: Fruit juice (if the child receives juice once per week)		X				
Bread						
White	0	1	2	3	4	5
Best of Both or Low GI white	0	1	2	3	4	5
Brown or whole wheat	0	1	2	3	4	5
Low GI brown or seeded	0	1	2	3	4	5
Wraps / Pita's	0	1	2	3	4	5
Other (please specify):						
Protein-rich foods						
Eggs	0	1	2	3	4	5
Polony / viennas / ham roll / ham /salami	0	1	2	3	4	5
Red meat / Biltong / Droë wors	0	1	2	3	4	5
Chicken	0	1	2	3	4	5
Fish	0	1	2	3	4	5
Pork	0	1	2	3	4	5
Cheese	0	1	2	3	4	5
Baked beans	0	1	2	3	4	5
Other (please specify):						
Biscuits						
Savoury (e.g. Mini Cheddars / Tuck / Bacon Kips)	0	1	2	3	4	5
Provita's	0	1	2	3	4	5
Sweet (e.g. Marie and Lemon Creams)	0	1	2	3	4	5
Other (please specify):						
Muffin						
Savoury / Sweet	0	1	2	3	4	5
Bran	0	1	2	3	4	5
Bars						
Seeded / Granola / Oats	0	1	2	3	4	5
Energy bar	0	1	2	3	4	5
Fruit bar	0	1	2	3	4	5
Other (please specify):						
Fruit	0	1	2	3	4	5
Vegetables	0	1	2	3	4	5
Takeaway / fast foods	0	1	2	3	4	5
Please specify:						
Treats						
Tinkies / Cake / Cupcake	0	1	2	3	4	5
Sugar sweets / Jelly sweets / Chocolate	0	1	2	3	4	5
Dried fruit	0	1	2	3	4	5
Nuts	0	1	2	3	4	5
Chips	0	1	2	3	4	5
Popcorn	0	1	2	3	4	5
Other (please specify):						

2.9 How many helpings of fruit and/or vegetables should your child eat every day? (One helping of fruit is a small fruit and one helping of vegetables is 1 cup chopped raw vegetables or ½ a cup cooked vegetables.)

0	0
1	1
2	2
3	3
4	4
5	5

2.10 Please mark the appropriate block with an X.

	Yes	No	Uncertain
Are you concerned about including certain foods because it can go bad in the lunchbox during the day?	1	2	3
Is it important for your child to eat the food in his/her lunchbox?	1	2	3
Does eating fruits and vegetables daily assist in reducing the risks of developing certain diseases?	1	2	3
Are foods that contain fibre (roughage) important in your child's diet?	1	2	3
Can fats help with the absorption of certain nutrients?	1	2	3
Do chips contain healthy fats?	1	2	3
Do nuts contain healthy fats?	1	2	3
Do avocado pears contain healthy fats?	1	2	3
Do biscuits/cookies contain healthy fats?	1	2	3

2.11 When you eat lots of fat and fatty foods, you can: (Select **all** the appropriate answers)

1	Become fat (overweight)
2	Concentrate better
3	Feel more energetic
4	Get high blood pressure
5	Get a heart attack
6	Get diabetes

2.12 Eating a lot of sugar, sweets and sweet foods: (Select **all** appropriate answers)

1	Is good for health
2	Can make you fat
3	Is bad for your teeth
4	Can cause diabetes

2.13 Select **all** the food group/s that contain **fibre** (roughage):

1	Meat, fish & chicken
2	Dairy
3	Fruits
4	Vegetables
5	Unrefined starchy foods/ carbohydrates
6	Beans & Lentils
7	Fats

2.14 Which food do you regard as the healthiest?

1	Plain popcorn
2	Packet of chips (e.g. Simba / Lay's)

2.15 Indicate the degree to which you agree or disagree with the following statements.

Please mark the appropriate block with an X.

