Food for thought: A closer look at Ipolokeng primary schools' nutrition programme

Hlengiwe Princess Khuzwayo

972190132

Masters in Science Education

Supervisor: Dr. A. Singh-Pillay

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Faculty of Education

University of KwaZulu-Natal

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DECLARATION

I hereby declare that "**Food for thought: A closer look at Ipolokeng primary schools' nutrition programme"** is my own work and that all of the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Hlengiwe Princess Khuzwayo

December 2016

Student Number: **972190132**

Signed: _____

Date: _____

Supervisor: Dr. A. Singh-Pillay

Signed: _____

DEDICATION

This thesis is dedicated to:

My late adorable father, Mandlenkosi Aubrey Mhlongo, who used to say, "*Ntombi yami, ngifuna ufunde ugcine lapho uthanda khona.*"

My late mother, Primrose Lindiwe Mhlongo Makhanya, for the unconditional love she gave us. Your love was like a woven basket, covered with impeccable tar and pitch, energy, wisdom and patience. You have truly sweated for us to be where we are today. As a woman, a wise woman, who chose to stick with God, for that I thank you!

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Finally, my Lord and Saviour, who gave me strength, hope and faith that through perseverance, nothing is impossible with God.

Luke 1:37

ABSTRACT

The National School Nutrition Programme (NSNP) was initiated in 1994 to improve the learning capacity of children through school feeding; to increase the attendance of learners; to obliterate school dropout; to increase the pass rate; to reduce the rate of child mortality; and to empower poverty-stricken communities, particularly in rural areas across all nine provinces in South Africa (Seoketsa, 2007). For many South African children, the meals provided through the school feeding programme are their main, and in some cases their sole source of energy and nutrients.

The success of the school feeding programme hinges on volunteer food handlers (food handlers are mainly local women from the community who are responsible for the preparation and serving of meals at schools).

Although annual reports from the Department of Basic Education indicate the success of the National School Nutrition Programme (NSNP) (DBE, 2009; DBE, 2010a; DBE, 2011), there have been reported incidents of food poisoning and food contamination in the following provinces: KZN, Limpopo, Gauteng, and the Eastern Cape (Myburgh, 2015). Whilst South African food legislation requires that the food that is made available to the general public should be hygienic and free of harmful substances and organisms (R.1183 of 1990; R.918 of 1999), in 2014 alone, 1 600 learners took ill after consuming contaminated food from their school's nutrition programme. Sound nutrition comprises more than simply the availability of food. It was these incidences of food poisoning and contamination that prompted me to take a closer look at my school's nutrition programme (Ipolokeng primary). We feed 599 learners on a daily basis.

The study was guided by the following research questions:

> What are the knowledge and practices of food handlers and suppliers with regard to food safety?
> What is the practice of food handlers with regard to food preparation?
>
> Do the meals prepared and served to learners constitute a balanced meal? If so, how? If not, why not?
>
> Do the levels of environmental hygiene at Ipolokeng primary meet the requirements prescribed by Regulation R918 of 30 July 1999? If so, how? If not, why not?

To address these questions, a qualitative case study design approach was used. Data was generated through questionnaires, photo observations, photo focus group discussions, and document analysis. The data collected were then subjected to a content analysis.

The findings of the study reveal that the VFH has not undergone any formal training in terms of food preparation/food safety to equip them with the necessary knowledge and skills required to engage with the preparation of food in a safe manner. In terms of their practice during food preparation, the findings expose that the standards and requirements prescribed by Regulation 9 of R918 of July 1999 were not complied with. Adequate cautionary measures to safeguard food from contamination were not taken by the Volunteer Food Handlers (VFHs) or the SMT of Ipolokeng primary school. As a result of their poor practice during food preparation, food safety was not maintained and good personal hygiene was not practiced at Ipolokeng primary school in terms of the stipulations of Regulation R918 of 1999.

On the days when food items went 'astray', learners at Ipolokeng primary did not eat a balanced meal comprising all of the food groups. In terms of the level of environmental hygiene, Ipolokeng primary school did not meet the requirements stipulated by Regulation R918 of 1999 regarding ablution facilities, the availability of hand sanitizer, and disposable hand towels. The absence of these essential items compromised the personal hygiene practice of the VFH, the learners and teachers, and thereby impacted the safety of the food prepared and consumed. Additionally, the garbage disposal facilities, food storage area, and the food preparation area at Ipolokeng primary also failed to embrace the conditions set out by Regulation R918 of 1999. Furthermore, there was no feeding area where learners could sit and eat their meals. The lack of environmental hygiene at Ipolokeng primary has raised questions about the safety of the food prepared at the school.

The above findings signal the need for capacity building programmes for the effective implementation of the NSNP.

Key words: Cross-contamination, food preparation and safety, personal hygiene, environmental hygiene.

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LIST OF ACRONYMS

DBE: Department of Basic Education

DoE: Department of Education

DoH: Department of Health

HACCP: Hazard Analysis and critical control points

INP: Integrated Nutrition Programme

INS: Integrated Nutrition Strategy

IFSS: Integrated Food Security Strategy for South Africa

KZN: Kwa Zulu Natal

MDG: Millennium Development Goals

NSNP: National School Nutrition Programme

PSNP: Primary School Nutrition Programme

RDA: Recommended Daily Allowance

PED: Provincial Education Department

RDP: Reconstruction and Development Programme

SAVACG: South African Vitamin A Consultative Group

SGB: School Governing Body

SMT: School Management Team

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNHTF: United Nations Hunger Task Force

UNICEF: United Nations International Children's Fund

WFP: World Food Programme

WHO: World Health Organisation

CHAPTER 1 INTRODUCTION

1.1 Background information

Whilst the right to education is one of the basic human rights enshrined in the Bill of Rights in the South African Constitution (Currie & De Waal, 2005), the learning process for many children is overshadowed by hunger and malnutrition (Kloka, 2003). Learners who go to school without food find it very difficult to concentrate and perform in the classroom, which can lead to an increase in the drop-out rates of school-going children if not addressed (Sangweni, 2008). To uphold the basic Right to Education, the Primary School Nutrition Programme (PSNP) was introduced in 1994 (Vorley & Corbett, 2005). The goal of the PSNP was to improve educational outcomes, improve school attendance, and alleviate short-term hunger[1] (Silangwe, 2012; Ntuli, 2009). Since its initiation, the PSNP has catered for the most needy primary school learners, i.e. learners from communities with low socio-economic status. It is worth noting that 53.8% of the South African population is living below the breadline or poverty line[2] (STATS SA, 2015). Put differently, this means that 27 million people in South Africa are living on R779 per month or less, and that many children go hungry. Due to increased levels of poverty, child-headed households, and unemployment, the existing nutrition programme was extended to some secondary schools in 2009 (DBE, 2009) and was renamed the National School Nutrition Programme (NSNP).

The NSNP is classified by the Department of Basic Education (DBE) as an integral component of the government's Programme of Action, which was assigned the responsibility of addressing children's ability to learn by providing them with nutritious meals (DBE, 2009). It is envisaged that the success of the NSNP may contribute towards the country's attainment of the Millennium Development Goals (MDGs). These goals incorporate the reduction of child mortality, achieving universal primary education, and the eradication of extreme poverty and hunger by 2015 (Kimani-Murage & Ngindu,.2011). The objectives of the NSNP are: to alleviate poverty and improve the learning capacity of children through school feeding; to generate and promote sustainable food production and economic activities in school communities; to strengthen nutrition education in

[1] Short term hunger: the PSNP only provides meals on official school days as designated by the official school calendar

[2]Poverty line: it is a measure used to separate the poor and the not so poor by determining the food and non food items that are essential for daily survival (Statistics South Africa)

schools; to increase the attendance of learners and to eliminate school dropouts; to increase the pass rate; to reduce the unemployment rate, particularly among women; to reduce the incident of child mortality, mobility and the morbidity rate; to empower poverty-stricken communities, particularly in rural areas across all nine provinces in South Africa; and to increase the transfer of skills and self-reliance (DBE, 2009).

It is crucial that the NSNP programme is managed effectively so that its aims and objectives are met, especially in terms of the benefits for learners (Seoketsa, 2007). The NSNP is funded through a provisional grant that is transferred to provinces (DBE, 2010a; DBE, 2011). The DBE designs the menu, coordinates, and oversees the programme, while the Provincial Education Departments are tasked with the procurement of goods and services for the NSNP (DBE, 2010a; DBE, 2011). Schools are funded according to a national system of ranking and funding, which is referred to as quintile ranking[3] (Ntuli, 2009). Schools rated at the lowest quintiles (1 and 2) receive more funding based on the Norms and Standards for Funding Schools, however, it should be noted that schools do not receive funds or monies directly (Ntuli, 2009). Food items are delivered to schools by private contractors sought out by the provincial department via a tender process (DBE, 2011). The food is prepared on the school premises (Noe, 2005). At each participating school, the school principal is responsible for supplying information to the provincial department in terms of the number of learners participating in the programme (DBE, 2009). The school administrator or School Governing Body (SGB) oversees the operational responsibility of the NSNP, and supervises the daily activities of the programme such as receiving and recording stock, maintaining and updating records of all invoices, noting the number of meals served and the number of learners fed per day, as well as the recruitment of Volunteer Food Handlers (VFHs) (DBE, 2009). VFHs are responsible for the preparation and serving of meals, and for the maintenance of the preparation area (DoE, 2009). In other words, the success of the school feeding programme is dependent on VHFs (food handlers are mainly local unemployed women from the community). According to the Department of Education (2009), the number of people who volunteered to handle food increased from 32 904 in 2009 to 39 716 in 2010. VFHs are paid a stipend of R522 per month by the DBE, and are required to handle foodstuffs in a manner that preserves the safety and nutritional

[3] Quintile ranking: a system of ranking that takes into account socio-economic circumstances, such as inequality and poverty of learners and schools (DBE, 2011).

quality of the food (DBE, 2009). Through the NSNP, the DBE was supplying meals to approximately 7 million learners in over 20 000 schools in the 2009/10 financial year (DBE, 2010a). Afoakwa (2008) and Buhl (2011) have noted that the problem of poverty, food insecurity, and malnutrition is on the rise in sub-Saharan Africa, and in particular, in South African rural communities.

Although factors such as the quality of teachers, textbooks and infrastructure also impact leaners' academic performance in the classroom, according to Sangweni (2008), children who lack nutrients such as iron and iodine in their food, and those who suffer from protein-energy malnutrition, hunger, parasitic infection or other diseases do not have the same chance of being able to learn as compared to their friends who are healthy, strong, and well-nourished. The school nutrition programme is well placed to address these challenges and is a convenient way for important nutrients to be provided to needy children in schools. Additionally, Sangweni (2008) asserts that the school nutrition programme plays a critical role in enhancing the educational outcomes of schoolchildren as a lack of nutrition is likely to create a vacuum in the process of improving the quality of education in South Africa. The aforementioned facts bring into focus the significance of the school nutrition programme and why research into this programme is necessary. Notwithstanding the objectives of the school feeding programme, it seems that the implementation of the programme faces a number of challenges.

1.2 Rationale

The children catered for by the NSNP programmes are from poverty stricken communities and possibly attend school without receiving a decent meal. For the majority of these children, the meals provided through the school feeding programme are their main, and in some cases their sole source of energy and nutrients. Although annual reports from the DBE indicate the success of the NSNP (DBE, 2009; DBE, 2010a; DBE, 2011), there have been reported incidents of food poisoning and food contamination in the following provinces: KZN, Limpopo, Gauteng, and the Eastern Cape (Myburgh, 2015). In 2014 alone, 1 600 learners took ill after consuming contaminated food from their school nutrition programme. This happened in six separately reported incidents at Makhabeni primary in Kgapane, Mashegoana primary near Hlakano, Makeke primary, Kwena Chuene Primary near Luckau, and Magane primary in Gamogashoa, where food

was provided through the NSNP. South African food legislation requires that the foodstuffs made available to the general public should be hygienic and free of harmful substances and organisms (R.1183 of 1990; R.918 of 1999). Thus, the DBE has to ensure that nutrition security is observed, facilitated and provided to those it serves via the NSNP (Panda, 2010).

According to Kloka (2003), nutrition security incorporates food security, health security, and care security. Furthermore, Panda (2010) finds that nutrition security entails physical and economic access to a balanced diet, safe drinking water at all times, as well as proper sanitisation. In the absence of nutrition security, contamination may occur during the handling of food, resulting in foodborne illnesses (Brown, 2011). According to Brown (2011), the main factors associated with foodborne illness are poor personal hygiene, cross-contamination, and incorrect time during food preparation or incorrect temperature control during food storage. To prevent foodborne illness, food service personnel, food flow (such as purchasing, storage, preparation, cooking, holding, cooling, reheating and sanitation) and food safety programmes should be implemented and closely monitored (Brown, 2011).

It is these aforementioned incidences of food poisoning and contamination that have prompted me to take a closer look at my schools' nutrition programme (Ipolokeng primary). Serving safe food to its learners is a critical responsibility of a school nutrition programme. The purpose of a school nutrition program is to ensure that safe food is served to children by controlling hazards that may occur along the flow of food from delivery to serving the food. We feed 599 learners on a daily basis at Ipolokeng primary and have three food handlers (helpers) from the community who are involved in food preparation and manning the school nutrition programme. Sound nutrition is a basic human right that is stipulated in South Africa's Constitution, through the Bill of Rights, and comprises more than simply the availability of food. The food handlers appointed in schools where the programme is rolled out are not trained by the national or provincial department in good food handling practices, or regarding issues of food safety and hygiene. Appropriate infrastructures such as kitchens, storage rooms and dining halls are lacking in many of the schools where the programme is rolled out. Furthermore, water shortages are experienced in most of the schools and the level of hygiene and food safety is a great cause for concern. Personal hygiene practices require food handlers to regularly wash their hands before they handle any food. As water is a scarce resource in rural areas, the probability of occurrences of foodborne outbreaks is very high.

Research has shown that one in ten South Africans do not wash their hands; the situation is worse in schools where there is not a single drop of water (Sapa News24, 2006: 1-5).

I am a teacher of Natural Science, technology, and Life Orientation at my school and I promote science, technology, and hygiene literacy amongst my learners pertaining to nutrition. Nutrition and hygiene are important topics that feature in these curricula. I am deeply concerned about food safety, food preparation, the meals served, and the environmental hygiene of my school. Therefore, I wanted to take a closer look at the knowledge, attitudes and practice of food handlers regarding food safety (cautionary measures taken to safeguard against food contamination during transportation, preparation, handling and storage), food preparation, the environmental hygiene at my school, and whether the meals served at Ipolokeng primary were balanced in terms of food groups/nutrients.

1.3 Objectives

The objectives of this study were:

1. To establish the knowledge and practice of food handlers and suppliers with regard to food safety.
2. To establish the practice of food handlers with regard to food preparation.
3. To establish if the meals prepared and served to learners constituted a balanced meal.
4. To assess if the levels of environmental hygiene at Ipolokeng primary met the requirements prescribed by Regulation R918 of 30 July 1999.

1.4 Research questions

The research questions guiding this study were:

1. What are the knowledge and practices of food handlers and suppliers with regard to food safety?
2. What is the practice of food handlers with regard to food preparation?
3. Do the meals prepared and served to learners constitute a balanced meal? if so, how? If not, why not?
4. Do the levels of environmental hygiene at Ipolokeng primary meet the requirements prescribed by Regulation R918 of 30 July 1999? if so, how? If not, why not?

1.5 Significance of this study

This study will be beneficial to the Basic Department of Education, the Provincial Department of Education, school principals, school administrators, food suppliers, and food handlers as it will contribute to the knowledge base regarding food helpers' knowledge, attitude and practice in terms of food safety and food preparation.

Furthermore, information will be made available about the level of compliance of the school environment with standard hygiene requirements.

1.6 Limitations of the study

This study adopted the case study method to explore the topic under study. One disadvantage of case studies is that the results cannot be generalised. Nonetheless, Flyvbjerg (2006) highlights the single cases of Galileo, Newton, Einstein, Bohr, Darwin, Marx and Freud to show that both human and natural sciences may be advanced by a single case. In addition, Erickson (1986) argues that because the general lies in the particular, what we learn in a particular case can be transferred to similar situations. Consequently, despite its limitations, a case study can further our insight into similar situations. In this study, the case study method allowed for an in-depth and detailed study of the knowledge, attitude and practice of food handlers and suppliers with regard to food safety and food preparation in order to provide rich thick descriptions of the case (Shuttleworth, 2008).

1.7 Clarification of terms

Primary School Nutrition Programme: This is a presidential lead project of the Reconstruction and Development Programme, which was introduced in 1994 to alleviate short term hunger by providing 25% of the energy requirements of a child per day (Gunde, 2004).

School Governing Body: According to Macbeth (1989), the SGB of a school is the mouthpiece of all the stakeholders involved, which makes key decisions about the school's functioning and educational responsibilities. The South African Department of Education (2010) regards SGBs as organisations comprising parents, educators, non-educators, learners and co-opted members of the community. This group of people is elected to represent the school and its community and must promote the school's best interests in all its actions and discussions.

Nutrition: refers to the process of providing or receiving nourishing substances (Fowler *et al.* 1990).

Food hygiene: This refers to all conditions and measures necessary to ensure the safety and suitability of food during transportation, preparation, storage and serving (Kilemi, 2004).

Personal hygiene comprises the action taken to ensure that food is handled, stored, prepared and served in such a manner so as to prevent the contamination of food (Kidiku, 2001).

Environmental hygiene refers to a clean environment with clean water, access to toilets, a waste water disposal system, and refuse storage and removal (Kidiku, 2001).

Volunteer Food Handler: A parent/community member (usually female) who volunteers to offer their services in the preparation, cooking and serving of meals to learners in return for a monthly stipend.

Quintile: A system of ranking and funding schools, taking into account the socio-economic circumstances of learners (inequality and poverty), for example, the poorest quintiles (1 and 2) receive more funding in terms of the Norms and Standards for Funding Schools.

Hazard Analysis Critical Control Point refers to a continuous self-inspection process designed to ensure that safe food is served to consumers, namely, the learners (Martin, 1999).

1.8 Outline of the subsequent chapters

This dissertation is organised into five chapters. A brief overview of the subsequent chapters is discussed below.

Chapter 2 comprises a review of the literature that is relevant to the research questions, so as to provide a deeper insight into to the NSNP. Thereafter, the conceptual framework is presented, which was used to underpin the analysis and arguments put forward in addressing the research questions of this study.

Chapter 3 sets the stage for the research methodology that was used to answer the research questions. The chapter provides the reasons for the choice of research method and design, and methods of data analysis. The development of materials, and the processes undertaken to improve the different data

collection tools, and hence the reliability of the results, are discussed in depth. Ethical aspects of the research that were considered were exemplified.

The fourth chapter covers the data analysis. Field data was collected according to the research methodology and was analysed against the backdrop of the conceptual framework in order to answer the research questions.

The final chapter consists of a critical discussion of the key findings of the research. Furthermore, recommendations are made, and areas for future research are advocated in the effective implementation of NSNP in schools.

1.9 Conclusion

In this chapter the background to the research was foregrounded. The rationale, objectives and research questions of the study, significance as well as limitations of the study were explicated. An overview of the subsequent chapters was provided. The next chapter draws our attention to the literature review

.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

Education undergirds all economic, social, and political development as it provides opportunities, and creates avenues for people to reduce poverty, inequality, and diseases (Sen, 1995). This means that education is a significant factor in creating economic and social opportunities geared towards prosperity and improving living conditions. Sen and Kallman (2005) assert that education creates a dynamic workforce, as well as well-informed citizens who are able to compete and participate in the global economy. In a similar vein, the World Food Programme (WFP) (2006) stresses that education is an important aspect of any sustainable development initiative, such as the empowerment of women, equity and gender equality. In this regard, it is worth noting that what people can achieve is influenced not only by economic, political and social opportunities, but also by enabling conditions in terms of good health and a balanced meal (Sen, 1995). In the absence of a basic balanced meal, learning becomes constrained and difficult. The Tiger Brands Foundation Programme (2011) finds that breakfast is the most important meal as it has positive effects on the cognitive performance and on feelings of well-being. Hoyland, Dye and Lawton (2009) posit that breakfast consumers tend to have higher micro-nutrient intake due to the fortification of breakfast cereals with minerals like magnesium and iron (Taljaard, Covic, Van Graan, Kruger & Jerling, 2013). Given the importance of nutritious meals for cognitive development, social opportunities, and empowerment, it is key to examine the goals of school feeding programmes.

Globally, school feeding programmes are said to have two major impacts. The first includes the improvement of the nutritional status of school-going children, and the second entails the reduction of the rate of malnutrition. Achieving this critical goal requires an understanding of the interrelatedness of every part of the food service system beginning with transportation, preparation, storage, food handling, and ending with serving food to children that is safe for consumption (Martin, 1999).

The nutritional value of the food served in the NSNP is important in combating malnutrition, while the hygienic handling, storage and preparation of food is vital to prevent food contamination and food poisoning. Malnutrition is caused by the continual consumption of levels of nutrients and/or energy that do not meet or maintain the requirements of the human body (World Hunger Education

Service, 2011; Nnakwe, 2013). The nutrients most likely to be deficient in children are reported to be iodine, iron, zinc, calcium, folic acid, vitamin A, and vitamin B6 (Mabaya Jordaan & Malope, 2010; Iversen, Du Plessis, Marais, Morseth, Høisæther & Herselman, 2011; Nnakwe, 2013). As alluded to earlier in the rationale of the study, many learners were admitted to hospital for food poisoning after consuming food provided by the school nutrition programme. Food contamination and food poisoning results from the poor handling of food (World Hunger Education Service, 2011; Nnakwe, 2013).

In Chapter 1, it was established that this study sought to explore two issues in terms of the NSPS, namely, the knowledge and practice of food handlers and suppliers with regard to food safety and food preparation at Ipolokeng primary so as to establish whether the meals served in our school nutrition programme constituted a balanced diet; and secondly, to determine the environmental hygiene at this school within the schools' nutrition programme. These issues, together with my research questions, directed me to review the literature on the role of school nutrition; food safety; foodborne diseases; sources of micro-organisms causing foodborne diseases; the routes of contaminations; the prevention of foodborne diseases; food hygiene practices, and environmental hygiene practices. .

2.2 Historical background of the school feeding programme

Food security is defined in the Integrated Food Security Strategy for South Africa (IFSSA) as "physical, social and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preferences for an active and healthy life" (Department of Agriculture 2002, p. 15). The increasing rate of food insecurity, high levels of malnutrition, the overwhelming existence of poverty, including the demands for development, require that school feeding should be an integral part of policies in every country in the world (World Hunger Education Service, 2011). Worldwide, at least 113 million children do not attend school - in Africa, more than 56 million children do not attend school due to food insecurity (UNESCO, 2010).

The school feeding programme was initiated in the 1930s in the United Kingdom (UK) and the United States (US) in order to improve the physical growth of children (Richter, Rose & Griesel, 2000, p. 16). In 1934, in the UK, a programme that subsidised milk for school children was initiated, and from 1944, milk was provided free (Baker, Elwood, Hughes, Jones & Sweetnam,

1978). In 1946, the United States of America (USA) established the National School Lunch Act, which was passed by Congress. This act was established to provide assistance in the establishment, maintenance, operation, and expansion of school lunch programmes. The act serves as a measure of national security to safeguard the health and well-being of the children in the USA. It also encouraged domestic consumption of nutritious agricultural commodities and other food (Gunderson, 2011, p. 11). The United States Department of Agriculture (2003, p. 12) states that, in pursuit of this Act, the Department of Agriculture provides states within America with general and special cash assistance and donations of foods. These provisions help schools in serving children nutritious lunches each school day. Today, the National School Lunch Act still serves as the legislative forerunner for all child nutrition programmes in existence (Gunderson, 2011, p. 11).

