KNOWLEDGE, PRACTICES AND ATTITUDES OF PRIMARY SCHOOL CHILDREN TOWARDS HEALTHY DIET IN DIKGALE VILLAGE, LIMPOPO PROVINCE, SOUTH AFRICA

By

SHAPULE EDITH LADYGAY MODJADJI

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SUPERVISOR: Prof. MJ THEMANE

CO-SUPERVISOR: Prof. M VALCKE

DEDICATION

This thesis is dedicated to my late loving mother, Victoria Mamokgatla Malatji, who passed away on the 15th of August 2002. May her soul rest in peace.

DECLARATION

I, Shapule Edith Ladygay Modjadji, declares that EXPLORING KNOWLEDGE, PRACTICES AND ATTITUDES OF PRIMARY SCHOOL CHILDREN TOWARDS HEALTHY DIET IN DIKGALE VILLAGE, LIMPOPO PROVINCE, SOUTH AFRICA is my own work and that all the sources that I used and quoted in this research have been acknowledged by means of complete references. This work is submitted in fulfilment of the requirements for the degree thesis in Education in the Department of Education Studies at the University of Limpopo, South Africa. It has not been submitted for any degree or examination at this or any other university.

Signed at Mankweng, Polokwane

On 31 March 2019

Modjadji SEL (Mrs)

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Signature Date

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ABSTRACT

The aim of this study was to investigate knowledge, attitudes and practices of primary school children towards healthy diet in Dikgale Village, Limpopo Province, South Africa. This study was an intervention study at eight primary schools in Dikgale Village. The study used both qualitative and quantitative research where mixed methods research design. A total of 324 participants consisting of Grades 6 and 7 males and females was purposively selected. These participants were divided into experiment and control group after pre-test but before the intervention. This study used a 27-item questionnaire which covered, knowledge on healthy diet, attitudes, practices, subjective norm and self-efficacy questions as well as focus group interviews. The main findings of the study comprise the following: (i) Learners in the experiment condition did not reflect more health-related practices ($F(1.315)=0.20$; $p>887$), i.e., when considering co-variables and changes in health attitude, subjective norm and self-efficacy; and (ii) After intervention, there was a significant increase ($F(1.315)=115.72$; $p<0.001$) in health-related knowledge on the experiment group, i.e., when considering co-variables and changes in health attitude, subjective norm and self-efficacy. In addition to this significant increase, 58.3% of the differences between both groups seemed related to the intervention with regard to changes in knowledge acquisition. However, there was no significant increase on both health knowledge and health practices on the control group. The results suggested that, even if there can be changes in knowledge due to intervention, healthy practices may be difficult to change mainly because knowledge alone cannot decrease the prevalence of health-related conditions. As a result, this study suggest that the curriculum should cover Food knowledge practice so as to persuade learners to practice healthy diet. Also, School Management Teams (SMTs) and School Governing Bodies (SGBs) should play their role in emphasizing the importance of Food-Based Dietary Guidelines in schools. Future interventions are therefore encouraged to include a moderate intensity intervention by trained professionals and feasibility of involving educators, SGBs and SMTs, particularly in policy adherence. Therefore, this study proposed a healthy food intervention strategy incorporating the Theory of Planned Behaviour in order to justify the knowledge, attitude and practices of children in healthy diet. Intervention should adopt the Training Partnership Model wherein children, parents, educators are trained by health professional on adherence to healthy diet.

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LIST OF ABBREVIATIONS AND ACRONYMS

BMI	Body Mass Index
CAPS	Curriculum and Assessment Policy Statement
CSTL	Care and Support for Teaching and Learning
DBE	Department of Basic Education
DoH	Department of Health
UNICEF	United Nations Children's Fund
FAO	Food and Agricultural Organisation
FBDG	Food-Based Dietary Guidelines
HBM	Health Believe Model
IFAVA	International Fruits and Vegetable Alliance
NASA	Nutrition Security of South Africa
NES	Nutrition Education Strategy
NEIP	Nutrition Education Intervention Programme
NSNP	National School Nutrition Programme
NCD	Non-communicable Diseases
SAFBDG	South African Food-Based Dietary Guidelines
SES	Socio-Economic Status
SMT	Science, Mathematics and Technology
SMTs	School Management Teams
SPSS	Statistical Package of Social Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WHO	World Health Organisation

CHAPTER 1
BACKGROUND AND MOTIVATION

1.1. Introduction

Dietary changes have stemmed in a risk transition where there is a rapid rise in non-communicable diseases (NCDs) such as diabetes, cardiovascular disease and obesity (World Health Organisation (WHO), 2015). These NCDs are closely related to the lifestyle practices and common behavioural risk factors such as unhealthy diet and lack of regular exercise. Healthy foods are viewed as important prerequisites for a healthy life. The reason being, these foods create the necessary balance between the intake and outflow of calories (Daniels & Popkin, 2010). In addition to maintaining an appropriate energy balance, adopting a healthy diet in children and youth prevents the occurrence of NCDs. The intake of fruit and vegetables is linked to a reduced risk of NCDs (Elias, 2019).

Eating healthy is usually not an urgency during childhood and poor-eating pattern may thus add a risk for current and future health problems (Oldewage- Theron & Egal, 2010). The underlying risk factors of NCDs are largely preventable and can be prevented from a tender age. As many diseases begin in youth (Mullin & Marian, 2017) and obesity tracks from childhood through to adulthood, it is important for children to develop knowledge on healthy diet and adopt healthful behaviours at a young age. Acquiring nutrition knowledge is important, which makes it significant to promote healthier eating habits through interventions from childhood (Thakur & Gautam, 2015). Nutrition education has been established as an effective way in which to fight malnutrition and food-related diseases (David, Kimiywe, Waudo & Orodho, 2008).

Studies have shown that overweight and obesity problems are significantly linked to unhealthy dietary patterns and lack of knowledge on healthy lifestyle (Egner, Oza-Frank & Cunningham, 2014; and Sandercock, Voss & Dye, 2010). There is evidence that suggests that young children from developing countries are making unhealthy food choices mainly due to lack of knowledge and incorrect perception towards healthy foods (Kyallo, Makokha, Mwangi, 2012; and Zaborskis, Lagunaite, Busha & Lubiene,

2012). The percentage of obese children among primary school learners has increased from 9.7% in 2001 to 18.7% in 2013 (Karimi-Shahanjarini, Rashidian, Omidvar, Majdzadeh (2013).Knowledge on nutrition and positive attitude are regarded as influences to dietary practices. Learners who lack knowledge on healthy diet may have the tendency to continue their food attitudes and eating habits throughout adulthood. Thus, it may be important for schools to implement measures aimed at inculcating healthy eating habits as early as the primary school level to develop an ongoing healthy lifestyle. A number of intervention studies have attempted to promote healthy body size through improving the eating habits of children, often with limited levels of success. Recent systematic reviews suggest that multi-component studies that address both sides of the energy equation within interventions are the most effective (Uys, Draper, Hendricks et al, 2016).

Children's food intake and eating behaviours have been cited as key factors in the obesity epidemic, with food accounting for the energy in component of the energy balance (Boddy, Knowles, Davis, Warburton, Markintosh, Houghton & Fairclogh, 2012). In particular, energy-dense food which are readily available, and energy containing beverages have been associated with extreme adiposity in children and young people, (Steyn, Lambert, Parker, Mchiza & de Villiers, 2015). These suggest that non-communicable diseases are likely to increase if this behaviour continues to happen.

Although the highest rates of obesity are generally observed in industrialized nations such as the United States (Prelip, Slusser, Thai, Kinsler & Erausquin, 2012), developing nations like South Africa are experiencing a sharp increase in obesity rates as their economies grow and thrive. It is estimated that the number of people with non-communicable diseases like diabetes and obesity may increase to over 300 million from developing countries because of unhealthy diet (Egner et al., 2014). Unhealthy eating practices has resulted in South African children recording a very disappointing low rating which is considered as the average risk for imminent disease (Steyn et al, 2015). The reason being, most South African children's diet mostly consist of high sugary and fatty food. This is regardless of the South African Food-Based Dietary Guidelines (SAFBDG) that recommends that school curriculum should implement cost-effective intervention in preventing the development of non-

communicable diseases and the consequences of malnutrition (WHO, 2013). According to Voster (2013), Food-Based Dietary Guidelines are science-based policy recommendations in the form of guidelines for healthy eating. Essentially, they are a translation of evidence-based nutrient recommendations into dietary patterns that should guide the population towards consuming a healthy diet.

Currently, there is trend in South Africa whereby children and adults have a rising prevalence of obesity and many diseases associated with NCDs (Shisana, Labadarios & Rehle, 2013) and most children and adults have limited knowledge about healthy lifestyle. For example, in a study conducted in the Western Cape, it was discovered that primary school educators have poor nutritional knowledge and challenges in changing health behaviours. Furthermore, only 15% knew that one should eat five or more fruit and/or vegetables per day (Dalais, Abrahams, Steyn, de Villiers et al., 2014). This suggests that it is important to introduce preventative measures as early as possible in children so that they do not grow up with certain habits. For this reason, schools can be important vehicles for teaching children about a healthy diet and good healthy practices mainly because children spend a large amount of time at school. This makes them readily accessible to health-promotion intervention strategies. Learning about proper diet as part of life skills and scientific literacy may equip children with knowledge and they could be able to understand the risks associated with bad health and lack of physical activity. As suggested by World Health Organisation (WHO 2013), schools are environments healthy diet can be reinforced and can only be reinforced if curriculum includes issues on healthy lifestyle.

As governed by WHO and UNICEF on health issues, South African curriculum in both Natural Sciences and Life Skills in the intermediate phase (Grades 4-6), has included health issues such as diseases and conditions affected by lack of healthy diet and nutrition related topics. Nutrition-related topics include the dietary habits of children, healthy eating, nutrients in food, food processing and food hygiene. The curriculum has the goal of promoting learners' knowledge and understanding of nutrition for improving their health and that of the community. Learners are introduced to concepts on healthy habits when they enter Grade 4 and this proceeds until learners are in Grade 7. As argued by Hill et al., (2015) promoting healthy habits in young children is therefore of key importance and this may also be done through interventions. It has

been reported that interventions have significant improvements in nutrition knowledge and behaviour (Boo, Cho & Park, 2015; and Nyberg, Sundblom, Norman, Bohman, Hagberg & Elinder, 2015). Also, if children can learn about healthy diet at a tender age, this has a potential to be sustainable over the child's lifespan and hence contribute to reduced risk of developing chronic diseases.

School curriculum can assist in teaching learners about healthy diet from an early age and as a result, such intervention may assist in behavioural changes even in rural areas like Dikgale. Steyn et al., (2015) have suggested that a nutrition-based curriculum, which equips teachers with nutrition knowledge, improves behavioural outcomes of learners. As a result, this study seeks to understand the knowledge, practices and attitudes of primary school children towards healthy diet in Dikgale village. Dikgale is a rural village in the outskirts of the Capricorn District in Limpopo Province, South Africa. It is important to undertake the study in this population so that the researcher can be able to observe whether the intervention has brought behavioural change to primary school children in this village.

1.2. Research Problem

Quality of children and adolescents' diet has become a major concern for researchers. In recent decades, there have been considerable efforts following changes in diet and types of consumed foods leading substitution of fast foods with salutary traditional meals (Talip, Serudin, Noor & Tuah, 2017). However, the majorities of children do not meet recommended standards of dietary guidelines and are devoid of healthy dietary habits (de Villiers et al., 2014). In addition, dietary quality would be exacerbated when children grow up by not only lower consumption of fruits, vegetables, and milk, but also higher consumption of soft drinks.

The promotion of a healthy lifestyle and healthy eating from childhood is an issue of social, health and economic significance. Unhealthy diet has become increasing concerns in the South Africa and the world at large. It has been reported that *"*Approximately one in five children in South Africa is overweight, they do not eat healthy and they eat fried food, chips and cold drinks*"* (Barnard, Butshingi, Clacherty, Clitheroe, Dada & Doubell, 2013, p.25). This exacerbates obesity and other related diseases among children. This kind of lifestyle, coupled with lack of exercise, has

long-term health implications and can also have adverse effects as they become adults. Obesity has increased rapidly and its occurrence has become a global issue today (Kesten, Cameron & Griffiths, 2013; and World Health Organization, 2013). With the vast advancements of the modern world, food is developed in ways that are cheaper for consumers but cause the food to contain high amounts of saturated fat and cholesterol, which affect both males and females (Holliday, Batey, Eves & Blannin, 2014).

Taking into considerations dietary policies in place, no research has been conducted to assess the feasibility of implementing the SAFBDG within school settings (Nguyen et al., 2013). Accordingly, Armstrong (2006) found that 22% of girls and 17% of boys aged 6-13 years were overweight or obese; and 18% of children aged 1-9 years were stunted and 10% were underweight. One of the studies on urban 18-year olds and older conducted in Limpopo Province, discovered that there was a gap on nutrition knowledge among both Blacks and Whites (Audain, Carr, Dikmen et al., 2017). However, there is little documented research that has explored the knowledge, practices and attitudes towards healthy diet within rural schools in Limpopo Province.

The relationship among attitudes, subjective norm, self-efficacy to TPB model, and the intended health practices and knowledge is not known in South Africa. This suggests a need for intervention in rural schools in Limpopo Province. The need for such an intervention was confirmed in a recent national study that found that a large proportion of South African primary school children's basic nutrition knowledge was regarded as being poor (Shisana et al., 2013). So far, we do not know what children's knowledge, attitudes and practices are regarding healthy diet in this target population (Dikgale). The gap widens even broader when it comes to primary school children between the ages of 10-14 years. For this reason, this study seeks to explore and describe the knowledge, practices and attitudes of primary school children towards healthy diet in Limpopo Province and examine if the intervention on health diet knowledge and health practices has a positive impact on primary school learners around Dikgale Village.

1.3. Literature Review

In response to the growing burden of non-communicable diseases and in order to reduce the impact of major risk factors such as unhealthy diet, the World Health

Assembly adopted the "Global Strategy on Diet, Physical Activity and Health" (DPAS) in 2013. The DPAS has called upon member states, including South Africa, to develop and implement school policies and programmes that promote healthy diet and increase levels of physical activity (de Villiers, Draper, Basset & Lambert, 2014). As a result, South Africa, through the Department of Health (DoH) and the Department of Basic Education (DBE), has designed a national policy on healthy eating that is supposed to be implemented in all schools. However, even if policies on health-related issues are in place, there is a growing burden of non-communicable diseases among South African children as a result of low socio-economic status (SES) (Hill et al., 2015). Low SES has been correlated with poor health (Pretorius & Sliwa, 2011) which consequently leads to a higher rate of diabetes, cardiovascular diseases and other obesity-related illnesses.

Childhood obesity is a major public health issue globally affecting both developed and developing countries such as South Africa. The World Health Organization (WHO) has estimated that more than 340 million children and adolescents between the ages of 5-19 years are classified as overweight or obese worldwide (WHO, 2018). In the United States of America (USA), the Centre for Disease Control and Prevention (CDC) has stated that the prevalence of obesity, which is currently at 18.5%, has increased since the 1970s (CDC, 2018). Data in the United Kingdom (UK) have shown that 20% is the current rate of childhood obesity (Team & Niblett, 2015). This growth in childhood obesity has in turn led to an increase in severe health consequences for children and adults. Furthermore, poor diet is deemed as the leading cause of 15% of deaths in the USA (Jeffries, Noar & Thayer, 2015) due to lack of knowledge and poor-eating habits. In a study about nutrition knowledge, attitude and practices in Kenya, it was discovered that about 32.7% of primary school children had low knowledge about nutrition.

Children's eating behaviour, as well as their attitudes towards such behaviour, may be influenced by various factors. Possible influential factors that play a role in attitude formation and behaviour, may include nutrition knowledge; physiological needs; body image; personal experience; gender; age; peer pressure; social norms; parental behaviour; the media; fast foods; cultural factors; food availability and accessibility;

and the type of school nutritional education (Pirouznia, 2001; Reinehr et al., 2003; and Reinaerts et al., 2007).

South African studies have shown the coexistence of under-nutrition and over-nutrition which give rise to obesity and under-weight among schoolchildren. A South African national survey conducted by Feeley, Musenge, Pettifor and Norris (2012) showed that 20.7% of 1- to 9-year-old children were stunted, 8.1% were underweight, 14.8% were wasted, and 14% were either overweight or obese. Some studies also suggest that 22% of girls and 17% of boys aged 6-13 years were obese, 18% of children aged 1-9 years were stunted and 10% were underweight (Armstrong et al., 2006; Labadarios, 2007; and Reddy et al., 2010). It has also been reported that obesity and overweight problems are meaningfully related or linked to unhealthy dietary patterns, physical inactivity and misperception of body image (Egner, Oza-Frank & Cunningham, 2014; and Sandercock, Voss & Dye, 2010). Lack of physical activity and unhealthy diet are viewed as contributing factors to such, and schools can play a major role in educating children about the benefits of healthy diet and regular physical activities.

Children spend most of their time at school and there is a strong link between their health status and capacity to learn (Littlecott, 2016). A larger proportion of the population is represented by school-going children, which is also available over prolonged periods of time in a setting where education and learning are the norm. It is therefore imperative for schools to implement methods aiming to instil healthy eating habits as early as primary level in order to improve a lifelong healthy lifestyle. It has been reported that malnutrition during the school-aged years impacts negatively on the health, development and educational achievement of children, highlighting the importance of nutrition interventions targeting school-aged children in developing countries or countries in transition (Felegush, Henry, Hailu & Regassa, 2018). Furthermore, it has been reported that the development of a healthy lifestyle is significant since healthy body improves academic achievement (Oza-Frank & Cunningham, 2014). This was also supported by van Niekerk (2014) who indicated that the education and learning performance of school children may be enhanced when their general health is improved through health education.

Promoting health has long been an important role of schools because schools are positioned to shape children's eating habits (Gourdet, Chriqui, Piekarz, Dang & Chaloupka, 2014). Thus, the possibility of correcting eating habits is possible through changing the eating habits from low-nutrient, high-energy diets to nutritious food and food with sufficient energy. This can be done through education and by creating an awareness campaign and intervention programmes (GreenMills, Davison, Gordon, Li, & Jurkowski, 2013). It can, therefore, be suggested that schools are the ideal environment for the delivery of interventions for childhood obesity because schools are already established as settings for health-promotion activities. There is also some evidence that family involvement of health-promotion programmes can positively influence the wider community. The school is therefore the best environment for the delivery of interventions for obesity in children because schools are already established as settings for health-promotion activities.

The DBE has launched an integrated health framework called the Integrated School Health Policy (ISHP) (Departments of Health and Basic of Basic Education (DoH & DBE, 2012). The policy includes the Food-Based Dietary Guidelines (FBDG) as basic content for the nutrition education component of a school health programme. The Grade 5 syllabus has included FBDG and this shows how serious the DBE is on promoting good health for school going children. Health education and nutrition ought to be accessible to learners through the national curriculum Life Skills, NS/TECH subject, accompanied by co-curricular activities and interventions (DoH & DBE, 2012).

1.4. Theoretical Framework

This study explores primary school children's knowledge, attitude and practices on healthy diet. In order to accomplish this, the Theory of Planned Behaviour (TPB) is utilised as the basis of theoretical framework to guide the study. TPB was proposed by Icek Ajzen (2012) to advance the predictive power of the Theory of Reasoned Action (TRA) by including perceived behavioural control in the model. The TPB is basically concerned with the prediction of behavioural intentions on actual behaviours. Ajzen (2013) maintained that the level of beliefs motivate people to participate in certain activities.

Within the TPB model, behavioural, normative and control beliefs as well as attitudes, subjective norms and perceptions of behavioural control are proposed to clarify behavioural intentions (Ajzen, 2011). Behavioural, normative and control beliefs create the cognitive underpinnings for attitudes, subjective norms and perceived control respectively (Ajzen, 2012). Specifically, beliefs in a behaviour's likely consequences (behavioural beliefs) are postulated to determine attitudes toward the behaviour; beliefs in the expectations and behaviours of others (normative beliefs) are assumed to determine subjective norms; and beliefs in potential environmental influential factors (control beliefs) are postulated to determine perceived behavioural control (Ajzen & Sheikh, 2013).

Three independent determinants of intention are attitude toward the behaviour, subjective norm, and perceived behaviour control. Attitude toward the behaviour refers to the degree to which an individual has a favourable or unfavourable evaluation of the interested behaviour; subjective norm is conceptualized as the perceived social pressure to perform the behaviour; perceived behaviour control refers to an individual's perception of the ease or difficulty of performing the behaviour of interest (Ajzen, 1991). So perceived behaviour control focuses on the extent to which people believe that they are capable of performing a given behaviour (Ajzen, 2012). The relationship between intention and behaviour symbolises the fact that people tend to participate in behaviours they intend to perform; however, the implementation of a behavioural intention into action is to some degree affected by some environmental barriers. Accordingly, Perceived Behavioural Control added to Theory of Reasoned Behaviour should facilitate the implementation of behavioural intentions into action, so it can predict behaviour directly (Feldmann & Hamm, 2015).).

The TPB was designed to show that the TRA model can be extended by taking the degree of volitional control over the behaviour into account (Ajzen, 2015). Ajzen (1985) argued that success in performance of social behaviour depends on the degree of a person's control of internal and external factors that may interfere with the execution of the intended behaviours. Individuals who intend to perform the behaviour and who have a high degree of control over it are more likely to perform the behaviour (Ajzen, 2012). The concepts in TPB were defined in a way that allows for prediction and understanding of particular behaviours in specific contexts (Ajzen, 2013). The

TPB is a general model and is applicable to any behaviour (Ajzen, 2012) with realistic values (Ajzen & Sheikh, 2013). The importance of attitudes, subjective norms, and perceptions of behavioural control for the prediction of intentions varies from behaviour to behaviour and from population to population (Ajzen, 2012). The TPB has been applied to a substantial number of empirical research designed to understand, predict, and explain human behaviours. Meta-analyses of TPB research that cover a wide range of different behaviours identified the adequacy of the model.

It has been demonstrated that the mean multiple correlations of attitudes, subjective norms and perceived behaviour control with intentions ranged from 0.59 to 0.66 (Armitage & Conner, 2001). Regarding health-related behaviour, Albarracin, Johnson, Fishbein and Muellerleile (2001) found that intention-behaviour relations were stronger for studies measuring current behaviour than those measuring prospective behaviour. Overall, the TPB has been shown to be an adequate predictor of behaviour, especially in a health context (Ajzen, 2011). In light of the empirical support of TPB, this study utilizes the TPB model to examine healthy diet behaviour among primary school children. TPB was seen as an appropriate theoretical lens in helping predict and explain primary school children's knowledge, attitudes and practices related on healthy diet (Kassem, Lee, Modeste, & Johnston, 2003; Maddock et al., 2008; and Peng, 2009).

TPB accounts for multiple components that influence behaviour in specific contexts. TPB has been used to explain many health behaviours including eating behaviours. This theory suggests that attitude toward behaviour, subjective norms, and perceived behavioural control, together shape an individual's behavioural intentions and behaviours (Ajzen, 2015). This theory is used to "predict and understand motivational influences on behaviour that is not under the individual's volitional control", "to identify how and where to target strategies for changing behaviour" and "explain virtually any human behaviour" such as why people adhere to healthy diet (Levine & Pauls, 1996).

1.5. Purpose and Objectives of the Study

This study was an intervention study which lasted for three months in Dikgale primary schools. The purpose of this study is to explore knowledge, practices and attitudes of

primary school children on healthy diet at Dikgale village in Limpopo Province. The following are the objectives of the study:

- To understand the relationship among attitudes, subjective norm, self-efficacy to TPB model, and the intended health practices and knowledge prior to the intervention;
- To understand the relationship among attitudes, subjective norm, self-efficacy to Theory of Planned Behaviour (TPB) model, and the intended health practices and knowledge after the intervention;
- To determine whether there is are differences in experimental and control condition in health practices and knowledge due to intervention;
- To determine whether there is change in health practices and knowledge due to intervention on healthy food considering co-variables and changes in health attitude, subjective norm and self-efficacy; and
- To propose a model for teaching health knowledge and practices for primary school children.

1.6. Research Methodology

This study adopts mixed methods by implementing both quantitative and qualitative approaches. Mixed methods research is a methodology for conducting research that involves collecting, analysing, and integrating quantitative and qualitative research in a study (Bulsara, 2014). The reason for using mixed research is that, together, qualitative and quantitative data would provide a better understanding of a research problem. However, it should be noted that the goal of mixed methods research is not to substitute either quantitative or qualitative approach but rather to draw from strengths and reduce weakness of both in single study (Johnson, Onwuegbuzie, 2007).

Combining quantitative and qualitative approaches produces a better-off and more widespread understanding of a study's accomplishments (Creswell, 2013). These two methods complemented each other for triangulation. In terms of triangulation, the researcher seeks different types of sources that can provide insight about the same events or relationship (De Vos, Strydom, Fouche & Delport, 2015). The researcher

chose to use combination of qualitative and quantitative data in order to ensure that the limitations of one type of data are balanced by the strengths of another.