	Completely Agree	Agree	Sometimes Agree	Sometimes Disagree	Disagree	Completely Disagree
It is important to have healthy eating habits.	1	2	3	4	5	6
Healthy food packed into a lunchbox would help reduce the risk of your child developing certain diseases.	1	2	3	4	5	6
A healthy lunchbox does not help my child to concentrate at school	1	2	3	4	5	6
To prepare a healthy lunchbox is an extra workload.	1	2	3	4	5	6
I seldom read the food label before I buy a new food item.	1	2	3	4	5	6
Healthy food is more expensive than less healthy food.	1	2	3	4	5	6
In general, healthy food is tasty.	1	2	3	4	5	6

Part 3: General questions: *What is your relationship to this child?*

1	Mother
2	Father
3	Grandparent
4	Foster parent
5	Other, please specify:

3.2 *What is your birthdate?*

D	D	M	M	Y	Y	Y	Y
---	---	---	---	---	---	---	---

3.3 *How old are you?*

		Years
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3.4 *What is the child's birthdate?*

D	D	M	M	Y	Y	Y	Y
---	---	---	---	---	---	---	---

3.5 *What is the child's age?*

		Years
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3.6 *What is your gender?*

1	Female	2	Male
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3.7 *What is your child's gender?*

1	Female	2	Male
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3.8 What is your highest qualification?

1	Grade 8 or less
2	Grade 9
3	Grade 10
4	Grade 11
5	Grade 12
6	Diploma
7	Bachelor's degree
8	Honours degree
9	Master's degree
10	Doctoral degree

3.9 What is your occupation? Please specify:

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3.10 Are you currently employed?

1	Employed full-time (more than 35 hours per week)
2	Employed part-time (less than 35 hours per week)
3	Self-employed
4	Unemployed by choice
5	Unemployed

3.11 What is your total household monthly income, after taxes?

1	Equal or less than R5 000	4	R20 001 – R40 000
2	R5 001 – R10 000	5	more than R40 001
3	R10 001 – R20 000		

3.12 What is your home language?

1	Afrikaans
2	Sesotho
3	English
4	isiZulu
5	isiXhosa
6	Setswana
7	Tshivenda
8	Xitsonga
9	isiNdebele
10	Sepedi
11	siSwati
12	Other, please specify:

3.13 What is your marital status?

1	Single
2	Married (legally or traditionally)
3	Divorced/Separated
4	Widowed
5	Living together

END of questionnaire

Thank you very much for your participation!

ADDENDUM G

Information letter

Knowledge, attitudes and practices of primary caregivers of foundation phase learners in Bloemfontein regarding breakfast and lunchboxes.

Ethics reference number: UFS-HSD2017/1093

Dear Parent / Caregiver

PARTICIPATION IN RESEARCH PROJECT ON BREAKFAST AND LUNCHBOXES

I am conducting a research study under the Department of Nutrition and Dietetics, Faculty of Health Sciences, University of the Free State on the knowledge, attitudes and practices of breakfast and lunchboxes of grade 1 – 3 learners. Could you please assist me by completing an anonymous questionnaire?

Completing the questionnaire should not take more than **10 - 15 minutes** and will assist us to develop a pamphlet on healthy breakfast and lunchbox choices for the school.

Participation is voluntary and you have to be willing to complete the questionnaire in English. All responses will be treated as confidential, and in no way will the data be presented in a way in which individual answers can be linked back to a specific person. There is no risk involved in the study for you or your child and no one would receive any remuneration when completing the questionnaire.

Your child will not be penalized if you decide not to take part in this study and uncompleted questionnaires can be returned to the teacher. The study has ethical approval from the Health Sciences Research Ethics Committee from the Faculty of Health Sciences, University of the Free State, who can be contacted at 051 401 7795 or EthicsFHS@ufs.ac.za.

By completing the questionnaire, you give consent to take part in this study. ***If you have more than one child in grade 1, 2 and/or 3, please only complete the questionnaire for your oldest child.*** Your other child/children can take their blank questionnaires back to their teacher.

Please return the completed questionnaire **within two days** after receipt thereof.

Thank you in advance for taking the time to participate in this survey.

Kind regards,



Thea Hansen MSc (Dietetics) student