As part of its effort to alleviate hunger, the United Nations (UN) first commenced providing food assistance to community schools in the Lusaka District of Zambia, and in Malawi in 2003, with Project Concern International (PCI) as the implementing partner (World Food Programme, (WFP), 2005). In both these countries, the programme is supported both financially and technically by the UN through the WFP. In Malawi, the programme is called Food for Education (FFE), and it serves in-school meals and/or snacks in order to reduce short-term hunger and achieve the commonly anticipated goals of improving school enrolment, attendance, learning, and community-school ties. The Malawian FFE programme also provides 'take-home rations', which are targeted at girl learners, orphans, and vulnerable children. These rations are provided to learners who attend school regularly. In Zambia, the programme targets learners from poor families, and a strict screening system was established to ensure that only learners from such families were given priority in the programme. As a result of the high poverty level in the country, schools appear to struggle to deny any learners access to this food because it would appear that every learner comes from a poor background (Report on the Evaluation of the National School Nutrition Programme, 2008). Subsequently, these school feeding programmes were scaled up to reach five million more children and their families in 17 countries, namely: Bangladesh, Benin, Burundi, the Central African Republic, Ghana, Guinea, Guinea-Bissau, Haiti, Kenya, Liberia, Mozambique, Nicaragua, the Occupied Palestinian Territory, Pakistan, Senegal, Sierra Leone, and Tajikistan (WFP, 2005). The expansion of the school feeding programme was confirmed by the World Bank (2009), which indicated that low-income countries are in the process of expanding school feeding programmes because these programmes help push them closer to reaching the first Millennium Development

Goals (MDGs). These goals comprise eradicating extreme hunger and poverty with the sub-goal being that by the year 2015, the proportion of people who suffer from hunger will be halved as compared to 1990 (UNICEF, 2005, p. 16).

The school feeding programme supports school-going children in acquiring an education. This expands their opportunities in life, thereby saving them from the trap of poverty and hunger. The realisation of this goal has led to various forms of support from civil society and the international community (Gunderson, 2011). The United Nations Hunger Task Force (UNHTF) has made seven recommendations on how to achieve the first MDG (Sanchez, 2005). One of the strategies identified by the UNHTF to achieve this goal is the implementation of school feeding programmes with locally produced food rather than imported food. The UNHTF especially recommends comprehensive community and school-based feeding programmes that include not only school feeding, but also systematic de-worming, micro-nutrient supplementation, take-home rations, safe cooking facilities, clean drinking water, and improved sanitation. To a large extent, all of these ingredients added together provide a good platform for improving the performance of school children, and keeping them healthy and engaged in the community (UNICEF, 2005, p. 12). The United Nations (1949) and the International Covenant on Economic, Social and Cultural Rights (1966) recognise the right to food as a component of an adequate standard of living. The International Covenant on Economic, Social and Cultural Rights, in particular, requires that state parties undertake individually, and through international cooperation, to institute measures and specific programmes to improve access to food. The right to food security is also recognised in the Copenhagen Declaration on Social Development (1995), which affirms its support for the progress and security of people and communities.

2.3 The school nutrition programme in South Africa

South Africa is unique in east and Southern Africa as it is the only country considered to be food secure and self-sufficient in terms of its own food production, yet statistics from 2003 show that more than 14 million South Africans were food insecure in that year (Pieterse & van Wyk, 2006). In addition, 1.6 million children were stunted by malnutrition, and 43% of households were suffering from some level of food poverty (Pieterse & van Wyk, 2006).

In the South African context, the Integrated Nutrition Program (INP) was formulated to address the nutrition problems in the country. The INP aims to implement programmes that are integrated, sustainable, people and community driven, and are targeted at helping the most vulnerable groups in South Africa (Department of Education, 2004, p. 1). The mission of the INP is to improve the nutritional status of all South Africans through the implementation of integrated nutrition activities. In 1994, the Primary School Nutrition Programme (PSNP) was introduced on a national scale in South Africa as part of the Reconstruction and Development Programme (RDP). The main aim of the programme is to alleviate hunger in children by providing 25% of the energy requirements of a child per day, solely to improve health through micro-nutrient supplementation, to improve health through parasite control/eradication, and to improve health through providing education on health and nutrition, which enhances broader development initiatives in the area of combating poverty (Fourth Draft of the Department of Health's National Policy Framework and Operational Guidelines for the PSNP, 1995). Furthermore, sound nutrition is a basic human right guaranteed in South Africa's Constitution. In the Bill of Rights, access to quality basic education (Educational Policy Act 27 of 1996, South African Schools Act 84 of 1996) is provided, including targeting schools for school feeding, as informed by the Norms and Standards for funding of Public Schools. This is according to the Department of Education General Notice 2362 of 12 October 1998; and the Provision of Grade R, as enshrined in White Paper no. 5, and the Cabinet Resolution of January 2002 in which the transfer of the National School Nutrition Programme is addressed. Caring for children affected by HIV/AIDS, and Orphans and Vulnerable Children is espoused in the strategic objectives of the Department of Education (Strategic Plan for the Department of Education 2003-2005).

Studies have shown that nutrition plays a crucial role in children's school education. Studies have further shown that improved health and nutritional status in children contribute to high enrolment, better school attendance, lower rates of dropout, improved performance in academic work, health promotion, disease prevention, social equity, and economic growth as healthy persons have the energy to work (Iversen., Du Plessis, Marais, Morseth, Høisæther & Herselman , 2011, p. 75). It has been pointed out in history that investment in education is important for the growth of any economy. Investment in education should be accompanied by investment in the health and nutrition of learners (Martin, 1999, p. 710). To achieve the objectives of providing healthy meals that contribute to the health and wellbeing of children, and to help them develop healthy food

behaviour, school nutrition professionals find it imperative that learners eat healthy meals. The primary purpose of the Primary School Nutrition Programme (PSNP) is to meet the nutritional needs of all children during the time that they are under school supervision.

The primary school nutrition programme was eventually extended to secondary schools and was renamed 'The National School Nutrition Program' (NSNP). The rationale for extending the programme to secondary schools, according to Ruel and Alderman (2013), was to ensure gender equality in access to education. Ruel and Alderman (2013) further clarify that school nutrition programmes encourage adolescent girls to remain in school, they address HIV risk factors, and improve adolescent girls' nutritional knowledge and micro-nutrient status to prepare them for motherhood. In addition, Shisana, Rehle, Simbayi, Zuma Jooste, Zungu, Labadarios & Onoya, (2014, p. 239) state that including secondary schools in the programme has the potential to be more effective and long lasting as it extends knowledge, skills, and values regarding nutrition that prevail into adulthood, preventing adult obesity and ensuring healthier offspring.

The NSNP of the Department of Education focuses on:

- The provision of nutritious supplementary meals to learners to alleviate temporary hunger;
- The improvement of learners' active learning capacity and, therefore, increasing school achievement, attendance and punctuality (DoE, 2003, p. 2);
- Enhancing the implementation of school gardens;
- Enhancing programmes for orphans and vulnerable children (DoE, 2004, p. 4);
- The improvement of health through micro-nutrient supplementation; and
- The improvement of health through providing education on health and nutrition (DoH,1994, p. 4).

According to Labadarios, Steyn, Mgijima & Daldla ,2001, p. 70), a large part of South Africa's population still lives under adverse socioeconomic conditions, with unemployment and inadequate income being prevalent. One in ten children between the age of 1 and 9 in South Africa were found to be underweight (Labadarios *et al.*, 2001, p. 70). Micro-nutrient deficiencies in iron, iodine and vitamin A have adverse effects on the mental development and learning abilities of school children

(Popkin, 1996, p. 11). Furthermore, a lack of vitamin A is reported to impair the immune system, while a lack of iodine reduces mental capacity and iron leads to fatigue and dizziness (Labadarios *et al*, 2001, p.72; Popkin, 1996, p. 11; Witten, Jooste, Sanders & Chopra, 2002, p3).

In a study at Insingizi Primary School (ANON, 1995, p. 8) in a poverty stricken area of the South Coast in KZN, the results showed that the food provided by the NSNP was the only meal that the learners received during the day. The teachers noticed a marked increase in school attendance after the NSNP had been implemented. Prior to the NPNP, learners were falling asleep and could not concentrate in class because they were so hungry. Promoting health care is important in the NSNP. A study carried out by Wentzel-Viljoen (2003, p. 351) in the North-West Province showed that learners benefit from school feeding as it encourages school attendance and increases potential for learning. Other indicators that improved due to school feeding were punctuality, discipline, average scores, alertness, physical well-being and behaviour.

Achieving the primary goal of the NSNP requires an understanding of the interrelatedness of every part of the food service system beginning with transportation, preparation, storage, food handling, and ending with serving food to children that is safe for consumption (Martin, 1999, p. 716). If every sector of the NSNP does not function with the goals of the NSNP in mind, then the quality of food provided will be compromised, as will be the health of the learners. On this particular note, it is important to emphasise the role that food handlers (VFH) play in the NSNP.

The food handlers in the programme are the people who are responsible for the processing, production, manufacturing, packaging, preparation, sale or serving of any foodstuff, including water and beverages (DoH, 2000). Food handlers suffering from upper respiratory tract infections can easily contaminate their hands with micro-organisms by coughing, sneezing, and touching their nose or mouth (Aycicek, Aydogan, Kucukkaraanslan, Baysallar, & Basustaoglu ,2004).

One proposed strategy for the health surveillance of food handlers include: Management commitment; education and training; reporting illness to management; applying basic food handling practices; and applying basic personal hygiene practices (DoH, 2000). The main emphasis for food handler surveillance should fall on personal hygiene, clean protective clothing, effective supervision of the health of employees, appropriate action taken timeously when indicated, and maintaining hygienic food handling practices (DoH, 2000).

According to the South African Occupational Health and Safety Act (1993), the general responsibilities of employers to their employees are:

- Every employer shall provide and maintain a working environment that is safe and without risk to the health of his employees; make arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances; and
- Employers must provide such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of employees.

The international principles for Hazard Analysis Critical Control Point (HACCP) comprise all the procedures that a company needs in order to provide safe food. Basic training for food handlers should cover basic food handling procedures. The proper training of staff implementing the NSNP will be needed to ensure its success (Norton, 2002a).

2.4 Challenges in the implementation of the school feeding programme

The Ministerial Review Committee Report, as discussed by Buch (2000), indicates that the school feeding programme in South Africa faces challenges. The committee noted challenges such as the role-players sharing different interests, the School Governing Body (SGB) members lacking capacity, knowledge and necessary skills, especially in the previously disadvantaged communities, and the SGB failing to encourage parental involvement in all the activities of the school feeding programme. In keeping with the aforementioned report, Mabasa and Themane (2002), and Sumra (1997) indicate that most developing countries struggle with stakeholders' participation in the school feeding programme because of a lack of knowledge, expertise, and time constraints. Mabasa and Themane (2002, p. 112) point out a few challenges that SGBs are faced with, such as the fact that SGBs do not receive proper training before assuming their duties. They further noted that SGBs are unfamiliar with meeting proceedings, the language used in their meetings, coping with administration issues, as well as failing to participate in making important decisions. There is a lack of knowledge amongst SGB members regarding the various legislations, hence they are often intimidated by those who are knowledgeable about school legislations and protocols. As a result, the SGB feels alienated in collective decision-making. Greenhalgh, Kristjansson &

Robinson (2007, p. 12) refer to SGB's participation in decision-making as "sham participation and rubber stamping." This means that SGBs in many schools and communities are actually not involved in the governance of the schools that they are responsible for, and these responsibilities are then relegated to the school's management.

The efficient and effective implementation and sustainability of any programme hinges on good governance and management. The DoE (1997, p. 9) defines governance as "*the representative of the community within the school which has to create a vision, mission statement, to formulate policies, rules of the school and take decisions about the improvement of the school,"* while management *"is the team that is concerned with the day-to-day running of the school."* The definition set out by the DoE can be used as a guideline to ensure that the school feeding programme, as well as teaching and learning, are carried out smoothly in accordance with the policies and rules. According to Beckmann and Visser (1999), the main aim of managers and governors in the school feeding programme is to make sure that there is a good culture of feeding, teaching and learning, and to enhance the effective day-to-day functioning of the school. Since implementation is dependent on governance and management, they cannot be separated (Pretorius & Lemmer, 1998, p. 21). Therefore, the quality and objectives of the school feeding programme will be achieved when all stakeholders are involved or buy into the programme. These stakeholders include educators, parents, learners, and members of the community. Squelch (2001) maintains that the school managers and governors are failing to share their roles and responsibilities due to conflicting interests amongst themselves. In this regard, Heystek (2006, p. 308) points out that effective school feeding will be attained if the School Management Team (SMT) and community (parents) engage in building a strong, effective and transparent relationship with each other. Mestry (2004, p. 127) also adds that most educationalists find it difficult to differentiate between governance and management because of their overlapping roles and responsibilities. In other words, maintaining a balance between the SGB and the SMT remains a problem because both stakeholders need determination in balancing their roles and responsibilities.

Joubert (2011) suggests that SGBs need certain competencies before they are able to govern their schools. They also need to develop and improve their capacity for and knowledge of the school feeding programme as part of educational governance within schools. Therefore, school governors need training that is based on decision-making as parents and educators, especially in black

communities, do not have much experience in participating in decision-making (Van der Berg, 2008, p. 19). Heystek (2006, p. 478), in support of this view, indicates that these abilities required by school governors are dependent on their educational background, especially the literacy level of governors.

The World Food Programme (2008, p. 9) has also identified challenges in the school feeding programme such as the fact that school feeding programmes are labour-intensive and require skilled human resources to operate. They further concluded that the cost involved in the operationalisation of the school feeding programme may not be affordable for most African governments, thus, the Minister of Education cannot offer school feeding programmes at the expense of other equally important educational inputs such as health and the provision of water and sanitation.

Although school feeding programmes have been widely implemented, there remains much to be desired with regard to the strategy, monitoring, and evaluation of these programmes. Del Rosso (1999, p. 16) is of the opinion that school feeding programmes have gained a reputation over the years for being "expensive, riddled with implementation problems which makes them not effective in meeting health, nutrition or educational objectives." In agreement, Vidar (2003, p. 43) highlights serious implementation problems concerning poor learner coverage, a lack of good data, the absence of a national nutritional surveillance system, the leakage of funding and monitoring, and the evaluation of nutrition programmes that are not effective.

With regard to the above mentioned dilemmas, Shaw (2001, p. 41) explains that in the implementation of any programme, there should be proper monitoring and evaluation policies to ensure the effectiveness of the programme. In accordance with this assertion, Shaw (2001) maintains that one of the major difficulties facing the school feeding programme is internal monitoring and evaluation, which has been lacking since the inception of the school feeding programme. This has led to the tendency of the Department of Education to focus more on keeping proper records of accounts rather than focusing on the possible benefits to the recipients, in this case, the learners. In support of this argument, Del Rosso (1999) states that providing healthy meals in schools requires that continuous assessment be done to ensure nutritional adequacy. Monitoring and evaluation, if strengthened, ensure that food is secured and the quantities that are

allocated for learners are delivered exactly in their required size, shape and quality. The purchase, transportation, and delivery of foodstuff require a high level of security measures to ensure the continuous supply, delivery and running of the school feeding programme. Consistent with this view, Zachritz (2004) suggests that the biggest challenge in the school feeding programme is the issue of security. Security measures surrounding the transportation and warehousing of the food are necessary to avoid theft, mismanagement and misappropriation. Tomlinson (2007, p. 15), whose study evaluated a number of the school feeding programmes in South Africa, outlines a number of significant weaknesses in the programme. These include, among others, the vertical school feeding programme, which means that food is provided in isolation rather than as a comprehensive nutritional programme. Again, administrative and management difficulties related to corruption and quality of food were also cited as a weakness in the feeding programme. The management of funds, logistics and delivery of a quality food supply have come under immense criticism in the implementation of the school feeding programme. Carien (2009) claims that a renewed focus on fraud, corruption and 'leakages' in government contracts in programmes such as school feeding should form part of government's cost-saving measures.

Vorley and Corbett (2005, p. 3) highlight some of the challenges faced by the Project Concern International NGO in implementing a school feeding programme, viz.: an increased workload, monitoring and evaluation, food management, and the availability of water. They further explain that many schools find it difficult to turn away students who come to school seeking admission as a result of the school nutrition programme. This puts an enormous strain on the physical capacity of the school in terms of the classrooms and class size.

In his study, Zine (2000, p. 12) found that 61% of the beneficiary schools did not have good kitchen structures, and 78% did not have adequate stock of kitchenware, especially plates and cups. Also, he found that 28% did not have toilet facilities, while 87% lacked hand washing facilities. The unavailability of these structures poses a challenge to the food handlers and teachers, which leaves them with no choice other than to cook below the quantity required or be late in serving food to these learners. It also means that hygiene in serving as VFHs may be problematic.

2.5 Schools that are a part of the NSNP

All of the schools in South Africa have been ranked from quintile 1 to quintile 5 in terms of available resources and socio-economic level of the local community. Schools with the least resources and the poorest socio-economic community are ranked 1, while schools that have state of the art resources and a wealthy socio-economic community are ranked 5. The NSNP caters for both primary and secondary schools with a quintile of 1 to 3, which represent the less privileged population. Quintile 1-3 schools make up more than 60% of the schools in South Africa. In these schools, learners should receive a cooked meal each school day of the year (which approximately constitutes 195days) (DoE, 2011).

2.6 Food safety

The way in which food is handled, stored, transported, and prepared ultimately affects the health of those who consume it. As such, these factors (safety and handling of food) are a priority in the implementation of the school nutrition programme.

The procedures for maintaining food safety and food quality must be taught and managed so that they are mutually supported. The international principles for Hazard Analysis and Critical Control Points (HACCP) consist of all the procedures that a company needs to learn to provide safe food (Hall & Monson, 2006, p. 49). Understanding how each of these processes may become a potential source of contamination is critical. Service providers and food preparers should develop and practice safe food handling techniques to minimise the risk of foodborne illness. Bacteria or pathogens present in the air, in water, in other foods, on work surfaces, and on a food preparer's hands and body pose the greatest threat to food safety (WHO, 2005). Raw produce should be inspected for spoilage upon delivery and should be thoroughly washed before use as fresh fruits and vegetables can carry bacteria and pesticide residues (Sivapalasingam, Friedman, Cohen & Tauxe,.2004).

Children are more vulnerable to foodborne pathogens. Foodborne and waterborne diarrhoea-based diseases are the leading causes of illnesses that globally kill an estimated 2.1 million people annually, most of whom are said to be children in schools in developing countries (WHO, 2005). Care should therefore be taken to ensure food safety and sanitation in schools as poor hygiene and

sanitation is often to blame for poor child health (WHO, 2005, p 2). According to UNICEF (2005), in continent-wide health surveys carried out in 2002 in African schools, it was reported that a lack of access to clean water caused waterborne illnesses that annually killed more than 1.6 million young children. Moreover, this survey revealed that millions of girls were deterred from getting an education because of a dearth of sanitation facilities in these schools. The lack of separate and decent sanitation facilities at schools often forced these girls to drop out of primary school (UNICEF, 2005).

In the South African Region, 46 560 Grade 6 students from 2 493 schools were surveyed by the Southern African Consortium for Monitoring Educational Quality (SACMEQ) in 2007. The results suggest that 15% of the schools surveyed did not have water supply. According to UNESCO (2008), the implementation of the Primary Schools Nutrition Programme in such schools had a negative impact on the health of learners. While in South Africa 18 million people were supposed to be provided with adequate sanitation by 2010, in 2011 it was reported that an estimated 2 115 schools still did not have sanitation facilities. Safe, adequate and reliable water sanitation is an intrinsic part of Section 29 of the Constitution; it is further stated that water sanitation affects the right to human dignity (Section 10). Basic water sanitation is an essential part of the right to water and is intimately connected to and affects the right to health and life. In the school context, each of these rights, in turn, has an effect on the rights of children. Within the South African context, the sanitation infrastructure at public schools varies substantially, and continues to reflect historical resource allocation and distribution patterns, with the worst conditions affecting learners in rural and township schools. The National Education Infrastructure Management System Standard Report (2014) reveals that 49% of public schools either have no sanitation facilities or are forced to rely on pit latrines, or a combination of pit latrines and other facilities. This number is just short of half of all public schools in the country. Children are often forced to leave school to find more acceptable sanitation facilities, missing learning, and becoming vulnerable to rape and assault. In 2014, a tragic incident occurred in Chebeng village in Limpopo when a six-year-old (Michael Komape) died when he fell into a pit toilet at his school. More recently, a caretaker in the Eastern Cape fell into an unsafe pit latrine (Sapa News, 2014). These cases highlight the extreme and fatal threat that poor sanitation infrastructure at schools pose to children and staff. Furthermore, the lack of toilet paper and soap leads to children contracting illnesses from these toilets. The absence of

proper sanitation facilities raises questions about the implementation of the NSNP, the conditions under which food is prepared, and the general hygiene conditions at these schools.

Research has shown that food poisoning outbreaks are prone where schools do not have access to sanitary facilities (Sapa News24, 2002, p.2). An international survey on hand washing conducted in South Africa found that almost half (50%) of the South African population under-estimated the effectiveness of hand washing in preventing the spread of diseases. A global hygiene survey conducted in 2006 in South Africa, the United Kingdom, Germany, the United Arab Emirates, India, and Malaysia revealed that 50% of those surveyed did not believe in hand washing. The results further showed that simple hand washing is still rated as an ineffective method of disease prevention (Sapa News24, 2006, p. 7).

2.7 Foodborne diseases

Outbreaks of foodborne diseases that result from the ingestion of contaminated foods occur in many primary schools. There are a number of factors that contribute to occurrences of food poisoning outbreaks in schools: it may be due to failure to cook food thoroughly; holding food at ambient temperature; poor handling or storage of cooked food; the cross-contamination of cooked food from raw foods, especially of animal origin; and a lack of good hygienic practices. When the PSNP was introduced in schools, food handlers were appointed from the communities to ensure the effective implementation of the programme. The food handlers were appointed without formal training on food hygiene and food safety. Food handling personnel, therefore, could play an important role in ensuring food safety during transportation, preparation and storage if training were to be properly carried out. The mishandling and disregarding of hygienic measures on their part may enable pathogens to come into contact with food, and to multiply in sufficient numbers to cause the learners to become ill (WHO, 1989, p. 6). It is essential that food hygiene principles are continuously applied by the appointed food handlers if the children are to receive the protection that they are entitled to. School food handlers need training in basic food hygiene prior to their appointment in order to prevent occurrences of foodborne diseases that can impact negatively on learners who otherwise benefit from the Primary School Nutrition Programme (Wilson Disease, 2008, p. 2).

2.8 Sources of micro-organisms causing foodborne diseases

The greatest source of the organisms that cause outbreaks of foodborne diseases is said to be humans. It is crucial that food handlers be trained in food hygiene principles as a way of providing food security to the learners. Most of the bacteria in humans are said to be found in the intestinal tract, respiratory tract, infected cuts, sores, boils, and in contaminated utensils used by them, hence the maintenance of good personal hygiene is crucial (Kidiku, 2001, p. 20).

Food is the primary source for the transmission of disease-causing bacteria. Bacteria can be transferred to food from unclean hands, carriers, infected persons, improperly washed utensils, and equipment. It is therefore crucial that food handlers be knowledgeable about the causes of food contamination. If adequate measures to guard against food contamination and cross infection are not taken, the health of the learners who fall under the programme will be negatively impacted (Kidiku, 2001, p. 18).

2.9 Routes of contamination

2.9.1. Food hygiene practices

These are the measures that are necessary to ensure the safety and wholesomeness of food at all stages until its final consumption by the learners. The single most important factor in the prevention of foodborne diseases is the human element. If the food handlers in schools do not practice proper hygiene, a high number of food poisoning incidences may occur (Department of health, 2013, p. 13). Food must be obtained from approved sources, especially products of animal origin. The storage of food in appropriate store rooms and at the right temperature before and during food preparation is important. Proper food hygiene practices must be adhered to in order to prevent foodborne diseases that may affect the learners who take part in the programme (Kidiku, 2001, p. 28).

Appropriate methods of preparation help to retain food's nutritional quality, and to control costs. The cleanliness of the tables can be a problem, especially if they are also used as classroom tables. In order to maintain adequate sanitation, the tables should be washed with a chlorine bleach solution before each meal. Children should also be taught to wash their hands carefully before

eating and adults must do the same, especially before they begin to set the table or prepare/serve food (Shisana *et al.*, 2014).