1.6.1. Research Design

This study was conducted through mixed methods design which is descriptive where quantitative data were be collected first. Thereafter, qualitative data were collected to help explain or elaborate on the quantitative results (Creswell, 2017). This design was mainly employed through descriptive survey. The reason for descriptive survey is because it would provide an accurate portrayal or account of the characteristics, for example behaviour, opinions, attitudes, beliefs, and knowledge of an individual, situation or group (Du Toit & Mouton, 2013). Moreover, descriptive survey would assist the researcher in obtaining information from various cases in the sample population, and allowed to focus on the exact characteristics under consideration (Creswell, 2013).

1.6.2. Sampling

The population under study are all Grades 6 and 7 learners in Dikgale Village. The reason for this population is that learners in these Grades have already been taught about healthy diet, diseases and conditions related to diet from subjects like Natural Sciences and Life Skills in the previous years of Grades 4 and 5. The researcher uses stratified random sampling to divide the population in a category of males and a category of females. Stratified random sampling is a sampling technique wherein the researcher divides the entire population into different subgroups or strata, then randomly selects the final subjects proportionally from the different strata (Creswell, 2017). The reason for proportionate random sampling is that it improves the representation of particular group within the population, as well as ensuring that the groups are not over-represented. Together, they helped the researcher to compare strata, as well as make more valid inferences from the sample to the population.

1.6.3. Data Collection

This study was nested under a bigger project of multiple literacies encompassing literacy and health. The role of the researcher was to deal with health aspects, particularly healthy diet. Two methods for collecting data are used in this study, that is, closed questionnaire and focus group interviews. The methods are used to

triangulate the data collected and to increase trustworthiness, credibility and reliability. The first phase of collecting data was be self-administered questionnaires. This questionnaire was developed with reference to SAFBDG. A questionnaire (Appendix G) with close-ended questions was personally distributed to the learners. The researcher ensured that everyone in the sample answered the same questions, which makes this a very reliable method of research. However, it has some drawbacks, one of which is the depth of answers that the participants can provide tend to be more-limited. But nonetheless, this questionnaire assisted in eliciting some ideas from participants so that focus group interview schedule can be properly prepared.

The second phase of collecting data is focus group interviews using Food Dietary Guidelines (Appendix H). The second phase of data collection assisted the researcher to discover important qualitative results with a small number of participants (Creswell, 2013), which may not be possible to gain from the questionnaire. Focus-group interviews are well-planned discussions designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment (Newcomer, Hatry & Wholey, 2015). Through focus group interviews, the researcher gained multiple perspectives in an interactive group setting of both Grades 6 and 7 learners. The researcher chose focus-group interviews because discussions with participants would be comfortable and enjoyable for participants as they would be sharing ideas. Focus groups consist of eight learners per school in both Grade 6 and 7 learners. Each Grade was represented by two boys and two girls as clarified in sampling procedure, that is, stratified random sampling. All interviews were audio-recorded and notes were also be taken. The focus group interviews were conducted to understand learners' ways of making meaning together with peers in a primary school setting (Søndergaard, 2005).

1.6.4. Data Analysis

Questionnaires were analysed by making use of descriptive statistics using SPSS software. According to Creswell (2013), descriptive statistics is a mathematical technique for organising, summarising and displaying a set of numerical data. This was done through measures of frequency and measures of central tendency. Data are organised and presented in tables and graphs. Data from questionnaire are then corroborated with data from focus group interviews.

All audio recordings from focus-group interviews were transcribed verbatim. This qualitative data are analysed using thematic content analysis. Transcripts were reviewed and codes allocated with an open coding system (Babbie & Mouton, 2001). Data from focus group interviews are coded and later are organised according to categories and themes that emerge. These themes are then be tabulated and inferences made to address the research questions. The analysis in data collected during focus group interviews established how participants make meaning of their specific situation by analysing their attitudes, knowledge and practices on healthy diet.

1.6.5. Quality Criteria

Validity

The researcher complied with the validity in that the measurement instrument, namely, questionnaires, represent the context area that is measured. The questions used reflect the various parts on healthy diet, namely, knowledge, attitudes, dietary practices, subjective norms and self-efficacy. The questionnaire was validated by nutritionists for content validity. Content validity is the degree to which an instrument covers the scope and range of information that is sought to cover (Creswell, 2013). It is important for an instrument to test content validity in order for the results to be accurately applied and interpreted (Thompson, 2005). In this case, the experts on nutrition rated each item's relevance. Items were rated as strongly relevant by experts in nutrition, were included in the final test.

Reliability

The reliability of a measuring instrument is the extent to which it yields consistent results when the characteristics being measured have not changed and also take different forms in different situations (Leedy & Ormrod, 2005). Reliability was determined by ensuring that when the same set of questions were to be re-applied to these primary school children after an interval of time they may yield same results for the two trials. This will ensure that they are correlated and the co-efficient of correlation denotes the reliability of the test.

Credibility

Durrheim and Wassenaar (2002) refer credibility as the assurance that researcher's conclusions stem from the data. In order to ensure credibility of the research, the

questionnaire was assessed by both her supervisors and the nutritionist. This was done in order to ensure that the instrument is adequate for measuring what it is supposed to measure, thereby ensuring content validity (Thomas, 2013). This might have resulted in the supervisors and nutritionist providing comments and inputs before finalization of the instrument and the researcher increased validity by minimizing the amount of bias as much as possible.

Dependability

Dependability refers to the degree to which the reader can be convinced that the findings actually occurred as the researcher says they did (Durrheim & Wassenaar, 2002). The researcher aims to achieve this by using member checking. Identified themes are discussed with the participants (after interviews were completed) to ensure that they are accurate and dependable (Creswell, 2013). In addition, the researcher triangulated all data collected during the research process, including the results of the questionnaire and interviews, in order to search for common themes to provide reliable findings.

1.7. Significance of the Study

The findings of this study are important because they may assist policy makers in the DBE and Department of Health to address issues of healthy diet in schools. For example, they might have come up with interventions and programmes that would be adhered to by schools and home environments. In addition, the study may assist academics in the field of health promotion to develop programmes that may assist schools, communities and other stakeholders in promoting good health.

These stakeholders may be able to know how to contribute towards ensuring that learners adhere to a healthy diet and that they engage in regular physical activity, both at school and at home. Furthermore, the study may also influence the incorporation of health policies and educational policies on issues of nutrition in schools and the communities at large. Since the Theory of Planned Behaviour is used to direct the study, it is anticipated that a model may be developed, considering the outcomes of knowledge, attitudes and practices on healthy diet in a school setting. Given that healthy diet is extremely important in curbing NCDs, this study will contribute additional knowledge to the field of health education as a valuable research for identifying the

relationship among attitudes, subjective norm, self-efficacy to TPB model, and the intended health practices and knowledge.

This explanatory study will serve as foundation for further mixed methods studies regarding implementation of interventions on healthy diet in rural schools. Experiences from this study may therefore serve as a useful example for similar studies regarding possible drawbacks.

1.8. Ethical Considerations

This study was submitted for ethical approval to the School of Education Research Committee and was subsequently approved by the University Ethics Committee where a project number TREC/115/2019 PG was issued. After approval, necessary permission was sought from and subsequently granted by the Department of Basic Education in Limpopo and the participating schools (Appendixes A & B). Participation in this study was purely voluntary and learners were made aware that they may withdraw from the study if they do not feel comfortable.

It is important to acknowledge that participants in this study were all minors. As a result, permission of the children's parents or guardians was obtained through consent (assent) forms prior to the participation of that children in this research. Such Consent forms were translated into their mother tongue, in cases where the parents were not conversant with English. Thus the participants' consent was obtained before the study proceeded. Only children who returned the consent forms participated in the study. The researcher explained the aim of the study to all children who participated. The research took place at the school during school hours. Each participant received a questionnaire to complete in the presence of the researcher. The questionnaire was translated into Sepedi, which is a home language or mother tongue in Dikgale Village.

To render the study ethical, considerations for rights to anonymity and confidentiality was observed at all times (McMillan & Schumacher, 2012). In this study, anonymity was ensured by not disclosing the participants' personal details and the name of the school they attended on the research report. Finally, the following legislative/policy framework that might have had impact on the study is applied:

1.9. Summary

This chapter outlined the background of the study, statement of the problem and the aim of the study. The chapter also outlined the objectives of the research questions and the significance of the study. The next chapter discusses literature review in context.

CHAPTER TWO
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Introduction

In this chapter, literature based on the topic under study is reviewed. A literature review is an evaluative report of studies found in the literature related to the selected area (Boote & Beile, 2005). Working with literature is an important part of the research process as it assists to generate ideas, helps form significant questions and is instrumental in the process of research design. The production of new knowledge is fundamentally dependent on past knowledge (Craft, 2013). As a result, primary and secondary sources were carefully chosen, studied and investigated, with the purpose of drawing out only the essential information that is present, reliable and applicable to the current study. Its purpose is to create familiarity with current thinking and research on a particular topic, and may justify future research into a previously overlooked or understudied area.

Therefore, this chapter is designed as follows: Firstly, the researcher looked at a healthy diet in South African context; and the importance thereof. Secondly, the researcher reviewed literature based on the role played by schools as important vehicles for imparting knowledge on children about a healthy diet; mainly because children spend a large amount of time at school. Thirdly, the chapter addresses risks associated with unhealthy diet. Then, the chapter closes with a discussion on the theoretical framework that provide support or a firm basis for the study.

2.2. Overview on Healthy Diet

Healthy diet offers the body with essential nutrients required to maintain cells, tissues and cells, and to function correctly. Healthy diets are therefore adequate regarding all nutrients, but also prudent and protective against non-communicable diseases risk (WHO, 2013). Dietary changes have resulted in a risk transition where there is rise in non-communicable diseases such as diabetes, cardiovascular disease and obesity (WHO, 2014). These NCDs are closely related to the lifestyle practices and common behavioural risk factors such as unhealthy diets. Despite this, it has been reported that South African children do not exercise and their diet mostly consists of high sugary and fatty food (Steyn et al., 2015). This results in high risk of diabetes and cardio-

vascular diseases. It is estimated that the number of people with diabetes and obesity may increase to over 300 million from developing countries as a result of unhealthy diet. The trend of unhealthy eating practices has resulted in South African children scoring a very disappointing C-rating, which is regarded as the average risk for future disease (Draper, Tomaz, Bassett, Harbron, Kruger, Micklesfield & Lambert, 2019).

The global prevalence of chronic NCD is on the rise, with developing countries like South Africa experiencing the greatest problem. This increase in the prevalence of chronic diseases in the developing world has been attributed to changes in lifestyle associated with development and urban migration, including obesity because of unhealthy diet. Most chronic diseases in adulthood originate from dietary practices which are mainly formed during childhood (Abdollahi, Amini, Kianfar et al., 2008). In order to promote healthier eating habits, nutrition knowledge is believed to be important (Kigaru, Loechl, Moleah, Macharia-Mutie & Ndungu, 2015). However, nutrition knowledge alone may not be sufficient to change dietary habits hence in addition there is need to mould a positive attitude toward healthy eating early in childhood.

2.3. Healthy Diet in the South African Context

The South African population consist of a diversity of ethnic and cultural groups with different traditional eating patterns. It has been reported that “the White population consumes a typical Western diet, which has high fat intake, low carbohydrate intake, low fibre and high free sugar intake” (Draper et al, 2012). The Indian and Coloured populations have a similar pattern to the White population, with the addition of certain popular and commonly consumed foods. The Black African population, on the other hand, has two distinct types of eating patterns. The rural population follows a very traditional diet, which is high in carbohydrates, low in fat, low in sugar, and moderately high in fibre. However, this has changed due to urbanisation, media advertising (TV, newspaper, magazines and technology). Dietary pattern of the Black South African population is changing to a more Westernised diet, with lower carbohydrate and fibre intakes, and higher fat intake (Pretorius & Sliwa, 2011).

People in rural areas like Dikgale village were previously subsistence farmers. They mostly farmed on cattle, goats and sheep, and grew their own vegetables. They also

depended on indigenous and traditional fruits that were only found in the forests. It is not clear whether those fruits had the necessary nutrients needed by the body. The reason being, traditional diet is related with a low prevalence of degenerative diseases, whereas the Western diet is associated with increased prevalence (Pretorius & Sliwa, 2011).

The nutrient profile of healthy diets is grounded on a vast body of scientific evidence. The indication is about the variety of nutrients required by humans for their presence in foods, absorption, physiology, metabolism and excretion, genetic influences on these processes, human variability in needs, and the association of specific nutrients with diseases (Voster, 2013). WHO has emphasised that policy makers in various countries including South Africa, should consider traditional and indigenous food in designing Food-Based Dietary Guidelines-FBDGs (Fao, 2012). Hawkes and Buse (2013) have defined FBDGs as an information-communication tool comprising the translation of recommended nutrient intakes or population targets into recommendations of the balance of foods that populations should be consuming for a healthy diet'. As explained by the European Food Safety Authority (2008), FBDG is as science-based policy recommendations in the form of procedures for healthy eating. As a result, dietary guidelines in the South African context should be based on local foods and eating patterns of South Africans. Furthermore, WHO (2009) has recommended that the FBDG should provide nutrition knowledge and inspire consumers towards changing behaviours to make the best choices within their budgets and their eating patterns.

In partnership with the Department of Health, Nutrition Society of South Africa (NASA) initiated a process of designing FBDG. The FBDG was developed to be suitable for the South African multi-cultural society, specifically on affordable choices that form a large part of regular consumption for poorer people (Voster, 2013). As a result, SAFBDG, which was adopted in 2003 and revised in 2012, developed guidelines that are socio-cultural, ethnic sensitive and also promote the use of indigenous foods. Below are the SAFBDGs adopted in 2013.

Table 2.1: South African Food-Based Dietary Guidelines

- Enjoy a variety of foods.
- Be active!
- Make starchy foods part of most meals.
- Eat plenty of vegetables and fruit every day.
- Eat dry beans, split peas, lentils and soya regularly.
- Have milk, maas or yoghurt every day.
- Fish, chicken, lean meat or eggs can be eaten daily.
- Drink lots of clean, safe water.
- Use fats sparingly. Choose vegetable oils, rather than hard fats.
- Use sugar and foods and drinks high in sugar sparingly.
- Use salt and food high in salt sparingly.

(Department of Health, 2013)

South Africans are expected to eat healthy according to the SAFBDG as depicted in the illustration in Figure 1 above and Figure 2 below. However, it may not be ideal for poor communities who some of them are not working but depend on social grants to afford such. These Food-Based Dietary Guidelines make nutrition a little bit easier, moving away from scientific jargon and are easier to understand and apply (Vorster, Badham & Venter, 2013). It translates evidence based nutrition recommendations into a guide that aims to help the general population make better food choices for their health and wellbeing, and helps in preventing (NCDs). As indicated earlier in Chapter 1, NCDs typically refer to lifestyle diseases, which include Type 2 diabetes, hypertension, high blood cholesterol, cardiovascular diseases, obesity and some cancers. The risk of over-nutrition, unbalanced diet and limited knowledge on healthy food directly correlates with the risk factors that contribute to NCDs (Harris, 2012).

The food based dietary guidelines are used to help in changing food behaviours so a person is always able to make the best possible choices within budget and food preferences. According to WHO (2013), these guidelines aim to educate people so that they are able to make better food choices which in turn contribute to their health and well-being while also aiding in the prevention of NCDs.

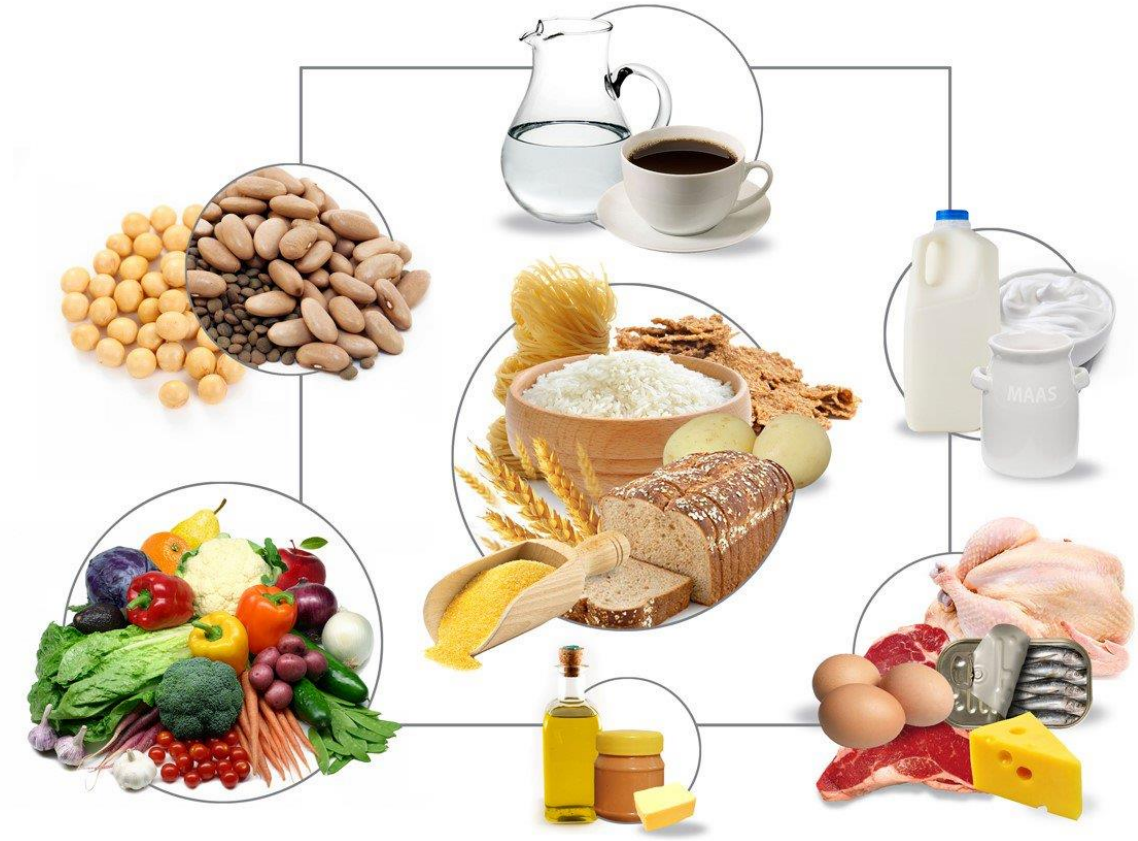


Figure 2.1: South African Food Based Dietary Guidelines (Department of Health, 2013)

Although South Africa generates enough food for all its population, and even exports, many deprived families are food insecure, especially in rural areas and in informal housing areas. Barriers to the application of the FBDGs, as cited by many South Africans, are, namely, affordability; availability; household taste preferences; time constraints; traditional/habitual food acquisition and preparation methods; and persistent attitudes (Wolde-Mariam, 2017).

Rural villages like Dikgale are poverty stricken and have high levels of food insecurity which might be the biggest barrier to apply the South African Food-Based Dietary Guidelines. According to Wolde-Mariam (2017) food security is access to sufficient food for a healthy life. Poverty remains to be the leading cause in household food insecurity. As a result, adequate, safe and diverse food supply can avert under-nutrition and over-nutrition and minimise the risk of chronic disease. However, in villages like Dikgale, the household income is more likely to suffer food shortages, thus

making them relatively more vulnerable to the effects of food price inflation (Altman, Hart & Jacobs, 2009).

Although tradition and culture remains robust in many areas of South Africa, a transition is currently occurring between traditional and Western-orientated lifestyles. Even though the SAFBDG is in place, there is no clear sign of including indigenous or traditional fruits and vegetables from rural areas like Dikgale. This suggests that a lot needs to be done by policy makers and health practitioners to include indigenous type of diet, which needs to be tested scientifically.

According to McQuaide (2008), the figures for overweight and obesity among South African children and adolescents are similar to those for young people in the USA and the United Kingdom whereby more than 30% of adolescent girls and nearly 10% of boys are either overweight or obese. Primary schools showed a similarly disturbing trend, with 22% of girls and 17% of boys falling into this category. In a combined sample of children under the age of nine years, an astonishing 17% was already overweight or obese.

2.4. Importance of Healthy Diet

Eating a healthy, balanced diet is significant for everyone, but children in particular need to get all of the essential nutrients for growth and development (de Villiers et al, 2014). Healthy diet is also good for prevention of non-communicable diseases in children. It is vital that children eat healthy food on daily basis for the good development of the body and the brain. Healthy diet is important for good health; and for children, they are essential for healthy growth and development. Moreover, they assist to maintain a healthy body weight and enhance physical and mental health and wellbeing (Welsh Assembly Government, 2013). Consumption of a healthy diet has benefits, including increased energy, happiness, health and even a long life (Schuna, Tudor-Locke, Barreira, Mire & Katzmarzyk, 2013). Healthy diet is essential for determining a person's overall health, and making them both part of lifestyle can make a dramatic difference in how children look and feel. However, if children do not eat healthy, they are likely to develop chronic and non-communicable diseases (NCDs) like diabetes, obesity, cardiovascular disease and other diseases related to diet as they grow older (Economos, Hatfield, King, Ayala, & Pentz, 2015).

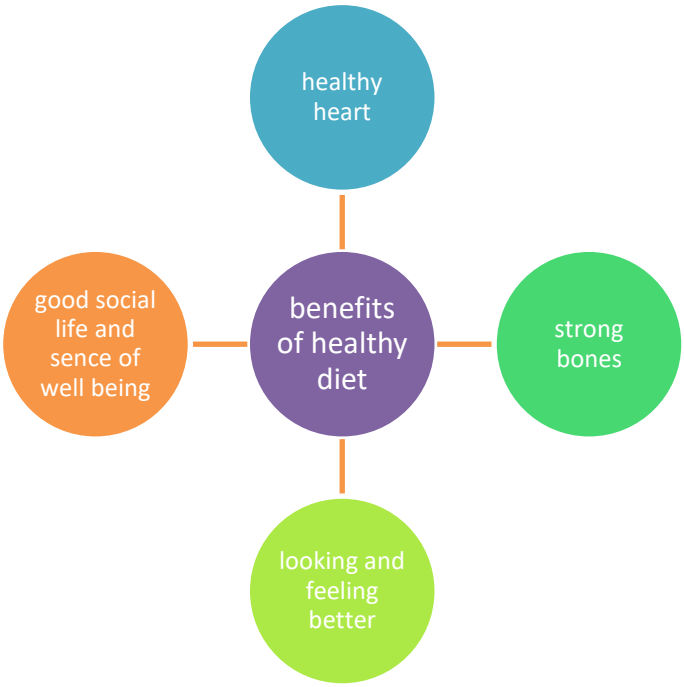


Figure 2.2: Benefits of Healthy Diet

Healthy diet is generally important for overall health of a human being. According to the Department of Health (2013), the nutrients in foods people eat support the activities of daily living, defend cells from environmental damage and repair any cellular damage that may arise. So, it is important for children to know the importance of healthy diet from a young age as this may assist them to achieve better academically. It is a well-known factor that poor nutritional condition is related to poor academic achievement. Even though this study did not measure nutritional status and the relationship it has to academic achievement, it is important to acknowledge the importance thereof. In a study by Themane, Koppes, Monyeki et al (2006), in a rural setting in Limpopo Province, it was discovered that nutritional status of children was positively associated with academic achievements. This suggests the importance of overall health in children.

Factors that influence eating behaviour need to be better understood in order to develop effective nutrition interventions that are tailored to individuals to improve their eating habits. Determinants such as habits, attitudes, self-efficacy, barriers to change and the meaning of “healthy” and “unhealthy” diet and food must be considered (Hawkes & Buse, 2013).

2.5. Factors that Influence Food Intake for Children

There are various factors that influence healthy diet and food intake for children. These include, school, home or family, community, media, availability of food.

2.5.1. School Feeding Programme in South Africa

The National School Nutrition Programme (NSNP) was introduced in South Africa in 1999 to Quintiles 1, 2 and 3 schools. The NSNP's aim was to provide meals to the neediest learners. Furthermore, NSNP was meant to contribute to improving the learning capacity, promote self-supporting school food gardens and other production initiatives and finally, to promote healthy lifestyles amongst learners (DBE, 2012). According to the DBE (2012), good food provides energy for the brain. The meals which are provided at schools are, therefore, intended to give energy for mental and physical activities for the body and brain to function and to make the learners alert and receptive during lessons with the aim of feeding children in poor communities on daily basis in school.

The Department of Education, in conjunction with the Department of Health, have provided a variety of menu options from which the schools may choose. However, it is the responsibility of the District Office to make this available to schools. School menus should offer tasty and adequate meals that must fulfil at least 30% of the daily nutritional needs of learners per meal. It is important to serve a balanced meal that is composed of the following:

- ✓ Protein:
  - vegetable protein, e.g., Soya products, dried beans, lentils, nuts and dried peas or
  - animal protein, e.g., meat, milk, eggs and fish (depending on affordability)
- ✓ Starch: e.g. maize meal, samp, mealie rice, rice, bread, potatoes
- ✓ Vegetables: at least one green and one red or yellow or orange vegetable per meal

Also, fats and oils must be used in moderation iodized salt and seasoning must be used in moderation. This is in line with SAFBDG. However, it is important to highlight

that the use of indigenous food in menus is encouraged even though this is not included in the DBE menu.

The Education Mandate for Care and Support for Teaching and Learning (CSTL) has obligated the DBE to provide nutritional support and nutrition education to learners as part of the nutritional support priority area (DBE, 2012). As a result, NSNP provide school meals to deserving learners during school days and also promote nutrition education. Based on this, the Nutrition Education Strategy (NES) is intended to make every school a healthy school where health promotion and awareness is integrated into school life.

2.5.2. The Role of the School in Enhancing Healthy Diet

Schools are a key setting where young children can learn good habits and attitudes towards healthy diet. As a result, they are considered as a principal target to provide nutrition education (Hawkes & Buse, 2013). Since proper nutrition is important for physical and mental growth of children; school children are at the phase of life when they are acquiring habits that will last a lifetime; and they are an important link between school and home and community (Olivares et al., 2016). As a result, WHO (2009) developed the Global Strategy on Diet, Physical Activity and Health (GSDPAH) recommends that school policies and programmes support the embracing of healthy diets. The basic aim of the GSDPAH is to guide policy makers to acknowledge and promote healthy eating in schools (WHO, 2009). For example, the guide recommends the presence of nutrition education in school policies as a way of:

> Providing knowledge and skills about the relationship between a good diet, physical activity, and health; and addresses the safe preparation of food and its consumption as an essential positive and enjoyable aspect of life. Also, it allows students to identify barriers to making healthy food choices and solutions to overcome the identified barriers. Again, the policy is good in involving teachers in imparting health messages to children.
>
> (WHO, 2009)

Schools are a particular important vehicle for primary prevention of NCDs. For example, in addition to programmes within life-orientation classes that must encourage healthy life-styles through improved dietary intake, encouraging exercise, school health nurses can play a pivotal role in reducing risk factors for NCDs through screening, education and health-promotion activities. Concepts of healthy diet are

incorporated in the South African curriculum. Such concepts are taught in both primary and secondary schools. Life Skills and Natural Sciences syllabus are subjects in South African education system that try to develop the knowledge and skills that are needed to make informed decisions, practice healthy behaviours and create conditions that are conducive to health in children (DBE, 2012). Children are taught about healthy diet in Natural Sciences and Life Skills from Grades 4-7. However, it cannot be suggested that they acquired adequate knowledge on healthy diet, and their practices and attitude may not change.

For example, CAPS document suggests that Grade 6 learners in the first term should be taught about nutrients and food, nutrition, diseases related to diet and food processing (DBE, 2012). Such concepts are important for children because children can learn about the possible disadvantages of not adhering to healthy diet. The following illustration shows what learners should learn about in nutrition at Grade 6 Natural Sciences classes:

- ✓ *Food can be grouped according to their functions in the body and learners are required to sort and classify food according to food groups.*
- ✓ *Children should be able to list the food groups and their function in the body.*
- ✓ *Children should be able to identify unhealthy food even on food labels.*
- ✓ *Children should know what a balanced diet is and the diseases related to poor diet.*

(Barnard et al., 2013)

Even if the CAPS document prescribe this, it is not clear whether educators adhere to the document. Given the prescribed curriculum, it is important for educators to teach children about the goodness of health and dangers of not eating healthy. By so doing, they will be cultivating the spirit of good health in children and also playing a vital role in enhancing healthy diet.

Both the Department of Basic Education and the Department of Health have designed policies on health issues that need to be adhered to by schools. Some of the policies are incorporated in CAPS documents for both Natural Sciences and Life Skills or Life Orientation subjects. For example, Natural Sciences CAPS policy documents suggest that in the first term of the year, Grade 4 to Grade 6 children should be taught about nutrition (DBE, 2012). This suggests that if children are taught about nutrition, they

may have adequate knowledge on healthy diet. The reason being, schools are institutions of learning and children may acquire knowledge on healthy diet in schools. The education and learning performance of school children may be enhanced when their general health is improved through health education (van Niekerk, 2014).

There are school feeding programmes worldwide that provide only two thirds of undernourished children with a basic meal (Rastogi & Thakur, 2014). In collaboration with the Department of Health, the DBE has established National School Nutrition Programme for Quintiles 1-3 primary and secondary schools in South Africa. So, schools have a bigger role to play in advancing policies of the DBE on health, particularly on health issues. It is through such programmes where schools can enhance healthy diet and healthy eating habits on children.

Many schools have tuck shops and vendors at school gates. This is where variety of food is sold to children. Generally, food sold in school tuck shops and vendors is not healthy for children. For example, in a study by (Ndlovu, 2016), it was reported that tuck shops and vendors mostly sell fried chips, crisps, carbonated beverages, sweets, fat-cakes (*magwenya*), bunny-chow (*sephatlo*). Most of the food bought at schools, coupled with processed sausages are higher in total and saturated fatty acids and lower in calcium, iron and fibre (Ndlovu, 2016). This suggests that schools may not have policies in place regarding the types of food items to be sold to children on the school premises, or maybe the existing policies on selection of healthy may not be properly implemented.

The selection of food sold in schools tends to be based on popularity rather than dietary benefit. Since many children are given pocket money to school (Temple, Steyn, Myburg & Nel, 2015) it is reasonable to be suggested that they may buy items which are popular and probably cheap. Such food often includes energy-dense foods that have a low nutritive value (Feeley & Norris, 2014). Tangible progress in promoting healthy eating behaviours may only be accomplished if operational policies on selling of foods are effected and a healthy school environment is encouraged (Gallotta, Iazzoni, Emerenziani et al, 2016). Given that most schools sell food solely to raise school funds, it can be suggested that the health of children may be compromised.

It has been suggested that multi-component school-based interventions, targeting curriculum, school policy, environment and the community, are effective in promoting healthy lifestyles (Okely, Cotton, Lubans et al., 2011). However, there are few intervention strategies in South Africa, particularly in rural area like Dikgale village and some interventions did not improve behaviour among children in primary schools. For example, there are various intervention programmes that have been established to implement health education. School-based interventions, such as the Child and Adolescent Trial for Cardiovascular Health, Pathways, Action Schools! BC NEIP, Health-kick and the "Top Grub" intervention, have been shown to have a positive effect on children's diet.

The NEIP, for example, aimed at increasing nutritional knowledge and improving healthy eating and ultimately preventing childhood obesity. Attitudes of most primary school children towards healthy eating remained unchanged after a NEIP (Harris, 2012). In the same way, the Health-Kick intervention programme was introduced to children, educators and parents in order to prevent overweight at a young age, to promote healthy eating habits in children, their parents and educators (Hills et al., 2015). Moreover, the intervention was initiated to integrate healthy eating into the existing Life Skills curriculum (Hills et al., 2015).

However, intervention like Health-Kick did not improve quality of diet of children. Instead, the study suggested that learners' eating behaviours are unlikely to improve if they are exposed to a school environment that does not specifically promote healthy behaviours (Steyn, 2015). There is evidence that training educators to teach and promote nutrition in the classroom could lead to positive change in behaviour of children (de Villiers, 2012). But, there are instances where educators do not comply with CAPS policy document in some subject, including Life Skills and Natural Sciences. After conducting a study on promoting healthy lifestyle behaviour through the Life Skills curriculum, Hill et al., (2015) discovered that time constraints and educators' heavy workload, were the reasons for non-compliance in using the curriculum document.

Schools represent a perfect setting to address social challenges because they provide access to the communities and generally have the necessary facilities, curriculum,

environment and personnel to advance healthy eating (Hills, Dengel & Lubans, 2015). The DBE through schools, have the policies, resources and educators to adopt programs into usual school practice that are likely to impact on healthy diet. However, it is not clear if such policies are implemented in schools and whether they have positive impact on children.

It has been reported that youth from low socio-economic situations have poor nutritional knowledge and receive less family support for healthy eating compared to youth from middle and high socio-economic strata (Zarnowiecki, Dollman & Parletta, 2014). This suggests equipping young children with the required nutritional knowledge. Coupled with physical education, nutrition knowledge from early stages of life may lead to children making healthier choices. Such knowledge may be passed to families for support purpose and for them to live a healthy lifestyle.

Healthier eating behaviours such as increased eating of fruit and vegetable are associated with reduced risk of cardiovascular disease (Tyrovolas & Panagiotakos, 2010). SAFBDG has even included consumption of fruits and vegetables daily to curb the increase of such diseases. Interventions to increase healthier eating behaviours such as reducing saturated fat consumption have led to significant improvements in health outcomes such as reducing coronary heart disease (Estruch, Ros, Salas-Salvadó et al., 2013; and Tyrovolas & Panagiotakos, 2010). However, such interventions are limited in South African schools, particularly in rural areas.

2.5.3. Socio-Economic Status in Families

Seventy percent of South Africa's children live in rural areas, and many live in households with incomes below the poverty line (Meintjies & Hall, 2010). Socio-economic status, food pricing, education and employment may contribute to enhancing healthy diet. Unemployment, poverty and lack of knowledge contribute immensely on what is eaten in families. Lower educational status of parents has been associated with lower dietary quality, including higher fat and lower micronutrient intakes in children (O'Dea, 2016). Maternal employment has been found to be negatively associated with the frequency of family meals, which are, in turn, positively associated with diet quality (Lessa et al., 2017). In a study conducted in Kenya for example, it was found that lack of knowledge and unemployment in families, contribute

to children eating food which are not benefiting the body with necessary nutrients a body requires (Anetor**,** Ogundele & Oyewole, 2012). On the other hand, food price becomes the most important consideration in food choice when income is restricted (Jenkins et al., 2015) often leading to the selection of foods that are higher in sugar and fat because they are among the least expensive sources of dietary energy (Francis, Nichols & Dalryple, 2010). Finally, reducing the price of foods and beverages that are high in sugar and fat increases the consumption of these foods (White, Adams & Heywood, 2009). However, the South Africa government has recently introduced sugar tax with the view of limiting high intake of sugar (DoH, 2017).

The availability and accessibility of healthy foods, frequency of family meals and parental intake and practices are important influences on a child's dietary choices within the home environment. The choices people make depend on the choices they have. So what children eat also depends on what food choices parents make. The home food environment can affect the development of eating behaviours in children (Wyse, Wolfenden & Bisquera, 2015). Many families are so poor they cannot afford to eat food from all the food groups. On the other hand, some children eat whatever they like, for example sweets and fatty foods. As a result, they do not eat fruits and vegetables. Sometimes children get nothing to eat, particularly in countries where there is famine.

The ability of families to access healthy food does not only depend on economic access, but also on the food environment within their communities. Easy access to retail food stores, fresh food markets, fast food outlets and vendors selling street food, all play a role in people's food choices. However, it cannot be suggested that the Dikgale community experiences the same, being rural as it is. It may well be that some children prefer to consume healthy foods, but it is a barrier to have access to healthy food, particularly in low socio-economic communities (Story, Kaphingst, Robinson-O'Brien, Glanz, 2008). Consequently, an inclusive method may be required to inspire healthy eating habits in children, in which improving the school food environment is an important. Three broad domains, in which policy actions can be taken, have been identified by the Nourishing framework to enable a healthy diet and the prevention of obesity and diet-related NCDs. These are the food environment, the food system and behaviour-change, communication regulatory action from governments and increased

effort from industry and civil society are necessary to effectively address the global epidemic of obesity within each of these three domains.

What children eat and what is done at home can control their lifestyle. Because of SES, children are often left alone at home while their parents go to work and there is inadequate family mealtime. Such children are left with no option but to prepare food for themselves. This is the time in which they have the opportunity to prepare and eat any type of food they prefer, and sometimes they indulge themselves with unhealthy food (Li et al., 2015; and Sedibe, Pisa, Feely et al., 2018).

Parents play a pivotal role in the development of their child's food preferences and energy intake, with research indicating that certain child feeding practices, such as exerting excessive control over what and how much children eat, may contribute to childhood overweight. Mothers are of particular interest on children's eating behaviour, as they have been shown to spend significantly more time than fathers in direct interactions with their children across several familial situations.

Many children in rural communities live with their grandparents while their parents are working in cities and suburbs. So, this leaves the grandparents with the primary responsibility of caring, feeding and nurturing the children. However, a study by Li et al., (2015) revealed that grandparents were commonly perceived to contribute to obesity through inappropriate perception. For example, it has been reported that grandparents believe that fat children are healthy and well cared for, obesity related diseases can only happen in adults, the higher the dietary energy or fat content, the more nutritious the food is (Li et al., 2015). Similarly, a study by Mamabolo, Alberts and Steyn (2005) concurred to the latter when they indicated that mothers believed that children who are over-fed are healthier, thus increasing the risk of developing obesity. This is perpetuated by the African norm or culture that suggests that increased body fatness is viewed as a sign of health and wealth. So, the responsibility lies with health practitioners to educate families on healthy diet. Equally important, schools can also teach children about healthy diet, good health. Children may cascade such information to their families.

Even if schools can come up with food programmes that entail healthy lifestyle, homes remain environments where development of eating behaviours is enhanced (Østbye, Malhotra, Stroo, Lovelady, Brouwer, Zucker & Fuemmeler, 2013). Families or home environment can take a lead in advancing good lifestyle so that children can adapt to a healthier diet. However, culture, religion and society are essential in shaping a person's diet. Unfortunately, as a society where 'cheap food is good and fast is better', communities have welcomed super-sized, low-cost fast food that has paved the way for a massive increase in the rate of obesity (Bull, Dembrowski, McCleary & Johnston, 2014). In fact, the increased consumption of high calorie, low-nutrition food has spawned an obesity epidemic.

Although culture is considered one of the most important influences on healthy eating, increasing "globalization" of food habits (Aung et al., 2012) has led to a reduction in intercultural differences in food practices within society. In South Africa, there has been clear evidence of nutritional concerns about children in rural communities. For example, Draper et al (2012) found that children in rural communities consume food with low calcium and protein intake. However, there is a scarcity of data comparing dietary behaviours of South African children and youth with those from other countries and cultures.

The intakes of parents and children are correlated for most nutrients (Bull et al, 2014) with stronger correlations between mothers and children than fathers and children. According to Sahoo et al. (2016), familial factors include food exposure and availability, parental modelling, meal structure and family meals, parenting style, and food socialization practices. A strong positive association between the availability of fruits and vegetables in the home and consumption has been reported (Colchero, Rivera-Dommarco & Popkin, 2017; and Lessa, Corles, Frigola & Esteve, 2017). While the availability of healthy foods is necessary, it is not always a sufficient enabler of healthy eating. Family meals have a positive influence on diet quality of children and youth (O'dea, 2016) with higher consumption of vegetables and fruit, milk products and improved nutrient intakes. An authoritarian parenting style, characterized by controlling child feeding practices (using high-fat/high-sugar foods as rewards, restriction of "junk foods") increases children's preferences for and intake of restricted foods once the restriction is removed. Furthermore, encouraging the consumption of

a healthy food based on its health benefits may decrease children's preference for the food.

2.5.4. Availability of Food

One of the dietary guidelines in South Africa, as per SAFBDG, suggests that people should eat plenty of vegetables and fruit on a daily basis (Department of Health, 2013). Considering socio-economic status of different families, it may not be feasible to every household in South Africa to consume vegetables and fruits regularly. South Africa is the only country in Sub-Saharan Africa to launch a 'Five a Day for Better Health Trust' campaign as part of the International Fruit and Vegetable Alliance (IFAVA) that advocates the importance of fruits and vegetables. However, it may not be possible for South Africans to pursue such call given the economic challenges that communities face, particularly rural areas. Rural communities, such as Dikgale village, have high poverty levels, which lead to families to be depended on social grants from the state. The following illustration indicates the prevalence of poverty in Dikgale village:

In many countries, people prefer certain foods, for example, samp or mealie meal in the case of South Africa. People eat a lot of this particular food type and do not get enough proteins or fats in their diet. They also often cannot afford other types of food types, especially in developing countries. However, some families in developed countries do not eat enough fruits and vegetables out of choice and eat a lot of refined carbohydrates, which also leads to diseases and illness.

2.5.5. Media and Advertising

Some studies have reported that children are influenced by marketing of unhealthy foods (Stevens et al, 2012; and de Villiers et al., 2014). Advertising, food packaging, food placement in supermarkets, and high availability of unhealthy foods in public places made it difficult for parents to make healthy food choices for themselves and their children. I think when sweets are obviously in the shops and advertising them and the children can see them, it makes it very hard obviously to get away from that with them demanding things like that. Children are thus exposed to temptation all of the time, both in the shops, on television and in newspapers. It is important for healthy eating messages in advertising, newspaper, TV and radio stations to target the

population, particularly children and adolescents in communities and schools. However, media perpetuate the promotion of unhealthy lifestyle through advertising.

2.6. Risks Associated with Lack of Knowledge about Healthy Diet

An unhealthy diet is one of the main risk factors for non-communicable diseases. For example, insufficient consumption of fruit and vegetables increases the risk for cardiovascular diseases (Hawkes & Buse 2013). Furthermore, consuming high amount of salt is a 'significant determinant of high-blood pressure and increases the risk of stomach cancer', high consumption of saturated fats and trans-fatty acids is linked to heart disease; a range of dietary factors have been linked with diabetes (WHO, 2013; Steyn et al., 2015; and WCRF, 2007). This is because of unhealthy lifestyle practices.

Based on the above illustration, it is clear that unhealthy diet is one of the risk factors that affect general health and quality of life, and many of these conditions can be avoided. According to Yoon, Gillespie & George, Wall, (2012), "consequences of obesity, metabolic syndrome, insufficient bone health, under-nutrition, iron deficiency, eating disorders, and dental problems can begin early in childhood, thus, leading to development of diseases and subsequent premature death". Unhealthy diet have become increasing concern in South Africa. There is growing evidence relating to poor childhood unhealthy diet, obesity, increased risks of Type 2 diabetes and other NCDs later in life (Duthie, Trueman, Chancellor & Diez, 2014). Given the current challenge of NCDs in both children and adults, it is important to establish knowledge, practices and attitudes of children on healthy diet in order to facilitate change.

The TPB has been applied successfully to study intentions and behaviour in a great variety of domains, including food consumption (Fishbein & Ajzen, 2010). Many studies on food consumption stop at the prediction of intentions, but others also collect behavioural data. TPB affords good prediction of various food-related intentions, including intentions to consume soft drinks, fish, and dairy products. In most cases, a person's personal attitude or preference was the strongest predictor of intentions, but an interesting exception occurred in relation to eating a healthy diet (Conner, Norman & Bell, 2002). A healthy diet referred to eating low-fat, high-fibre products, as well as fruit and vegetables. Inspection of the regression coefficients shows that perceived

behavioural control made the strongest contribution to the prediction of intentions to eat a healthy diet. This indicates that anticipating difficulty in maintaining a healthy diet reduced people's intentions to engage in this behaviour.

With the current policies in place, South African children and adults may reduce the prevalence of sedentary or inactive lifestyles by consuming healthy food. This is likely to impact on the prevalence of lifestyle diseases, such as heart disease and diabetes, in at least a portion of South African adults (Joubert et al., 2016). There is strong evidence that a more healthier and active population would have lower rates of chronic and non-communicable problems (WHO, 2015; and Knai et al., 2015). Research has shown that a positive change in health behaviour has the potential to reduce the global occurrence of many of these diseases and conditions by nearly 80% (Ezzati, Vander Hoorn, Rodgers, Lopez, Mathers, & Murray, 2013). It can, therefore be inferred that if healthy diet and physical activity can be acquired during childhood, such behaviour may be more likely to be maintained throughout one's lifespan, thus providing the foundation of active and healthy ageing.

2.7. Gender Differences on Healthy Diet

As indicated earlier, obesity and overweight in young children is becoming a global concern, with a rising occurrence among children of all age groups (York, Rossner & Caterson, 2004). This is the case even among South African children, with an occurrence of overweight and obesity of 14.0% and 3.2% in boys, respectively. Among girls between the ages of six and thirteen years, 17.9% are overweight and a further 4.9% are obese (Armstrong et al., 2016). Studies performed on small, local and regional samples of South African children suggest that the relatively high prevalence of obesity may be attributed in part to unhealthy diet, an increase in inactivity and sedentary lifestyles, associated with increasing urbanisation and improved socioeconomic status within households.

2.8. Theoretical Framework

2.8.1. Theory of Planned Behaviour

Theory of Planned Behaviour (TPB) is a theory that links beliefs and behaviour. The TPB concept was proposed by Icek Ajzen in order to improve on the prognostic ability of the Theory of Reasoned Action by embracing perceived behavioural control

(Szwacka-Mokrzycka, 2015). This theory explains how human beings behave. The aim of this study is to explore knowledge, practices and attitudes of primary school children on healthy diet. Theory of Planned Behaviour was deemed to be appropriate for this study considering that there would be intervention strategy. The Theory of Planned Behaviour helped the researcher to design interventions that effectively addressed the behaviour of primary school children in a rural setting. This theory suggests that attitude toward behaviour, subjective norms, and perceived behavioural control, together shape an individual's behavioural intentions and behaviours (Ajzen, 2000). It is in this context that this theory formed the basis of this study.

The following figure is a schematic representation of Theory of Planned Behaviour:

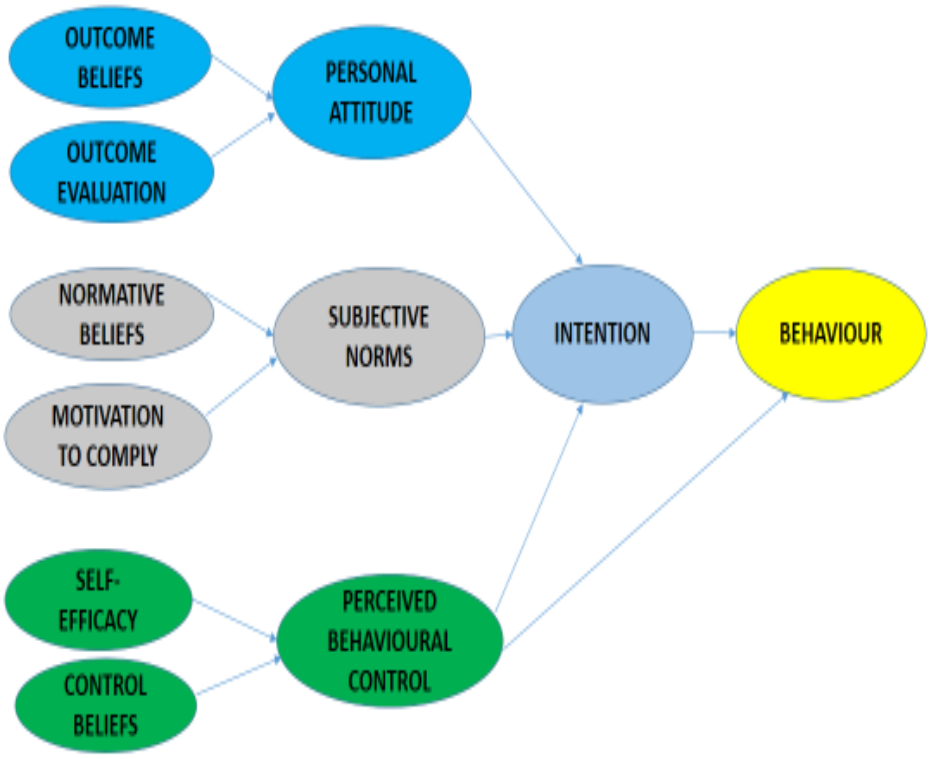


Figure 2.3: Theory of Planned Behaviour (Ajzen, 2015)

According to the figure above, human behaviour is guided by three kinds of considerations. First are the beliefs about the likely outcomes of the behaviour and

the evaluations of these outcomes (behavioural beliefs). Second are the beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs). Finally are the beliefs about the presence of factors that may facilitate or impede performance of the behaviour and the perceived power of these factors (control beliefs). When combined, attitudes towards the behaviour, subjective norm and the perceived behavioural control result in the formation of an intention. Understanding these beliefs and the intentions they produce can provide clues on how to impact behaviour change. This is represented below in figure 2.