2.9.2. Food preparation area

The standards and requirements for food premises are prescribed in Section 5 of Regulation R918 of 30 July 1999. These comprise the regulations governing general hygiene requirements for food premises and the transportation of food. The kitchen where food is prepared for the learners must meet certain standards and requirements, as prescribed by the health regulations. Regulation 5(3) of Regulation R918 of 30 July 1999 prescribes that food premises should be constructed such that they do not cause any health hazard and should be constructed of face bricks, non-absorbent, and non-corrosive materials (Regulations R918, 1999, p. 7).

According to the South African Health Act No. 63 of 1977, the following regulations for food premises must be in place in organisations catering for the public. Food premises must:

- Have a wash-up facility with hot and cold water for the cleaning of facilities;
- Be rodent proof using the best available method; and
- Have a waste water disposal system approved by the local authority (DoH, 2013, p. 8).

With regard to food premises, according to the regulations of The Department of Health (2013, p. 7), one latrine and one hand basin must be available for every ten staff members. For staff facilities where less than 10 people work on a food premises, separate sanitary facilities are not required for workers of different sexes. Hand washing facilities must be provided with cold and/or hot water for workers to wash their hands, together with a supply of soap and hand drying material/equipment. Refuse containers must be liquid-proof, easy to clean with close-fitting lids suitable for hygienic storage or refuse removal from the food handling area. The storage space for the hygienic storage of food, facilities, and equipment, and a suitable separate area for the hygienic storage of refuse containers on the food premises must be made available. An adequate water supply for the type of organisation is further required (DOH, 2013, p. 7).

The room in which food is handled must not have a direct connection to any area in which gas, fumes, soot deposits, offensive odors or any other impurity is present or may arise in such a manner that food could be contaminated or spoilt (DOH, 2013, p. 7).

2.9.3. Food storage rooms

Regulation 5(3) of Regulations R918 of 30 July 1999 prescribes that storage rooms should be constructed of face-bricks, and should be non-absorbent and non-corrosive materials. The sub-regulation further prescribes that the storage space for all kinds of food should be hygienic. The health regulations prohibit the storage of food in storage facilities that do not meet the standards and the requirements as prescribed. The careful storage and handling of food at appropriate temperatures are also essential food safety measures.

Storage areas must be well ventilated, cool, and easy to clean to control hygiene (Maunsell & Bolton, 2002, p. 100). Maize meal porridge forms a major part of the hot menu for the NSNP (Department of Education, 2004, p. 24), and if ideal storage temperatures are not present, then insects can make a significant contribution to the bio deterioration of maize meal. A critical appliance in terms of the storage of food items is a refrigerator. However, there is no specific fund that is allocated to enable schools to buy refrigerators (Kepe & Tessaro, 2012).

2.9.4. Food transportation

The transportation of menu items differs by province and school (DoE, 2011). In the provinces where the centralised procurement model is used, food suppliers who are contracted at provincial level have to deliver menu items to schools. The frequency of delivery depends on the contractual arrangements with the supplier, and can range from weekly to monthly. Ordinary vehicles (non-refrigerated) are used for the transport of food items (Shisana *et al.*, 2014).

However, in the provinces utilising the decentralised model, the agreements with food suppliers are made directly with the school, and food items can be delivered or the school may hire transportation to fetch food items if the supplier does not provide delivery services. Generally, dry food items are delivered monthly and perishables are delivered weekly depending on the arrangements made. Again, these vehicles that transport food are non-refrigerated and hence compromise the storage temperature and nutritional quality of the food items transported.

The standards and requirements for the transportation of food are prescribed in regulations 13(2) and 13(3) of Regulations R918 of 30 July 1999. The regulations prescribe that a vehicle used for the transportation of food should have a freight compartment that is dustproof. The two sub-

regulations further prescribe that the food should be transported such that it does not come into contact with the floor of the vehicle, the floor covering, or a surface that can be walked on. The sub-regulations prescribe that food should be transported such that it cannot be spoiled or contaminated. The use of open panel vans or trucks is strictly prohibited by the health regulations, and furthermore, a vehicle used to transport food should not be used to transport people (Regulations R918, 1999, p. 15).

2.9.5. Personal hygiene practices

Personal hygiene plays an important role in minimising the transmission of infections. Every opportunity to reinforce the importance of personal hygiene should be taken by those in the nutrition programme, including the provision of adequate hand washing facilities (Department of Health, 1996, p. 4). Good personal hygiene should be practiced by food handlers in schools so as to protect their own health and that of the learners. Food handlers should wear protective headgear, gloves, and clean and sanitised uniforms. Staff must be trained in good personal hygiene, the use of correct hand washing techniques, and they should follow the correct procedures in preparing, cooking, serving and the cleaning procedures in the kitchen to prevent the spread of infection (Sun & Ockerman, 2005, p. 326). Hands can be vectors in the spread of foodborne disease because of poor personal hygiene or cross-contamination. An employee might, for example, contaminate his hands when using the toilet, or bacteria might be spread from raw meat to salad greens.

Also, persons who are involved in food preparation and service must take great care to maintain a high level of personal health. Food handlers should meet the health standards set by the health department, and should be free of communicable diseases such as colds, respiratory or intestinal types of influenza, gastrointestinal upsets, acute throat infections, tuberculosis, and hepatitis (DoH, 1996). Primary schools participating in the nutrition programme should meet the following personal hygiene requirements:

- Food handlers with colds, a sore throat, diarrhoea, and infected cuts should not be allowed to handle food and should go for treatment.
- Personal cleanliness requires a daily bath or shower.
- Men should always be clean-shaven, have short clean hair, and wear a cap over their heads.

- Women should have their hair clean and should wear a hair net or other suitable covering.
- All food handlers should wear protective clothing that is well-maintained and clean.
- Hands should be kept clean and nails kept short while handling food (Department of Health, 2000, p. 6).

The standards and the requirements for protective clothing are also prescribed in Regulation 9 of Regulations R918 of 30 July 1999. The regulation further prohibits food handlers from handling food without the use of suitable protective clothing, which includes, amongst others, light coloured overalls, aprons, head gear and footwear (Regulations R918, 1999, p. 12).

2.9.6. Environmental hygiene practices

Regulation 5(3) of Regulations R918 of 30 July 1999 prescribes that food handling premises should have latrines for workers and consumers to use. Sub-regulation 3 of Regulation 5 prescribes that hand washing facilities should be provided with hot and cold running water. The sub-regulation also details that soap should be provided for the washing of hands. Good housekeeping is strongly promoted by the health regulations as a way to ensure food safety and the maintenance of good environmental hygiene. Environmental hygiene plays a crucial role in preventing food and waterborne diseases. The availability of clean toilet facilities and good hand washing practices will ensure that learners consume food that is free from faecal contaminants (Regulations R918, 1999, p. 6).

2.10 Concerns relating to children's health in the implementation of NSNP

The NSNP provides only a small amount of food once a day to primary school learners that assists to relieve their hunger (Hall & Monson, 2006, p. 48). The quantities of food served to learners in the North-West province were less than indicated on the approved menus due to poor or no portion control at the schools (Wentzel-Viljoen, 2003, p. 345). Issues of concern related to the managing of the NSNP that may have an impact on the children's health are discussed below.

2.10.1. Insufficient menus

Most provinces prefer to choose cold menus that do not require cooking facilities. The equipment and facilities available at each school determine the menu choice (DoE, 2004, p. 25). This menu

consists of brown bread with margarine (the margarine supplied does not meet the recommendations of the heart foundation), peanut butter and jam, served with a powdered milkshake supplement enriched with micro-nutrients, or a powdered vitamin C enriched cold drink (Hall & Monson, 2006, p. 48). Wentzel-Viljoen (2003, p. 187) has found that this menu provides on average 20% of the RDA for energy for 7-10 year olds, and does not meet the national or the North-West province's guideline of 25% for 7-10 year old children. Therefore, these menus are seen as insufficient.

2.10.2. Insufficient storage

To cook for large groups of people, a secure, spacious, and pest free storage area is needed. Schools that are a part of the NSNP are not provided with the infrastructure required to store the ingredients they receive to feed the children. In many schools, the staff room/kitchen is used as the basis for food storage and preparation for the NSNP (Paton, 1998, p. 29). As far as the parents are concerned, the food that is allocated to rural schools in South Africa is stolen (Hall & Monson, 2006, p. 48). It has been noted that food handlers and other staff members in rural schools in South Africa take the food that is meant for the learners for their own use (Hall & Monson, 2006, p. 48).

2.10.3. Accounting to parents

A major limitation of the school feeding program is the lack of accountability to the parent body, and a lack of clarity on which learners are eligible to eat food from the programme. Many caregivers do not know whether their children receive food regularly. Food handlers say that all of the children in the class should receive food, while others believe that the programme is only for those children whose parents are unemployed, or only for orphaned children (Hall & Monson, 2006, p. 48; Department of Education, 2004, p. 7).

2.10.4. Environmental constraints

A number of factors hinder the proper implementation of a school feeding program, these include:

- Schools that do not always operate during regular school hours, and who close half-way through the morning.
- The delivery of bulk supplies is to be made weekly or monthly, but most of the rural areas are inaccessible by road after even a light rainfall, which makes deliveries an uncertainty (Department of Education, 2004, p. 7).
- The milkshakes/cold drinks require a clean, safe water supply to reconstitute, and schools without this facility have reported diarrhoea episodes in the children (Hall & Monson, 2006, p. 50).

These factors impact the nutritional quality of the food.

2.10.5. Problems with the volunteers

To provide properly cooked meals, a school needs a committee of local women (mothers, grandmothers, aunts or well-wishers) who would, with their own resources (time, hands, ovens), cook proper meals for the children. Paton (1998, p. 28) discovered that VFHs lacked experience, did not have knowledge of mass catering, and could not keep basic accounts for costing purposes. Furthermore they received no training from the Department of Education on food preparation techniques or hygiene, however, the school pays the volunteers an honorarium, which is a minimal salary and excludes all benefits (Department of Education, 2004, p. 24).

2.11 Conclusion

This chapter presented an overview of the historical background to the school nutrition programme globally, and the rationale for the school nutrition programme within the South African context. Next, issues such as food safety, foodborne diseases, personal and environmental hygiene, and transportation, which impinges on the effective implementation of the NSNP, were examined. Concerns relating to the children's health in the implementation of NSNP were also interrogated. The standards and the requirements prescribed by the Department's health regulations were highlighted before the chapter could be concluded. The methodology chapter will be presented next.

CHAPTER 3 : RESEARCH METHODOLOGY

3.1 Introduction

As mentioned previously, this study sought to explore the knowledge, attitudes and practice of food handlers and suppliers with regard to food safety and food preparation at Ipolokeng primary. It was also sought to establish whether the meals severed in our school nutrition programme constituted a balanced diet, and whether the environmental hygiene at the school was up to standard. This chapter elaborates on the methodological underpinnings of this study. A detailed description and explanation of the choice of paradigm, type of research, and research design are offered. Also, the types of instruments and methods used for data collection and analysis, as well as the sampling technique employed and the rationale behind these choices are elaborated on. Furthermore, the steps taken to ensure the validity and credibility of the research are made explicit. The efforts made towards overcoming the limitations encountered in this study, and the ethical issues that were considered are then unpacked and explained.

3.2 Philosophical assumptions underpinning this study

It is quintessential to clarify the philosophical underpinning or paradigm that a study adopts (Maree, 2013). According to Creswell (2012), a research paradigm is an approach or view that includes assumptions about the nature of knowledge, the nature of reality, the role of values, and assumptions about research methodology.

This research study is underpinned by the interpretivist paradigm. The interpretivist paradigm aims to understand and offer a detailed interpretation of the lived experiences and actions of participants in a study (Cohen, Manion & Morrison, 2011). This means that the interpretivist researcher seeks to understand, as well as describe how people make sense of their worlds, and how they make meaning of their actions and interactions. Agreeing with the ideas put forth by Cohen *et al.*, Maree (2013) contends that interpretative studies aim to understand phenomena through the meanings that people assign to them. Similarly, Denzin and Lincoln (2011) maintain that from an interpretivist perspective, human actions have meanings that are determinable by a researcher. Simply put, it means that the interpretivist paradigm focuses on people's subjective experiences, on how they construct their social world by sharing meanings, and how they engage/relate with

each other or a phenomenon. Additionally, Maree (2013) explains that the interpretivist paradigm assumes that reality is socially constructed through the meanings that people assign to the phenomenon being explored. In other words, placing people in their social contexts offers a better opportunity to uncover the perceptions that they have of their own activities or engagements with the phenomenon under study. Therefore, the uniqueness of a particular context is crucial to understand and interpret the meanings constructed (Maree, 2013). Consequently, it is important to examine/explore situations through the eyes of the participants rather than the researcher.

3.3 Research approach

The interpretative paradigm adopted in the study directed it towards a qualitative approach.

According to McMillan and Schumacher (2010, p. 10) the goals of qualitative research are to "describe and explore" and to "describe and explain any phenomenon." In this study, qualitative data was collected in order to gain greater and deeper insight (Bertram, 2003; Kumar, 2005).

To access this insight, there needed to be room for flexibility at every stage of the research. Consequently, the qualitative data was deemed suitable because it allowed for and captured a wide range of responses from observed situations and the opinions of the respondents.

3.4 Research design

The research design of a study is the plan of how the researcher will systematically collect and analyse the data that is required to give valid solutions to the research problem explored. This study adopted a case study design as a result of the ontological position of the interpretive paradigm (Creswell, 2013). According to Yin (2008, p. 2), "The distinctive need for case studies arises out of the desire to understand complex social phenomena," because, "the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events."

A case study is an in-depth empirical inquiry approach that investigates a phenomenon in its real life context within a bounded system (Cohen *et al.*, 2011). This means that context (real-life context) is a major factor in case study research methodology because it gives the researcher the opportunity to interact with the participants in their natural setting/context, leading to in-depth understanding and interpretation of the phenomenon/case under investigation. The aim of a case

study is to understand things in detail (Creswell, 2013). The case may be some aspects of the social life of a person or group of persons, an organisation, or a phenomenon, and it usually generates words rather than numbers as data for analysis (Lapan, 2012). This method allows participants to freely share their ideas, views, perceptions and experiences in their natural settings, making it possible for the participants to provide in-depth information (Cohen, Manion & Morrison, 2013). In other words, a case study method is suitable and useful when a researcher is seeking an in-depth understanding of a specific event, process, organisation or particular group/groups of people in a particular place. Furthermore, the case study approach seeks to answer the crucial 'what', 'how' or 'why' of the phenomenon under investigation and also provides a detailed explanation of the phenomenon being explored by focusing on specific instances in a bounded system.

According to Lapan (2012), the hallmark of the case study approach is that it provides rich, thick descriptions of participants' lived experiences of, thoughts about, and feelings regarding a situation using multiple data sources. It is descriptive and detailed with a narrow focus, and combines subjective and objective data. Put simply, this means that it focuses on individual participants or a group of participants, and seeks a deep understanding of their perceptions of events. The researcher is integrally involved in the case since the case study may be linked to the personality of the researcher. Thus, the latter characteristics of the case study approach underlines my reason for the choice of this approach, given that the I am integrally involved in the case under investigation as a result of my experience as a Natural Science and Life Orientation teacher at Ipolokeng primary school.

According to Yin (1994), there are three categories of case studies that can be used when exploring a phenomenon. These include:

- **Exploratory case study**: This serves as a suitable means of eliciting information in order to seek new insight and clarify one's understanding of a process or problem. This approach also serves as a pilot for other studies or research questions. This implies that the exploratory approach provides new and detailed information or insight about a problem or a process (phenomenon) through the research findings, which can perhaps inform policy or serve as the background for further research.
- **Descriptive case study:** This type of case study focuses on providing narrative accounts.

- **Explanatory case study:** This deals with hypothesis testing.

After closely contemplating the above categories and types of case studies, I chose the exploratory case research study methodology. This was due to the purpose or intent of the study, which was to explore the knowledge, attitudes and practice of food handlers and suppliers with regard to food safety and food preparation at Ipolokeng primary.

According to Yin (2008), there are six possible sources of evidence for case studies: documents, archival records, interviews, direct observation, participant-observation, and physical artifacts (pp. 83, 85-96). Indeed, the case study's unique strength is "its ability to deal with a full variety of evidence - documents, artifacts, interviews, and observations" (Yin, 2008, p. 8). Whilst a case study design has many advantages, it also has its limitations. According to Maree (2013), the dependence on a single case makes it impossible to generate generalisable conclusions as the samples are usually small and often not necessarily representative of the broader population. It is thus difficult to know how far the results can be generalised; and it is difficult to tell how far the findings are biased by the researcher's own opinions.

3.5 Location of study

Ipolokeng Primary is situated in the urban area of Diepkloof in Soweto.

The learners attending this school came from homes where most of the parents were unemployed or they survived on a social grant from the government. Crime, the use of drugs, and promiscuous behaviour were popular and rife in the community surrounding the school. The school provided classes from Grade 1 to 7. There were 599 learners enrolled at Ipolokeng primary school at the time of this study, who either spoke Setswana or Sotho at home. The school had limited resources so it used the local community sports field, and the community hall and library to improve the quality of its educational offering. The school is currently part of the national Department Of Education's nutrition programme; it caters for 599 learners on a daily basis (Monday to Friday).

3.6 Data generation

Data generation methods comprise the tools used by the researcher to collect data in order to answer the relevant research questions. In this section, I discuss issues pertaining to gaining access, the instruments used, sampling methods, phases of data collection, how the data was analysed, as well as how the issues of trustworthiness, validity and reliability were addressed.

3.6.1. Gaining access

Gaining access refers to dealing with various gatekeepers at each stage of the research. Formal permission to conduct the research was obtained from the University of KwaZulu Natal's (UKZN) research office (see Appendix A1 for ethical clearance), as well as the principal of Ipolokeng Primary school (see Appendix A4 for the principal's permission to conduct research). Permission was also obtained from the participating food handlers and the food supplier during each phase of data capturing.

3.6.2. Data generation instruments

The following instruments were used to capture the data: namely, a questionnaire, individual interviews, a focus group discussion, observations, photo voice, and document analysis. The above-mentioned instruments were used because they were the most suitable instruments for collecting qualitative data, and for gaining an in-depth insight into the problem under study.

3.6.2.1. Questionnaire

Two closed-ended questionnaires were designed with the assistance of a food technologist, environmental health officer, and university researchers to be given to the food handlers and the food supplier. The questionnaire was piloted with several food handlers and a food supplier from another school in Soweto (see appendix A5 for questionnaire). Using a closed-ended questionnaire to collect data for this study was deemed suitable because the questions allowed for the capturing of information with specificity to a particular situation (Cohen *et al.*, 2007). Cohen et al (*ibid*.) add that closed-ended questions are time-efficient and responses are easy to code and interpret.

The questionnaires were piloted to check the clarity of the questionnaire items, and to eliminate ambiguities or difficult wording. The outcome of the piloting indicated that the questionnaire items had good construct validity. According to Cohen *et al.* (2011), a pilot study serves to increase the reliability, validity and practicability of the questionnaire. The rationale for using the questionnaire first was twofold. First, it allowed the participants the opportunity to answer the questions privately, and the information was written down in the participants' own words, which reduced the possibility of the researcher misinterpreting the information and then misrepresenting the data in the field notes.

The questionnaire targeted biographical data, as well as information on personal hygiene, cleaning practice, knowledge of food safety, and the attitude of the respondents towards food preparation. The rationale for using the questionnaire first was to get a broader picture of the food handlers' and the food suppliers' knowledge/attitude and practice with regard to food safety and preparation.

Copies of the questionnaire were delivered personally to the food handlers and food supplier for completion. Both parties were conversant in English, but not all of them were able to read and write. For the two food handlers who could not read or write, I asked one of my colleagues to serve as a scribe. I read out and explained the contents of the questionnaire to the food handlers and then my colleague wrote down their response. Other respondents who could read and write were given a timeframe of one week to complete the questionnaire before it was collected from them. As a follow-up measure, I reminded the respondents after three days to complete the questionnaire in time (Kerruish, Settle, Campbell-Stokes & Taylor, 2005). The returned questionnaires were then

coded from H1 up to H4 (Handler 1 up to handler 4) to represent the respondents, where after analysis then began.

3.6.2.2. Photo observation

Marshall and Rossman (1989, p. 79) define observation as "the systematic description of events, behaviors, and artifacts in the social setting chosen for study." . As such, these observations enabled the researcher to describe existing situations using the five senses, thereby providing a ’written photograph’ of the situation under study (Erlandson, Harris, Skipper & Allen, 1993). According to DeWalt and DeWalt (2002), participant observation enables researchers to learn about the day-to-day or routine activities of the people under study in their natural setting.

Observation(s) provide researchers with ways to check for the non-verbal expression of feelings, to determine who interacts with whom, to grasp how the participants communicate with each other, and to check how much time is spent on the various activities (Schmuck, 1997). Participant observation allows researchers to check the definitions of terms that participants use in questionnaires, observe events that informants may be unable or unwilling to share when doing so would be politically incorrect, impolite or insensitive. Observation further allows the researcher to observe situations that the informants have indicated in the questionnaires, thereby making them aware of distortions or inaccuracies in the descriptions of the informants (Marshall & Rossman, 1995).

According to DeWalt and DeWalt (2002), there are three types of observations that researchers can engage in:

- *Descriptive observation*: Here, the researcher observes anything and everything, assuming that he/she knows nothing. The disadvantage of this type is that it can lead to the collection of minutiae that may or may not be relevant to the study.
- *Focused observation:* This emphasises observation that is supported by interviews in which the participants' insights guide the researcher's decisions about what to observe.
- *Selective observation:* Here the researcher focuses on different types of activities to help delineate the differences in those activities.

Having read about the different types of observations, I decided to incorporate the use of photography into my selective observation. The purpose of the observations was to gain insight into the practices of the volunteers and supplier in terms of food safety, food preparation, and environmental hygiene at Ipolokeng primary school. The photographs taken during my observation of the different processes involved in food preparation (storage, handling, preparation, and serving), and of environment hygiene were used as a catalyst for the dialogue during the focus group discussion.

The advantage of photo observations, according to Demunck and Sobo (1998), is that it affords access to the "backstage culture" (p. 43) of the phenomenon; it allows for richly detailed description, and provides opportunities for viewing or participating in unscheduled events. Dewalt and Dewalt (2002) add that it improves the quality of data collection and interpretation, and facilitates the development of new research theories and deeper insights (p. 8).

3.6.2.3. Photo Focus group discussion

I grouped the photographs taken during the observation to firstly reflect the different stages of food preparation, and secondly, the environmental hygiene at Ipolokeng primary school. The displayed photographs were used as a catalyst to initiate a discussion with the food handlers regarding their knowledge and practice of food safety and preparation, and their views on environmental hygiene. I opted to use a focus group discussion as a method of data collection as this could reveal a wealth of detailed information and provide deep insight into food handlers' knowledge/attitude and practice with regard to food safety and preparation. According to Maree (2013), a well-planned focus group discussion creates an accepting environment that puts the participants at ease, allowing them to thoughtfully answer the questions in their own words and add meaning to their answers. Furthermore, Cohen *et al.* (2011) assert that focus group discussions are appropriate when the research seeks to: Explore the depth and nuances of opinions regarding an issue, understand differences in perspectives, understand what factors influence opinions or behaviour, test reactions to actual or proposed services, understand the results obtained in the research process, as well as learn about participants by observing their interactions.

The value of the photo focus group discussion, according to Collier and Collier (1986, p.99), is that the photographic data can also be better interpreted by the participants in the study because

"[the] potential range of data enlarges beyond that contained in the photographs themselves." In this way, photographs could be used not only to engage in a dialogue with the food handlers in this study, but also to look beyond the content of the photographs and further into the school nutrition programme. The photo focus group discussions were video recorded and then transcribed.

3.6.2.4. Document analysis

A document analysis is a form of qualitative research in which documents are interpreted by the researcher to give a voice and meaning to an assessment topic (Cohen *et al.*, 2011). Analysing documents incorporates coding the content into themes in a manner similar to how focus group or interview transcripts are analysed. There are three primary types of documents that can be analysed in document analysis:

- Public Records: The official, ongoing records of an organisation's activities. Examples include student transcripts, mission statements, annual reports, policy manuals, student handbooks, strategic plans, and syllabi.
- Personal Documents: First-person accounts of an individual's actions, experiences, and beliefs. Examples include calendars, e-mails, scrapbooks, blogs, Facebook posts, duty logs, incident reports, reflections/journals, and newspapers.
- Physical Evidence: Physical objects found within the study setting (often called artifacts). Examples include flyers, posters, agendas, handbooks, and training materials.