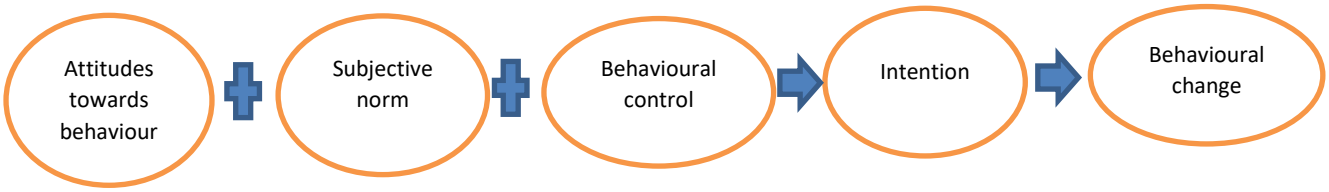


Figure 2.4: Beliefs and Behavioural Change (Ajzen, 2015)

2.8.1.1. Behavioural Beliefs

It can be assumed that there is a need to predict whether children intend to eat whichever food they are comfortable with. Considering the representation above, it can be suggested that behavioural beliefs produce a favourable or unfavourable attitude towards the behaviour and guide considerations of positive and negative outcomes. For example, when children make decision about the type of food they eat, they may ask themselves what the outcomes may be. Furthermore, they may or may not know what the benefits are based on the decision and the negative consequences they might experience. Therefore, attitude informs whether the children are in favour of doing something (eating healthy, for example).

2.8.1.2. Normative Beliefs

Normative believes result in perceived social or peer pressure. Because of social or peer pressure, children may think about what their peers expect from them or how peers expect them to behave towards food. Furthermore, with normative beliefs, children may want to know whether they will be supported or ridiculed with regard to their lifestyle or eating behaviour (Fishbein & Ajzen, 2010). The subjective norm may be how much the child feels social pressure to eat healthy food whereas the perceived behavioural control indicates whether the child feels in control of the action in question.

Individuals are much more likely to intend to have healthy behaviours if they have positive attitudes about the behaviours, believe that subjective norms are favourable towards those behaviours and believe they are able to perform those behaviours correctly.

2.8.1.3. Control Beliefs

Control beliefs produce a behavioural control by impacting performance of the behaviour. For example, children may ask themselves if they have the necessary knowledge to make decision about food they eat. They may also ask if they are confident in their ability to behave in a certain way. Control beliefs are also determents of decision making for children if they decide to eat certain types of food.

2.8.2. Behavioural Interventions

This study includes intervention strategy in order to detect if there is or there would be change in behaviour of children with regard to knowledge, attitudes and practices on healthy diet. Interventions designed to change behaviour can be directed at one or more of its determinants: attitudes, subjective norms, or perceptions of behavioural control (Patton, 2015). Changes in these factors may produce changes in behavioural intentions and, given adequate control over the behaviour, the new intentions should be carried out under appropriate circumstances.

Since attitudes, subjective norms, and perceived behavioural control are assumed to be centred on corresponding sets of beliefs (Buhmann & Brønn, 2018), behavioural interventions must try to alter the beliefs that, according to the theory, ultimately guide performance of the behaviour. It is important to realise, however, that this explanatory function is associated only with significant beliefs or beliefs that are readily accessible in memory. Pilot work is required to identify accessible behavioural, normative, and control beliefs, as a result, pilot study was carried out before the main study. Participants were given a description of the behaviour and were asked a series of questions designed to elicit accessible beliefs. The responses were then used to identify personal accessible beliefs, that is, the unique beliefs of each research participant, or to construct a list of modal accessible beliefs, i.e., a list of the most commonly held beliefs in the research population.

By measuring these beliefs, one gains insight into the underlying cognitive foundation, that is, one can explore why people hold certain attitudes, subjective norms, and perceptions of behavioural control. The beliefs provide a picture of the behaviour's cognitive foundation in a given population at a given point in time. For the purpose of this study, a variable model was developed to guide how the study would proceed. This model was developed in line with the TPB in Figure 2.1 and the behavioural change as indicated in Figure 2.2:

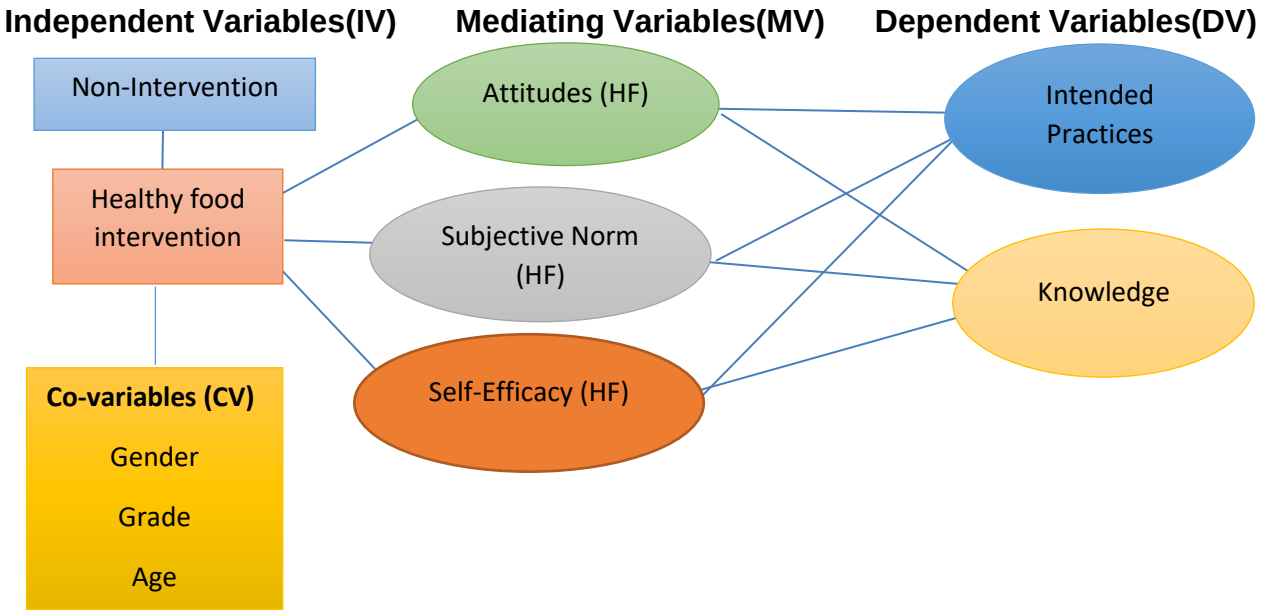


Figure 2.5: Variable Model of the Study

Because there are various factors which determine behaviour, this study mainly consisted of four variables. First are the mediating variable (MV) which is a variable that causes mediation in the dependent variable (DV) and the independent variables (IV). In other words, it explains the relationship between the dependent variable and the independent variable. The process of complete mediation is defined as the complete intervention caused by the mediator variable. These mediating variables are attitudes and knowledge on healthy food. Second and third are the independent variables, which include non-intervention and healthy food intention strategy and dependant variable, which includes intention to change behaviour and practices on healthy food. Finally are the core variable, which

includes age, gender and grade. The core variable explains most of the participants' main concern with much variation as possible.

2.9. Summary

This chapter has provided a summary of studies on health diet, in relationship to the topic under investigation. It became evident that there are challenges in as far as enhancing healthy diet. From previous studies it can be suggested that healthy diet are thus important for a healthy lifestyle. The next chapter explains methodology in detail, including design, sampling, data collection and analysis.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1. Introduction

In the previous chapter, literature and theoretical framework of the topic under study were presented. The current chapter introduces the methodology for the study and how its data were collected and analysed. It opens by providing essential background and fundamental guidelines common in mixed methods approaches. The subsequent four sections explain data collections, sampling, data analysis and quality criteria. The chapter concludes by addressing significance of the study and ethical issues.

3.2. Research Approach

This study implemented both quantitative and qualitative approaches. The qualitative and quantitative approaches are pragmatist paradigms which encompasses different phases of the research process (Tashakkori & Teddlie, 2010). Furthermore, Creswell (2013) describes mixed method research as a procedure for collecting, analysing and mixing both qualitative and quantitative data at some stage of the research process within a single study to understand a research problem comprehensively. In the same way, Johnson, Onwuegbuzie and Turner (2007) suggest that mixed methods research is the type of research in which a researcher combines elements of qualitative and quantitative research approaches (for example, use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (p. 123). This kind of research methodology involves collecting, analysing, and integrating quantitative and qualitative research in a particular study (Bulsara, 2014).

According to Creswell (2013), applying mixed methods approach is more comprehensive than attacking a problem form just one point of view. There are three types of mixed method research, namely, sequential explanatory, sequential exploratory research (Creswell & Clark, 2017). The three differ in the order in which data are collected. These three methods also differ in how the qualitative and quantitative data are used once they have been collected. For this reason, sequential explanatory mixed method was used. The reason for sequential explanatory was that even though quantitative and qualitative data were collected at different times, they worked together to answer the research questions comprehensively. Mixing both

quantitative and qualitative allowed the researcher to study analyse the results from a varying perspective.

The other reason for the researcher to use mixed research was that together, qualitative and quantitative data provided a better understanding of a research problem. Furthermore, the research questions called for mixed methods in that the researcher explored the meaning of a construct or phenomenon from more than one perspective. However, it should be noted that the goal of mixed methods research is not to substitute either quantitative or qualitative approach but rather to draw from strengths and reduce weakness of both in single study (Burch, Good & Heirich, 2016). Mixed methods research presents a prospect to explore both worlds by allowing in-depth discovery of practices while at the same time benefitting from the advantages of high generalization through large scale empirical research (De Lisle, 2011). This suggests that it is important to integrate the two approaches in order to produce rich data.

In addition, mixed methods research yields both statistics and stories that provide understanding and meaning to the numbers obtained (Patton, 2015). Patton (2015) describes quantitative evidence as the bones of the study and the qualitative analysis as the flesh. The quantitative, deductive reasoning of this case study aimed to describe the population of stakeholders in the study. Quantitative research within a mixed methods design is deductive in nature and fits varying perspectives into predetermined categories (Patton, 2015). Quantitative research approaches make it possible to measure reactions and perspectives of a large number of individuals and limit them to a set of questions, thus providing the ability for comparison and statistical aggregation of the data (Patton, 2015). According to Creswell (2013), mixed method research is an emerging research approach that involves combining both the statistical trends and stories to study human and social challenges. This provide a better a better understanding of the problem that either trends or stories alone.

Combining quantitative and qualitative approaches produced a better-off and more widespread understanding of a study's accomplishments (Creswell, 2013). Both these methods complemented each other for the purpose of triangulation. In terms of triangulation, the researcher found different types of sources that provided insight

about the same events or relationship (De Vos, Strydom, Fouche & Delport, 2015). Triangulation is about drawing the same conclusion from more than one data set. The researcher chose to use combination of qualitative and quantitative data in order to ensure that the limitations of one type of data are balanced by the strengths of another.

The central premise of mixed method is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone (Creswell & Clark, 2017). Mixed method research allows collecting and analysing both quantitative and qualitative data in the same study. Also, mixed method research made it possible for the researcher to compare quantitative and qualitative data sets in order to produce well validated conclusions. It should be noted that both quantitative and qualitative methods have strength and weaknesses.

The strength of quantitative method is that it has an advantage of taking a large sample and the weakness is that these methods generalise the results. Qualitative method has a disadvantage or weakness of using a small sample. Even if the qualitative method took up a small sample, the methods have the strength of gathering detailed and in depth data. Furthermore, a quantitative study helped to corroborate findings from a qualitative study and to transfer these findings to other domains.

According to Creswell and Clark (2017), the advantage for using mixed methods research is that one data resource may not be enough. Furthermore, initial results need to be further explained; hence the researcher chose two methods to collect data. A second method was needed to enhance a primary method which in this study was the quantitative way of collecting data. It should be noted that there was point of interface in these methods, that is, a point where the two strands were mixed. The point of interface in this study was at the design (when the results of the quantitative data lead to qualitative data collection), interpretation and data analysis. Moreover, quantitative data assisted in formulating focus group interview schedule on aspects which were not properly addressed or clear form the questionnaires. Also, interpretation assisted in comparing or combining results from both methods.

3.3. Research Design

A research design is the plan according to which relevant data is collected (Bassey, 2001). The research design, which was viewed as appropriate for used in this study was descriptive survey. This design was appropriate because it was less expensive and could enable the researcher to examine data from a wider area within a short time (Gatara, 2010). This design was also ideal for obtaining, recording and reporting conditions as they existed. Singleton (1993) observed that an ideal setting for research is one that directly satisfies the researcher's interests.

The purpose of descriptive method was to use qualitative results to assist in clarifying the quantitative findings. The rationale was that the quantitative findings provided a general picture of the research problem while the qualitative findings, refined, explained and extended a general picture (Creswell et al., 2013; and Ivancova et al., 2007). This method allowed the researcher to collect data in two separate phases or stages. Quantitative data were collected and analysed first. Subsequent to this initial phase, qualitative data were then collected and analysed. Explanatory in simple terms suggests that the qualitative results assist to explain the quantitative results obtained from the first phase (Creswell et al., 2014).

As indicated earlier, this explanatory study used a descriptive survey. According to McMillan and Schumacher (2010), a survey is used to describe and explain the status of phenomena to trace change and draw conclusions. Furthermore, Dulock (1993) indicated that a descriptive survey is concerned with:

> Conditions or relationship that exist; practices that prevail; beliefs; points of views or attitudes that are held. At times, descriptive research is concerned with how what is or what exists is related to some preceding event that has influenced or affected a present condition or event.

The reason the researcher chose descriptive survey was that data on variable of interest were comprehensively described.

3.4. Research Population and Study Sample

One of the crucial stages of the research process is deciding on a research population and study sample for a study. The choice of the population and sample is likely to influence generalisability or external validity, which can also be described as comparability, translatability of the study results (Cohen, Manion, & Morrison, 2013). A population is any group that is the subject of research interest (Bless, Higson-Smith & Kagee, 2006). For the purpose of this study, seven primary schools in the Dimamo Circuit formed part of the population in this study.

3.4.1. Study setting

In terms of geographical location, schools which formed part of this study are found in Dimamo Circuit under Capricorn District. Dimamo Circuit is situated in the east of the Polokwane local municipality in the Capricorn District. The circuit has a total of 13 primaries and 12 secondary schools. The schools are situated in Dikgale village, which is located within a radius of 39 kilometres of Polokwane District Municipality. All schools which formed part of this study are rural.

3.4.2. Sampling procedure

The quality of a piece of research stands not only by the appropriateness of methodology and instrumentation but also by suitability of the sampling tactic (Collins, 2016). Sampling plays a vital role in research so, as a researcher, issues of sampling were thought of early in the planning stages of this study. Sampling is a process of selecting a group of individuals to participate in a research (Cohen et al., 2013). Sampling guides researchers to choose in an appropriate way, the restricted set of individuals from which actual information can be drawn. The aim of sampling is to save time and to obtain consistent and unbiased information of the population status in terms of whatever is being researched.

This study utilised stratified random sampling. According to Creswell (2013), stratified random sampling is a sampling technique which tries to restrict the possible samples to those which are ‘less extreme’ by ensuring that all parts of the population are represented in the sample in order to increase the efficiency. In stratified sampling, the population is divided into subgroups, in this case, boys and girls. The first step in stratified random sampling was to split the population into strata, that is, segments.

The strata were chosen to divide a population into important categories relevant to the research interest. With stratified random sampling, there would be a probability that each female or male student could be selected for inclusion in each stratum of our sample. With the stratified random sample, there is an equal chance (probability) of selecting each unit from within a particular group of the population when creating the sample.

The reason the researcher chose stratified random sampling is that this kind of sampling obtains estimates of known precision for certain subdivisions of the population by treating each subdivision as a stratum (Creswell, 2013). A stratified random sampling procedure was used for selecting the participants in this study. This technique was employed to ensure a fairly equal representation of the variables for the study. The stratification was based on Grade 6 and 7 learners in primary schools in Dimamo Circuit. Within each primary school, selection of Grade 6 and 7 learners was by simple random sampling. This was achieved by using class registers to write names of all learners on pieces of paper which was folded and put in a basket where boys' names were separated from girls' names. After thorough reshuffling, the researcher selected participants, recorded them and put back in the basket until the required number is obtained. That is, researcher applied sampling with replacement. Proportionate stratified random sampling technique was employed to select 324 Grade 6 and 7 learners.

To replicate this study, Grade 6 and 7 learners from primary schools in Dikgale who participated in this study should be used. Also, a questionnaire with the same set of question should be used to collect quantitative data and focus group interviews should take place after the intervention to collect qualitative data. When the results from this study are found to be consistent by another study, it is more likely to represent a reliable claim to new knowledge.

3.4.3. Study Sample

To create a stratified random sample, there are seven steps some of which is to define the population, choose the relevant stratification and list the population according to the chosen stratification; which was defined above (Baran & Jones, 2016). Sample sizes vary depending on the research methods. Mixed methods research can

incorporate both quantitative and qualitative strategies (Patton, 2015). The study sample size was chosen by calculating a proportionate stratification and using a simple random sample to select the sample. The sample was calculated based on a proportion for a small, finite population with a margin error of 0.10. The researcher wanted to ensure that the selected sample had a proportional number of male and female learners. This is known as proportionate stratification (as opposed to disproportionate stratification, where the sample size of each of the stratum is not proportionate to the population size of the same stratum).

A total of 324 Grades 6 and 7 learners were the study sample which was spread evenly with 162 for Grade 6 and 162 for Grade 7. Out of a total 162, 78 were boys whereas girls were 84 in each grade. It should be noted that the number of boys and girls in the study sample in both grades is not exactly equal. The reason for this is that the researcher ensured that the number of units selected for the sample from each stratum was proportionate to the number of males and females in the population (Denzin & Lincoln, 2014).

3.5. Data Collection

According to Creswell (2013), data refers to materials researchers collect from the world they are studying. Data collection in this study was explanatory sequential. In basic sequential mixed designs, data collected and analysed from one phase of the study are used to inform the other phase of the investigation (Onwuegbuzie & Johnson, 2006). Furthermore, this sequential way of collecting data assisted the researcher to use qualitative findings to help interpret or contextualize quantitative results. At the highest level of integration, referred to as sequential mixed model studies, “multiple approaches” to data collection were employed in a sequence of phases. Each phase, by itself, used a mixed approach and provided conceptual and/or methodological grounds for the next one in the chain” (Tashakkori & Teddlie, 2010).

There are different methods and techniques of data collection. This study used two methods for collecting data. These were, namely, questionnaires and focus group interviews. These methods were used to collect data from the sample that was described above. Questionnaires and focus group interviews were seen as having

differing and possibly complementary strengths and weaknesses. These methods were also employed to triangulate the data collected and to increase trustworthiness credibility and reliability (Cohen, Manion & Morrison, 2011). As indicated earlier, triangulation assisted the researcher in mapping out or explaining more fully, the richness and complexity of human behaviour by studying it from more than one standpoint (Cohen et al., 2011). The most important factor here is that the researcher became confident that the data generated were not simply artefacts of one specific data collection method, rather two data collection methods, which yielded results that complemented each other. Furthermore, the more the results contrast each other, the greater the researcher's confidence (Cohen et al., 2013).

As indicated earlier, this study is a sequential exploratory approach. When the research is sequentially explanatory, the quantitative data are collected first. The qualitative data are generally collected after the quantitative data and are meant to serve the purpose of providing explanation for the results of the quantitative data (Cohen et al., 2011). Even if the quantitative and qualitative data were collected at different times, they worked together to answer the same research questions.

In this study, data were first collected through questionnaires. Here, the data analysis process began before all the data are collected, that is, immediately after data were collected. The focus group interviews intended to help uncover meaning, develop understanding, and discover insights relevant to the research problem. These methods for collecting data were chosen to gain insight and a better understanding of the topic under study. Before the main study started, a pilot study was conducted.

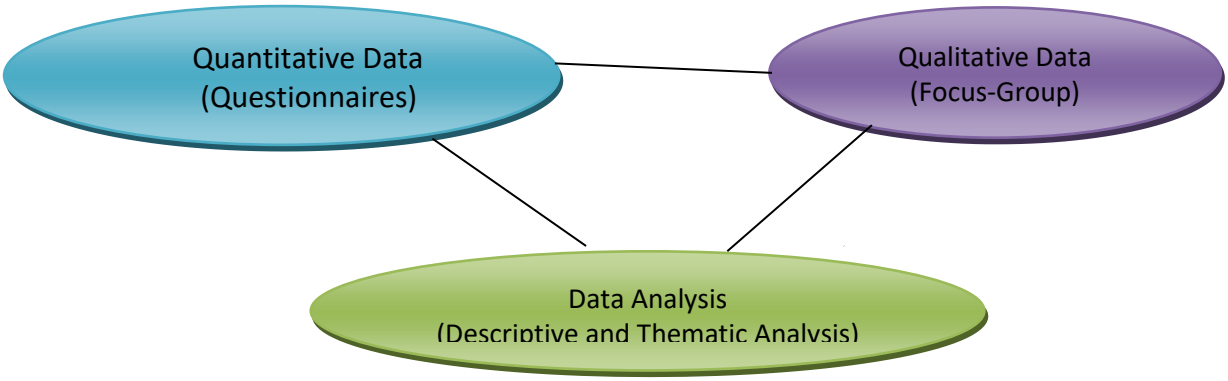


Figure 3.1: Data model of the study

3.5.1. Pilot Study

For the study to be feasible, piloting was important. A pilot study is a small study designed to test whether the required results will be gathered prior to a larger study (Creswell, 2013) and allows researchers to conduct preliminary analysis before committing to the main study. The purpose of conducting pilot study is that the researcher was able to know whether the instruments used were valid or not and whether the results were to be of quality and efficiency. Furthermore, a pilot study assisted the researcher to test whether the respondents interpreted the questions correctly and whether the response categories provided by the questions were suitable (Creswell et al., 2014). When a questionnaire is used as a data-gathering instrument, it is necessary to determine whether questions and directions are clear to participants and whether they understand what is required from them. This is referred to as the pretesting o piloting of a questionnaire (Polit & Hungler, 2003). A pilot questionnaire was used to obtain initial quantitative and qualitative data to re-design the questionnaire and the interview schedule. In other words, the feedbacks from the respondents in the pilot study lead to some adjustments of the questionnaire.

The questionnaire was piloted among Grades 6 and 7 learners in one school in Mothiba Village, which was not part of the main study. It is important to acknowledge that the pilot study revealed deficiencies (Cohen et al., 2013) in the design and instruments of the proposed study and also analysis. Piloting the questionnaire helped the researcher to identify these problems so that corrections were effected in the final version. These corrections were addressed before the main study could take place.

3.5.2. Questionnaire

Questionnaires were used as the first data collection instrument for the main study. As indicated earlier, data collection was done sequential, that is, one happens after the other, starting with questionnaire. The questionnaire used in this study was structured. In a structured questionnaire, participants respond to prompts by selecting from predetermined answers (Cohen et al., 2011).

A questionnaire (Appendix G) with close-ended questions was personally distributed to the learners described in the sample. The researcher ensured that everyone in the sample answers exactly the same questions, which makes this a very reliable method

of research. Before the intervention, a pre-test was administered to all 324 participants. These participants answered the same set of questions from the questionnaire. After analysis of these questionnaires, the same participants were then divided into two groups, i.e. experiment condition and control condition before intervention could take place. Intervention, which lasted for three months was conducted on the experiment condition group whereas in the control condition group there was no intervention. After the intervention both sets of conditions or groups were given same set of questions again to check if there is improvement in knowledge, practices and attitude with regard to healthy diet. This was a post-test for both the intervention (experiment) and non-intervention groups (control).

The advantage of using a questionnaire was that many participants were able to complete the questionnaire in a short space of time. Furthermore, this method was relatively cheaper and easy to administer. However, it has some drawbacks, one of which is that the depth of answers that the participants can provide tends to be more limited. But nonetheless, these questionnaires assisted in eliciting some ideas from participants so that focus group interview schedule can be properly prepared.

Because participants were minors, each question was clearly explained to participants so that they were able to respond accurately. The questions in the questionnaire were kept as short and simple as possible to increase the likelihood that they are understood as well as the accuracy of responses. Also, questions were grouped together under a common themed heading and this helped the participants to contextualize the subsequent questions. The questionnaire made it possible for the researcher to adjust the interviews schedule so that follow up with focus-group interviews can help explain their outcomes from quantitative data.

3.5.3. Focus Group Interviews

The second phase of collecting data was through focus group interviews (Appendix H). Focus-group interviews are well-planned discussions designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment (Oppie, 2004). This phase of data collection assisted the researcher to discover important quantitative results with a small number of participants (Creswell, 2013). In

focus group interviews, the researcher gained multiple perspectives in an interactive group setting of both Grades 6 and 7 learners, who formed part of focus group.

The researcher chose focus group interviews because such allow probing and follow-up responses (Creswell, 2013), and consequently, focus group interviews discover attitudes and opinions not shown in a survey. For this study, learners were randomly selected such that boys and girls are representative of Grades (Grades 6 and 7) at each of the participating school. Each grade had two boys and two girls to form the group that was interviewed during focus group discussion. In other words, the focus group consisted of eight learners per school. According to De Vos et al. (2015), a focus group should not exceed eight participants and it should also be no smaller than three people. If the group is too large, participants are more likely to break off to talk in sub-groups and leave people out of the discussion; if the group is too small and it is hard to keep the conversation going in enough depth for the participants not to feel intimidated by the situation (De Vos et al., 2015). Seven focus group interviews were conducted with eight participants in each group. The interviewees were given sufficient time to respond to the interview questions. Each focus group interview session lasted for an average of forty-five minutes as recommended by Shahid et al., (2009) to give participants sufficient time to minimize anxiety. All interviews were tape recorded in order to enhance the accuracy and trustworthiness of the data collected and later transcribed verbatim.