In this study, the menu set up for the school nutrition programme by the DBE (which is a public record) was subjected to a content analysis in order to establish if the meals provided to the learners embraced the concept of a balanced diet. Also, Regulation R918 of 1999 was analysed to check if environmental hygiene at Ipolokeng primary met the requirements prescribed by the regulation.

3.7 Sampling

Cohen *et al.* (2007) refer to sampling as a process of decision-making about the population (community), settings, and events or deeds that have been chosen for exploration. Both convenience sampling and purposive sampling were used in this study. According to Maree (2013), convenience sampling occurs when the site or respondents are selected on the grounds of

proximity and affordability. The location for the study was conveniently selected as I am employed as a teacher at Ipolokeng primary school. Johnson and Christensen (2010) explain that purposive sampling occurs when the researcher specifies the characteristics of a population of interest as they have the data. The participants for this study were purposively selected as they (food handlers and the supplier) were the individuals whose information responded to the research questions posed. My sample consisted of one food supplier and the four food handlers responsible for the school nutrition programme at Ipolokeng primary school.

3.8 Data generation plan

In this section, I explicate the stages that were undertaken during the data collection. The table below shows the four stages that I engaged in during data collection. It also reflects the data source, the instrument used, the research questions in focus, and the purpose of each stage. The table thus provides an overview of the data generation plan carried out in this study.

Table 3.1: Data generation plan

Research question	Stage	Data source	instrument	Purpose of stage
What are the knowledge and practices of food handlers and suppliers with regard to food safety?	1	Food handlers and school environment.	Questionnaire.	To establish food handlers' knowledge and practice with regard to food safety.
		Suppliers.	Questionnaire.	To establish the food suppliers' knowledge and practice with regard to food safety.
What are the practices of food handlers with regard to food preparation?	2	Food handlers.	Photo Observation. Photo focus group discussion.	To gain a deeper insight into food handlers' practice with regard to food safety.
To establish if the meals prepared and served to learners constituted a balanced meal.	3	School nutrition programme menu actual daily menu. Food handlers.	Document analysis: Content analysis of actual menu. Photo focus group discussion.	To establish if the meals prepared and served to the learners constituted a balanced meal and if divergences occurred from the set menu.
Do the levels of environmental hygiene at Ipolokeng primary meet the requirements prescribed by Regulation R918 of 30 July 1999? If so, how? If not, why not?	4	Food handlers. School environment - (ablution facilities/garbage disposal facilities/food preparation area/tap area).	Photo observation. Photo focus group discussion. Document analysis of Regulation R918 of 1999.	To establish if the levels of environmental hygiene at Ipolokeng primary met the requirements prescribed by Regulation R918 of 30 July 1999.

In the section below, I elaborate on each stage of the data collection.

Stage one

During Stage one, data was collected from food handlers and the food supplier of Ipolokeng primary school using closed-ended questionnaires (see appendix A5 for questionnaires).

Stage two

I engaged in photo observation by capturing the various moments during the preparation and serving of meals. I also recorded my observations of the various stages of food preparation in my reflective diary. The photographs were developed and displayed during the photo focus group discussion.

Stage three

This stage entailed a document analysis of the menu set out by the DBE for the school's nutrition programme to establish if the intended meals were balanced (i.e. they contained all of the food groups). The school nutrition programme menu was then compared to the actual meals served at Ipolokeng primary school to check for divergences.

Stage four

Stage four entailed comparing the data obtained from Stages 1 to 3 to Regulation R918 of 30 July 1999 in order to establish if the levels of environmental hygiene at Ipolokeng primary met the requirements as set out by this Regulation R918.

3.9 Data analysis method

As mentioned previously, this study embraced a qualitative case study approach, therefore, the analysis of the data also involved a qualitative approach. According to Cohen *et al.* (2011), the analysis of data entails breaking down the information gathered and collating them into elements in order to obtain clear responses to the research questions. Put simply, this means that an analysis entails categorising, ordering, manipulating and summarising the information obtained in response to the research questions (De Vos, 2002). The intention of an analysis is therefore to transform

data into an interpretable and understandable form, so that the relation of the research problem to the research questions can be studied and tested in order to draw conclusions (De Vos, 2002).

According to Cohen *et al.* (2011), the analysis of qualitative data involves organising, accounting for, and explaining the data in terms of the participants' experiences of the phenomenon being explored. The researcher must further note patterns, themes and categories, and regularities. The data from the four stages were analysed using a deductive approach. Deductive analysis involves a systematic procedure where the analysis is guided by specific objectives (Cohen *et al.*, 2011). Using this approach, all of the relevant data from the different sources are collated to provide a collective answer to the research questions. In this study, the units of analysis were the food handlers, food supplier, and the environmental hygiene of Ipolokeng primary school. Therefore, the phenomenon being explored is the knowledge and practices of the participants in terms of food preparation and food safety.

The data generated in the study were analysed in stages, where each of the stages involved the analysis of the data in terms of each research question individually

Stage one of the data analysis:

This stage addressed Research Question one. The analysis started with the questionnaires administered to the food handlers and the food supplier, which was done through a content analysis. Content analysis is defined as:, "A research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). Hesse-Biber and Leavy (2011, p. 234) find that content analysis is a repeated or spiral "method to knowledge-building where data are increasingly analysed bit by bit [...] In the process, the researcher generates new understanding with varied levels of specificity, during each stage of the project and uses this information to double back and gain more information." Figure 1 shows the spiral steps undertaken in the content analysis in this study.

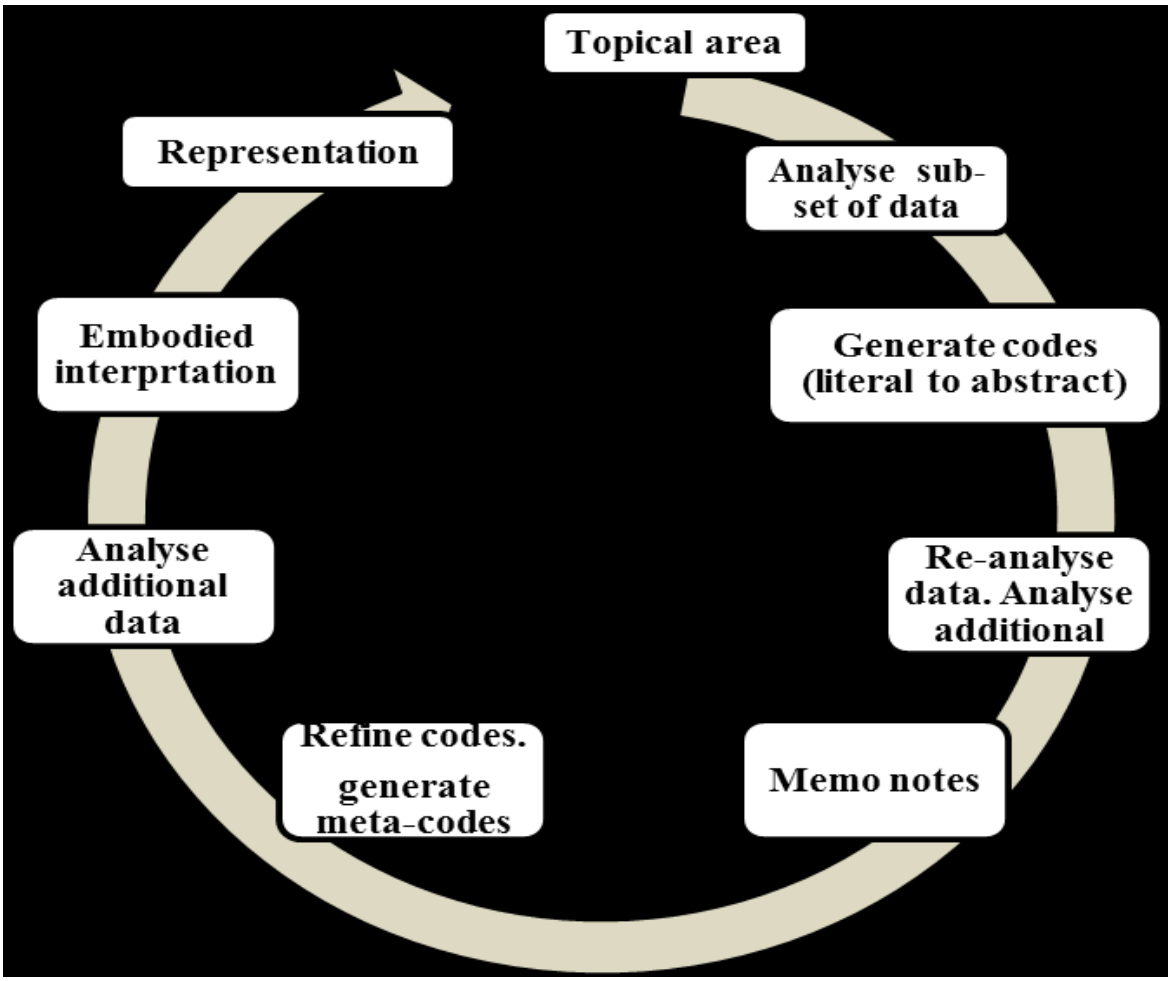


Figure 3.1: A Qualitative model (inductive) showing steps in Content analysis

(Neuendorf, 2001, as cited in Hesse-Biber & Leavy 2011, p. 234)

Figure 3.1 depicts the various steps in a content analysis. Though sometimes these steps are not followed exactly as the layout presents, this is a prototype of how to analyse and interpret data.

Stage two of the data analysis

This stage addressed Research Question 2. The data from the photo observation and photo focus group discussion were analysed in stages using the thematic method (Clarke & Braun, 2013; Hesse-Biber & Leavy, 2011). The first step comprised the transcription of the recorded photo focus group discussions; while the second step required the reading and familiarisation of the researcher with the items noted. Thirdly, open source coding was carried out through a close examination of

the data, then themes were sought for. The fifth stage was a review of the themes that emerged, which preceded the definition and naming of the themes for subsequent reporting.

Stage three of the data analysis

Stage three aimed to answer Research Question 4. The data from the school nutrition programme and the photo focus group discussion were juxtaposed and then subjected to a content analysis, as described in Stage one.

Stage four of the data analysis

This stage aimed to answer Research Question 4. The data obtained from Stages 1 to 3 were juxtaposed with the prescribed requirements of Regulation R918 of 30 July 1999 on environmental hygiene. The data was then once again subjected to a content analysis.

3.10 Research rigor

Every research study is subject to an open critique and evaluation. Without this, the soundness of its methods, the accuracy of the findings, and the quality of the assumptions made and the conclusions reached are questionable and could reduce the value of the study (Long & Johnson, 2000, p. 30). The results gained from the data that was collected and analysed in this study were exposed to criticism from other researchers in this field of study. Nevertheless, I indicate below how this research was designed to avoid or minimise challenges to its validity.

3.10.1. Validity

Validity is a term used in qualitative research that indicates whether the researcher is actually carrying out the research as proposed. This is achieved through a consistent check of the research instrument for objectivity, and the data for consistency. Ensuring objectivity is not an abstract activity; rather, it should dictate all of the efforts undertaken to ensure that the research evidence actually verifies the research claims (Silverman, 2010, p. 366). Due to the fact that qualitative data does not allow for statistical testing, in qualitative research, significant attention is given to internal validity. In this regard, Yin (2008) recommends that different responses from participants in the group should be checked for consensus. In other words, triangulation is needed, as explained in Section 3.10.5. To further achieve internal validity, methods such as pattern matching, explanation

building, logic models, or addressing conflicting descriptions were used. As stated by Amerson (2011, p. 428), "Construct validity can be achieved using several sources of evidence, sustaining an arrangement of proof, and having a key informant review the draft of the case study report, or through member checking." Consequently, construct validity necessitates having several sources of evidence. In this study, all video recordings were kept safely and reviewed during analysis to avoid uncertainty. Furthermore, during the focus group discussion, I asked the participants for clarity where there were divergent views (for example, on missing ingredients) in order to ascertain a consensus on their response, which helped to achieve internal or construct validity.

Furthermore, many researchers in qualitative research find that to evaluate and ascertain the quality of qualitative research, terms such as 'trustworthiness', 'relevant', 'confirmable', 'credible', 'dependability', 'transferability' or 'plausible' are used (Denzin & Lincoln, 2005, p. 24). Accordingly, to enhance the worth of my research, I adopted the notion of credibility, as well as internal or construct validity.

3.10.2. Credibility

In order to ensure the credibility of my study, data was collected to ensure a detailed description of the settings, participants, and themes of my study, as recommended by Creswell and Miller (2000, p. 128). These aspects are discussed next.

Triangulation: Triangulation is a process used to ensure credibility in research. The data from the three phases of data collection were juxtaposed in order to build a coherent justification for the interpretations and conclusions arrived at.

Member checking is a research procedure used to ensure the credibility and validity of the research. According to Carlson (2010), member checking involves taking back the focus discussion transcript to the respondents and asking them to check the accuracy thereof. In this process, the participants were given the opportunity to elaborate, and clarify or confirm aspects of the discussion in order to ensure that their views, experiences, and perceptions were captured accurately during the discussion. Thus, member checking was adopted for the transcripts of the focus group discussion to guarantee the credibility of the research.

Rich, thick descriptions were used to convey the findings. These descriptions may transport the reader to the setting and provide a discussion of an element of shared experience.

Anonymity: All of the participants in the study were assured of the anonymity of their identity before and after data collection to enable them to partake willingly and freely in the research. Again, this was to also guarantee strict adherence to the University's research ethical standards.

3.11 Limitations of the study

This was a case study, so the findings may not necessarily be generalized, but rich, thick descriptions are provided so that the findings of this study may be applicable to similar contexts in South Africa.

As this is a case study and the sampling carried out was purposive, the results of this study should not be generalised. Nevertheless, as mentioned previously in Section 1.5, a single case study can be regarded as valid, as was the case with Newton and Gailileo. This case study allowed for an in-depth and detailed study of the knowledge, attitude and practice of food handlers and suppliers with regard to food safety.

3.12 Conclusion

This chapter described the research methodology wherein a case study research design was used. The data was generated via questionnaire, photo observations, a photo focus group discussion and document analysis. A description of each stage of the data generation and analysis was provided. The measures taken to ensure the credibility of the study were also highlighted. The limitations of the study were further illuminated. The next chapter presents the data according to each research question.

CHAPTER 4 :PRESENTATION AND DISCUSSION OF THE FINDINGS

4.1. Introduction

This chapter sets out to present the data in order to answer the four research questions posed, namely: (i) What are the knowledge and practices of food handlers and suppliers with regard to food safety? (ii) What is the practice of food handlers with regard to food preparation? (iii) Do the meals prepared and served to learners constitute a balanced meal? If so, how? If not, why not? (iv) Do the levels of environmental hygiene at Ipolokeng primary meet the requirements prescribed by Regulation R918 of 30 July 1999? If so, how? If not, why not? As indicated in Chapter 3, the data was generated via questionnaires, interviews, photo observations and a document analysis. This chapter is divided into four parts: A, B, C and D. Part A focuses on the data generated via the questionnaire in an effort to answer Research Question 1. Part B aims to answer Research Question 2, while Part C proposes to answer Research Question 3, and Part D examines the levels of environmental hygiene at Ipolokeng primary school, answering Research Question 4.

4.1 Part A: Research Question One

As mentioned previously in Chapter 3, in order to answer Research Question 1 (What are the knowledge and practices of food handlers and suppliers with regard to food safety?) voluntary food handlers and the food supplier responded to a questionnaire (see Appendices A5 and A8).

4.1.1. Questionnaire responses: VFHs

The questionnaire targeted biographical information, as well as information on personal hygiene, cleaning practices and knowledge, as well as attitudes towards hygiene and cleaning practice. The data acquired from the biographical section of the questionnaire was used to create a topology of the VFH at Ipolokeng primary school. This section of the questionnaire focused on the VFHs age, gender, level of education, training to prepare food, and duration of employment as a VFH.

4.1.2. Biographical data for VFHs

Figure 4.1 below reflects the biographical data for the VFHs.

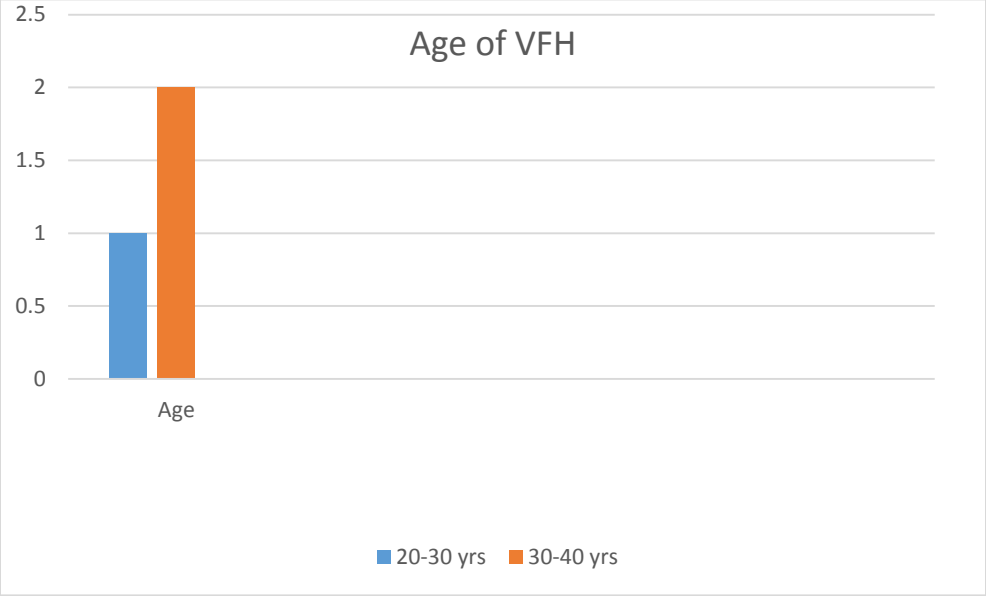


Figure 4.1: The age of the VFH

One of the three VFHs was younger than the other two female food handlers. The VFH between the ages of 20 and 30 was a male food handler, which is interesting to note. This particular finding disrupts the gendered sexual script perpetuated in a patriarchal black community. In black communities, gender stereotyping is common and women are often relegated to or confined to the preparation of meals. Young black men are thus not expected to engage in cooking and cleaning.

In terms of their educational background, one of the three VGHs had a primary school level of education, while the other two VFHs had a secondary school level of education. The educational level of the VFHs is visible in Figure 4.2 below.

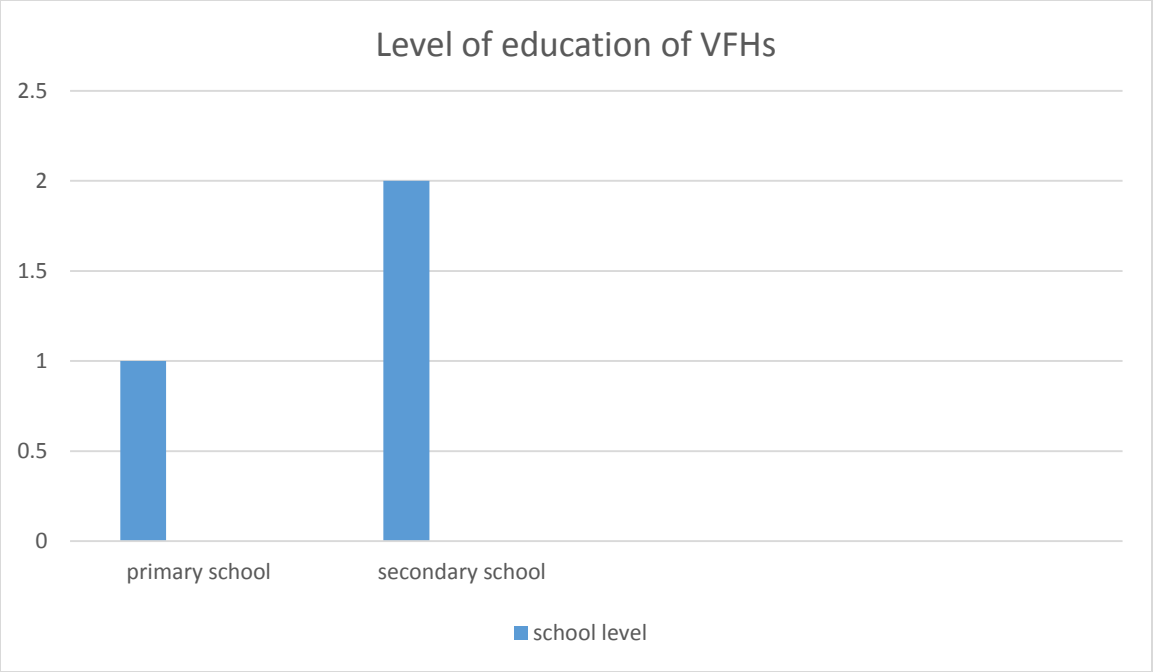


Figure 4.2: Level of education of VFHs

The duration for which the VFHs had been employed thus far at Ipolokeng primary school can be seen in Figure 4.3 below.

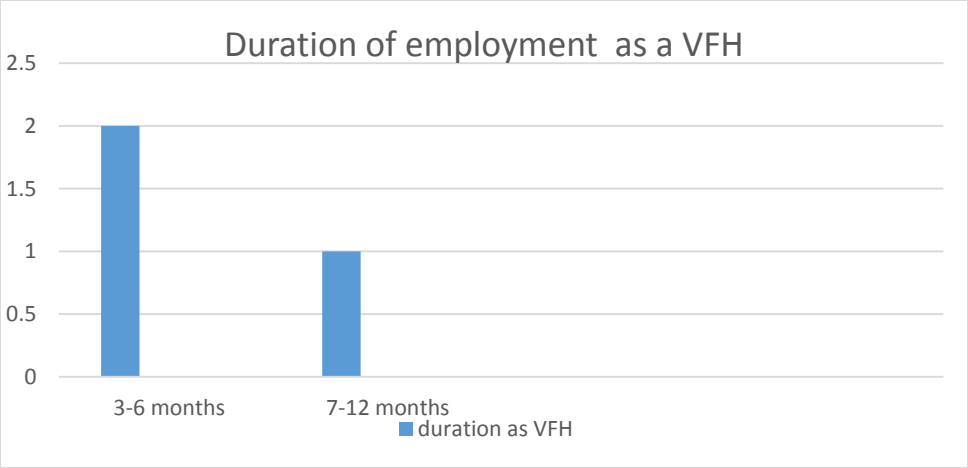


Figure 4.3: Duration of employment as a VFH

Two of the three VFHs had been working at Ipolokeng primary school for between 3 and 6 months as VFHs, while one had been employed for 7 to 12 months at Ipolokeng primary school.

On a daily basis, 599 learners are fed at Ipolokeng primary school. It is thus alarming that none of the three VFHs have received any training to engage in food preparation, food safety, and serving. This particular finding resonates with that of Louw, Bekker and Wentzel-Viljoen (2001). Their study reported that 56% of all VFHs received no training from the DBE with regard to basic hygiene in the preparation of food, how to prepare food (63%), or how to mix food items (64%).

The possession of food preparation knowledge and skills improves nutritional knowledge and the ability to prepare meals; and it also affects dietary quality (Ternier, 2010). Being equipped with cooking competence would enable a VFH to prepare and incorporate the vital food groups for a healthy diet, and would broaden their food selection in the absence of certain ingredients. The training received for food preparation is illustrated below in Figure 4.4.

Figure 4.4: Training for food preparation

With regard to the above-mentioned point, it is worth noting that the VFHs neither pursued home economics nor consumer studies at school level to equip them with the necessary knowledge and skills required to engage with food preparation and food safety on a large scale (i.e. for 599 learners).

The safety, storage and care required to prepare food for children in large quantities over a prolonged period (156 days) requires additional knowledge, skills and attitudes that differ from that of cooking at home. In light of the reported incidences of food poisoning resulting from the poor handling of food and the consumption of contaminated food from the school nutrition

programme (World Hunger Education Service, 2011; Nnakwe, 2013), the lack of any official training from the DBE for VFHs to be able to engage in food preparation raises questions about the safety of NSNP and the VFHs knowledge on the safe preparation of food, and portion size. Therefore, it is imperative for VFHs to understand the interrelatedness of every part of the food service system from transportation, preparation, storage, and food handling to the serving of food to children that is safe for consumption (Martin, 1999).

4.1.2.1. Personal Hygiene of the VFHs

This section of the questionnaire targeted information on personal hygiene of the VFHs. Via the analysis of the data from the questionnaire, six categories emerged on personal hygiene: nails, weaves, jewelry, wounds/cuts, the use of a mouth mask, and the washing of hands. These six categories are discussed below.

Nails

All three VFHs indicated that they did not use artificial nails as these could fall into the food while it was being prepared and could be a potential health hazard. The two female VFHs indicated that they trimmed and filed their nails on a weekly basis (so that they were short), while the male VFH indicated that he grew the nail on his pinky finger (right hand). With regard to the previous point, it is worth noting that when nails are long, dirt and micro-organisms can collect beneath them and can be passed onto the food being prepared, thereby causing contamination.

Weaves

The two female VFHs claimed to use weaves while preparing food, they also indicated that they did not always use a hair net or some form of hair restraint to protect their hair. A hair net or hair restraint keeps hair from ending up in the food, and may also deter employees from touching their hair. In the absence of a hair net or restraint, it is possible to contaminate their hands when they touch their weaves.

They did not consider the use of weaves or the absence of a hair net while preparing food as being unhygienic.

Jewellery

The two female VFHs indicated that they wore a wedding ring while preparing food. This piece of jewelry could get dirty during food preparation (when food particles become embedded in it), and may be a source of harmful micro-organisms that could contaminate the food being prepared. An additional hazard associated with jewellery is the possibility that pieces of the item or the whole item itself may fall into the food being prepared. Hard foreign objects in food may cause medical problems for children, such as chipped and/or broken teeth, internal cuts, or lesions (Fraser, 2003).

Wounds/cuts

All three VFHs unanimously agreed that if they had an open wound or sore, they would get it cleaned and covered immediately before they began with food preparation. They, however, did not specify with what type of material the cut or wound would be covered. It is worth noting that such wounds should be covered by impermeable or waterproof dressings to prevent oozing into the food, and the dressing should preferably not be flesh coloured (a nude colour) as they could easily fall off without being detected.

Use of a mouth mask

Two of the three VFHs indicated that they did not use a mouth mask when they were ill (flu, coughing, diarrhea, fever, sore throat, tummy bug). The use of a mouth mask provides sufficient protection against the droplet transmission of viruses, which could contaminate food that is being prepared (WHO, 2012)

Hand washing

When it came to hand hygiene, it was interesting to note that the VFHs stated that they washed their hands when they were dirty, or after going to the toilet as can be seen in Figure 4.5 below:

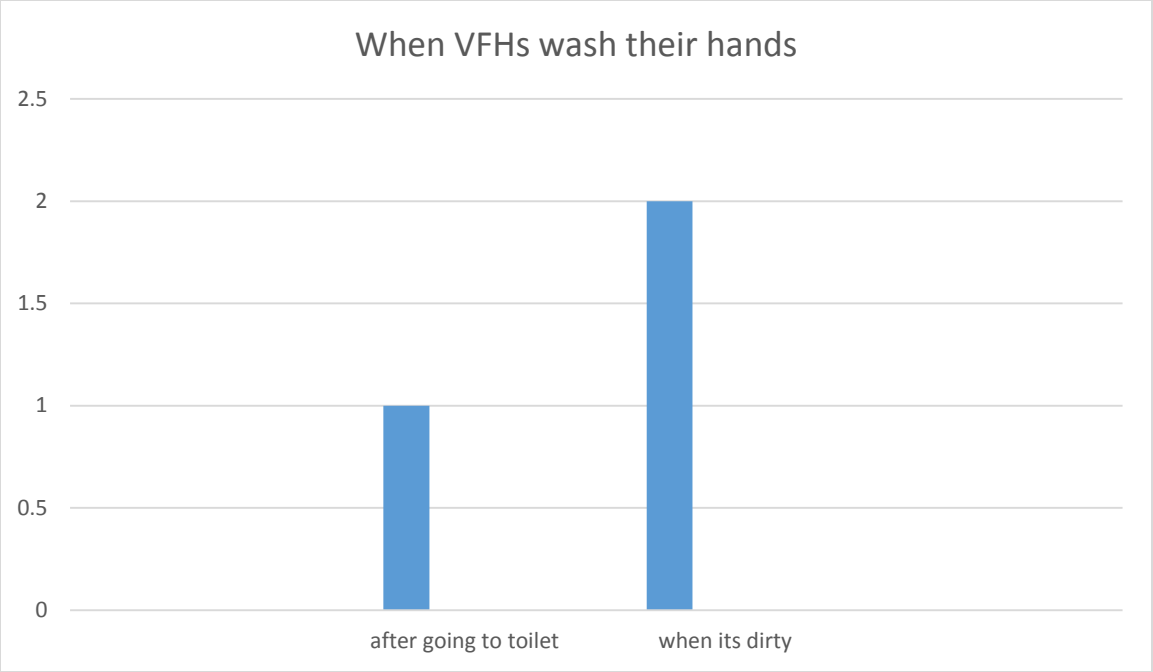


Figure 4.5: When VFHs wash their hands

It is important to note that hands are the most common way in which harmful micro-organisms can reach food that is being prepared or served (WHO, 2012). The fact that two VFHs indicated that they only washed their hands when they were dirty is problematic and was probed further during the interview. These two VFHs were oblivious that their hands could become soiled with many contaminants during routine tasks, such as after using the bathroom, coughing, sneezing, smoking, eating, and drinking. Due to their lack of knowledge and the absence of training to serve as VFHs, they were unaware that they had to wash their hands after any task that might contaminate their hands. Furthermore, they were unaware that harmful bacteria such as E. coli, Salmonella, Staphylococcus Aureus, and viruses (e.g. norovirus) that are present on their hands would be removed by proper hand washing techniques (WHO, 2012). The instances when the VFHs washed their hands (after going to the toilet and when they were dirty) raises question about the VFHs' standards of personal hygiene, and the safety of the food provided to the children at Ipolokeng primary school. VFHs need to be realise that they should wash their hands as often as necessary, and always before starting work, before handling cooked or ready-to-eat food, after handling or preparing raw food, after handling waste, after cleaning duties, after using the toilet, after blowing their noses, sneezing or coughing, after eating drinking or smoking, and after handling money.

The hand washing practices implemented by the VFHs is reflected in Figure 4.6 below. Their routine in terms of hand washing and drying methods demanded attention and further probing during the interview.

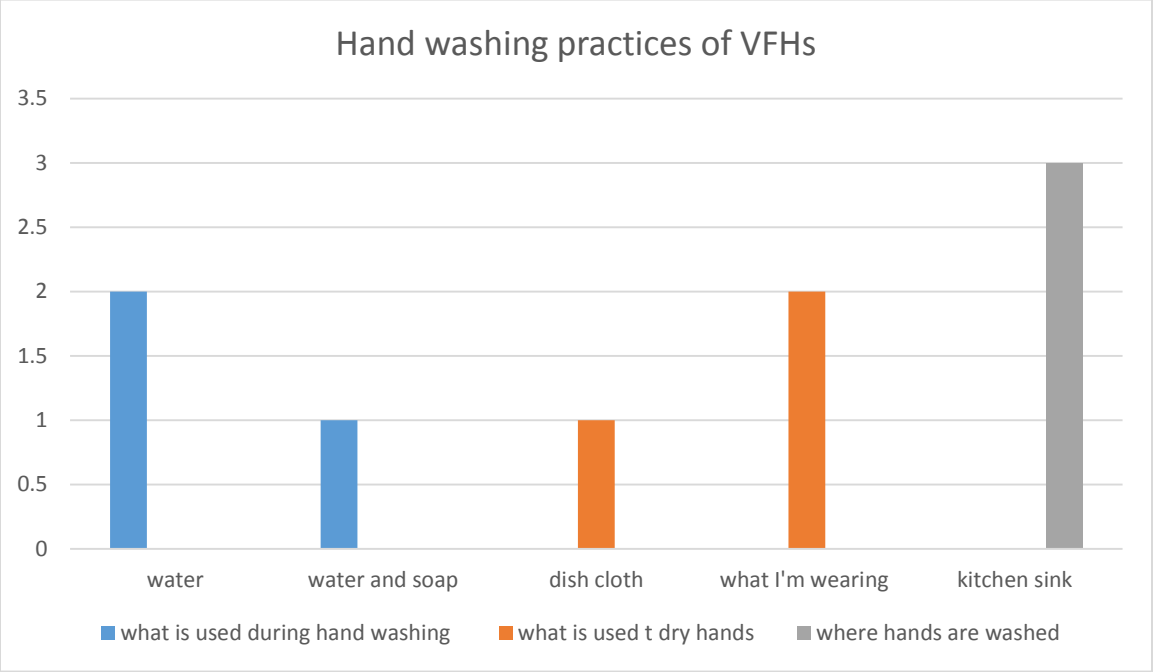


Figure 4.6: Hand washing practices of VFHs

Two VFHs indicated that they washed their hands with water only, while one VFH indicated that water and soap was used during the washing of hands. These VFHs were unaware that warm water and soap is more effective than cold tap water in removing micro-organisms from their hands. Their lack of awareness of hand washing practices can be associated with a lack of training by the DBE to serve as VFHs.

It is worth noting that all three VFHs revealed that they washed their hands in the kitchen sink. These VFHs were unaware that hands must never be washed in a food preparation sink because this could lead to cross–contamination. Micro-organisms can be transferred from their hands to the sink and thereby to the food that is washed or prepared in it, or the utensils stacked in it for washing. Their practice of washing their hands in the kitchen sink raises questions once again about the safety of the food served to learners at Ipolokeng primary school. According to WHO (2012), children are prone to getting sick from food that is handled unsafely.

Additionally, the hand drying practices of the VFHs was a cause for concern. Two of the VFHs dried their hands after washing on the clothes they are wearing, while one of them used a dish cloth to dry their hands. Both of these hand drying practices could result in cross-contamination as they allow for micro-organisms to be transferred from one surface to another, resulting in the contamination of the food being prepared.

In terms of the use of an apron, two VFHs indicated that they wore an apron when handling and preparing the food, while the male VFH indicated that he did not wear an apron while working in the kitchen. The response of the male VFH was probed further during the interview to establish if his decision not to wear an apron was linked to Sexual Script Theory. Figure 4.7 below brings to the fore the apron hygiene practice of the VFHs.

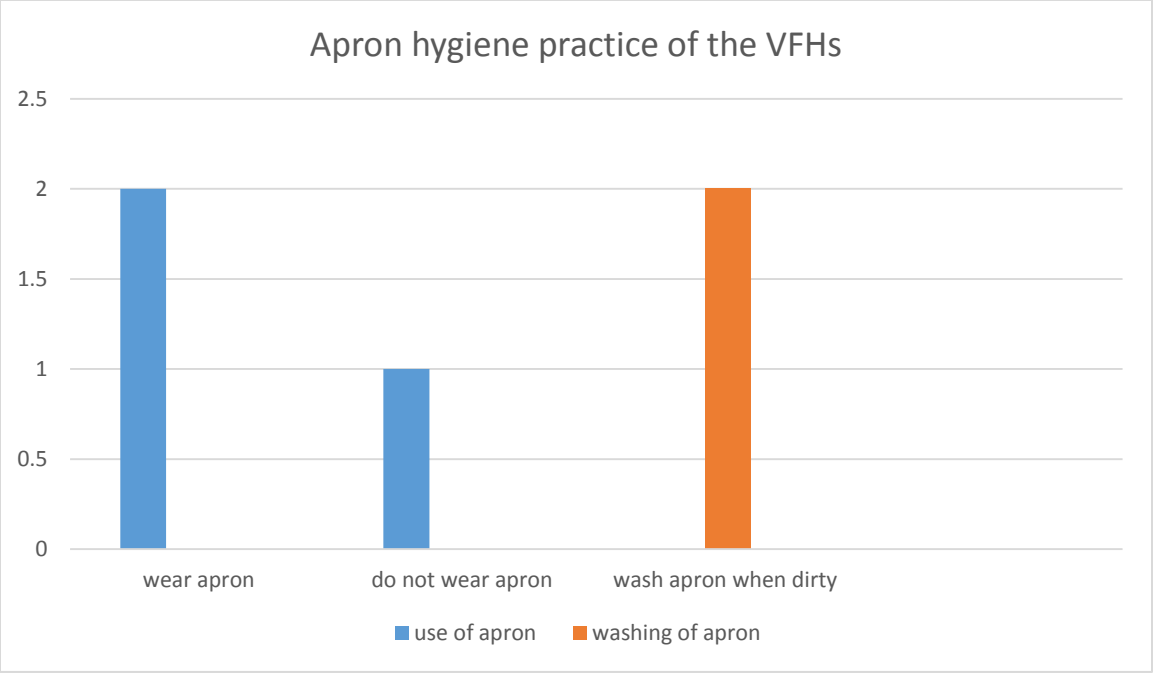


Figure 4.7: Apron hygiene practice of the VFHs

Figure 4.7 above exemplifies the lack of knowledge and skills of these VFHs when it comes to issues of personal hygiene. It is standard policy for all food handlers to wash their aprons on a daily basis to ensure that they are clean and free of micro-organisms that could cause cross-contamination. A dirty apron provides the ideal breeding ground for micro-organisms and pathogens.

The level of personal hygiene displayed by the VFHs compromises the safety of the food served at Ipolokeng primary school.

4.1.2.2. Cleaning hygiene of the VFHs

The cleaning hygiene of the VFHs is visible in Figure 4.8 below.

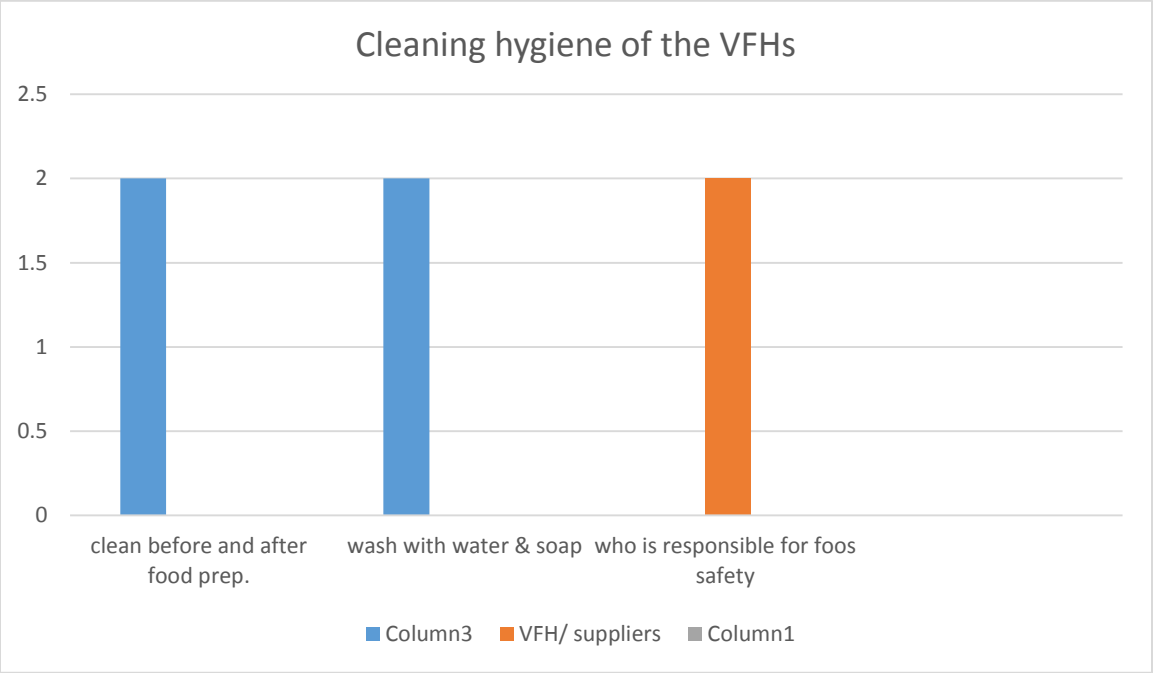


Figure 4.8: The cleaning hygiene of the VFHs

Two VFHs indicated that they cleaned the preparation surfaces (tables/ boards) before and after preparing food with water and soap. The male VFH did not respond to the questions in this section of the questionnaire (his lack of response was probed further during the interview to check for gender stereotyping of roles). It is interesting to note that all three VFHs only considered food safety to be their responsibility. They did not conceptualise food safety as being linked to the quality of the products that they received from the suppliers. Therefore, they did not consider the supplier as also being responsible for food safety.

4.1.2.3. Knowledge and practice of the VFHs with regard to food safety

As already mentioned earlier, none of the three VFHs received any training to serve as a VFH. The lack of training impacted their hygiene and cleaning practices (see Sections 4.2.1.2. and 4.2.1.3.

above for greater details), as well as their knowledge of food safety. They saw themselves as being solely responsible for food safety as they were at the forefront of food preparation and serving. The VFHs were unaware that the use of different knives and cutting boards for raw and cooked food was necessary, or that the storage practices of food items have an impact on food safety. In the absence of such vital knowledge, it is not surprising that all three VFHs noted that they always observed children suffering from nausea (vomiting) at Ipolokeng primary school. The nausea that the learners experienced could be attributed to the unsafe food practices of the VFHs (as discussed in Section 4.2. above).

4.1.2.4. Knowledge and practices of the food supplier with regard to food safety

Biographical information of the supplier

The biographical data of the food supplier is captured in Figure 4.9 below.

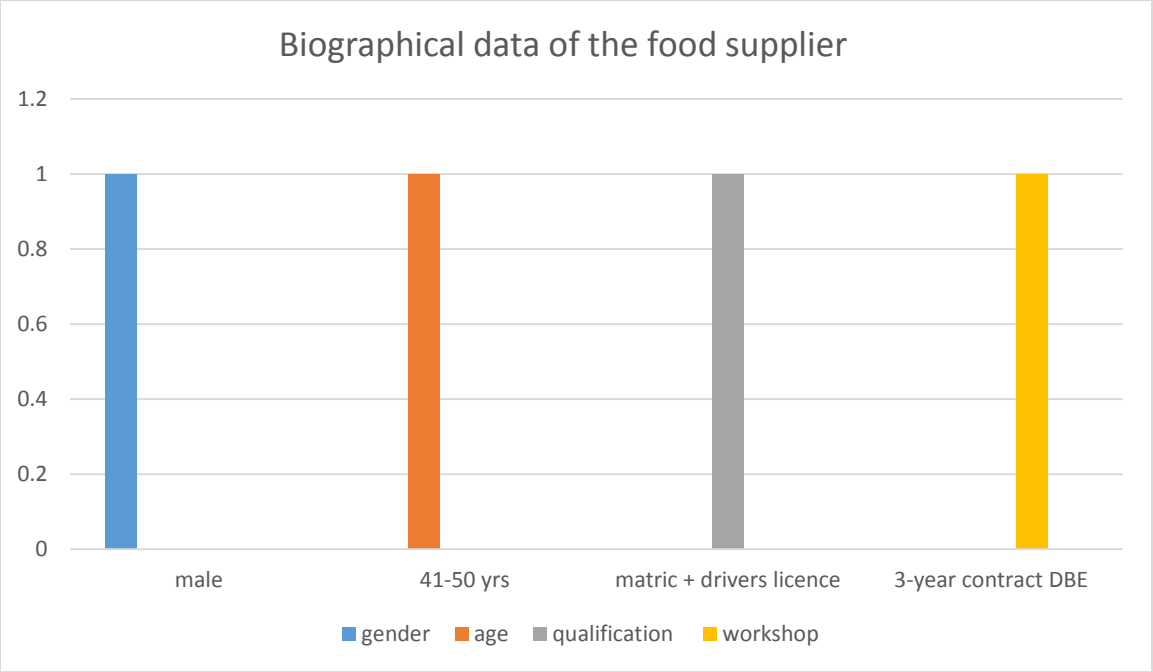


Figure 4.9: Biographical details of the food supplier

From Figure 4.9, it can be seen that the food supplier was a male between the ages of 41 and 50. He had a matric certificate and a code 12 driver's license. He had attended a workshop for suppliers on food safety conducted by the DBE, and had been a supplier for more than a year as he had a

three year contract with the Gauteng Provincial Department of Education. The information contained in Figure 4.9 reflects the bias that the VFHs encountered at the hands of the DBE or the Provincial Department Of Education. The NSNP (DBE, 2009) stipulates that VFHs should be unemployed females, yet training was not provided to the VFHs to assist them to become more adept at their jobs, and to receive employment for a longer period. One wonders if the decision not to provide training to the VFHs could be underpinned by gender bias. By not providing training to the VFHs (most of whom are unemployed females), it seems that the DBE and the Provincial Department of Education is perpetuating this inequity.

The knowledge and practices of the food supplier with regard to food safety

A striking difference can be observed between the supplier's and VFHs' knowledge and practices in terms of food safety.

The supplied saw food safety as a collective responsibility of many individuals, such as the manufacturer, the supplier, the VFHs, the school, the SGB, and the parents, while the VFHs misconstrued food safety to be their responsibility. The rationale for the supplier's aforementioned explanation is that good personal hygiene is learnt at home and reinforced at school. Manufacturers are responsible for ensuring that no cross-contamination occurs when food is sent to suppliers. Suppliers are thus supposed to ensure that food is transported under the proper conditions. Schools and SGBs should ensure that food is stored at the correct temperature to ensure its safety, while VFHs are responsible for proper hygiene conditions being maintained during food preparation and serving. The supplier had a holistic or birds eye perspective of food safety and was able to see the links or relations between the different individuals involved in the NSNP who were collectively responsible for food safety. His deep insight into individual responsible for food safety could be attributed directly to the training provided to him to assist him in carrying out his duty more efficiently.

Furthermore, he was aware that certain foods needed to be transported refrigerated, and that a cold chain supply must be maintained until food is prepared. Also, he understood that food should be neatly packaged for transportation to avoid cross-contamination.

4.2 Part B: Research Question 2

In Part B, I attempt to answer Research Question 2 (What is the practice of food handlers with regard to food preparation?) using the data generated via the photo observations and photo focus group discussion. Two categories of food practice emerged from the data: unsafe and unhygienic practices, and the poor storage of ingredients.

Unsafe, unhygienic practices: cross-contamination

The unsafe and unhygienic practice of food handlers is illuminated via the photo observations that were undertaken (the VFHs had consented to photo observation - but they were not told the exact time when the photographs were to be taken).

Photograph 1: Chopping directly on a table instead of a chopping board

A closer examination of Photograph 1 elucidates the unhygienic practice of the VFH. She is chopping cabbage directly on the table (*the tafel is clean – so I cut on it directly).* Put simply, it means that she is not using a cutting board (*why must I used the board and make it dirty,I will have to wash the board ...it will make more work for me*). The non-use of a cutting board poses the threat of contact contamination and micro-organisms or pathogens could easily be transferred from the table surface onto the cabbage, thereby contaminating the cabbage and posing a potential hazard to the children. The above-mentioned practice mentioned in chopping the cabbage relates to their knowledge (or lack thereof) regarding food safety (*akukho amagciwane lapha ... there are no germs here)* (see Section 4.2.1.4.). According to Abdullah, Sani and Siow (2014), inadequate

knowledge of food hygiene, food hygiene practices, and food safety among food handlers encourage pathogen growth and lead to foodborne outbreaks of disease.

The table edge had some sections that were chipped. It is possible for wood remains from the chipped parts of the table to be present in the chopped cabbage. These chipped fragments of wood could also be a potential health hazard to the children if swallowed when eating the cabbage.

In addition, this particular VFH was not wearing the proper attire needed to engage in food preparation. She was wearing a ring, had no gloves, apron or hair net on. Not using a hair net could result in hair falling into the chopped cabbage. The VFH could have contaminated her hands when and if she touched her hair, and she could transfer micro-organisms onto the cabbage. Furthermore, she was not wearing an apron, her clothing, if it was dirty, could have been a source of micro-organisms. The cabbage could also have become contaminated if it was in contact with her clothing.