3.6. Data Analysis

Quantitative data were analysed first for the sake of preparing qualitative data collection. This quantitative data were cleaned, coded and entered into SPSS software. Descriptive statistics of frequencies, percentages, means and standard deviation were used to describe the characteristics of learners with reference to age, grade, nutrition knowledge, attitudes, practices, subjective norms and self-efficacy. Nutrition knowledge was determined based on nutrition knowledge scores. Scores were coded as 1 for correct answer and 0 for incorrect answer. The overall nutrition knowledge score for each learner was determined by the number of correct responses wherein those with higher scores demonstrated higher knowledge as compared to those with lower scores that reflected limited nutrition knowledge. Attitude was measured by determining food that learners preferred to eat and whether the food is

regarded as healthy or unhealthy. Descriptive statistics does not, however, allow us to make conclusions beyond the analysed data or reach conclusions regarding any hypotheses that might have been made. They are simply a way to describe data. According to De Vos, Strydom, Fouche and Delport, (2015), descriptive statistics is a mathematical technique for organizing, summarizing and displaying a set of numerical data. Data were organised into tables and where possible, graphically presented. Data from questionnaire were then corroborated with data from focus group interviews for proper interpretation of the results. Inferential statistics are techniques that allow us to use these samples to make generalizations about the populations from which the samples were drawn. Hence the sample in this study represented the population.

Inferential statistics was used to determine statistical significance in selected variables between learners. Correlation analysis and regression analysis were used to measure associations between knowledge and practices; and attitude, subjective norms and self-efficacy.

Qualitative data from the focus group interviews was transcribed verbatim and extensive notes were also taken during the interviews. According to Thomas (2013), when transcribing data, text from interviews or observation is typed into word processing document. The information gathered from these interviews was subjective, although an attempt was made to present an account from various perspectives and levels within the schools. Interview transcripts and written notes were analysed systematically through iterative reading. This made it possible to gain an increasingly deep understanding of each interviewee's viewpoint and perspective, of links and contradictions within and across interviews, of complex contextual factors emerging from the interviews and of the many relationships between the relevant concepts.

These qualitative data were analysed using thematic content analysis. Data from focus group interviews were coded and later organised according to categories and themes which emerged. These themes were then tabulated and inferences made in order to address the research questions. The analysis in data collected during focus group interviews tried to establish how the participants make meaning of their specific situation by analysing their attitudes, knowledge and practices on healthy diet. The findings were then triangulated with the reported quantitative finding.

3.7. Intervention Process

As indicated in Chapter 1, this study was nested under was nested in a bigger project of Multiple Literacies encompassing literacy and health. The role of the researcher was to deal with health aspects, particularly healthy diet. The intervention process comprised of 4 stages which are discussed below.

Stage 1

After approval of the thesis by the university research committee and acceptance letters form eight schools in Dikgale Village, 800 consent forms were distributed to schools which were part of Multiple Literacies Project. These consent forms were for grade 6 and 7s learners only. About 589 consent forms were returned to schools and sampling was done on those consent forms. From this sample, 324 participants were included in the study.

Stage 2

Questionnaires (324) with close ended questions were personally distributed by the researcher to learners on different dates to schools for pre-test and post-test. These questionnaires were translated in their home language which is Sepedi. The researcher was with learners when they answered the questionnaires. These questionnaires (324) were immediately after learners completed them for analysis purpose.

Stage 3

After analysing the questionnaires, intervention process began. Participants were divided into two groups, namely the intervention group or experimental condition (162) and the non-intervention or control group (162). The experiment group was taught about healthy diet and good health practices. The intervention lasted for a period of three months. The researcher visited the schools for intervention and learners who belong to the experiment group were taught during Life Skills/Natural Science periods or after school, depending on the programme of the school. Those in the control group were not taught about healthy diet and good health practices. Arrangements were made with principals of the eight schools and each school was visited twice a week for a period of three months.

Stage 4

After experiment group was taught about healthy diet and good health practices, the same set of questionnaires used in stage 2 were distributed again to the all 324 participants. The experiment group (162), that is, those whom intervention was subjected to, and the control group, answered the questionnaires in their respective schools after the intervention. These questionnaires were personally collected by the researcher immediately after the participants responded on them.

Stage 5

After analysis of questionnaires, an interview schedule was prepared. This interview schedule was informed by data from the questionnaire analysis. These set of questions were for the focus groups which are indicated in the interview section above. Focus groups were interviewed by the researcher in their respective schools. The interviews were to validate responses from the questionnaire and to responses which required more clarifications.

3.8. Quality Criteria

3.8.1. Validity

Validity is an important key to effective research. It is therefore worthless if a piece of research is invalid. Validity in this study was addressed through honesty; depth, richness and scope of the data achieved; the extent of triangulation; and the objectivity of the researcher (Winter, 2000). In this study, validity was improved through careful sampling, appropriate instrumentation and sufficient treatment of data. Threats to validity were minimized by selecting appropriate methodology for answering research questions and also selecting appropriate instrumentation for gathering the type of data required, for example, a questionnaire.

It is important to understand that a questionnaire is a tool and, as such, it must be usable so that the reader can easily understand, interpret and complete it. This made it possible to have accuracy of responses. The researcher complied with the validity expectations in that the measurement instruments, namely, questionnaires and interview schedule, represented the context area that was measured. The questions used reflected the various parts on healthy diet, dietary practices and attitudes. The questionnaire was validated by nutritionists for content validity. Content validity is the

degree to which an instrument covers the scope and range of information that is sought to cover (Creswell, 2013). Cohen et al., (2013) support the latter statement by indicating that in content validity the instrument must show that it fairly and comprehensively covers domains or items that it purports to cover. As a result, it was important for an instrument to test content validity in order for the results to be accurately applied and interpreted (Heale & Twycross, 2015). In this case, the experts on nutrition rated each item's relevance. Items that were rated as strongly relevant by both experts were included in the final questionnaire. Moreover, content validity was further ensured by consistency in administering the questionnaires. All questionnaires were personally distributed to participants by the researcher. The questions were formulated in simple language for clarity and ease of understanding. Clear instructions were given to the participants and the researcher assisted participants to complete the questionnaires. All participants completed the questionnaires in the presence of the researcher. This was done to prevent subjects from giving questionnaires to other people to complete on their behalf.

External validity was ensured. Burns and Grove (1993) refer to external validity as the extent to which study findings can be generalised beyond the sample used. All the learners approached to participate in the study completed the questionnaires. No single learner who was sampled refused to participate. Generalising the findings to all members of the population is therefore justified. Seeking subjects who are willing to participate in a study can be difficult, particularly if the study requires extensive amounts of time or other types of investment by participants. If the number of the persons approached to participate in a study declines, generalising the findings to all members of a population is not easy to justify. The study needs to be planned to limit the investment demands on participants in order to increase participation.

It should be noted that during data analysis there are some areas where invalidity lurks. However, in this study, such lurks were minimized by avoiding subjective interpretation of data, that is, lack of standardization and moderation of results as suggested by (Denzin & Lincoln, 2014). Also, invalidity was minimized by avoiding poor coding of qualitative data and selective use of data.

3.8.2. Reliability

The reliability of a measuring instrument is the extent to which it yields consistent results when the characteristics being measured have not changed and also take different forms in different situations (Leedy & Ormrod, 2005). Reliability was determined by ensuring that the questionnaire contains the same set of questions that are structured in the same way. In addition, Cohen et al., (2013) indicate that, in a survey it would mean that if a test and then a re-test were undertaken within an appropriate time span, then similar results would be obtained.

Cronbach's alpha measures reliability of a test or internal consistency. A reliability coefficient of 0.70 or higher was considered acceptable in most social science research. On the basis of the post-test admin in this study, an internal consistency index (Cronbach's alpha) was calculated. Health-related attitudes had a Cronbach's alpha of 0.621, which is a good sign. However, health-related subjective norm Cronbach's alpha was 0.401. This does not look good, but it should be noted that practices are very different and we cannot expect them to be always consistent. On the other hand, health-related self-efficacy was very low with Cronbach's alpha of 0.029. The reason might be that subjective norm originates from parents, friends, school. It was not surprising that the different subjective norm sources spread a consistent message. Cronbach's alpha for health-related food practices was 0.691 which is good. Reliability index for knowledge was not calculated because the subjects were diverse. This reflects a good content validity, but is at the expense of a reliability. Nevertheless, it was calculated and the results were surprisingly good with a Cronbach's alpha of 0.708. The following table illustrates reliability analysis in reference to Cronbach's alpha:

Table 3.1. Internal Consistency Reliability Values of Scales

	Cronbach's alpha	No. of items
Reliability healthy food related attitudes	0.621	14
Reliability healthy food related practices	0.401	8
Reliability healthy food related subjective norm	0.029	5
Reliability healthy food related self-efficacy	0.691	4
Reliability knowledge	0.708	6

3.8.3. Credibility

Durrheim and Wassenaar (2002) refer credibility as the assurance that researcher's conclusions stem from the data. To ensure credibility of the research, the researcher gave the questionnaire to supervisors and the nutritionist for assessment. This was to ensure that the instrument was adequate for measuring what it was supposed to measure, thereby ensuring content validity (Thomas, 2013). As a result, the supervisors and nutritionist provided comments and inputs before finalization of the instrument and the researcher increased validity by minimizing the amount of bias as much as possible.

3.8.4. Dependability

Dependability refers to the degree to which the reader can be convinced that the findings actually occurred as the researcher says they did (Duheim & Wassenaar, 2002). The researcher aims to achieve this by using member checking. Identified themes were discussed with the participants (after interviews shall have been completed) to ensure that they are accurate and dependable (Creswell, 2013). In addition, the researcher triangulates all data collected during the research process, including the results of the questionnaire and interviews, in order to search for common themes to provide reliable findings.

3.8.5. Trustworthiness

Trustworthiness (Boudah, 2011) is how a researcher convinces the audience that the findings described are credible and provide conclusions that are appropriate and fully developed. Ensuring trustworthiness in mixed methods research is important because qualitative research has been criticised for lack of credibility (Bassey, 2001). Therefore, it was important for me to devise strategies to minimise threats so that the results can be credible. However, it is important to acknowledge that trustworthiness in research cannot be brought about by methods (Brinberg & McGrath, 1985). This means that trustworthiness is not a product but rather it is a goal that researchers strive to achieve.

The process of data verification was carried out according to Guba's Model of Trustworthiness as described by Krefting (1991). The strategies carried out in this

study to ensure trustworthiness are listed in Table 1 below and conform to the strategies in Guba's Model of Trustworthiness.

Table 3.2: Threats to Trustworthiness and Strategies Employed to Minimise the Threats

Threat to trustworthiness	Strategy
1.Participants providing information for the sake of making the researcher happy	• Checking
2.Participants concealing vital information	• Prolonged engagement
3.Researcher bias	• Neutral and-open ended interview questions were used • During data collection no statements showing preferences of the aspects investigated were mentioned • Participants were allowed to talk freely about their experiences with no interjections from the researcher • During data analysis, no cases were given priorities over others • Analysis was based on verbatim transcripts descriptive statistics
4.Reactivity	• Personal observations • Informal conversations • Mindfulness of the environment of participants
5.Limitations	• Data were collected through the use of a questionnaire and focus group interviews for triangulation purposes.

3.9. Summary

This chapter discussed the research design and methodology employed in this study. It explained how the research was conducted in order to find out knowledge, attitude and practices of primary school children towards healthy diet. The chapter also provided ample justifications for the techniques used to gather data. The method allowed and facilitated systematic data collection, recording and analysis.

CHAPTER 4
PRESENTATION OF RESULTS

4.1. Introduction

The previous chapter discussed all structural and fundamental methodological components relevant to the present study. This chapter explicates in detail the results of data analysis. It begins with the description of profile of respondents and the studied variables, followed by the results of research questions. All the data was collected through a questionnaire from children who were tested for knowledge, attitudes and practices towards a healthy diet.

4.2. Research Results

First, the demographical profile of participants followed by results according to the hypotheses of this study. Secondly, quantitative results are presented because they inform the qualitative result. Finally, qualitative results are presented. Both results are consolidated to give a clear picture on what primary school children's knowledge, attitude and practices are with regard to healthy food.

4.2.1. Demographical Profile of the Respondents

Section A of the questionnaire elicited information pertaining to the demographic characteristics of participants. The section addressed the following attributes pertaining to the respondents:

- Grade;
- Gender; and
- Age group.

Demographical profile with regard to grade, gender and age are presented in Table 4.1 below. The table reveals that a total of 324 participants participated in this part of the study. In terms of gender, Grade 6 had a total of 78 (44.3%) males and 98 (55.7%) female participants which contributed to about 176 (54.3%) of the entire sample. Grade 7 had total of 64 (43.8%) males and about 84 (56.8%) females which contributed to 148 (45.7%) of the entire sample. With regard to age, the majority of participants were between a bracket of 11-12 and 13-14 years, i.e. 292(90.1%). Grade

6 had a total of 133 (76.6%) participants between the ages of 11-12 whereas Grade 7 had 13 (8.8% of the same age range. There were 37(21.0%) of Grade 6 participants of ages 13-14 while Grade 7 had 109(73.6%) of the same range. With regard to age range of 15-16 Grade 6 had 6(3.4%) while Grade 7 had 25(16.9%). The last age category was that of 17 year olds. Grade 6 had no participant of this age range whereas Grade 7 had only one who made up 0.3%.

Table 4.1: Demographical characteristics of participants (N=324)

Variable	**Grade 6** **n (%)**	**Grade 7** **n(%)**	**Total** **n(%)**
Grade	176(54.3%)	148(45.7%)	324(100%)
Gender **Male** **Female** **Total**	 78(44.3%) 98(55.7%) 176(100%)	 64(43.2%) 84(56.8%) 148(100%)	 142(43.8%) 182(56.2%) 324(100%)
Age (Years) **11-12** **13-14** **15-16** **17** **Total**	 133(76.6%) 37(21.0%) 6(3.4%) 0(0) 176(100%)	 13(8.8%) 109(73.6%) 25(16.9%) 1(0.7%) 148(100%)	 146(45.1%) 146(45.1%) 31(9.5%) 1(0.3%) 324(100%)

4.2.2. Presentation of Quantitative Results

4.2.2.1. Descriptive Results

To explain the descriptive results, Mean (*M*), Standard Deviation (*SD*) were calculated. Table 4.2 below shows the descriptive results in detail. These descriptive statistics show differences with regard to knowledge, attitude, practices, and subjective-norms for both pre-test and post-test. The table reflects improvement with regard to children's healthy knowledge when comparing pre-test and post-test but decrease in practices after intervention. When looking at knowledge and practices as dependent variables, the mean for variable knowledge at pre-test was 3.0401 (1.94739 *SD*) and for post-test 4.95 (2.783 *SD*), which shows an improvement of +1.9099. However,

children's health practices did not improve after intervention. Instead, healthy practices dropped from a mean score of 5.4796 (1.09880 *SD*) to 5.2635 (1.03343 *SD*) with a difference of -0.2161.

Table 4.2: Descriptive Results for Pre and Post-Tests (N=324)

Variables	Mean	Std deviation
Knowledge during pre-test	3.0401	1.94739
Knowledge after post-test	4.95	2.783
Attitude during pre-test	3.8404	1.27804
Attitude after post-test	5.1411	1.99962
Healthy practices during pre-test	5.4796	1.09880
Healthy practices after post-test	5.2635	1.03343
Subjective-norm during pre-test	2.5247	0.90885
Subjective-norm after post-test	2.5802	0.96199
Self-efficacy during pre-test	0.8410	1.36527
Self-efficacy after post-test	3.8194	3.49355

What is the relationship among attitudes, subjective norm, self-efficacy to TPB model, and the intended health practices and knowledge prior to the intervention?

Table 4.3 represent the results to address the first Hypothesis and displays the values that highlights the levels of the relationship among attitudes, subjective norm, self-efficacy, and the intended health practices and knowledge before the intervention. The results in this section are presented in accordance with Hypothesis 1a and 1b which are the under the umbrella of the first research objective.

- *Hypothesis 1a* - There is significant relationship among attitudes, subjective norm, self-efficacy, and related health practices in relation to TPB before intervention during pre-test.

The health practice (dependent variable) at pre-test did not show any relationship with attitude, subjective norm and self-efficacy prior to the intervention. Table 4.3 presents a clear picture for an overall relationship of practices where it shows no significant relationship among attitudes, subjective norm, self-efficacy and practices during pre-test.

Table 4.3. Relationship among Attitudes, Subjective Norm, Self-Efficacy and Practices during Pre-Test (N=324)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.075[a]	.006	-.004	1.10085	.006	.599	3	320	.616

- *Hypothesis 1b*- There is significant relationship among attitudes, subjective norm, self-efficacy, and related health knowledge before intervention.

With regard to *Hypothesis 1b*, knowledge at pre-test (dependent variable) did not have any relationship with attitude, subjective norm and self-efficacy. When looking at Table 4.4 below, the results show that knowledge is not related to attitude subjective norm and self-efficacy prior to the intervention.

Table 4.4: Relationship among Attitudes, Subjective Norm, Self-Efficacy and Knowledge during Pre-Test (N=324)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.060[a]	.004	-.006	1.95297	.004	.385	3	320	.764

What is the relationship and attitudes, subjective norm, self-efficacy to Theory of Planned Behaviour (TPB) model, and the intended health practices and knowledge after the intervention?

In response to the second research question, the relationship among attitudes, subjective norm, self-efficacy to the TPB model, and the intended health practices and knowledge after the intervention was studied.

- *Hypothesis 2a*- There is significant relationship among attitudes, subjective norm, self-efficacy, and related health practices at the time of post-test.

For the purpose of confirming *Hypothesis 2a*, the relationship among attitudes, subjective norm, self-efficacy and practices after the intervention was studied. The

post-test results showed that there was no relationship among attitude, subjective norm self-efficacy and practices where in F(3.320)=0.25; p>0.858; aR^2 0.002 . This is shown in Table 4.5 below where there is no significant change of practices after the intervention.

Table 4.5: Relationship among Attitudes, Subjective Norm, Self-Efficacy and Practices after Post Test (N=324)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.049[a]	.002	-.007	1.03702	.002	.255	3	320	.858

- *Hypothesis 2b*- There is significant relationship among attitudes, subjective norm, self-efficacy and related health knowledge at the time of post-test.

After the post test, the model seemed to be important because there was an impact after intervention. This affirmed in *Hypothesis 2b* where the relationship was significant. There was a significant change among attitude, subjective norm, self-efficacy and knowledge after the intervention. The extent to which the model works is that F(3.320)=66.47; p<0.001; aR^2 0.378" of the knowledge is linked to subjective norm, self-efficacy and attitude. Therefore, knowledge, attitude and subjective-norm are all significantly related. However, the relationship between knowledge and self-efficacy is the strongest. Table 4.6 below illustrates the relationship among attitudes, subjective norm, self-efficacy and knowledge after the intervention. This table is correlated with the TPB model on Figure 2.4.

Table 4.6: Relationship among Attitudes, Subjective Norm, Self-Efficacy and Knowledge after Post Test (N=324)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.620[a]	.384	.378	2.195	.384	66.471	3	320	.000

Is there a difference in experimental and control condition in health practices and knowledge after intervention taking into account the initial differences in health practices?

- *Hypothesis 3a*- Learners in the experiment condition will reflect more health-related practices.

With regard to the differences between experiment and control condition in health practices after intervention considering initial differences in healthy practices, there was no significant difference between pre-test (pre-practices) and post-test (post practices). Table 4.7 indicates the non-significance of the difference whereby F(1.321)=0.019; p>0.894; a R^2 0.001, which indicates that the model explains none of the variability of the response data around its mean. Also, Figure 4.1 indicates that health practices have dropped after the intervention.

Table 4.7: Difference between Experimental and Control Condition in Health Practices after Intervention, Taking into Account Initial Differences in Health Practices (N=324)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.270[a]	2	.135	.126	.882
Intercept	353.256	1	353.256	328.983	.000
Pre-practices	.268	1	.268	.249	.618
Condition	.019	1	.019	.018	.894
Error	344.684	321	1.074		
Total	9321.302	324			
Corrected Total	344.954	323			

R Squared = .001 (Adjusted R Squared = -.005)

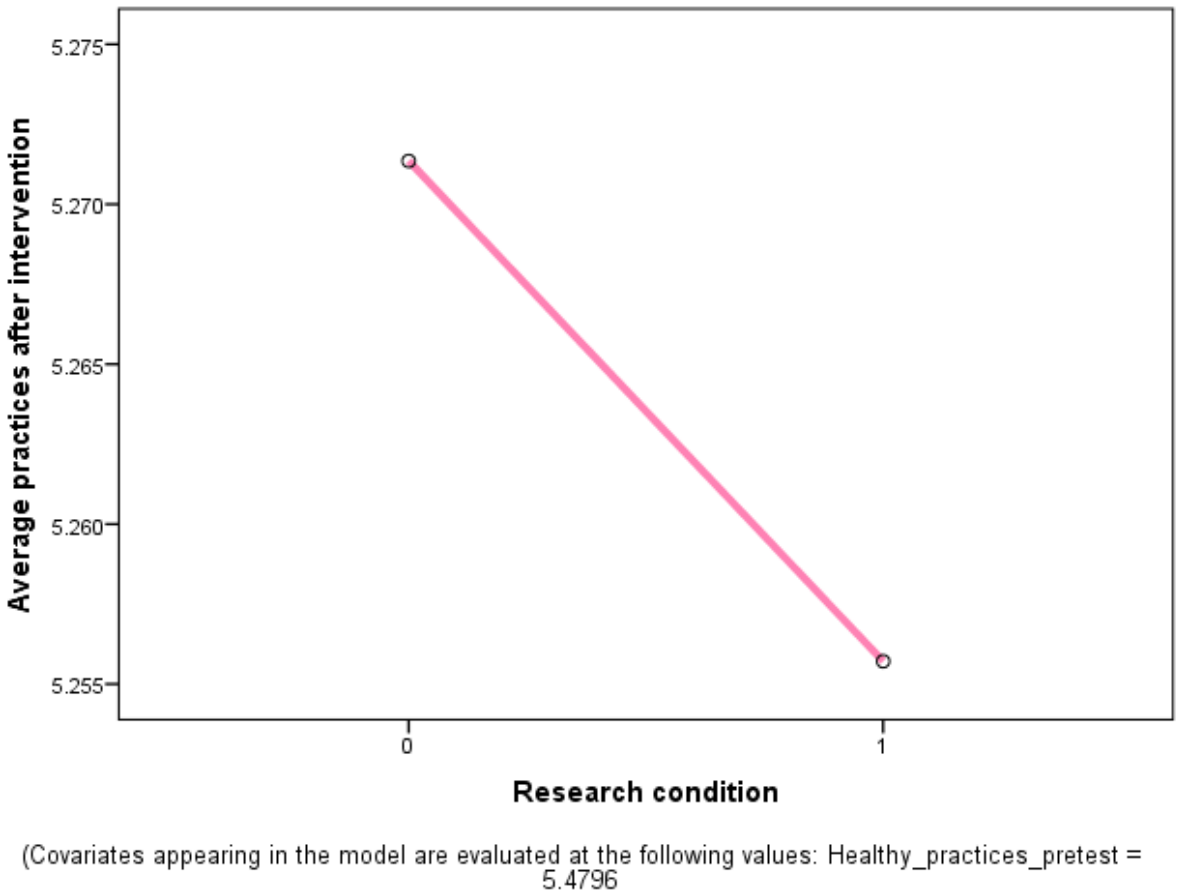


Figure 4.1: Practices after intervention-Post test

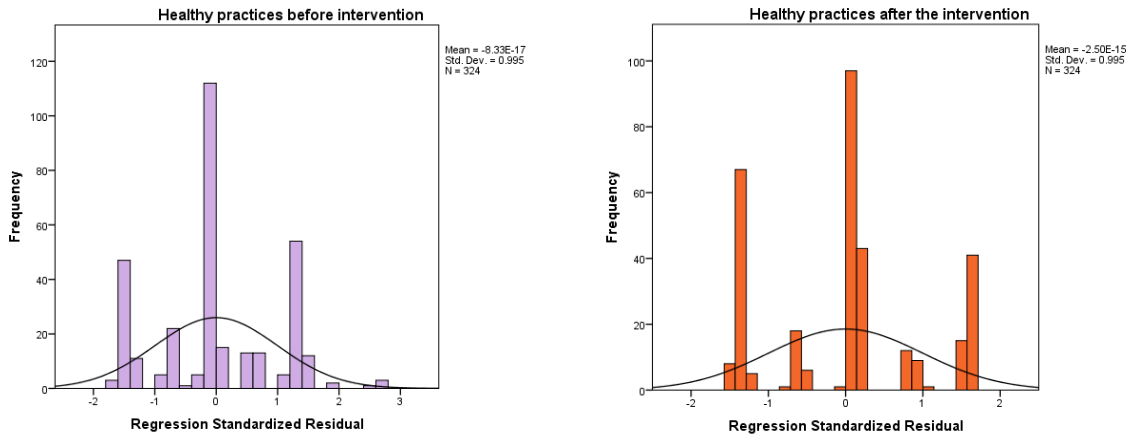


Figure 4.2: Comparison of Practices Prior Intervention and Practices after the Intervention (N=324)

- *Hypothesis 3b*- Learners in the experiment condition will reflect more health-related knowledge.

There was significant difference between experiment and control condition in health knowledge after intervention, taking into consideration initial difference in health knowledge at pre-test time. So, the condition had an impact with the F(1.321)=353.89; p<001; aR^2 0.524=52.4%. Looking at Table 4.8 below, this means that 52.4% difference of post knowledge is related to the differences between the intervention and the non-intervention. This indicates that the model explains the variability of the response data around its mean. These results show that knowledge changes but not yet practices.

Table 4.8: Difference between Experiment and Control Condition in Health Knowledge after Intervention, Taking into Account Initial Differences in Health Knowledge at Pretest Time (N=324)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1312.116[a]	2	656.058	176.975	0.000
Intercept	2209.817	1	2209.817	596.110	0.000
Pre-knowledge	1.407	1	1.407	0.380	0.538
Condition	1311.919	1	1311.919	353.897	0.000
Error	1189.968	321	3.707		
Total	10452.778	324			
Corrected Total	2502.083	323			

a. R Squared = .524 (Adjusted R Squared = .521)

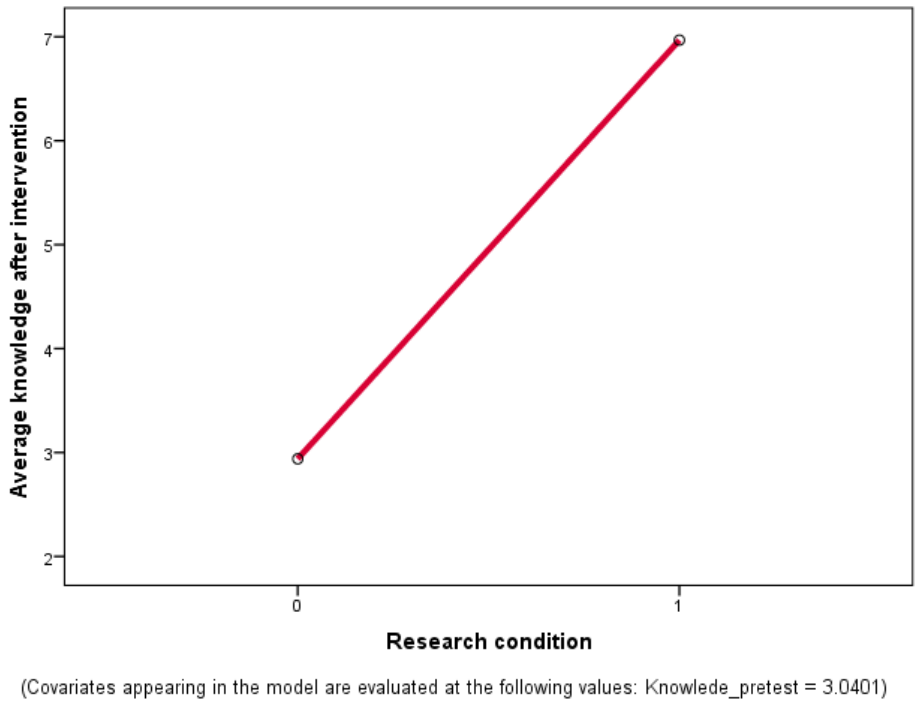


Figure 4.3: Knowledge Acquisition after Experiment Condition (Post Test)

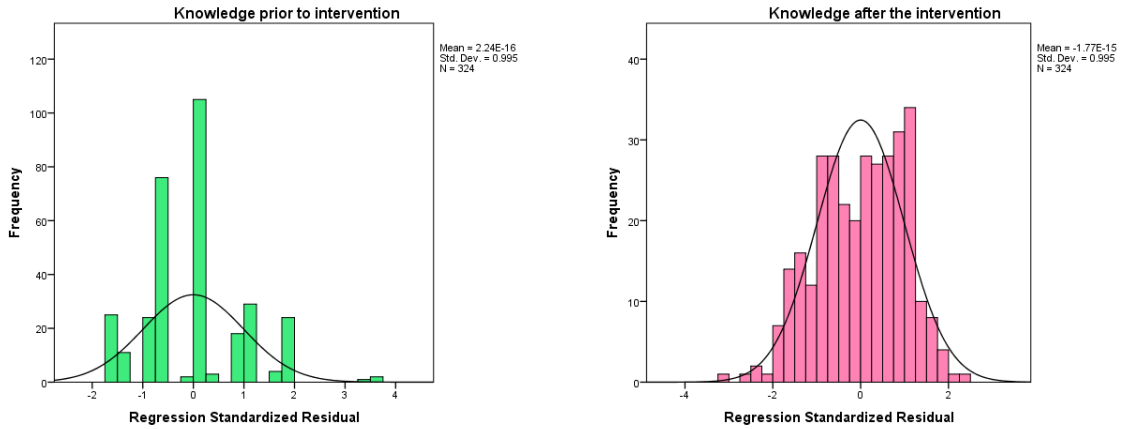


Figure 4.4: Comparison of Knowledge Prior Intervention and Knowledge after the Intervention (N=324)

Is there a change in health practices and knowledge due to intervention considering co-variables and changes in health attitude, subjective norm and self-efficacy?

To answer the fourth research question, I studied a change in knowledge due to intervention considering co-variables and changes in health attitudes, subjective norm and self-efficacy. The result showed that there was no change in health practices considering the co-variable. However, there was a change in health knowledge due

to intervention considering co-variable and changes in health attitudes, subjective norm and self-efficacy.

- *Hypothesis 4a*- Learners in the experiment condition will reflect more health-related practices considering co-variables and changes in health attitude, subjective norm and self-efficacy.

The results showed no significance difference between the experiment and control condition in heath practices after intervention. After considering initial differences in health practices, none of the other variables (viz., attitude, subjective norm, self-efficacy, grade, gender and age) played a significant role. Table 4.9 below indicates the non-significance in practices during pre-test and after post-test where F(1.315)=0.20; p>0.001; aR^2 0.008. In addition, 0,8% of the difference between both groups seems not to be related to the intervention.

Table 4.9: Post Practices by Condition with Differences in Attitude, Subjective Norm, Self-Efficacy, Grade, Gender, Age at Pre Practices (N=324)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.865[a]	8	.358	.330	.954
Intercept	189.911	1	189.911	174.873	.000
Pre-practices	.340	1	.340	.313	.576
Difference in Attitude	.569	1	.569	.524	.470
Difference in Subjective norm	.607	1	.607	.559	.455
Difference in Self-efficacy	.213	1	.213	.196	.658
Grade	.885	1	.885	.815	.367
Gender	.108	1	.108	.099	.753
Age	.581	1	.581	.535	.465
Condition	.022	1	.022	.020	.887
Error	342.089	315	1.086		
Total	9321.302	324			
Corrected Total	344.954	323			

a. R Squared = .008 (Adjusted R Squared = -.017)

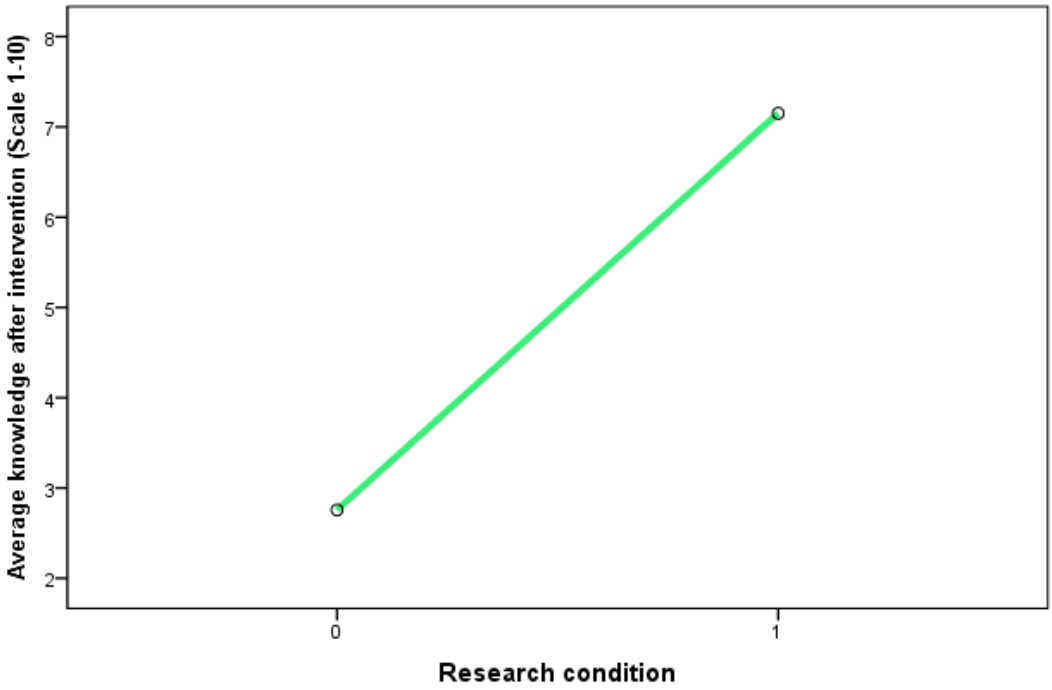
- *Hypothesis 4b*- Learners in the experiment condition will reflect more health-related knowledge considering co-variables and changes in health attitude, subjective norm and self-efficacy.

After comparing the difference between experiment and post condition with regard to health knowledge, it was interesting to observe that there was significant difference were F(1.315)=115.72; p<0.001; aR^2 0.538. In addition, 53,8% of the differences between both groups seems related to the intervention. This is best represented in Table 4.10 below. However, none of the other variables played a significant role except for subjective norm. Subjective norm played a marginal role with p<1, which is a trend where the F(1.315)=2.76; p=0.9. A 'trend towards significance' suggests that, had the intervention recruited more children, the P value would have become more significant (Wood, Freemantle, King & Nazareth, 2014).

Table 4.10: Post Knowledge by Condition with Differences in Attitude, Subjective Norm, Self-Efficacy, Grade, Gender, Age at Pre-Knowledge (N=324)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1346.323[a]	8	168.290	45.867	.000
Intercept	198.610	1	198.610	54.131	.000
Difference in Attitude	8.619	1	8.619	2.349	.126
Difference in Subjective norm	10.123	1	10.123	2.759	.098
Difference in Self-efficacy	.019	1	.019	.005	.942
Grade	.127	1	.127	.035	.853
Gender	13.875	1	13.875	3.782	.053
Age	.401	1	.401	.109	.741
Pre-knowledge	2.448	1	2.448	.667	.415
Condition	424.607	1	424.607	115.726	.000
Error	1155.761	315	3.669		
Total	10452.778	324			
Corrected Total	2502.083	323			

a. R Squared = .538 (Adjusted R Squared = .526)



(Change in attitudes after intervention = 1.3007, Change in SN after intervention = .0556, Change in SE after intervention = 2.9784, Grade = 1.46, Gender = 1.60, Age = 1.65, Knowlede_pretest = 3.0401)

Figure 4.5: Knowledge Change after Intervention

4.2.3 Qualitative Results

Qualitative results were able to explore unanswered questions from the quantitative research. This required the researcher to complete quantitative analysis before collecting qualitative data. The second purpose that a qualitative follow-up pursued, was to provide illustrative materials that showed how and why quantitative methods produced the results that they did. Results from these interviews are herein presented according to the following themes:

4.2.3.1 The Impact of SAFBDG on Practicing Healthy Diet

The South African Food Based Dietary Guidelines provides guidance on the type of food people must eat. This emphasize the issue of knowledge on healthy diet. According to the SAFBDG, key to optimal nutrition and health of an individual is an adequate diet that must include a variety of foods in moderation (Smitasiri & Uauy, 2007). When learners were asked if they were aware of the SAFBDG, the majority of them had no idea what this is. L2B said:

"*I became aware of that word when you taught us about healthy diet in class".*

This was supported by L8B who said:

"*I have never heard about that word before, I only heard it from your lessons"*.

These sentiments were also shared by participants from other sampled schools. L3E indicated that they were not taught about SAFBDG before the intervention by saying,

"My teacher never taught us about guidelines before, but now I know it's important to eat according to the guidelines".

L4B: *"The food guidelines guides on the type of food we should eat, for example, we must eat fruits and vegetables everyday".*

When a follow up question was asked whether they think they eat at home or school is according to SAFBDG, participants had mixed feelings. For example, in School C, learners said it is difficult to follow all the guidelines. Following are some of the responses:

L7C: "*I want to follow food guidelines so that I can be healthy, but I eat what my parents cook. However, I think that the food we eat at school is okay."*

One learner even suggested that for him it would not be difficult to follow SAFBDG by saying:

L1C: *"I think I will be able to follow the guidelines because my mother sells bananas, tomatoes and 'morogo'. So I will tell her that she is selling healthy food".*

L4F: *"it is difficult to difficult to eat according to food guidelines at home. At school, we eat fish, samp, cabbage, and milk. We also served a fruit once a week".*

4.2.3.2 Challenges to Adhere to Good Health Practices

When children were asked why they did not follow SAFBDG to stay healthy, the majority of them indicated that they eat what is provided by their families. It was clear that even if they wanted to eat healthy, they have no choice but to eat what they are provided by their parents. In School B, for example, L4B said:

"I know that my diet must contain healthy food, however, my parents cannot afford to buy vegetables because they do not work".

This was supported by L1B who said:

> *"After you taught us about dietary guidelines, I know it's important for our diet to consist of food from all the food group, but I only eat what is cooked at home*".

L2D added by saying:

> *"I think it is important to eat healthy food, but if there is no one working at home, it is difficult to eat healthy food".*

Not following good healthy practices might be related to the kind of food children find from their homes and the type of food they are exposed to in their environment. Some participants asked me if '*morogo*' was healthy, for example L5A said:

> *"I eat 'morogo' at home instead of vegetables. Is 'morogo' healthy*?"

One participant quickly responded and said, L2B:

> *"Yes 'morogo' is a vegetable that means it is healthy*".

However, other participants argued that '*morogo*' is not healthy. For example, L8B said:

> *"I don't think 'morogo' is healthy but cabbage is 'morogo' that is healthy".*

Participants were asked if they eat breakfast before coming to school. The majority of them indicated that they did not eat until lunch time at school. In School E, for example, participants said:

> L1E: *"I do not eat breakfast because I will be late to school."*
> L6E: *"There is sometimes no bread, so I do not eat breakfast every day."*

When asked if they could change the type of food they eat to a healthy diet, participants indicated that they can change to the diet suggested by SAFBDG. Here are some of the responses:

> L8D: *"Because I don't want to get sick when I grow up, if I was able to make a choice, I would choose healthy food only.*
> L3B: *"I want to eat healthy, so if I had a choice, I would choose food according to the guidelines.*

4.2.3.3 Taste Preference Rather than Nutritional Value

Participants in this study preferred taste than nutritional value. When they were asked whether they eat food because is healthy or its nutritional value, most participants preferred taste. The following are some of the responses:

L6A: *"I eat food because of its taste, if the taste is awful, I cannot eat it. My aunt bought frozen vegetables one day and I only ate carrot. I did not like broccoli and some white stuff".*
L3E: *"When I eat food I like the taste. If the taste is bad, I cannot eat. For example, I don't like green beans.*
L1E: *"I like green beans and the beans they feed us at school. I also like beetroots and butternut.*
L5E: *"We eat butternut and cabbage at school".*

Participants indicated that even though they preferred tasty food, they can now differentiate between healthy food and unhealthy food regardless of taste. For example,

L8F said: *"I know I have to eat healthy food regardless of taste. Tasty food is not always healthy".*
L5A: *"Even if there is food that I don't like because of taste, I know they are healthy, for example, I don't like carrots but I know it's healthy".*

4.2.3.4 Knowledge on Healthy Diet and Diseases Related to Bad Diet

Most children were aware of the principle of balanced diet and selecting the correct amount of food from different food groups in terms of specific nutrients. They were also knowledgeable about the relationship between healthy diet and diseases related to bad diet. When participants were asked if they were aware of diseases related to diet, the majority of participants were aware of the diseases. They were taught about conditions and diseases related to poor diet. It is not clear if they were taught about diseases before. Here are examples of what they said:

L2C: *"I know about kwashiorkor and tooth decay"*
L8C: *"You have shown us videos and pictures of children who are suffering from kwashiorkor and rickets".*

Other participants added by saying:

L6C: *"and tooth decay".*
L3F: *"I know that if I eat too much sweets and chocolates my teeth will rot."*
L1A: *"My four teeth at the back of my mouth are Black because of sweets."*

4.2.3.5 School Vendors and Tuck Shop Promoting Unhealthy Diet

Participants in this study indicated that tuck-shops and vendors who sell food in and outside the schoolyards during breaks, they do not sell healthy food. The following are some of the responses from participants:

L7E: *"According to me, the mamas (vendors) do not sell healthy food because they sell sweets, mashwamshwam and magwenya (fatcakes).*
L2E: *"They also sell sephatlo (bunnychow) and coldrink".*
L4D: *"They don't sell healthy food at all. They know that children like sweet things that is why they sell sweets and biscuit".*

Only one schools had a tuck-shop within the school premises. The other five had a spaza-shop nearer to the school where learners are allowed to buy during break. When learners were asked if the tuck-shop/spaza-shop sold healthy food, majority indicated that they sell almost the same food as the school vendors.

L2F: *"They sell the same food as the mamas from the school, but they are cheaper than mamas".*
L6A: *"I think their food is not healthy because they sell sweets, biscuits and magwenya".*

L3A quickly intercepted and said:

"Even sephatlo."

It was quite interesting to hear some participants indicating that some spaza-shop sell bananas and avocado. But what became intriguing was that, even if learners did not buy them, their teachers always send them to buy for them. Here are some responses:

L4E: *"My teacher always send me to buy avocado and atchaar (pickled mango with spices), but sometimes I buy her bananas".*
L8B: *"Our teachers sometimes send us to buy atchaar, bread or sephatlo at the tuck-shop."*

L1B added thus:

"Don't forget that we also buy for them cold drink."

4.7. Summary

This chapter presented the results. Quantitative results were presented before the qualitative results because the quantitative data from questionnaire informed the structuring of questions during the interviews. This is in accordance with Figure 3.1 which depicts the Data model of the study. The chapter showed in detail how the

children’s knowledge and attitude improved considering the co-variables. Overall, these results indicate that participants improved knowledge does not necessarily brings change to practices. In the next chapter, this results will be discussed and detail and recommendations will be presented.

CHAPTER 5
DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

In this section, the chapters of the thesis are summarised discussing the integrated results from the questionnaires and focus group interviews data to grasp the basic gist of the thesis. The chapter is organised as follows: section 5.2 contains discussion of the main findings. Section 5.3 which contains conclusion. Section 5.4 which discusses the recommendation. Section 5.5 will finally discuss the limitations of the study.

It is important to develop and reinforce lifestyle behaviours that encourage the maintenance of appropriate healthy diet, foster good health and prevent diseases during childhood (Lin et al., 2007). With increasing prevalence of obesity (Barnard et al., 2013), comes diet-related diseases and problematic eating behaviours among the South African children (Sedibe et al., 2018). This study aimed to explore knowledge, practices and attitudes of primary school children on healthy diet at Dikgale village in Limpopo Province. Data were collected through questionnaires and focus group interviews with Grades 6 and 7 and participants. The findings are discussed around the following objectives that guided the study:

- To investigate the relationship among attitudes, subjective norm, self-efficacy to TPB model and the intended health practices and knowledge prior to the intervention;
- To investigate the relationship among attitudes, subjective norm, self-efficacy to TPB model and the intended health practices and knowledge after the intervention;
- To determine whether there is a difference in experimental and control conditions in health practices and knowledge due to intervention;
- To determine whether there is change in health practices and knowledge due to intervention considering co-variables and changes in health attitude, subjective norm and self-efficacy; and
- To propose a model for teaching health knowledge and practices for learners.

5.2 Main Findings

5.2.1 Main Finding 1

The Relationship among Attitudes, Subjective Norm, Self-Efficacy to TPB Model, and the Intended Health Practices and Knowledge Prior to the Intervention

This study exhibited that there was no relationship among attitudes, subjective norm, self-efficacy to TPB, and the intended health practices and knowledge prior to the intervention. In the attitude section, children were required to identify the type of food that they liked most, and decide if the food was healthy or not. Most of them preferred unhealthy type of food and they did not even know if the food was healthy or not. With regard to subjective norm, school vendors and tuck-shops sold mostly unhealthy type of food except food they received from the school nutrition programme (NSNP) which was healthy. Also, the food they enjoyed with friends was mostly junk food.

There was limited knowledge with regard to nutrients food for carbohydrates, proteins, vitamins and minerals. Although children knew that food such as fried chips, bunny-chow and fat-cakes contain a high amount of saturated fat and cholesterol, these foods were consumed by children and this reflects food preference rather than nutritional value. The fact that children preferred taste rather than nutritional value, suggests that knowledge alone is not enough to follow healthier diet. The children also responded well in terms of the type of food that cause tooth decay. Based on these findings, it can be suggested that there was no relationship among attitude, subjective norm, self-efficacy to the model, and the intended health practices and knowledge before the intervention.

5.2.2 Main Finding 2

The Relationship among Attitudes, Subjective Norm, Self-Efficacy to TPB Model, and the Intended Health Practices and Knowledge after the Intervention

The results showed that there was no relationship among attitudes, subjective norm, self-efficacy to TPB model, and the intended health practices after the intervention. However, there was a significant change between attitude, self-efficacy and knowledge after the intervention. Increased knowledge on healthy brought changes on attitudes towards healthy diet. In the attitude section of the questionnaire, for example, participants' liking of food changed after intervention. For example, initially, participants preferred a fried egg over a boiled egg before intervention. However, this

changed after intervention because 82% of participants in the experiment group preferred boiled eggs when compared to 12% of the control group. Overall, 76% participants in the experiment group showed positive attitude (compared to 30% from the control group) while 24% shown negative attitude towards healthy diet (compared to 70% from the control group). It can therefore be suggested that those who show positive attitude are aware of negative consequence (for example, diseases related to diet) of eating unhealthy food, whereas those with negative attitude are not aware of advantages of healthy eating (good health).

Positive attitude and behaviour change toward healthy eating early in childhood contributes massively in adopting healthy food habits (Kigaru et al., 2015). It has already been confirmed in other studies that linking knowledge and practice in nutrition education is a challenge and needs behaviour and attitude change (Sainsbury, Hendy, Magnusson & Colagiuri, 2018; Colchero, Rivera-Dommarco & Popkin, 2017; and Booker, Smith, Miles-Richardson, Dill, 2013), hence there was no link in this study. In broad terms, the more approving the attitude of a person towards behaviour, the greater the subjective norm; the more the perceived behavioural control, the more powerful will be the individual's intention reflected in a given case. Ultimately, it is the 'actual behavioural control' in any given case whereby an individual normally brings out one's intentions before the occasion takes place (Barry, Anderson & Gregoire 2016). Therefore, intention is supposed to be instant predecessor of behaviour. In other words, children's behaviour towards consumption of sweets, chocolates, bunny-chow and fat-cakes suggests that the best predictor of behaviour is intention. Intention is the conative representation of a person's readiness to perform a given behaviour (in this case, consumption of sweets and chocolates) and it is considered to be immediate inner sitting of behaviour (Barry et al, 2016). According to the TPB, children with strong intentions to consume such types of food are more likely to do so when compared to those with weaker intentions. Intentions are thought to be influenced by social expectations (i.e., the subjective norm), people's attitudes, and perceptions of control (Harris, 2012). Together the factors listed signify a person's ability to have control over the behaviour.

The idea that beliefs form the foundation for our attitudes is embedded in the most popular model of attitude formation and structure, i.e., the expectancy value (EV)

model. According to this model, people form behavioural beliefs by associating performance of the behaviour with certain outcomes (Zhang, Gu, Keller & Chen, 2019). Thus, perhaps as a result of being taught about diseases related to unhealthy diet, children may come to believe that reducing sugar intake (the behaviour) causes a drop in energy but also leads to weight loss, prevents tooth decay, and lowers the chance of developing diabetes (outcomes). Because the outcomes that come to be linked to the behaviour are already valued positively or negatively, they automatically and simultaneously acquire an attitude toward the behaviour. In this fashion, they may learn to form positive attitudes toward behaviours they believe produce mainly desirable outcomes, and form unfavourable attitudes toward behaviours they associate with mostly undesirable outcomes. Although children may form many different behavioural beliefs, it is assumed that only a relatively small number influences their attitudes in the moment (Ajzen, 2015). It is these readily accessible beliefs that are considered as the prevailing determinants of a person's attitude.