It is visible in the photograph that one VFH is depicted as not wearing gloves. If she had any cuts or abrasions on her hands, she could have transferred micro-organisms onto the cabbage. The VFH in the photograph was also wearing a ring, which could serve as a source of micro-organisms.

The excerpts from the photo focus group discussion provide a deeper insight into the unsafe unhygienic practices of VFHs that are invariably linked to their lack of knowledge on food hygiene, food safety, and contamination:

> VFH 3: "*The tafel is clean – so I cut on it – why must use the board and make it dirty, I will have to wash the board ... it will make more work for me ... we just cut everything on the tafel - bread, cabbage, spinach , then when we are done we wipe the tafel...haai its not dirty...I wipe the tafel ... akukho amagciwane lapha (there are no germs here).*"

> VFH 1: *"Haaibo… this is what we do all the time … we cut on the table, we use the same dish to keep our cut food and wash at the end- it saves time. We are very busy rushing to cook to so many children – … no it is not dirty … I wash my hands in the morning – I'm clean… we have to wash dishes outside, there is no tap in the kitchen."*

The lack of knowledge of the VFHs in terms of the hygienic and safe preparation of food comes to the fore. Their prevailing unsafe and unhygienic practices impact the safety of the food served

at Ipolokeng primary school. The above excerpts confirm the dire need for training of VFHs prior to their appointment as food handlers.

Photograph 2: Cooked meal exposed

Photograph 2 shows that empty cans are not discarded into the bin, but remain on the kitchen floor. The presence of these open cans in the confined kitchen space poses a threat to the safety of the VFHs as they could get cut or grazed by the open cans. Furthermore, the poor storage of the cooked food was revealed. The meals comprising of tinned fish stood in an open pot on the floor, and soya mince stood uncovered on the table. Dust, foreign particles, insects, and micro-organisms from the air or floor could enter the food and contaminate it. These contaminants present in the air or on the floor pose the greatest threat to food safety (WHO, 2005). If adequate measures to guard against food contamination and infections are not taken, the health of the learners, who are supposed to benefit from the Ipolokeng School Nutrition Programme, will be negatively impacted (Kidiku, 2001).

The excerpts from the photo focus group discussion bring to the fore the VFHs' lack of knowledge of food hygiene and food safety:

> VFH 1: *"Hey, I don't know ... isi ekhishini incane kakhulu - it is so small , no place to keep anything so when we cook we leave the food wherever there is place.... no its clean, very clean"*

> VFH 2: *"It's clean – it's inside the pot ... the food, the food is not touching the floor, so these is no dirt going into it... what micro-organisms .. mina, I can't see it... if I can't see it, it is not there."*

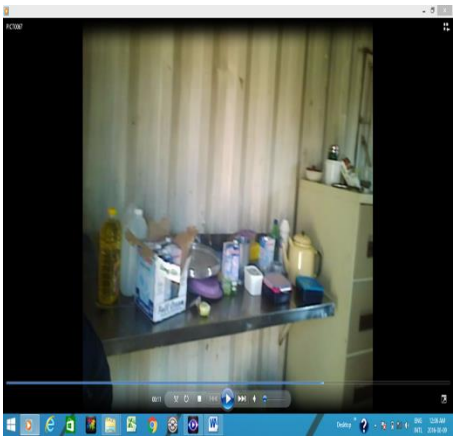
Photographs 1 and 2 exemplify that the disregarding of hygienic measures on the part of the VFHs (*it's clean, very clean*) may enable pathogens to come into contact with the food (*the food is not touching the floor, so these is no dirt goinig into it)* and may multiply in sufficient numbers to cause illnesses in the learners (WHO, 1989). Therefore, it is imperative for food handlers to receive training in basic food hygiene (*mina, I can't see it ... if I can't see it, it is not there..)* prior to appointment in order to prevent the occurrence of foodborne diseases that could impact negatively on the learners enrolled for the Primary School Nutrition Programme (Wilson Disease, 2008). Poor food hygiene knowledge and frequently engaging in unsafe food handling practice leads to foodborne illnesses, (Osaili *et al.*, 2013). According to Angeillo (2000), human handling errors have been responsible for most outbreaks of foodborne illness. In preventing human error, channeling hygiene knowledge through education may reduce the risk of foodborne illness. Gibson *et al.* (2002) concur that people who are involved in providing, processing, and serving a meal need to be capacitated with hygienic food preparation knowledge.

It is important that actual training is acquired and effectively applied. Without well-trained VFHs who realise the importance of hygiene rules in the food processing chain, implementing and maintaining a functional food safety system is a goal that will be very difficult to achieve (Jianu & Chiş, 2012). The implementation of safe food handling practices, learnt during food hygiene training, requires the food handler to use the resources available to them and to implement the knowledge and skills in a practical application (Green *et al.*, 2005).

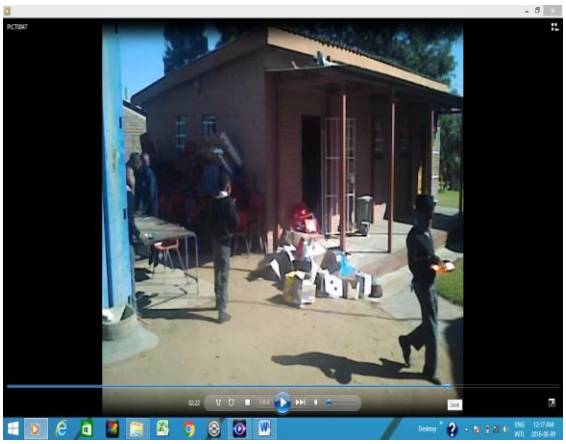
- **Poor storage of ingredients**

According to Maunsell and Bolton (2002), food storage areas must be well ventilated, cool, and easy to clean to control hygiene. The storage of food in appropriate store rooms and at the right temperature before and during food preparation is important.

Photograph 3: storage of ingredients



Photograph 4: poor storage of ingredients



Photograph 5: storage of ingredients

Photograph 3 depicts the storage of many different ingredients on a metal table in the kitchen. Photograph 4 shows boxes of ingredients from the school nutrition programme left outside the admin block, while Photograph 5 reveals that ingredients are stored all together, that is, they are not separated into perishable and non-perishable items. It should also be noted that perishable food should be placed in a fridge. Photographs 3-5 illuminate and confirm that the careful storage and handling of food at appropriate temperatures is not practised by the VFHs at Ipolokeng primary school. The incorrect storage of food items compromises the safety of the food.

Photograph 4 indicates that food is left outside and is exposed to changes in temperature. If ideal storage temperatures are not present, then insects can make a significant contribution to the biodegrading of food ingredients such as maize meal, samp and perishable ingredients that form the main ingredients in the NSNP.

The above photographs exemplify the unsafe, unhygienic practices of the food handlers with regard to the poor storage of food ingredients.

> VFH 2: "*A lot of food stuff goes missing mainly tin fish and mince… I don't know who takes it… but it hard . .. to keep the cooking things in one place – we keep a bit everywhere … so at least .. we have things to cook… sometime the maize meal has isiNdundundu (weevils) and we cook it … no it's not bad, we can store how you are saying … temperature, dry – angazi.*"
>
> VFH 3: *"We just keep the food stuff together were we can see it … it goes missing… haaibo … no check temperature to keep . .. or expiry date ... for what its food ... they must eat ... no it's good food ... they don't get at home so they must eat ... we eat … we ok, not sick."*

Form the excerpts above, it is obvious that the proper storage conditions for food items are lacking at Ipolokeng primary school. In their effort to ensure that learners have food (*… so at least we have things to cook…)* they store food everywhere *(just keep the food stuff together were we can see it … it goes missing, we keep a bit everywhere).* Temperature control and ideal storage conditions pose a challenge to the VFHs. They also seem to either lack knowledge concerning adequate temperatures or they do not check the expiry dates of food items *(no check temperature to keep ... or expiry date ... for what? It's food).*

In terms of the above evidence regarding the food storage practices at Ipolokeng primary school, the VFHs need to be familiar with Regulation 5(3) of Regulations R918 of 30 July 1999, which prescribes that storage rooms should be constructed from face-bricks, non-absorbent, and non-corrosive materials. The sub-regulation further prescribes that the storage space for all kinds of food should be hygienic. The health regulations prohibit the storage of food in storage facilities that do not meet the standards and the requirements prescribed in regulation 5(3) of Regulations R918 of 30 July 1999 (Regulations R918, 1999, p. 7).

4.3 Part C: Research Question 3

In Part C, I present the data from the document analysis and the focus group discussion to answer Research Question 3: Do the meals prepared and served to learners constitute a balanced meal? If so, how? If not, why not?

4.3.1. Document analysis

The official menu (Department of Basic Education, 2010) is as follows:

Table 4.1: Meal plan as per the DBE

Day	Meal option	Analysis of food group	Is the meal balanced in terms of food groups
Monday	Pap;	Carbohydrate.	Yes – all meals contain fats and oils.
	Pilchard fish;	Protein.	
	Fruit.	Vitamins /minerals/ dietary fibre.	
Tuesday	Pap;	Carbohydrate.	Yes.
	Morogo (spinach);	Vitamins /minerals. dietary fibre.	
	Vegetables.	Vitamins /minerals.	
	OR		
	Inkomazi;	Carbohydrate, fats and protein.	
	fruit.	Vitamins/minerals. Dietary fibre.	
Wednesday	Pap;	Carbohydrate.	Yes.
	Soya;	Protein.	
	Cabbage;	Vitamins /minerals. Dietary fibre.	
	Fruit.	Vitamins /minerals/	

Day	Meal option	Analysis of food group	Is the meal balanced in terms of food groups
		Dietary fibre.	
Thursday	Maize/rice;	Carbohydrate.	Yes.
	Meat mince;	Protein.	
	Mixed veggies.	Vitamins /minerals/ dietary fibre.	
	Fruit.	Vitamins /minerals, dietary fibre.	
Friday	Samp;	Carbohydrate.	Yes.
	Sugar bean;	Protein.	
	Fruit.	Vitamins /minerals/ dietary fibre.	

A document analysis of the official menu supplied by the DBE reveals that the meals that ought to be prepared and served to learners constitute a balanced meal. A balanced diet comprises the three main food groups, namely, carbohydrates, proteins, fats and oils, vitamins and minerals, as well as dietary fibre (Isaac *et al.*, 2012). While fats and oils are not indicated on the menu, they are present in all of the meals served as oil/margarine is used during the cooking process. Also present in the meals served are vitamins and/or minerals, as well as dietary fibre from the fruit and vegetables.

The official menu supplied by the DBE was not always the meal menu in practice at the school under study. This became obvious in the photo focus group discussion (see Section 4.3. for more details). The meal option/s vary when certain ingredients run out, as can be seen in the excerpts below:

> VFH 1: *"The things that miss the most … meat mince, potatoes, oil … we cook gravy /bisto when we run out of meat mince for Thursdays."*

> VFH 2: "*I don't know who takes it, but you can see* e-*pilchards when they delivery and after 2 ... 3 days, it's very less. When e-pilchards is finished, we give Inkomasi. .. we try to keep Inkomasi for when there is no mince or e-fish."*

The unofficial menu or the menu in practice when certain ingredients run out is depicted below:

Table 4.2: Unofficial menu in practice

Day	Meal option	Analysis of food group	Is the meal balanced in terms of food groups
Monday	Pap;	Carbohydrate.	Yes – all meals contain fats and oils.
	Inkomazi;	Protein/fat.	
	Fruit.	Vitamins /minerals/ dietary fibre.	
Tuesday	Pap;	Carbohydrate.	Yes.
	Morogo (spinach);	Vitamins /minerals dietary fibre.	
	Vegetables.	Vitamins /minerals.	
Wednesday	Pap;	Carbohydrate.	Yes.
	Soya;	Protein.	
	Cabbage;	Vitamins /minerals dietary fibre.	
	Fruit.	Vitamins /minerals/ dietary fibre.	
Thursday	Maize/rice;	Carbohydrate.	No.
	Gravy;	Carbohydrate.	
	Mixed veggies;	Vitamins /minerals/ dietary fibre.	
	Fruit.	Vitamins /minerals, dietary fibre.	
Friday	Samp;	Carbohydrate.	Yes.
	Sugar bean;	Protein.	
	Fruit.	Vitamins /minerals/ dietary fibre.	

As is visible in Table 4.2, on Thursday the unofficial menu in practice is not a balanced meal as not all of the food groups are served when the minced meat runs out. The Thursday menu lacks

proteins, which are essential for the growth and repair of worn out and damaged cells, the formation of the cell membrane, the formation of part of the enzymes and hormones of the body. These proteins also serve as a source of energy. A lack of protein and excess carbohydrates in children's diets results in Kwashiorkor (Pillay *et al.*, 2012).

My findings indicate that when ingredients do not run out (*the things that miss the most,)* the meals prepared and served to learners constitute a balanced diet as all food groups were included in these meals. When the ingredients ran out (*I don't know who takes it, but you can see* e-*pilchards when they delivery and after 2 ... 3 days it's very less),* then the unofficial menu in practice does not constitute a balanced diet.

4.4 Part D: Research question 4

In part D, I attempt to answer Research Question 4: Do the levels of environmental hygiene at Ipolokeng primary meet the requirements prescribed by Regulation R918 of 30 July 1999? If so, how? If not, why not? As mentioned in Chapter 3, the data from the photo observation, the photo focus group discussion, and thee questionnaire were juxtaposed with Regulation R918 of 30 July in order to answer this question. The following five categories emerged from the data in terms of environmental hygiene:

- Ablution facilities;
- Garbage disposal facilities;
- Food preparation area;
- Storage facilities; and
- Feeding facilities.

Each of these categories are elaborated on in the following sections.

4.4.1. Ablution facilities

According to Regulation R918 of 1999 (p. 6), clean toilet facilities and hand washing materials such as soap or hand sanitizer, and towels, are needed to encourage good hand washing practices

amongst food handlers and learners. The availability of these essential facilities will ensure that learners consume food that is free from faecal contaminants.

Ipolokeng primary school has a learner enrolment of 599 children, and there are only six toilets for the learners. Three toilets are for boys, and three are for girls. The male toilets are isolated from the female toilets (they are far apart). There are three taps in both the male and female toilets. In effect, this means that approximately 100 learners use each toilet and tap during school breaks, which is far greater than the learner toilet ratio (which is 20 learners per toilet) stipulated in Annexure C of Regulation R918 of 1999. In accordance with Annexure C of Regulation R918 of 1999, Ipolokeng primary has a critical shortage of ablution facilities (it ought to have 30 toilets for 599 learners).

Due to the high learner ratio per toilet, the toilets are always dirty and without toilet paper. Furthermore, no soap or hand sanitiser or hand drying disposable towels are provided for learners to wash and dry their hands. The photos below depict the toilet and taps in the morning before the start of the school day.

Photograph 6: The toilet is soiled

Photograph 7: No soap or disposable towels

The above photos show that the environmental hygiene at Ipolokeng primary does not meet the requirements prescribed by Sub-regulation 3 of Regulation 5 in Regulation R918 of 1999 in terms of hand washing facilities. According to the regulation, both hot and cold running water should be provided. The toilets at Ipolokeng primary school only have cold water. Furthermore, Sub-

regulation 3 of Regulation 5 prescribes that soap should be provided for washing hands for workers on the food premises, and for the persons to whom the food is served. The bathrooms at Ipolokeng primary school lack soap, hand washing material, hand drying material, and toilet paper. In the absence of these essential items, the environmental hygiene, personal hygiene, and the safety of the food prepared at the school becomes questionable.

Data from the VFH questionnaire (see Part 4A) revealed the all three VFHs washed their hands in the kitchen sink. This means that they did not make use of the taps in the toilets. The hand washing and drying practices of the VFHs confirm the absence of hand washing and drying materials in the toilets. It seems that there is a general underestimation of the effectiveness of hand washing in preventing the spread of diseases amongst VFHs, learners, the SGB and the management of Ipolokeng primary school. It is therefore crucial for the powers that be to ensure that food handlers and learners are knowledgeable about the routes, causes, and prevention of food contamination. Moreover, adequate measures must be put in place (such as provision of soap or hand sanitizer, and towels) to guard against food contamination and cross infection.

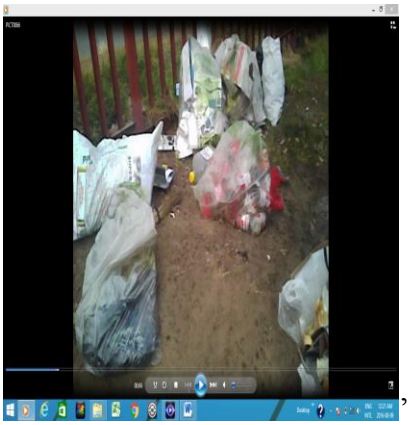
Form the aforementioned data, it is visible that the implementation of the NSNP in Ipolokeng primary school could have a negative impact on the health of the learners (UNESCO press, 2002).

4.4.2. Garbage disposal facilities

Sub-regulation 2 of the R918 regulation of 1999 states that the food premises should have a waste disposal system with refuse bins (containers) that have tight fitting lids that are suitable for the hygienic storage of refuse pending its removal from the school. In other words, there should be bin in which all garbage is stored so that it does not pose a health hazard to the food handlers or to the learners.

Unfortunately, Ipolokeng primary school does not satisfy this regulation of Regulation R918. As is evident in the photographs below, the garbage is not placed into bins with tight fitting lids, rather, it is placed in bin bags that are exposed to varying temperatures. These bin bags containing waste can create an ideal breeding ground for pathogenic micro-organisms and vectors of disease (flies), and may be a public nuisance due to unsightliness and bad smell.

Photograph 8: Garbage not placed in bins



Photograph 9: Garbage exposed to varying temperatures

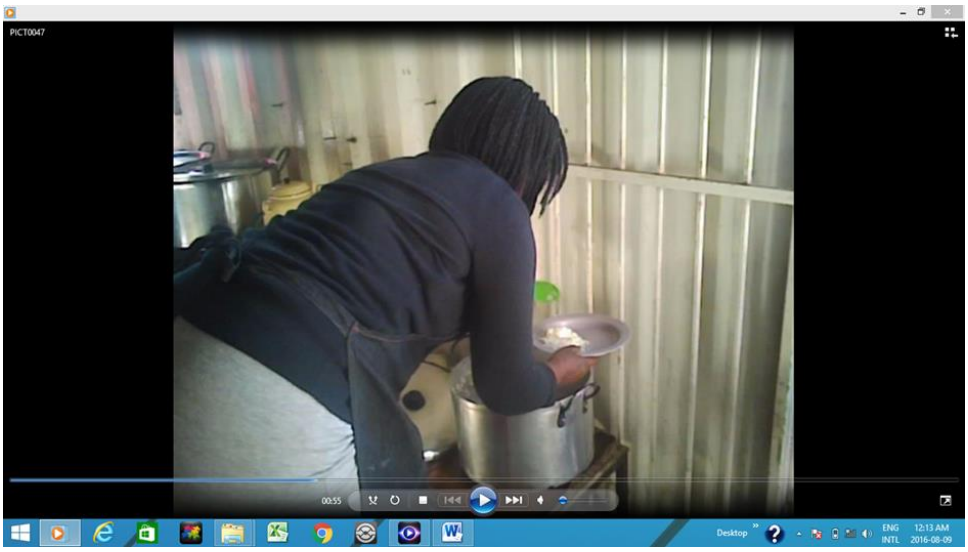
The unsafe garbage disposal practices at Ipolokeng primary school do not make its environment conducive to food preparation and food safety.

4.4.3. Food preparation area

Regulation 5(3) of Regulation R918 of July 1999 prescribes that food premises should be constructed in ways that do not cause health hazards. The regulations outline that kitchens should be constructed from face-bricks, non-absorbent, and rust free materials (Regulations R918, 1999, p. 6).

The kitchen used at Ipolokeng primary school does not meet the standards and the requirements prescribed by the health regulation. As is visible in the photograph below, the kitchen is constructed from a metal storage container.

Photograph 10: Kitchen – metal storage container



The kitchens used are constructed from metal, which is a corrosive material. Regulation 5(3) of Regulation R918 of July 1999 prohibits the use of corrosive materials in the building of food handling structures. Corrosive materials can contaminate food during preparation, which can cause lead poisoning. The safety of food cannot be guaranteed where corrosive materials have been used for the construction of food handling structures, such as kitchens (Regulations R918, 1999).

Furthermore, Regulation 5(3) prescribes that the tables in the kitchen should not be made of absorbent material such as wood. Wooden materials can absorb contaminants and various forms of bacteria, which can cause food poisoning. A wooden table cannot be cleaned with ease, and will absorb any detergent used for cleaning. Section 5(3) (a) of Regulation R918 prohibits the handling of food on a premises made of materials that are absorbent and not water resistant (Regulations R918, 1999).

As can be seen in the photograph below, the table in the kitchen is made of wood.

Photograph 11: Kitchen has a wooden table

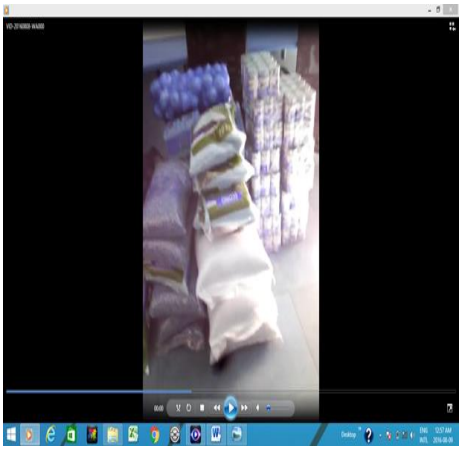
It is therefore evident that the levels of environmental hygiene at Ipolokeng primary do not meet the requirements prescribed by Regulation R918 of 30 July 1999.

4.4.4. Food storage facilities

Regulation 5(3) of Regulation R918 of 30 July 1999 prescribes that storage rooms must be constructed of face-bricks, non-absorbent, and non-corrosive materials. The sub-regulation prescribes that the storage space for all kinds of food should be kept in hygienic conditions (Regulations R918, 1999). Food safety can be guaranteed in such storage facilities as they can be easily cleaned.

With regard to the food storage facilities Ipolokeng primary, they did not meet the requirements prescribed by Regulation R918 of 30 July 1999 regarding environmental hygiene, as can be seen in the photographs below.

Photograph 12: Food storage place made of bricks



Photograph 13: Food storage space made of bricks

However, it is worth noting that the food ingredients received were often not stored timeously (see Part 4B for details on poor food storage practices) at the correct temperature. Therefore, in terms of the food storage practices, the safety of the food prepared and served was compromised.

4.4.5. Feeding facilities

Regulation R918 of 1999 does not make mention of feeding facilities as part of its requirement for environmental hygiene. Where learners sit and eat can also expose them to contaminants such as offensive gases, smoke, soot, dust, insects, and micro-organisms that can impact food safety and be a health hazard to them. Therefore, proper, safe, clean feeding facilities should be an integral part of environmental hygiene. At Ipolokeng primary school, there were no eating facilities for learners at the time of this study. As is evident via the pictures below, the learners sat or stood and are their meals.

Photographs 14, 15, 16 and 17: Learners have no proper eating facilities - they eat outside

The lack of proper feeding facilities exposes learners and their meals to contaminants.

As can be inferred from the lack of ablution, garbage disposal, food preparation, food storage and feeding facilities, Ipolokeng primary school does not meet the standard prescribed by Regulation R918 of 1999 regarding the level of environmental hygiene.

4.5 Conclusion

In this chapter, I attempted to answer the four research questions posed in this study. My findings reveal that the VFHs lacked knowledge on food handing and personal hygiene during food preparation and serving. Poor food hygiene knowledge and frequently engaging in unsafe food handling practices can lead to foodborne illness. This lack of knowledge on food safety and practice with regard to food preparation can be attributed to their lack of training to serve as food handlers.