Improved knowledge and positive attitude towards healthy diet, brought changes in self-efficacy in this study. This is supported by Jung and Bice (2019) when they indicate that there is strong evidence that enhancing self-efficacy results in nutrition change. It should be noted that self-efficacy, which is gained through knowledge, understanding and skills development (Lung-Guang, 2019), is a crucial component in effective health interventions. Before intervention, children were more comfortable with junk-food like burgers, fried chips, sweets and fried chicken instead of salad, cereals, boiled food and fruit, and this changed on the experiment group. This suggests that the improved knowledge on healthy diet gave them an option of choosing healthy food, which showed higher self-efficacy. Similarly, Fitzgerald, Heary, Kelly et al., (2013) highlighted that higher self-efficacy for healthy eating is associated with improved knowledge on healthy diet. This suggests that lower self-efficacy may be associated with limited knowledge on healthy food. As a result, intervention programmes that target self-efficacy for unhealthy eating may be beneficial in improving dietary choices among children and possibly adolescents. Therefore, changes in self-efficacy beliefs aroused by a self-efficacy intervention may mediate the effects of an intervention on health behaviour.

This study is consistent with that of Hall, Chai, Koszewski and Albrecht (2015) who indicated that self-efficacy is significantly associated with behaviour, therefore, should be integrated when creating interventions for behaviour change. Another essential point was raised by Muturi, Kidd, Khan et al., (2016) where their results showed moderate efficacy for healthy food choices and for healthy eating among adolescents.

With regard to the relationship between subjective norm to TPB model and the intended health practices and knowledge after the intervention, it was discovered that even if healthy food knowledge can change, influencing factors (normative beliefs) may not change. It was clear, in this study, that the type of food accessible to these participants was mainly cheap to buy. They consumed sweets, bunny-chow, fat-cakes which are high in cholesterol, which accelerate obesity. It has been reported that food is developed in ways that are cheap for consumers and these types of food contain high amounts of saturated fat and cholesterol (Holliday et al., 2014).

5.2.3 Main Finding 3

Differences in Experimental and Control Condition in Health Practices and Knowledge Due to Intervention

There was a significant difference between experiment and control condition in health knowledge after intervention, taking into consideration initial difference in health knowledge at pre-test time. However, there was no significance difference in between experiment and control condition in health practices due to intervention. A number of conclusions can be drawn from the results displayed in chapter four that relate to this finding. Even though the sample from which data was gathered was small, the researcher is of the opinion that the results still provide meaningful findings and insights that could be generalised to the impact of healthy food intervention on changes related to healthy food knowledge. According to Lessa, Cortes, Frigola and Esteve (2017), it is important to improve healthy food knowledge through nutrition education in order to have a positive influence on healthy food choices.

It was evident from this intervention that healthy food knowledge changed in both males and females. In this study, the average nutrition knowledge of female learners was 44% and that of male was 42%. An average of 86% in the experiment group compared to 32% in the control group, where there was improved knowledge on

healthy diet, suggest that intervention is likely to improve healthy food knowledge in children. A study conducted at Nairobi city in Kenya also highlighted improvement in knowledge after intervention (Schneider. & Masters, 2018). The results in this study are also consistent with those of the study conducted in Qwa-Qwa by Oldewage-Theron and Egal (2010) who found that there was fair knowledge regarding general nutrition facts. However, this study is in contrast with that of Steyn et al., (2015) where there was no improvement of knowledge despite the intervention in a study conducted in Western Cape. Having knowledge about healthy diet only is not sufficient because the practical aspect should also be emphasized to children, the reason been, there is no purpose of knowing without implementing what has been taught (Woodruff, Hanning, McGoldrick & Brown, 2010). The most intriguing aspect in this study was that during pre-test, both experiment and control group children were able to identify sweets as the type of snack that causes tooth decay. However, even though they knew that sweets and chocolates cause tooth decay, they continued to consume them.

The study was also consistent with that of Harris (2012) which have shown improvement in the awareness of nutrition knowledge. Also, in a study conducted in Eastern Cape by Jemmott, Jemmott, O'Leary et al. (2011), there was significant improvement in Grade 6 (n=495) children's knowledge of fruit and vegetables. From their study, the experiment group showed higher knowledge (P=0.00001), more favourable attitude (mean difference =0.43, P<0.001) and stronger intention to engage in health-promoting behaviour (mean difference =0.45, P<0.001) when compared to the control group (Jemmott et al., 2011). Also, Jemmott et al. (2011) included activities to make learners aware of the relationship between diet and health, to help learners assess their individual health habits, and to teach them healthy dietary and physical activity behaviours. However, their study was 3, 6 and 12 months post-intervention compared to the current study wherein the intervention was three months.

This might have contributed to children remembering facts about healthy food and that only components taught were tested, and those that were not taught were left out. On the other hand, Karimi-Shahanjarini et al. (2013) found that a year-long intervention has the ability to make children remember facts since they will get used to talk and write about what they learnt from interventions.

The two studies also differed in the sense that Jemmott et al., (2011) study used trained facilitators from outside the schools who implemented various activities which comprised interactive exercises, games, brainstorming, role-playing and group discussions whereas in the current study the researcher took upon herself to carry out the intervention. This intervention only administered a questionnaire which fit properly on Consolidated Standards of Reporting Trials (CONSORT) as explained by Grant, Mayo-Wilson, Montgomery et al. (2018). Accordingly, a programme that used expertise (like that of Jemmott et al., 2011) from outside the schools appeared to have a huge success at improving the quality of primary school children's diet. Other studies (Kupolati, MacIntyre, & Gericke, 2014; and Littlecott, 2016), for example, have revealed that using trained facilitators to implement a nutrition curriculum in primary schools resulted in successful outcomes in children's knowledge and eating behaviour. Furthermore, Ball, Leveritt, Cass and Chaboge (2016) have reported that primary health professionals are well trained and improve patients' dietary behaviours.

Based on what learners are fed from the NSNP, it can be inferred that the Integrated School Health Programme (ISHP) was adhered to by the schools and this is considered as an important tool to promote a healthy eating environment. Learners indicated that the school feed with porridge, rice and samp as sources of carbohydrates, beans and milk as sources of proteins, fruits and vegetables as sources of vitamins and minerals. It is important for learners to be taught about healthy eating habits at an early age, thus defining the purpose of implementing the ISHP at primary schools (Gourdet et al., 2014). However, not much was done at school to emphasise the importance of adhering to SAFBDG, which is part of the ISHP. Even though Grade 5 curriculum in both Life Skills and Natural Sciences indicate that learners have to be taught about dietary guidelines (SAFBDG), learners in this study were not taught about this concept until this intervention. These results are considered alarming because all participants have passed Grade 5 but had never been taught about the guidelines. This is the failure of the school SMT to clarify the importance of SAFBDG and ISHP and ensure that all concepts in the curriculum are taught. Failing to implement and teach learners about the health guidelines in schools deprives children of knowledge to health-related issues. As a result, Basch (2010) and Yamaguchi, Kondo and Hashimoto (2018) indicated that in accordance to scientific reviews schools that conduct the health programmes can create a positive effect on

children's educational outcomes and health outcomes. Not teaching primary school children about SAFBDG and ISHP could be one of the contributing factors of limited knowledge on health issues and probably poor performance.

One strategy to improve the diet of children is to provide better access to nutritious food at schools as indicated in this study. Evidence supports the notion that school-lunch programmes improve diet quality and food security among children, especially those of low SES (Egner, Oza-Frank & Cunningham, 2014). School-lunch programmes are provided to under-privileged children with socioeconomic difficulties. This selective approach can efficiently reach populations in need but it may also run the risk of stigmatizing children of low SES among their peers, particularly those from well to do families.

There was no difference shown in experimental and control condition on health practices. Both experimental and control condition showed no change with regard to health practices. The fact is that, while children may have some level of knowledge on the effect of unhealthy diet on their health, they still continued to consume unhealthy type of food. This finding is similar to that of Abdollahi et al., (2008) who found that there was poor dietary practices even among children with good nutrition knowledge. However, a study by Kostanjevec, Jerman and Koch (2013) has shown that healthy food knowledge is a factor that influence the decisions and behaviour people make about food. This suggests that, even if knowledge may be adequate, what you do with the particular knowledge is important. The belief is that behaviour may change after acquiring a certain level of knowledge (Sanne & Wiese, 2018) and it should be borne in mind that behaviour is critical to the health of an individual. Because behaviour takes place in social environments, efforts to change it must therefore take account of the social context and economic forces, which act directly on people's health, regardless of any individual choices that they may make about their own conduct.

Despite participants showing improvement in knowledge acquisition, practices were not improved, particularly the consumption of sweets, bunny-chow and fat-cakes. Lack of healthy food knowledge has been implicated as a cause of poor dietary habits (Bray & Popkin, 2014) but participants in this study showed improvement in

knowledge. Though knowledge has improved, there was not change in practices. This suggests that knowledge alone may not be sufficient to have appropriate dietary practices. When looking at the variable model of this study, intention, as per TPB, determines practices. However, these practices did not change regardless of knowledge acquisition. When looking at the practices and subjective norms, children still preferred to eat unhealthy food even after intervention. This was also observed during the focus group interview and experimental condition when they preferred to eat unhealthy type of food.

5.2.4 Main Finding 4

Changes in health practices and knowledge due to intervention considering co-variables and changes in health attitude, subjective norm and self-efficacy

The results showed no significance difference between the experiment and control condition in heath practices after intervention. After considering initial differences in health practices, none of the other variables (viz., attitude, subjective norm, self-efficacy, grade, gender and age) played a significant role. Nevertheless, after comparing the difference between experiment and post condition with regard to health knowledge, it was interesting to observe that there was a significant difference of knowledge before intervention and knowledge after the intervention ($F(1.315)=115.72$; $p<0.001$) in health-related knowledge. In addition, 58.3% of the difference between both groups seems related to the intervention. However, none of the other variables played a significant role except for subjective norm.

Health practices did not change even after intervention. The most common food that was eaten seven days in a week was porridge and *morogo*. Just like in Oldewage-Theron and Egal's (2010) study, the current study confirms that porridge is the staple food consumed by most Black communities since it was consumed daily. According to Steyn (2006), most South Africans consume mainly maize (which when cooked makes porridge), and bread. Fat intake was high, and did not significantly decrease even after intervention. One of the most common sources of fat was *sephatlo* (bunny-chow) and *magwenya* (fat-cakes) which participants reported consuming them at least five times per week.

Even though participants in this study showed fair healthy-diet knowledge acquisition after intervention, practices did not change. In general, the results show no relationship between knowledge and practices. It can therefore be concluded that there is no link between healthy-diet knowledge and practices. For example, about 67% (n=109) ate a fruit once a week. This is much less than the recommendations of five or more per day established by the Department of Health (2013). Although it is not certain where they get the fruit from, it is likely that the fruit is served from the school nutrition programme. However, schools cannot be the only environment that advances the consumption of fruit. Children cannot be blamed for not eating fruits daily because they eat whatever is provided for by their families. Even if families do not adhere to food guidelines, schools play a very important role in advancing healthy diet.

Findings that dietary practices among children were characterized by more consumption of fatty and sugary foods from vendors and tuck-shops in schools is an indication of unhealthy food choices. This study is in agreement with other studies which found that young children from developing countries are increasingly making unhealthy food choices especially due to lack of knowledge and negative attitude (Jain, Yadav, Singh & Chamoli, 2018). Previously, over consumption of sweetened drinks/beverages was a trend observed among American population (Parmar, 2014). However, current studies indicate increased feasting of fatty foods among children in developing countries, with increased consumption of sugary beverages (Popkin & Hawkes, 2016; and Rastogi & Thakur, 2014). This may contribute to a greater number of caloric intake which may accelerate obesity epidemic.

Participants in this study indicated that they did not eat breakfast. Some indicated that they did not eat because they would be late to school while other did not have anything to eat for breakfast. These findings are consistent with those by Mihrshahi, Drayton, Bauman and Hardy (2018) who found that many children do not have breakfast daily. This is despite recent data from the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE), which demonstrated that more frequent breakfast consumption was associated with lower BMI z-scores and body fat percentage compared with occasional and rare consumption (Zakrzewski, Gillison, Cumming et al., 2015). It is suggested that the protective effect of eating breakfast is that it may

reduce snacking and consumption of energy-dense nutrient-poor foods later in the day which may increase obesity (Timlin, Pereira, Story & Neumark-Sztainer, 2008). Skipping breakfast may also have long-term effects. It was found in the Australian longitudinal study by Smith, Gall, McNaughton, Blizzard, Dwyer and Venn (2010) that children age 9-15 years who reported skipping breakfast in both childhood and adulthood had larger waist circumferences, higher BMI, and poorer cardio-metabolic profiles than did those who reported eating breakfast at both time points.

Feasting on fried food was found to be high (76%), particularly among girls. This is despite the fact that they were aware that fried food can make a person fat. This finding suggest that primary school children might know about the bad practice of consuming fried food like fat-cakes and bunny-chow. Fried food could be seen everywhere since these kind of foods is tasty, fill the stomach and not much expensive (Aung et al., 2012). This suggests that even though they have sufficient knowledge regarding healthy food, they found it hard to follow the recommended type of food to be consumed, e.g., lots of fruits and vegetables. Thus, children need further education, not only on healthy eating, but also on effects of unhealthy eating.

Based on a TPB meta-analysis by Armitage and Conner (2001), attitudes, subjective norms, and perceived behavioural control (PBC) accounted for 39% of the variance in intention, and intention accounted for 25% of variance in health behaviours. Furthermore, PCB alone accounted for an additional 2% of variance in behaviour beyond the effect of intention. The TPB has been used to successfully plan and evaluate numerous interventions for many different behaviours, including healthy diet and exercise, among others. Research has utilized the TPB to predict dietary behavioural intention and behaviour, but few interventions have been developed based off the TPB (Hardeman, Johnston, Johnston, Bonetti, Wareham & Kinmonth, 2002). Even fewer TPB-based dietary behaviour interventions have been developed for adolescent or young adult populations. According to Azjen (2015), it is important to realize that the TPB does not assume rationality on the part of the decision maker, who is a child in this instance.

TPB does not assume rationality on the part of the decision maker given that the readily accessible beliefs that provide the basis for attitude toward the behaviour,

subjective norm, and perceived behavioural control can be poorly informed, unconscious biases, wishful thinking and probably self-serving motives. All what Azjen (2015) assumes in the TPB is that people's intentions and behaviours follow reasonably and consistently from their beliefs no matter how these beliefs were formed. It is only in this sense that behaviour is said to be reasoned or planned. Moreover, people are not assumed to go through a careful examination of beliefs every time they perform a behaviour. With repetition, behaviour becomes routine and is performed without much conscious. For example, eating bunnychow, fat-cakes and sweets has become a routine to many of the participants mainly because it is a routine.

After the intervention, when learners were asked to make their own choice of breakfast, lunch, snack and dinner, about 75% chose healthy types of food compared to those of control group. The fact that the experiment group chose healthier food than the control group suggest that children are able to make good judgement on healthier food. With regard to snacks, they were to make a choice among sweets, pizza and orange. However, the control condition results showed that most preferred to eat either sweets or pizza while the experiment condition opted for orange. Snacks are classified as the foods that are eaten in-between the meals or light meals. These snacks can either be healthy or unhealthy. In this instance, children opted unhealthy snack like pizza or sweets rather than the healthy snack, which is the orange. This finding suggest that parents should set an example for their children and differentiate between healthy and unhealthy type of snacks.

The more positive their attitudes and subjective norms are regarding their personal choices of healthier food, and the greater their perceived behavioural control, the stronger their intentions to perform the behaviour will be. Similarly, the stronger people's intentions, and the greater their perceived behavioural control, the more likely it is that people will perform the behaviour. The TPB assumes that intentions and perceived behavioural control mediate the effects of attitudes, subjective norms, and co-variables (e.g., age, gender, grade) on behaviour" (Sharma, Hopping, Roache & Sheehy, 2013). This is best illustrated in figure 2.3 in Chapter 2 (p36). Finally, this intervention was successful in improving knowledge on healthy diet but unsuccessful on improving practices.

5.3 Conclusion

Comparatively, there is improvement of healthy food knowledge in the experiment condition than in the control condition and after the intervention. However, practices did not change even after the intervention. There is no purpose of knowing without implementing what has been learnt. It is a concern that children in this study have knowledge on healthy diet yet they still eat unhealthy food. This study concluded that nutrition intervention is an important tool that can improve and control the eating habits of primary school children; therefore, may prevent the dietary risks of NCDs. It is thus advisable for all children to be taught about healthy diet and healthy eating habits from a young age because change may be relatively easier to achieve at this stage of life. It is possible to correct and change eating habits through interventions. However, the challenge that may arise is the type of food available for children to eat at home and at school. It was clear in this study that, even if knowledge on healthy food may change, it is difficult to change the practices; which may be as a result of availability of healthy food. It is important to raise awareness of eating nutritious food and food with sufficient energy than low-nutrient and high-energy diets through interventions.

It is therefore important to strengthen healthy school environments through the implementation of efforts towards a healthy diet and by avoiding the availability of unhealthy food and drinks in line with Integrated School Health Programme (Ahmed, 2014). The results suggest that even if there can be changes in knowledge due to intervention, healthy practices may be difficult to change mainly because knowledge alone cannot decrease the prevalence of health-related conditions. Also, School Management Teams and School Governing Bodies should play their role in emphasizing the importance of Food-Based Dietary Guidelines. Availability of healthy food like fruits, vegetables in the school premises may keep students away from junk food. The school has a predominant role in making sure that what is sold on school premises is of health importance, and also encourages parents to create a healthy environment at home.

As noted earlier, the factors surrounding the relationship between knowledge and practices are different disciplines that may be of uneven quality. However, it is important to consolidate what is learned (knowledge) through health education to practice, hence knowledge improvement than healthy practices in this intervention

study. This suggests that interventions must be escalated to household because in most cases children have no choice but to eat what is provided by parents or family members, whether the food is healthy or not. So, prioritizing community interventions is vital in order to curb the challenge of health-related diseases, suggesting that good practices on healthy diet can be enforced through various interventions. As it was shown in this study that knowledge acquisition cannot necessarily bring change to practices, underlying factors to this problem must be identified and addressed. A particular need exists to bridge the divide between knowledge practices and attitude towards healthy diet of primary school children. Future research should address how to integrate knowledge, practices and attitudes on healthy diet in primary schools. But the knowledge, practice and attitude relationship has relevance to school and home environment because their distinction creates power to promote efforts in the community to improve educational opportunities and create conditions in early childhood to put youth on a path for better health.

This study showed that the TPB can help predict and explain children's intentions and behaviour. The TPB model showed in this study illustrated that knowledge and attitude alone cannot change behaviour. Therefore, it is important to consider not only attitudes toward choice alternatives but also the influence of perceived social norms and behavioural control. Furthermore, by eliciting readily accessible behavioural outcomes, normative referents, and control factors, application of the TPB assisted to directly measure the considerations that guide the ideal diet for children. The school age period is nutritionally significant because this is the time to build up body stores of nutrients in preparation for rapid growth of adolescence. Better nutrition incorporates stronger immune system, less illness, better health and productive community (Sati & Dahiya, 2012). The TPB also assists to incorporate various background factors, such as age or gender, into the model and to test the mediated influence of these factors on intentions and behaviour. Finally, once the theory's predictive validity has been confirmed, the information obtained can be used to design effective behaviour change interventions.

5.4 Recommendations

As indicated in Chapter 1, this thesis was nested in a bigger project of multiple literacies encompassing literacy and health. The study suggests that future

interventions are encouraged to include a moderate intensity intervention by trained professionals and feasibility of involving educators, SGB and SMT, particularly in policy adherence. Therefore, this study proposes a healthy food intervention strategy incorporating the Theory of Planned Behaviour and Partnership Training Model in order to improve the knowledge, attitude and practices of children in healthy diet. The intervention strategy should adopt the Training Partnership Model among parents, educators, SGBs and trained health professional. The results of this study prompted the development of a model for future research. The following model may be used in conjunction with TPB model in further research on knowledge, practices and attitudes of primary school children towards healthy diet and lifestyle:

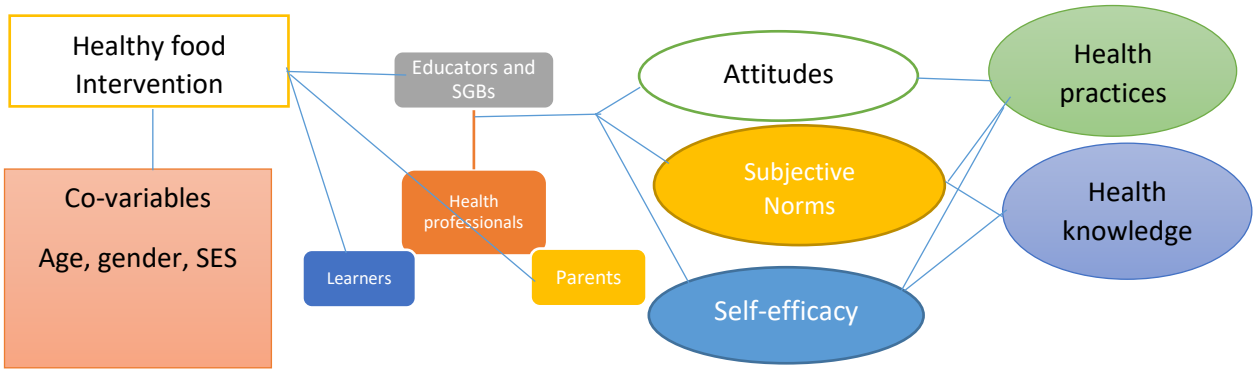


Figure 5.1: TPB and Training Model for Healthy Food Intervention

Since the Life Skill subject of CAPS emphasises healthy eating among school children, educators should guide learners to make informed and responsible decisions about their health and environment. The environment that learners find themselves in during school hours needs to support the messages conveyed in the classrooms. As a result, school should play a predominant role in advancing good health on children by not allowing vendors and tuck-shop operators to sell unhealthy food to children within the schools. The SAFBDGs should be incorporated when teaching Life Skills so that good practices on healthy diet can be adhered to. Also, schools should adhere to policies on school nutrition and integrate these policies to teaching and learning. Finally, delivering continuous education through interventions may help to improve children nutritional knowledge, attitudes and practices.

5.5 Limitations

There are limitations to this study. First, the generalizability of the study may be limited because all participants were selected from one rural village in a district of more than forty villages. Further studies should evaluate the effectiveness of broad-based knowledge, attitude and practices on healthy diet in schools that are in other settings in terms school quintiles. Secondly, findings would undoubtedly emerge with greater diversity for a larger number of participants. In any setting, delving into the broad expanse of variables that occupy the relationship among knowledge, attitude and practices on healthy diet, a web of influences noteworthy not only for its breadth may not be a simple task. Others may wish to continue gathering community perspectives on upstream determinants of adherence to a healthy diet, thus breaking this complex model into smaller components. Thirdly, this study did not look into socio-economic status of participants, which might have had a great impact on this study. Also, having responses from the school teachers and parents would be more beneficial; something that can correlate the answers from the learners, teachers and parents with respect to healthy diet. Finally, because the researcher is not a health professional, anthropometric measurements were not taken into consideration to understand the current BMI of participants so as to judge whether they were obese or not, based on the type of food they eat.

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APPENDICES

Appendix A: Ethics Clearance Certificate

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING:	**14 May 2019**
PROJECT NUMBER:	**TREC/115/2019:PG**
PROJECT:	
Title:	Knowledge, Practices and Attitudes of Primary School Children Towards Healthy Diet in Dikgale Village, Limpopo Province, South Africa
Researcher:	SEL Modjadji
Supervisor:	Prof MJ Themane
Co-Supervisor/s:	Prof M Valcke
School:	Education
Degree:	PhD in Education

PROF P MASOKO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**
ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**
iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

Finding solutions for Africa

Appendix B: Letter to Circuit Manager

Box 3056
Sovenga
0727

04 July 2016

The Circuit Manager
Department of Education
Dimamo Circuit Office/Capricorn District/Limpopo Province

Dear Sir/Madam

RE: PERMISSION TO CONDUCT RESEARCH IN PRIMARY SCHOOLS WITHIN YOUR CIRCUIT

I hereby request for permission to conduct educational research in seven primary schools in Dimamo Circuit. I am presently busy with my thesis, a compulsory requirement towards the completion of a PhD in the School of Education at the University of Limpopo. The topic of my thesis is:
TITLE: KNOWLEDGE, PRACTICES AND ATTITUDE OF PRIMARY SCHOOL CHILDREN ON HEALTHY DIET IN DIKGALE VILLAGE, LIMPOPO PROVINCE, SOUTH AFRICA

I am prepared to observe the following stipulations:

1. Participation in the research will be voluntary.
2. All information obtained will be treated confidentially and used for academic purposes only.