Training in terms of personal hygiene and the basics of food hygiene such as the storage temperature of food, cooking procedures, and cross-contamination is necessary as food handlers are responsible for ensuring the production of safe food, and for the prevention of food poisoning (Angelillo, 2000). Poor personal hygiene and human error (arising from a lack of knowledge) have been responsible for most of the outbreaks of foodborne illness. In terms of the above-mentioned factors, it is worth noting that hygiene knowledge can be targeted through education in order to reduce the risk of foodborne illness. Gibson *et al.* (2002) suggest that people who are involved in providing, processing, and serving a meal should be required to carry out hygienic food preparation, and receive education on this topic. This demonstrates that the level of education is a significant factor in ensuring and maintaining training regarding appropriate food practices (Jianu & Chiş, 2012).

The meals served at Ipolokeng primary school do constitute a balanced meal as they contain the three main food groups, namely, carbohydrates, proteins and fats, vitamins/minerals, and dietary fibre on most days when ingredients like minced meat does not run out. On days when these do run out, the learners eat a meal lacking in proteins. Furthermore, the levels of hygiene at Ipolokeng primary school do not meet the stipulated levels of environmental hygiene prescribed by Regulation R918 of 30 July 1999.

In the last chapter, I discuss the implications of the findings of this study for Ipolokeng primary in particular, and the NSNP in general.

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides an outline of the findings in relation to the aims of the study, as well as the measures of corrections in areas that are of concern to the researcher. As already alluded to in Chapter 1 and 3, this case study of Ipolokeng primary schools' nutrition programme explored the knowledge and practice of the VFHs and suppliers with regard to food safety and food preparation. It also explored whether the meals prepared and served at Ipolokeng primary school were balanced (i.e. did they contain all the food groups?) Lastly, the study aimed to assess if the levels of environmental hygiene at Ipolokeng primary school met the requirements prescribed by Regulation R918 of 30 July 1999.

The findings of the study reveal that the VFHs had not undergone any formal training on food preparation or food safety, nor did they study home economics/consumer studies at school to equip them with the necessary knowledge and skills to engage in the safe preparation of food. In terms of their practice during food preparation, the findings expose that the standards and requirements prescribed by Regulation 9 of R918 of July 1999 were not complied with. Adequate measures and precautions to safeguard food from contamination were not taken by the VFHs or the SMT of Ipolokeng primary school. Two of the three VFHs had weaves attached to their hair, and did not use a hairnet or hair restraint to protect their hair and to prevent it from falling into the meals being prepared. Two of the VFHs also wore their wedding rings while preparing meals and did not know that food particles attached to the rings could cause cross-contamination. It was found that the VFHs in this study only washed their hands when they considered them to be dirty, and they did not consider that their hands became soiled with contaminants during routine tasks such as using the bathroom, coughing, sneezing, smoking or eating. As a result of their poor practice during food preparation, food safety was not maintained and good personal hygiene was not practiced at Ipolokeng primary school in terms of the stipulations of Regulation R918 of 1999. The VFHs failed to take adequate measures to safeguard against food contamination.

In terms of whether the meals served at Ipolokeng primary were balanced, my findings indicate that on the days that the ingredients did not run out (*things… miss*), the learners consumed meals that were considered to be balanced as they contained all of the food groups, namely,

carbohydrates, proteins, fats/lipids a well as vitamins, minerals and dietary fiber. On days when there were insufficient ingredients (*e–pilchards is very less… meat mince runs out*), then the meals served to the learners were unbalanced as they lacked proteins. The findings regarding ingredients going astray concurs with studies conducted by Del Rosso (1999), Zachritz (2004), and Carien (2009), who also note the theft of ingredients as a challenge in the implementation of the school feeding programme.

With regard to the level of environmental hygiene at Ipolokeng primary school, the findings of the study illustrate that the ablution facilities available for learners are insufficient. There are only six toilets for 599 learners. Annexure C of Regulation R918 of 1999 stipulates that there should be one toilet per every 20 learners. The critical shortage of toilets, together with the lack of toilet paper, soap or hand sanitizer, as well as hand drying disposable towels did not meet the requirements stipulated in Regulation 5 of R918 of 1999. In the absence of these essential items, the environment at Ipolokeng primary school, and the personal hygiene of the VFHs, learners, and teachers is compromised. This raises questions about the safety of the food prepared at the school. The garbage disposal facilities at Ipolokeng primary school do not comply with Sub-regulation 2 of R918 of 1999, which specifies that any food premises should have refuse bins with tight fitting lids. Instead, garbage is placed in bin bags that are left along the school fence. These exposed bin bags create the perfect breeding ground for pathogenic micro-organisms and spreaders s of diseases such as flies and rodents.

With reference to the food preparation area, it should be noted that the kitchen at Ipolokeng primary school was an old metal iron storage container. Regulation R918 specifies that the kitchen should be constructed of face-bricks, non-absorbent, and rust free materials. Iron is a corrosive material that rusts, thus, it can contaminate food during preparation and can lead to lead poisoning. Therefore, the safety of the food prepared in such a space cannot be guaranteed. Furthermore, the ’kitchen’ at Ipolokeng primary school has wooden tables. Wooden materials can absorb contaminants, and cannot be cleaned with ease as they absorb the detergents used for cleaning. Therefore, various forms of bacteria that can cause food poisoning can grow on wooden tables.

In terms of food storage facilities, Ipolokeng primary school does meet the requirement stipulated in Regulation 5(3) of Regulation R918 of 1999 as the storage facilities were constructed using bricks.

Pertaining to the eating facilities at Ipolokeng primary school, there were no proper, safe, clean eating facilities for the learners to sit and have their meals. From the above finding on environmental hygiene, it can be deduced that Ipolokeng primary school does not meet the standards prescribed by Regulation R918 of 1999.

Based on the findings of this study, the relevant recommendations will be discussed in the next section.

5.2 Recommendations

The findings of this study inspired the following recommendations.

5.2.1. Capacity building programmes

The National and Provincial Departments of Education are the custodians of the NSNP, and as such, they should be well informed as to how the programme should be implemented. They should build capacity amongst all stakeholders. Capacity building programmes are concerned with increasing the ability of stakeholders in projects or programmes to continue their future development without external support, or to function independently. Capacity building is necessary for the sustainability of a programme or project. Despite the DoE's promise to effect capacity building workshops focusing on programme implementation, meal planning and preparation, food safety, as well as food production (Internal Memo, March 2011), none were reported to have been attended by the VFHs at the time of this study.

There is a dire need for VFHs to be knowledgeable about personal hygiene during food preparation, the proper storage of food, and factors that compromise food safety such as contamination and food borne diseases. Furthermore, VFHs should be subjected to some type of assessment on their knowledge and practices with regard to food safety and food preparation before they can be involved as a VFH. They should also be educated regarding food groups, what

constitutes a balanced diet, and diseases that result from nutritional deficiency of the three main food groups.

The SGB needs to be availed the knowledge and skills in the national school nutrition programme in terms of Regulation R918 of 1999 in order to be able monitor its implementations at school level. In this way, they would be able to assist with the administration of the NSNP at school level. They could thereby also increase the accountability of the VFHs, Suppliers, and the SMT regarding the NSNP in terms of compliance of the school environment with Regulation R918 of July 1999 regarding food storage procedures, food preparation requirements, and the monitoring of ingredients received to prevent unexpected missing ingredients.

School Management Teams need to have knowledge of the requirements of Regulation R918 of 1999 to ensure that the environment of the school, the food storage space, food transportation, the personal hygiene practices of the VFHs, and the learners are in compliance with the requirements of this regulation. Furthermore, the SMT and SGB should be enlightened on how to raise funds to better the infrastructure available at the school, which would ensure the efficient implementation of the NSNP. Additionally, they (SGBs and SMTs) should be informed on how to initiate and sustain food gardens at schools to supplement the ingredients available during food preparation. The above recommendations are proposed as a measure to ensure and promote food safety and to possibly put measures in place to safeguard against food contamination.

5.2.2. Environmental facilities needed to operate the NSNP

The successful implementation of the NSNP hinges on the availability of the environmental resources of a school.

All schools where the NSNP is operational should obtain the support of big businesses to ensure that:

- Their kitchens are equipped with the utensils required by Regulation R918 of 1999.
- Kitchens used for food preparation should have a certificate of acceptability issued by the health authority, as required by Regulation R918 of 1999.

- The storage facilities must be properly constructed of face-bricks and materials that are not corrosive or absorbent, and which are used solely for food storage purposes.
- Their storage facilities are properly secured in order to prevent the theft of food ingredients.
- Soaps and toiletries should always be available in the bathrooms to promote personal hygiene and prevent the cross-contamination of food.
- All VFHs should be provided with protective clothing (masks, hair nets and aprons).
- That there is a proper eating facility at the school where learners can sit at a table and eat their meals.
- Their food garden is sustainable.

5.2.3. The monitoring of raw ingredients

In order to prevent learners from being deprived of essential nutrients due to the theft of food ingredients during delivery to schools, as well as at the school itself, it is necessary to monitor the ingredients supplied and used. It is suggested that this monitoring should occur at two levels, namely, school level, and DoE level. At school level, either the VFHs, the school clerk, or SGB members should be trained to monitor the stock received from the supplier, note deficits or surpluses in delivery, the stock used daily, stock that is missing from the storage room, and the stock on hand. At a DoE level, there is a need for monitoring of both suppliers and schools. Suppliers stock control sheets should be juxtaposed with the delivery order note/s to check for discrepancies between these two sheets. This could curb the loss of ingredients in transit. Regular monitoring of the NSNP at school level would also ensure that environmental conditions comply with the requirements of Regulation R918 of 1999, which stipulates that acceptable levels of personal hygiene are practiced during food preparation and that these incidences of missing ingredients decrease.

5.3 Limitations of the study

The major limiting factors that might have had a negative impact on the findings of the study have been identified by the researcher. In the first place, the study was limited within the confines of

the Ipolokeng primary school. Generalising the findings to represent the entire country (South Africa) might not be possible. However, it should be noted that the results could be generalised to schools with similar challenges in the implementation of the NSNP. A second limitation was the unavailability of data on food poisoning incidences at Ipolokeng primary school.

5.4 Future research

Further research should be conducted in other primary schools to establish the level of their compliance with the requirements of Regulation R918 of 1999. Also, research should be conducted at high schools that have recently been included in the programme to determine the levels of compliance of the school nutrition programme to the standards and the requirements of Regulation R918 of 30 July 1999.

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APPENDICES

A1: ETHICAL CLEARANCE

A2: EDITING CERTIFICATE

A3: PERMISSION TO CONDUCT RESEARCH

School of Education,

College of Humanities,

University of KwaZulu-Natal,

Edgewood Campus,

3 April 2016

The Principal,

Sir/Madam

Permission to conduct research

My name is Helingwe Princess Khuzwayo, I am a Masters candidate studying at the University of KwaZulu-Natal, Edgewood campus, South Africa. I am conducting research entitled: Food for thought: A closer look at Ipolokeng primary school nutrition programme. To gather the information, I will need access to food handlers and nutrient suppliers to answer a questionnaire and participate in an individual interview. I will also need permission to take

pictures of food handling, food preparation and the Ipolokeng primary environment. Permission will also be sought from the individual food handlers and the nutrient supplier.

Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- The research aims at gaining a deeper insight into food safety, food preparation and environmental hygiene at Ipolokeng primary.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you are willing to grant me access to your school please indicate (by ticking as applicable)

	Granted	Not granted
Access		

I can be contacted at: Cell. No.: 071518 6093

e-mail : hlengiwe.khuzwayo67@gmail.com

My supervisor is Dr A. Singh-Pillay who is located at the School of Education, Science and Technology cluster, Edgewood campus of the University of KwaZulu-Natal.

Contact details: email: pillaya5@ukzn.ac.za Phone number: 031-26053672

The following personnel from the research office may be contacted: Mr Premlall Mohun Tel. No. 031 260 4557 Email: mohunp@ukzn.ac.za

Thank you for your contribution to this research.

Declaration

I…… (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I am also aware that I have the right to withdraw from the study at any time without any negative consequences.

_____ _____

Signature: Date

IPOLOKENG PRIMARY SCHOOL

ENQUIRIES
PRINCIPAL
A.P. BUTHELEZI
TEL:/FAX (011) 985-1126

P.O. BOX 36
DIEPKLOOF
1864
E-MAIL: ipolokengprimary@gmail.com

04 May 2016

Dear Mrs. Hlengiwe Princess Khuzwayo

Re: request for permission to conduct research at Ipolokeng Primary School

This letter serves to confirm that your request to conduct research at this school with food handlers is approved. I am aware that I am at liberty to withdraw permission, should I so desire, without any negative consequences and that pseudonyms will be used to protect the identity of the participants and the school.

I wish you well with your studies.

Yours sincerely

Buthelezi

A. P. Buthelezi

Principal

IPOLOKENG PRIMARY SCHOOL
P.O. BOX 36 DIEPKLOOF 1864
TEL: 011 985 1126
04 MAY 2016
"Arise and Shine!"
GAUTENG DEPT. OF EDUCATION

School stamp

A4: INFORMED CONSENT PARTICIPANTS

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

School of Education,

College of Humanities,

University of KwaZulu-Natal,

Edgewood Campus,

3 April, 2016

Dear Participant

INFORMED CONSENT LETTER

My name is Hlengiwe Princess Khuzwayo, I am a Masters candidate studying at the University of Zulu-Natal, Edgewood campus, South Africa. I am conducting research entitled: Food for thought: A closer look at Ipolokeng primary school nutrition programme. To gather information, I will be asking you some questions via a questionnaire and an individual interview. I will also need to observe you during the handling and preparation of food. In addition I also require permission to video record the interview and take pictures during the food handling /preparation. .

Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- The questionnaire activity will take 30 minutes
- The interview will take 10 minutes
- Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.
- Data will be stored in secure storage and destroyed after 5 years.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- The research aims at getting a deeper insight into food safety, food preparation and environmental hygiene at Ipolokeng primary school.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you are willing to be interviewed and have the interview video recorded and for photographs to be taken please indicate (by ticking as applicable) whether or not you are willing to allow the recording by the following equipment:

	willing	Not willing
Audio equipment		
Video equipment		
photographs		

I can be contacted at: Cell. No.: 071518 6093

e-mail : hlengiwe.khuzwayo67@gmail.com

My supervisor is Dr A. Singh- Pillay who is located at the School of Education, Science and Technology cluster, Edgewood campus of the University of KwaZulu-Natal.

Contact details: email: pillaya5@ukzn.ac.za Phone number: 031-26053672

The following personnel from the research office may be contacted:

Mr Premlall Mohun Tel. No. 031 260 4557 Email: mohunp@ukzn.ac.za

Thank you for your contribution to this research.

APPENDIX A 5: QUESTIONNAIRE

Questionnaire: On Knowledge and Practice of food handlers

A: Biographical data

1. ***Gender***

   Female

   Male

2. ***Age***

   Below 20

   20-30

   31-40

   41-50

   Above 50

3. ***Race***

   Black

   Coloured

   White

   Other (specify):.....

4. ***Home language***

   South Sotho

Tswana

Xhosa/Zulu

Afrikaans

Other (Specify):…….

5. ***English proficiency***

Poor

Fair

Good

6. ***Employment status***

Permanent

Volunteer

Contract

Other (Specify):……

7. ***Educational level***

None

Primary

Secondary

Tertiary

8. ***Additional Training***

Yes

No

If yes, specify:.....

9. How long have you been preparing food for the school?

Less than 3 months

3 to 6 months

7 months to 1 year

More than 1 year

B: PERSONAL HYGIENE

10. Do you have/wear long nails, nail polish, jewellery, weaves , fungal nails, etc while preparing

food?

Yes

No

Specify:.....……

11. How often do you wash your hands?

Once a day	
A few times a day	
When they are dirty	
After using the toilet	

Only when handling food	

Other (specify):.....

12. What do you wash your hands with? (May select more than one option)

Cold water	
Warm/hot water	
Water and soap	
Water, soap and hand sanitizing liquid	

Other (specify):.....

13. How do you dry your hands?

With tissue paper	
With a dry cloth	
On whatever I am wearing	

Other (specify):.....

14. What do you do when you have a cold/illness?

Do not work

Wear a mask

Continue working as normal

Other (specify):.....

15. ***What do you do when you have wound (e.g. cut)? (May select more than one option)***

Wash it and continue working	
Get the cut cleaned, covered and continue working	
Wear gloves and continue working	
Nothing, just continue working	
Stop working	

Other (specify):.....

16. Do you wear an apron while preparing food?

Yes

No

If no, explain.....

17. If yes, how often do you wash it?

Daily	
Weekly	
Monthly	
Only when it is dirty	

C: CLEANING PRACTICES

18. Do you clean surfaces, cutlery and cookery before and after preparing

each food item?

Yes

No

19. How often do you clean preparation surfaces (tables and boards)

Before preparing food	
After preparing food	
Before and after preparing food	

Other (specify):.....

20. How do you clean preparation surfaces (tables, boards, plates, etc.)?

With only water	
With water and suitable soap	

With disinfectants	
With water, soap and disinfectants	

Other(specify):…….....

D: KNOWLEDGE OF THE INTERVIEWEE

21. Who, in your opinion, is responsible for food safety?

Everyone (manufacturer to consumer)	
People who prepare food	
Just the consumer	

Other (specify):.....

22. In your opinion, why is food safety important?

To prevent illnesses	
To serve healthy, nutritious meals	
It is not important	

Other (specify):.....

23. Have you had any training in food safety (GMP, GHP and HACCP)?

Yes

No

24. If yes, what type of training?

Full course

Workshop(s)

Other (specify).....

25. Would you go for training/further training in food safety?

Yes

No

Specify.....

26. Indicate whether you find the following true or false or not sure:

	true	false	Not sure
It is important to wash hands before handling food.			
Hair nets and gloves must be worn when serving food			
Wiping cloths can spread microorganisms.			
The same cutting board can be used for raw and cooked foods provided it looks clean.			
Cooked food does not need to be thoroughly reheated.			

Temperature is not related to food safety.			
Water quality has no impact on food safety.			
Raw meat should not be transported in the same bag or container as fresh vegetables and fruit.			
It is best to drink pasteurised milk and juice.			
Person-to-person contact may cause contamination of food			

.

27. Where does the food you serve come from? (Supplier e.g. from which supermarket, farm, etc.)

Supplier	

Department of Basic Education	
I do not know	

28. Who delivers the food to the school?

Personnel from the Department of Basic Education	
Comes from supplier	
I do not know	

Other (specify).....

29. How is the food delivered to the school?

By truck(s)	
By car/van	
Not sure	

30. Is the cold chain maintained from supplier to food preparation?

Yes	
No	
I don’t know	

31. How long after delivery is the food prepared?

Within a day	
Within a week	
Within a month	

32. Do you make use of the first-in-first-out principle when preparing food?

Always	
Sometimes	
Never	
Not sure	

33. Have you seen any child/children suffer from any of the following symptoms: nausea, vomiting, diarrhoea, dizziness, abdominal cramping and fever?

No

Yes

34. If yes, how frequently has it occurred?

Often

Seldom

Other (specify)……

D: ATTITUDE OF THE RESPONDENT

Please evaluate your opinion w.r.t. the following by stating whether you agree or

Disagree or are not sure

	agree	disagree	Not sure
Frequent hand washing during food preparation is necessary.			
Keeping kitchen surfaces clean reduces the the risk of illness.			
Using different knives and cutting boards for raw and cooked foods is necessary.			
Storage practices have an impact on food safety.			
The freshness and appearance of food upon delivery is important.			
I think it is important to throw away foods that have expired.			

Knowledge and training are important in ensuring food safety			

.

E: SELF-REPORTED BEHAVIOUR OF THE RESPONDENT

Please a cross in the appropriate column

	Always mostly	seldom	sometimes	never
I wash my hands before and during food preparation.				
I clean surfaces and equipment used for food preparation before re-using on other food.				
I use separate utensils and cutting-boards when preparing raw and cooked food.				
After I have cooked a meal, I store any				

leftovers in a cool place within two hours.				
I wash fruit and vegetables with safe water before serving them.				

Appendix A6: Interview: KAP of supplier

A: Biographical data

1. ***Gender***

   Female

   Male

2. ***Age***

   Below 20

   20-30

   31-40

   41-50

   Above 50

3. ***Race***

   Black

   Coloured

   White

   Other (specify):.....

4. ***Home language***

   South Sotho

   Tswana

   Xhosa/Zulu

   Afrikaans

Other (Specify):…….

5. ***English proficiency***

Poor

Fair

Good

6. ***Employment status***

Permanent

Volunteer

Contract

Other (Specify):……

7. ***Educational level***

None

Primary

Secondary

Tertiary

8. ***Additional Training***

Yes

No

If yes, specify:.....

9. How long have you been a supplier for the school nutrition programme?

Less than 3 months

3 to 6 months

7 months to 1 year

More than 1 year

B: PERSONAL HYGIENE

10. Do you have/wear long nails, nail polish, jewellery, weaves , fungal nails, etc while selecting/ handling and transporting food supplies?

Yes

No

Specify:.....…….

11. How often do you wash your hands?

Once a day	
A few times a day	
When they are dirty	
After using the toilet	
Only when handling food	

Other (specify):.....

12. What do you wash your hands with? (May select more than one option)

Cold water	
Warm/hot water	
Water and soap	
Water, soap and hand sanitizing liquid	

Other (specify):.....

13. How do you dry your hands?

With tissue paper	
With a dry cloth	
On whatever I am wearing	

Other (specify):.....

14. What do you do when you have a cold/illness?

Do not work

Wear a mask

Continue working as normal

Other (specify):.....

15. ***What do you do when you have wound (e.g. cut)? (May select more than one option)***

Wash it and continue working	
Get the cut cleaned, covered and continue working	

Wear gloves and continue working	
Nothing, just continue working	
Stop working	

Other (specify):.....

16. Do you wear an apron/dust coat while sorting /transporting food?

Yes

No

If no, explain.....

17. If yes, how often do you wash it?

Daily	
Weekly	
Monthly	
Only when it is dirty	

C: CLEANING PRACTICES

18.Do you transport food in their original wrapping ?

Yes

No

19. How often do you clean the vehicle that is used for transportation of food items ?

Always	
seldom	
Only when its dirty	

Other (specify):.....

20. what do you use to clean transportation surfaces ?

only water	
water and suitable soap	
disinfectants	
water, soap and disinfectants	

Other(specify):…….....

D: KNOWLEDGE OF THE INTERVIEWEE

21. Who, in your opinion, is responsible for food safety?

Everyone (manufacturer to consumer)	
People who prepare food	
Just the consumer	

Other (specify):.....

22. In your opinion, why is food safety important?

To prevent illnesses	

To serve healthy, nutritious meals	
It is not important	

Other (specify):.....

23. Have you had any training in food safety (GMP, GHP and HACCP)?

Yes

No

24. If yes, what type of training?

Full course

Workshop(s)

Other (specify).....

25. Would you go for training/further training in food safety?

Yes

No

Specify.....

26. Indicate whether you find the following true or false or not sure:

	true	false	Not sure
It is important to wash hands before handling food.			

Hair nets and gloves must be worn when serving food			
Wiping cloths can spread microorganisms.			
The same cutting board can be used for raw and cooked foods provided it looks clean.			
Cooked food does not need to be thoroughly reheated.			
Temperature is not related to food safety.			
Water quality has no impact on food safety.			
Raw meat should not be transported in the same bag or container as fresh vegetables and fruit.			

It is best to drink pasteurised milk and juice.			
Person-to-person contact may cause contamination of food			

27. Are the food items transported at the correct recommended temperatures?

Yes

No

Specify……..

28. ***Is the cold chain maintained from the time food items are purchased up until they reach the schools for food preparation?***

Yes	
No	
I don't know	

29. How long after purchase is the food items delivered?

Within a day	
Within a week	
Within a month	

30. Do you make use of the first-in-first-out principle when supplying food items?

Always	

Sometimes	
Never	
Not sure	

31. What happens to food items that have past their use by date?

D: ATTITUDE OF THE RESPONDENT

Please evaluate your opinion w.r.t. the following by stating whether you agree or

Disagree or are not sure

	agree	disagree	Not sure
Frequent hand washing during food preparation is necessary.			
Keeping kitchen surfaces clean reduces the the risk of illness.			
Using different knives and cutting boards for raw and cooked foods is necessary.			
Storage practices have an impact on food safety.			