Yours sincerely,

Mrs Modjadji SEL

Appendix C: Letter to Principal

Box 3056
Sovenga
0727

04 July 2016

The Principal

.....

Dear Sir/Madam

RE: PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL

I hereby request for permission to conduct educational research in your school. I am presently busy with my thesis, a compulsory requirement towards the completion of a PhD in the School of Education at the University of Limpopo.

The topic of my thesis is:
KNOWLEDGE, PRACTICES AND ATTITUDE OF PRIMARY SCHOOL CHILDREN ON HEALTHY DIET IN DIKGALE VILLAGE, LIMPOPO PROVINCE, SOUTH AFRICA

I am prepared to observe the following stipulations:

1. Participation in the research will be voluntary.
2. All information obtained will be treated confidentially and used for academic purposes only.

Yours sincerely,

_____
Mrs Modjadji SEL

Appendix D: Letter to Parents (English Version)

Box 3056
Sovenga
0727

04 July 2016

Dear Parent

I am enrolled to PhD degree at University of Limpopo and I am working on a thesis titled **"KNOWLEDGE, PRACTICES AND ATTITUDE OF PRIMARY SCHOOL CHILDREN ON HEALTHY DIET IN DIKGALE VILLAGE, LIMPOPO PROVINCE, SOUTH AFRICA"**

In this context, I have to undertake a research and I would be grateful if you can grant your child permission to participate in this study. All information gathered will be treated with strict confidentiality and anonymity. The name of your child will not appear on the research report.

Thanking you in advance for your cooperation.

Yours sincerely

_____
Mrs Modjadji SEL

Appendix E: Letter to Parents (Sepedi Version)

Box 3056
Sovenga
0727

04 July 2016

Go Motswadi

Ke e ngwadišitše bjalo ka moithuti le University ya Limpopo moo ke ithutelang grata ya PhD go tša thuto. Ka fao, ke swanetše go dira dinyakišišo gore ke kgone go tšwelela. Hlogo ya dinyakišišo e re: “TSEBO YA BANA KA GA DIJO TŠA PHEPO” Ka ge ke tlo dira dinyakišišo, nka thaba kudu ge le ka fa ngwana wa lena tumelelo ya go kgatha tema mo dinyakišišong tšeo ke di dirago. Dinyakišišo tšeo di tla dirwa sekolong se ngwana wa lena a tsenago gona. Maina le dipoelo tša bakgatha-tema e tla ba sephiri. Ka fao, ke kgopela gore le tlatše foromo ye e latelago, gomme ge le feditše le e saene.

Nka leboga kudu ge le ka mo dumelela go kgatha tema dinyakišišong tšeo.

Wa lena ka boikokobetšo

_____
Mrs Modjadji SEL

Appendix F: Consent Forms (for Parents & Learners) (English Version)

CONSENT FORM (PARENT)

I……(Parents Names) am the parent of …… (Learner's Names) who is in Grade……
I give my child/ do not give my child permission to take part in the research, which will take place in the school. The final decision to take part will be taken by her if she wants to take part in that particular research.

Parent's Signature Date

……. ……..

……

CONSENT FORM FOR PARTICIPANTS

I …….. (Learner's Names) who is in Grade……. understand that my participation in this project is voluntary. I may withdraw and discontinue participation at any time without penalty. I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure.

Learner's Signature Date

…….. …….

Appendix G: Consent Forms (for Parents & Learners) (Sepedi Version)

FOROMO YA TUMELELO (MOTSWADI)

Nna.....(Maina a motswadi) ke motswadi wa.....(Maina a ngwana) yo a dirago mphato wa..... (Grade). Ke fa ngwana wa ka tumelelo/Ga ke fe ngwana wa ka tumelelo ya gore a kgathe tema mo dinyakišišong tšeo di tlabego di dirwa sekolong sa bona. Sephetho sa mafelelo se tla tšewa ke ngwana ge e ba o tla kgathatema.

Motswadi wa ngwana Tšatšikgwedi

....

……

FOROMO YA TUMELELO YA MORUTWANA

Nna ……. (Leina la morutwana) ke mphatong wa…….Ke tšea karolo dinyakišišong tše ka kgetho yaka. Ke dumela gore nka gogela morago nako ye ngwe le ye ngwe ntle le kotlo. Ke kwešiša gore monyakišiši a ka se phatlalatše leina la ka go laetša tše ke di boletšego dinyakišišong.

Morutwana Tšatšikgwedi

…… ……

Appendix H: Questionnaire

TITLE: Knowledge, Attitudes and Practices of Primary School Children towards Healthy Diet in Dikgale Village, Limpopo Province, South Africa

The following are the objectives that will guide the study:

- To investigate the relationship among attitudes, subjective norm, self-efficacy to TPB model, and the intended health practices and knowledge prior to the intervention.
- To investigate the relationship among attitudes, subjective norm, self-efficacy to Theory of Planned Behaviour (TPB) model, and the intended health practices and knowledge after the intervention.
- To determine whether there is a difference in experimental and control condition in health practices and knowledge due to intervention.
- To determine whether there is change in health practices and knowledge due to intervention considering co-variables and changes in health attitude, subjective norm and self-efficacy.

Tick [✓] one in all the questions in this questionnaire. There is not right or wrong answer.

1. School: ☐Kgatla ☐Dikgopheng ☐Mogabane ☐Dikwata
   ☐ Malesela ☐Kgalaka ☐ Mosebo

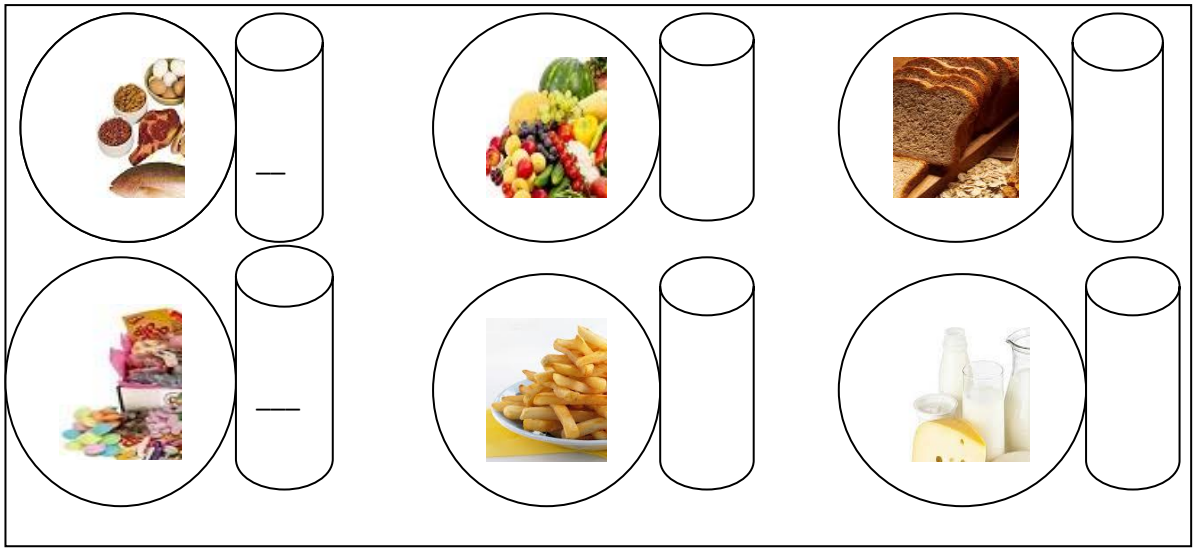
2. GRADE: ☐ Grade 6 ☐ Grade 7

3. GENDER:☐ Male ☐ Female

4. AGE: _____ years

1. **KNOWLEDGE IN HEALTHY DIET**

1.1. Look at the following diagram and answer the questions that follow.



1.1.1. Put **X** next to the food group that contains calcium for strong bones.(Milk)

1.1.2. Put **Z** next to the food group that contains high dietary fibre.(Fruits and vegetables)

1.1.3. Put **O** next to the food group that build strong muscles.(meat, eggs, fish)

1.1.4. Put **Q** next to the food group that gives the body energy. (bread, cereals)

1.1.5. Put **Y** next to the food that can cause tooth decay. (sweets)

1.1.6. Put **B** next to the food group that has lots of fat. (chips)

2. ATTITUDES IN HEALTHY DIET (Adapted from Steyn et al, 2013)

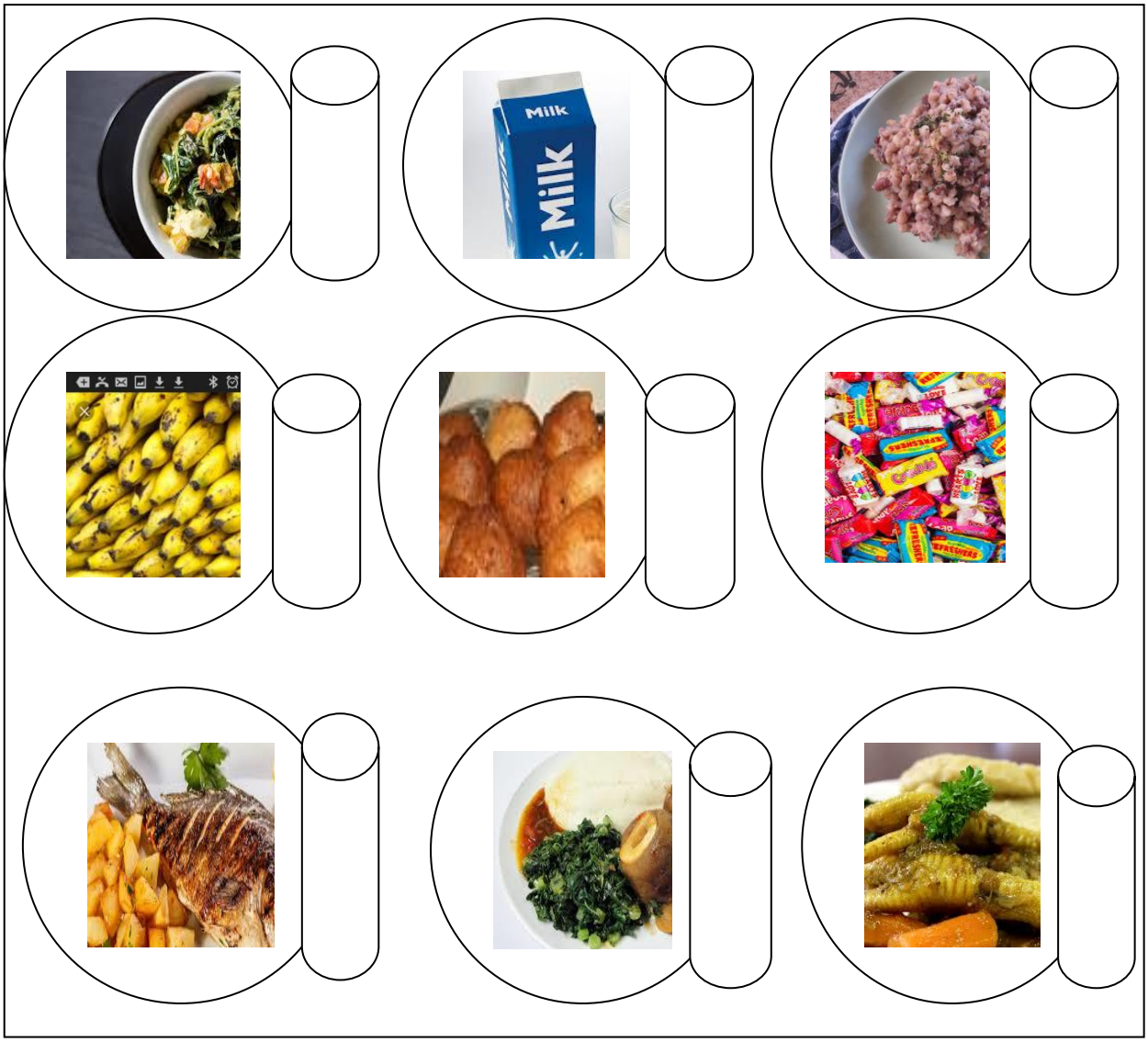
2. In this question we are showing you two sets of pictures. Write the letter (A or B in the FIRST box) of the food item you LIKE BEST and the letter (A or B in the SECOND box) of the food item that is the HEALTHIEST (the best for you) [Box 1↓] [Box 2 ↓]

2.1	A  Milk	or	B  Coffee creamer	LIKE BEST ☐	HEALTHIEST ☐
2.2	A  Plain popcorn	or	B  Packet of chips	LIKE BEST ☐	HEALTHIEST ☐
2.3	A  Brown bread with a boiled egg	or	B  Brown bread with a fried egg	LIKE BEST ☐	HEALTHIEST ☐
2.4	A  Cool drink	or	B  Water	LIKE BEST ☐	HEALTHIEST ☐
2.5	A  Sweets	or	B  Peanuts & raisins	LIKE BEST ☐	HEALTHIEST ☐
2.6	A  Banana	or	B  Cookies / Biscuits	LIKE BEST ☐	HEALTHIEST ☐
2.7	A  Bread & Jam	or	B  Bread & Peanut butter	LIKE BEST ☐	HEALTHIEST ☐

3. PRACTICES IN HEALTHY DIET

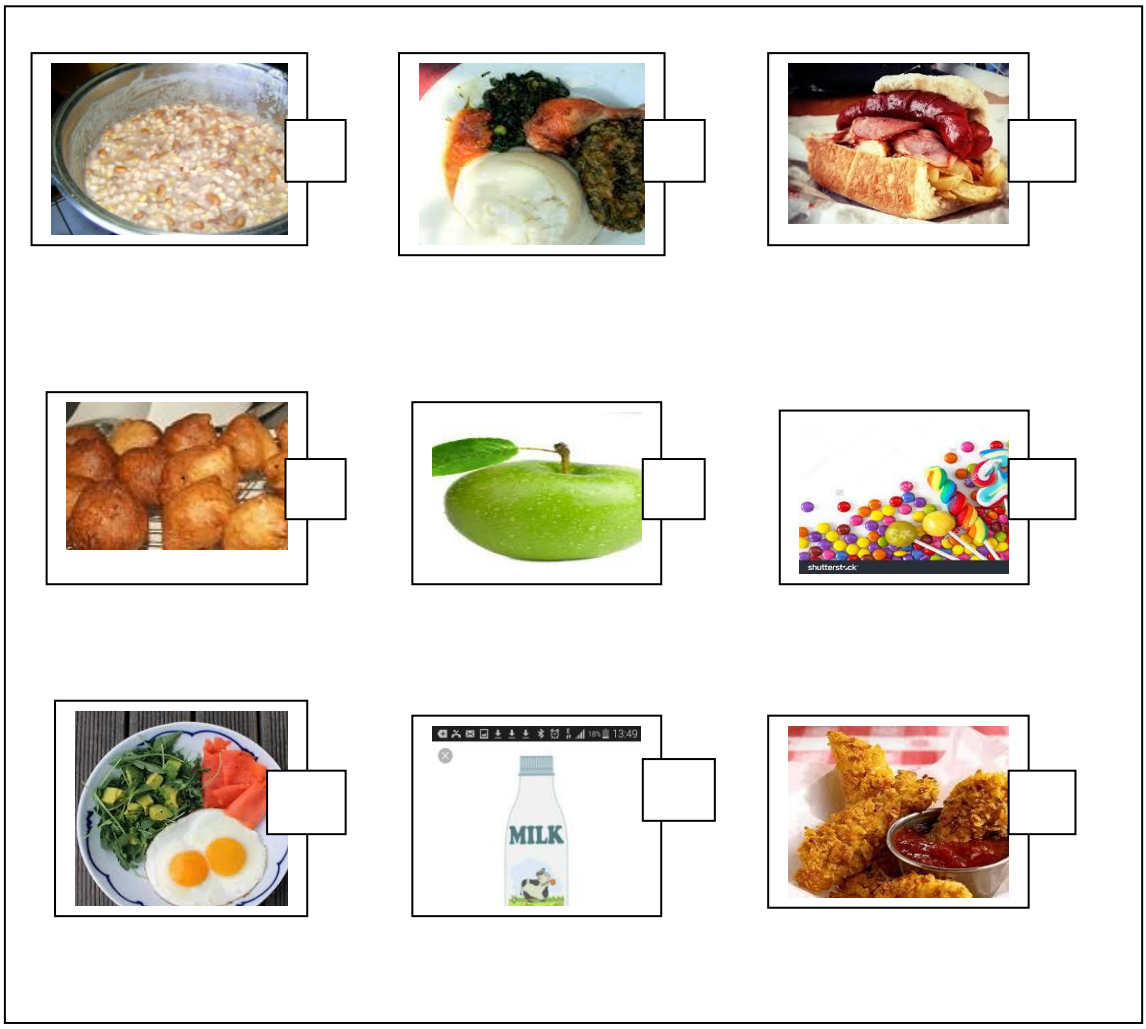
How often do you eat the following?

3.1. Put 1 when you eat once a week.
3.2. Put 2 when you eat/drink twice a week.
3.3. Put 3 when you eat/drink 3 times a week.
3.4. Put 4 when you eat/drink 4 times a week.
3.5. Put 5 when you eat/drink 5 times a week.
3.6. Put 6 when you eat/drink 6 times a week.
3.7. Put 7 when you eat/drink 7 times a week.
3.8. Put 0 when you don't eat/drink in a week.



4. SUBJECTIVE NORM- HEALTHY DIET

Look at the following pictures and answer the questions that follow. You may write more letters in each case.



4.1. Put **1** in a box of the food you get at home. (*pap* and *morogo*)

4.2. Put **2** in a box of the food you get at school nutrition. (samp/milk/apple)

4.3. Put **3** in a box of food you buy a school tuck-shop. (*sephatlo*/*magwenya*)

4.4. Put **4** in a box of the food you get at Vendor. (*sephatlo*/*magwenya*/sweets)

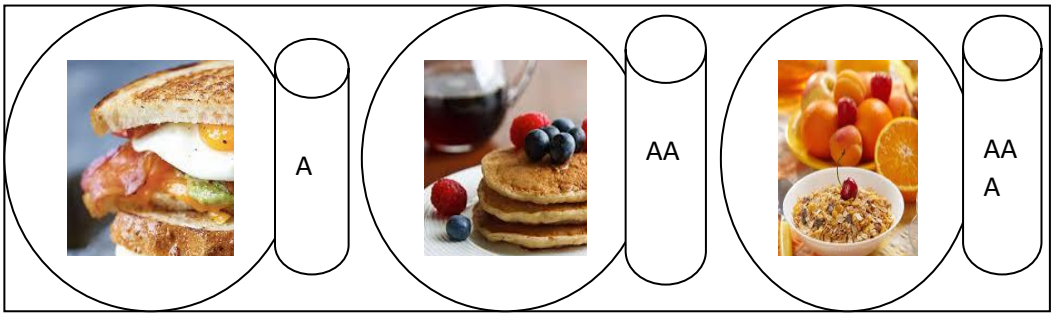
4.5. Put **5** in the box of food you eat with friends. (sweets)

5. SELF-EFFICACY - HEALTHY DIET

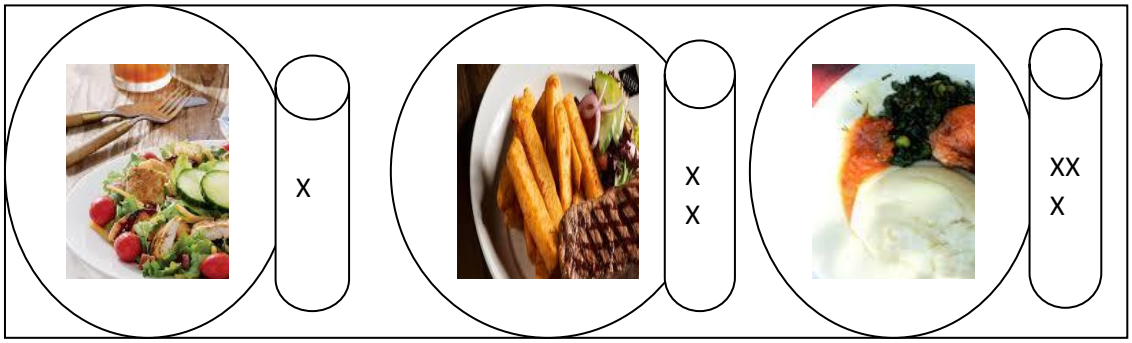
Your mother asks you to prepare the food. Can you make choices for each meal?

What can you put on the table? Choose one for each of the following by putting ◯

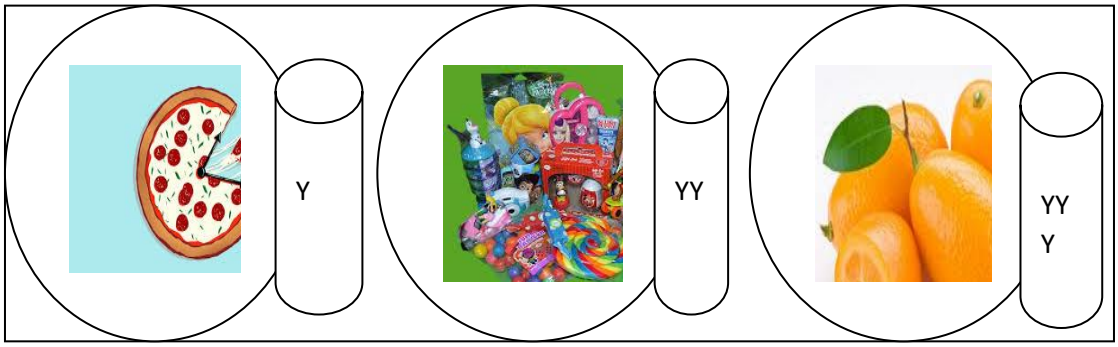
Breakfast



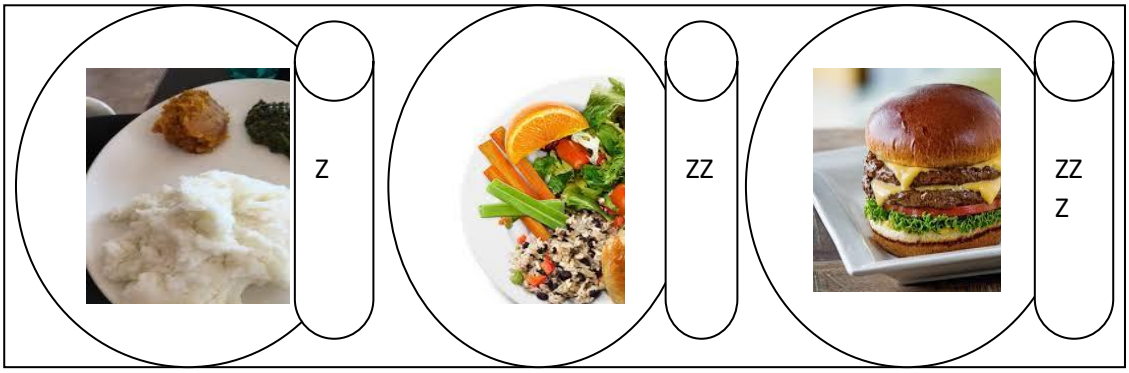
Lunch



Snack



Dinner



Appendix I: Interview Schedule

INTERVIEW SCHEDULE (Focus group)

1. According to your knowledge, what constitutes a healthy diet?
2. Why is it important to eat a healthy diet?
3. Do you eat breakfast before coming to school?
4. What do you like to eat?
5. Do you think that what you like to eat is healthy? Why do you say so?
6. Do you eat according to FBDG?
7. Are you aware of the effects if not eating healthy?
8. Explain what you are taught about on healthy diet at school.
9. Why do you buy food from vendors around the school? Do you think they sell healthy food?
10. Who usually prepares food at home? Do you think they prepare healthy food? Why do you say so?
11. Which food can you prepare for breakfast, lunch and dinner if you were given the opportunity?

THANK YOU FOR PARTICIPATING

Appendix J: Editor's Letter

Mr MM Mohlake
Po Box 544
Sovenga
0727

01 June 2019

To Whom It May Concern

EDITING CONFIRMATION: Ms SEL MODJADJI's THESIS

This letter is meant to acknowledge that I, MM Mohlake, as a professional editor, have meticulously edited the main thesis of Shapule Edith Ladygay Modjadji (Student Number #: 200309208), entitled "Exploring Knowledge, Practices and Attitudes of Primary School Children towards Healthy Diet in Dikgale Village, Limpopo Province, South Africa".

Thus I confirm that the readability of the work in question is of a high standard.

For any enquiries please contact me.

Regards

Mosimaneotsile M Mohlake
Freelance Professional Editor
072 1944 452
<mmohlake@otmail.com>