The freshness and appearance of food upon delivery is important.			
I think it is important to throw away foods that have expired.			
Knowledge and training are important in ensuring food safety			

APPENDIX A7:

Observation Schedule: food handlers

No of learners fed daily

No of food handlers

When are meals prepared

How long does it take to prepare meals?

What conditions of hygiene are followed when preparing meals?

Note number of taps/detergents available

Note how chopping boards are cleaned and used

How long does it take to serve the meals and clear the utensils?

Who cleans the utensils used and how?

Is there a designated feeding area, to serve meals and for learners to sit and eat?

During observation – photo graphs will be taken.

APPENDIX A8: PHOTO FOCUS GROUP DISCUSSION

Photo voice prompt

Please explain what process/action was captured in this photograph, why did you engage in this action- is this action safe.

Why were you cutting directly on the table- look at the phot you can see clearly

VH3: the tafel is clean – so I cut on it directly), why must I used the board and make it dirty,I will have to wash the board ...it will make more work for me, . akukho amagciwane lapha ... there are no germs here

VFH 3: "*The tafel is clean – so I cut on it – why must use the board and make it dirty, I will have to wash the board ... it will make more work for me ... we just cut everything on the tafel - bread, cabbage, spinach , then when we are done we wipe the tafel...haai its not dirty...I wipe the tafel ... akukho amagciwane lapha (there are no germs here)."*

VFH 1: *"Haaibo… this is what we do all the time … we cut on the table, we use the same dish to keep our cut food and wash at the end- it saves time. We are very busy rushing to cook to so many children – … no it is not dirty … I wash my hands in the morning – I'm clean… we have to wash dishes outside, there is no tap in the kitchen."*

Why do you keep the cooked food on the floor with the pot is open there is no lid on the pot, ma why?

VFH 1: *"Hey, I don't know ... isi ekhishini incane kakhulu - it is so small , no place to keep anything so when we cook we leave the food wherever there is place.... no its clean, very clean"*

VFH 2: *"It's clean – it's clean, very clean , it's inside the pot ... the food, the food is not touching the floor, so these is no dirt going into it... what micro-organisms .. mina, I can't see it... if I can't see it, it is not there."*

Ma, tell me why you keep the uncook ingredients everywhere it is not stored properly? Look at the picture it shows that.

VFH 2: "*A lot of food stuff goes missing mainly tin fish and mince… I don't know who takes it… but it hard . .. to keep the cooking things in one place – we keep a bit everywhere … so at least ..*

we have things to cook… sometime the maize meal has isiNdundundu (weevils) and we cook it … no it's not bad, we can store how you are saying … temperature, dry – angazi."

VFH 3: *"We just keep the food stuff together were we can see it … it goes missing… haaibo … no check temperature to keep . .. or expiry date ... for what its food ... they must eat ... no it's good food ... they don't get at home so they must eat ... we eat … we ok, not sick."*

What missies the most from all the ingredients? Tell me ma, who do you think take the things?

VFH 1: *"The things that miss the most … meat mince, potatoes, oil … we cook gravy /bisto when we run out of meat mince for Thursdays."*

VFH 2: "*I don't know who takes it, but you can see* e-*pilchards when they delivery and after 2 ... 3 days, it's very less. When e-pilchards is finished, we give Inkomasi. .. we try to keep Inkomasi for when there is no mince or e-fish."*

VH1: *I don't know – all I see is the things is lees or its not in tre place I left it.*

VH2*: Haaibo – don't ask us*

APPENDIX A9: QUESTIONNAIRE RESPONSES

A Biographical Data

Participant	Gender	2. Age	3. Race	4. Home Lang.	5.	6.	7	8.	9.
P 1	Female	31-40	Black	Sotho	Good	Contract	Primary	No	3-6 months
P2	Female	31-40	Black	Tstwana	Good	Contract	Secondary	Yes	
P3	Male	20-30	Black	Tswana	Good	Volunteer	Secondary	No	3-6 months

B. Personal Hygiene

Participants	10.	11.	12.	13.	14.	15.	16.	17.
P1	Have weaves , no hair nett, wedding ring	Only when handling food	Water	With a dry cloth	Wear a mask	Get it cleaned ,covered and continue working	Yes	Only when its dirty
P2	Have weaves , no hair nett, wedding ring	When they are dirty	Water ,	What I'm wearing	Do not wear mask	Get it cleaned ,covered and continue working	Yes	When its dirty
P3	Long nail on pinky finger	When they are dirty After using the toilet	Water and soap	What I'm wearing	Do not work	Get the cut cleaned , covered and continue working	No	----------

P	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33 34
P1	Before and after preparing food	With water , soap and disinfectants	People who prepare food	To prevent illness To serve healthy, nutritious meals	No	No	----	yes	no false false true true true true False	DBE	Personnel from DBE	Open trucks	no	Cant say things miss	Always	Yes , often
P2	Before and after preparing food	With water and suitable soap	People who prepare food	To prevent illness	No	no	---	Yes	no false false true true true true False	Supplier		Open trucks	no			Yes, always
P3	------	------	------	Everyone People who handle food	To prevent illness To serve healthy nutritious food	No	------	Yes	no false false true true true true False	Supplier Department of Basic Education	Personnel from DBE	By trucks	-	.*Within a day :	Never	no

D. Attitude of the respondent

Participants	Frequent hand washing during food preparation.	Keeping kitchen surfaces clean reduce the risk of illness.	Using different knives and cutting boards for raw and cooked food is necessary.	Storage practices have an impact on food safety.	The freshness and appearance of food upon delivery is important	I think it is more important to throw away foods that have expired.	Knowledge and training are important in ensuring food safety.
	Agree/ disagree/not sure	Agree / disagree/not sure	Agree/disagree/not sure	Agree/disagree /not sure	Agree/disagree/not sure	Agree/disagree/ not sure	Agree/ disagree/not sure
P1	Agree	Agree	Agree	Not sure	Agree	Disagree	Agree
P2	agree	Agree	Not sure	Not sure	Agree	Disagree	Agree
P3	Agree	Agree	Not sure	disagree	Agree	Agree	Agree

E. Self – reported behaviour of the respondent

Participant	I wash my hands before and during food preparation	I clean surfaces and equipment used for food preparation before re using on other food .	I used separate utensils and cutting –boards when preparing raw and cooked food .	After I have cooked a meal , I store any leftovers in a cool place within two hours .
	Always / mostly /seldom/ sometimes /never	Always / mostly/seldom / never	Always / seldom /mostly/Sometimes/never	Always / mostly / seldom/never
P1	always	mostly	Never	Never
P2	Always	seldom	never	Never
P3	Always mostly	Always mostly	----------	Always mostly

<u>Grid for supplier</u>

A. <u>Biological data</u>

Gender	Male	
Age	41-50	
Race	Black	
Home Language	Zulu	
English proficiency	Good	
Employment status	contract	
Educational level	Secondary	
Additional training	Yes	
Period of service	More than a year	

B. Personal Hygiene

1.	2.	3	4	5	6	7	8
No	After using toilet	Water ,soap and sanitizing liquid	With a dry cloth	Do not work	Wear gloves and continue working	Yes	Only when its dirty

C. Cleaning practices

1	2	3
Yes	seldom	Disinfectant

D. Knowledge of the interviewee

1	2	3	4	5	6	7	8	9	10
Every one	To prevent illnesses	yes	Full course	Yes	• True • True • True • False • False • False • False • True • True • True	Yes	Within a week	Always	Take it back

E. Attitude of the respondent

a.	b.	c.	d.	e.	f.	g.
Agree	Agree	Agree	Agree	Agree	Agree	Agree

APPENDIX A10: FOCUS GROUP DISCUSSION

Interview with VFH : Focus group Date : 03/08/2016

Venue : Staffroom (Ipolokeng Primary)

The interview will be conducted in a focus group for participant 1 and participant 2 (P1 & P2) . Participant 3 will be interviewed separately . The researcher will interact with the participant using the semi-structured interview questions The interviewer will allow the participants to be immersed in the discussions and share their perception and experiences with the researcher.

Question : How often do you wash your hands?

P 1: no it is not dirty ,I wash my hands in the morning , I'm clean… we have to wash dishes outside there is no tap in the kitchen"

	Participant 1	Participant 2
Once a day		
A few times a day		
When they are dirty		When they are dirty
After using the toilet	After using the toilet	After using the toilet
Only when handling food	Only when handling food	

Question : Is there any reason for that ? why do you have to wash hands before you touch any food ?

P1: "we wash before we peel. Mmh mmh ya you have to wash your hands ."

P2: "ha , plenty of times plenty (laughs) because we are dealing with the cooking we peeling need to wash hands"

Question : What do you wash your hands with?

P1 : " I soap"

P2: "soap with warm water disinfection"

Question : How do you dry your hands? Do you use your apron or ?
P1 : “with dry cloth”

P: 2 “We use the towel”

Q. **How many towels do you have in the kitchen? Do you have the dry one and the one you say swap?**

P2: “ No we always dry with 1”

Question : What do you do when you have a cold/illness? Do you come to work ,

P 2: “mmh we do because we are only two , mama ka Sibusiso aneva akhone eli one ------ unless if you are seriously sick ya ,
English version : Sbusiso’s mother will not cope alone

Question : Is it not possible for you to find a person to help you ?

P2 : “aah mina bengikhona because be ke peatse day before so on that day it was easy for me , ya”
English version : Ya I did managed because I did the peeling on the previous day.

P1 : “Yoo lena ka Friday ke cook eke le 1 (laughs) and ngimagile seriouse”
English version : Yo I too I cooked alone on Friday and I was surprised serious .

Question : And with the serving , lets say you are alone now how do you manage to serve that large number of learners ?

P1: “No when we are serving the teacher help us mmhn ya .

Question :What do you do when you have wound ?

P1: “ mmhm even to me too I hurt myself one day and then I rap, Lerato continued”

P2 : “mhcaa mina I stop and makaSbusiso continues . I go to toilet ke hlapa ka metsi and rap en mama ka Sbusiso uthla continue”
English version : I go to the toilet and wash with water and rap the wound , Sbusiso’s mother continues .

Question: “Do you sit there or you wait for her to finish or you go home ?

P2: “ I nooo…. I help there , don’t sit”

Question: .Do you wear an apron while preparing food?

P1: “ Yes”

P2: “ Yes mmm ya we do”

Q. why is it important for you to wear aprons ?

P1 : “ya ya mmh”

P2 : “ yooo for us not to get dirty yooo”

Q. Is there any other reason that if you are in the kitchen you must always have your aprons on ?

P2: “(nodding) it’s a law is a must”

Q. Who supplies you with apron ? do you come with your own ?

P2: “the principal gave us”

P1: “the school”

Q. and the covering hats?

P1: “no”

P2 : “no

CLEANING PRACTICES OF VFH

Q. Do you clean surfaces , cutlery and cookery before and after preparing each food item ?

P1: : “Yes”

P2 : “ We clean it with a pine-gel and the cloth”

Q. How often do you clean preparation area (tables and boards)

P1: “before we chop”

P2 : “the tafel is clean – so I cut on it directly,why must I used the board and make it dirty, I will have to wash the board ..it will make more work for me”

P2: “akukho amagciwane lapha ...”

English version : there are no germs here .

P 1 : “the tafel is clean – so I cut on it – why must use the board and make it dirty, I will have to wash the board ..it will make more work for me ... we just cut everything on the tafel - bread, cabbage, spinach , then when we are done we wipe the tafel...haai its not dirty...I wipe the tafel.. akukho amagciwane lapha (there are no germs here)”

Q. Is that what you do every day when preparing the food ? how do you know there are no gems ?

P 1: “Haaibo… this is what we do all the time we cut on the table we use the same dish to keep our cut food and wash at the end , it saves time we are very busy rushing to cook to so many children”.

KNOWLEDGE OF THE INTERVIEWEE

Q. Who in your opinion is responsible for food safety ? the manufacture , consumer, people who prepare food , just a consumer ?

P2: “ us (nodding)”

Q. Can you just add on that to make sure that the kids get healthy food ?

P2: “mmmh”

Q . Like for instance the food comes to you , it comes from manufacture to the supplier to the storage then in your hands , how sure are you that the food is safe as you are the one who prepares it ? I understand nina you are responsible in the kitchen .

P1: “ Mmhm ku safe because sikubona ku fresh “

English version : its safe , we could see it fresh .

P2: " and we do the checking , expiery date , like for instance ku expired we take it back

.

Q. In your opinion , why is food safety important ? to prevent illnesses , to serve healthy , nutritious meals ?

P1: " to prevent illness"

P2 : "make sure that the food is healthy "nodding"

Q. How do you make sure there are no micro-organisms that may contaminate the food while getting it ready for the pots? I have seen a bowl with fish on the floor.

P 2: " its clean , its inside the pot ...the food, the food is not touching the floor so there is no dirt going into it... what micro organisms .. mina I can't see it... if I cant see it it is not there "

P1: "Hey I don't know .. isi ekhishini incane kakhulu- it is so small , no place to keep anything so when we cook we leave the food wherever there is place.... no its clean, very clean".

Q. Have you had any training in food safety ?,

P1 no

P2 : " ynoooo , workshop ,whats that .

Q. would you go for training / further training in food safety ?

P1: "Ya"

P2 : " we wish to "laughs"

Q. Why ?

P2 : “ooh its important , yes (nodding)”

Q. Where does the food you serve come from ?

P1 : “ supplier , Department of Education”

P2 : “ Department of Education”

Q. Who delivers the food to school ?

P1 : “ the supplier by truck”

Q. How big is it ?

P1 : “weee , ene siyayibona laphaya”

English version : and we do see it there .

P2: “ Reya bona fela ha imile laphaya”

English version : we just see it standing there .

Q. Now referring to what I ve been observing like you said you do wear aprons and some of the days I did saw you having something in your head but there is this day I didn’t see you having hats ?

P1 : “ but ngesinye isikhathi masicedile iukupheka siyazikhumula , angithi sithwala for ukudla masipheka ”

English version: but sometimes we take them off because

P2 : “ akere sometimes ha mo hurry mam yoo …!”

English version : sometimes one is on a hurry .

Q. What challenges that you normally experience while you are preparing food ?

P1: “ shortages , like rice

P2: “ shortage , shortage

Q. Normally yini eshodayo ?

English version : where is the shortage normally

P1 : “ irice specially , namafutha mince, fish tin (cooking oil)

P2 : “ nama spice , like when we are doing samp we do need rama en e workshop bathi sicele imali , bayasifasisa nje abasiniki”

P1: “some times masicele icooking oil mayiphelile

English version : if we ask for cooking oil when its finish .

P2 : “ Izolo bengicele fish oil bathi ayi izolo sikunike i5Lt yonke uyenzeni ini ini yaboo”

English version : Yesterday I asked for fish oil and they said we gave 5 lt what did you do with it , this and that .

P1: “like for instance when isamp si white …….”

Q. Ok let’s go back where you will be cooking samp , so on that day you need lot of spice , rama …..

P1 : “ especially uma iwhite , mara uma ine bhontshisi”

P2 : “the thing is that we don’t use meat , but we have to cook tasty food for kids , that’s why we need irama, knorox …”

Q. Well are those things within the menu , because I have seen the menu that is pasted there in the kitchen its not on the list ?

P2 : “ is not , but the principal said if we need things we must make a list to make food nice .

P1: “mmh is not , at least to make the food nice because istampa namabhontshisi kuphela ! singabi namafutha mmhm!

Q. So basically the challenge that you are facing is the shorage of some ingredients like rama , beefstock and so on , let’s say you don’t have it , what do you use ?

P2: “ we use our own money”

Q. And then they pay you back ?

P2 : “mhm”

P1 : “mhm”

Q. Ok who is responsible for the things that are short ?

P2: “ they told us to ask for Khensani”

P1: “ Khensani and Tshidi , but when you tell them they don’t give back”.

Q. So if you use your money there is no chance ukuthi uzoyithola back ? You just do it for the love of the kids and also to prepare tasty food ?

P1: “mmh”

P2 : “ mmh yes , and they do”

Q. I heard mentioned a case of rice shortage , lets say Tuesday you normally prepare rice , if there is no rice what do you do ?

P2: “ we do pap, Monday and Friday pap

P1: “ pap “

Q. As you have mentioned rice liyashoda isikhathi esiningi who do you think is responsible for that?

English version : you don’t have enough .

P1 : “ I think u Tshidi because uye o counteryo when ukudla kufika .

English version : Tshidi is responsible for counting the stock on arrival.

P2 : “Tshidi”

Q. Nina nibona nini ukuthi ukudla kuyashoda ? like this week you cooked 1 bag of rice so next week ……..to whom do you report ukuthi irice alikho ke manje ?

English version : when do you notice that you don’t have enough stock? Who do you report for all the shortages ?

P 2 : “ like mam when we knock off neh mam sicela for Friday ……..(ask)

P1: “ angithi sicela a day before kuyafana nobisi angithi” (We request a day before)

Q. And than how long does it take ukuthi baniphe ?

English version : how long does it take for them to give you ?

P 2 : “ yooo it takes days”

P1 : “ sometimes like Tuesday sike sapheka ipapa” (cooked pap)

Q. Is not the problem from the ukuthi alethe irice elishodayo ?

English version : rice is not enough to cover a month .

P2 : “ No the supplier is doing the job , the problem is mo at skool , nini ngicela istampa-
---

P1 : “ Mara , bayaliletha shame I don’t want to lie , into ebeshodile istampa, yabona manje basilethile , uze wabuza yini eshodayo, istampa , still asikafiki , yabona manje 3 bags .

English version : But they do their job , he even asked what is not enough , samp is still to be delivered , now we only left with 3 bags .

Q. If so , how come do you run short of some foodstuff? Is it still on good condition when you cook it ? How is the temperature where you store the food?

P2: “A lot of food stuff goes missing mainly tin fish and mince… I don’t know who takes it… but it hard .. to keep the cooking things in one place – we keep a bit everywhere … so at least .. we have things to cook… sometime the maize meal has isiNdundundu and we cook it … no it’s not bad , we can store how you are saying … temperature, dry, angazi”

P1: “We just keep the food stuff together where we can see it … it goes missing… haaibo … no check temperature to keep .. or expiry date.. for what its food .. they must eat .. no its good food .. they don’t get at home so they must eat.. we eat… we ok not sick”

Q. So in a day how many bags for samp do you cook ?

P1: “ yooo like sibala izitsha , like we cook 1 bag , 10kg , also rice

P2 : “ya”

Q. So if supplier elethe lets say 4 bags beginning of the month it will cover for the whole month , so if kwenzeka any shortage it means that the problem is within the school not from the supplier ?

P1: “ yabona manje balethe ayi 6 , ene imonth iyacala

Q. So you are not expecting any shortages ?

P2: “ yes mmh”

Q. To who do you send your complains ?

P2: “Tshidi , anything that we want like igas mayiphelile sibuza yena uyafona .

P1 : “To Tshidi”

Q. How long does it take for a gas to finish ?

P1: “ March or mara le esifake manje ngo June , 2nd week masivula”

P2: “ Shoo konje besifake nini leya ? March ?

You use it in the morning , main meal .

Q. Basically how long does it take to prepare Soya mince and pap ?

P1: “Angithi sifuna ivuthwe , like masibonda ngo 8: 20 am”

P2 : “ipapa sibeka nini ? , like 1 hr 40 minutes neh”

Q. Is there anything you would like to add , do you enjoy your job ?

P2: “ Yooo mina I’m enjoying my job , I mic my job , the thing is ka fela ditaba tsa go shoda da dijo , ya di spices tsi tsamayile ka from our own pockets mna I not happy about that at all , when you ask for something , they have to buy but instead of buying they complain and complain.”

Q. So you don’t see any reason to ask the supplier for any shortages ?

P1: “ no asibaboni nokubabona mose”

P2 : “ but e workshop basinike ama numbers , mina angiwa storishanga , if kushoda something sibafonele Department of education .

P1 : “if basinika eskoleni complications”

P2 : “mina I’m happy so far”

Q. How long is your contract ?

P2: “ next year 17 March 2017”

END

INTERVIEW: PARTICIPANT 3 DATE: 04/08/2016

VENUE : STAFFROOM (IPOLOKENG PRIMARY)

Greetings ----------

Personal hygiene

Q. do you wear long nails, nail polish, Jewellery, weaves fungal nails while preparing food?

P3 : “ no”

Q. How often do you wash your hands ?

P 3: “ a few times a day yes ”

Q. what do you wash your hands with ?

P3: “ hot water and saop, yes”

Q. How do you dry your hands ?

P3: “with a dry cloth”

Q. What do you do when you have cold / illness ? do you work ?

P3: “ No I don’t”

Q. Is there anyone that can be in your place while you are absent ?

P3: “ Yes I can get someone”

Q. Do they know what are they expected to do ?

P3: “ no I will have to tell them hoore what should they do”

Q. : Who in your opinion , is responsible for food safety ?

P3 : “ The supplier , yes , yes”

Q. : What about other people who are also preparing food , is it not also your responsibility to check ukuthi the food is right na ?

P3 : “ yes, yes I do have to check yes after them but ?

Q. : So if the stock arrives then you do the check up ?

P3: “Yes “

Q. : Have you had any training in food safety ?

P3 : “ No”

Q. : “ you just volunteered ?”

P3: “ Yes”

Q. : would you go for further training in food safety ?

P3 : “ Yes I would love too, yes please”

Q. : Why would you like to go for training ?

P3: “ To learn hore what I ‘m doing is right or wrong , to learn more things

Q. : Basically you are not based ko kitchen as such you help a lot with the storage and unpacking , how do you feel about that part of your job as you are don’t stir the pots , cooking ?

P3: “ eh (laughing) no I feel happy to help the ladies in the kitchen because the food is too heavy for them to carry , yes , (so as we sometimes have ama50kg so they cannot carry that.)

Q. : As you spent few hours in the kitchen , usuku lonke wenzani ? rather moving the stock from the storeroom to the kitchen ?

P3. Most of the time I help the uncles in the garden , yes . (that’s how you spend your day ?) Yes”

Q. : Where does the food comes from ? supplier or supermarket, farm ?

P3: “ supplier yes’’

Q. : Who delivers food to the school ?

P3: “ supplier also”

Q. : How often do they deliver ?

P3: “ monthly”

Q. : What about the fruits and vegetables ?

P3: “fruits is weekly , yes fruits and vegetables is weekly then others monthly”

Q. : What is their condition , do you check the freshness of the product ?

P3:” Yes I do check , yes I do , if the fruits are fresh or not”

Question : lest say amanye awekho fresh what do you do?

English version: some are

P3: “ take them back ,yes , while the truck is still here”

Q. : are there any challenges on what you are doing ? like zikhona ezinye inkinga onazo or ozibonayo so far , on what you are doing ?

P3 : “ I don’t think we have a challenge is just that we need a room to where we can stock ye put our food , because its not safe in the staffroom .

Q. : So normally khona manje makufika I see some of the bags here in the staffroom, and then moved to the storeroom , how long is it gonna stay here in the staffroom ?

English version: stock has just arrived

P3 : “ (laughing) ya there is no space that side”

Q. : How clean is the place ? Who is responsible for the cleaning ?

P3: “ the cleaner”

Q. : are you satisfied ukuthi the place is clean enough ukuthi kungabekwa ukudla khona ?

English version: Are you satisfied with the cleanliness of the place where food is stored ?

P3 : “no I ‘m not , yes”

Q. : Ungasichazela ukuthi mhlasimpe ?

English version : Can you elaborate on that ?

P3: “ no they have to clean 3 times a day”

Question : Normally bacleaner kangaki ?”

English version : Normally how many times do they clean ?

P3: “ once a week”

(ok that’s one of your challenge you are facing now , cleaning process and space)

Q. : What is your view regarding to whole feeding skeem here at school, do you see it running smoothly or do you foresee any problems ?

P3: “aa ok they are good cookers but the problem is they don’t cook enough food for the children because yesterday when I took a photo few learners shored of food 8, , pap and soya , oh no is rice and fish , ya pap and fish .

Q. So it means if they are having pap and fish they come in large numbers ?

P3: “ Oh no is rice and fish , they don’t short ,pap and soya they short”

Q. : I think nawe you are part of that because you belong to the team e prepare ukudla nawe you must have input , because they come hoping to find something

nge break , lest say bashodile ke as you have stated, what do you do to make sure at the of day they do get food ?

English translation : Being one of the food handlers , you must have an input, what do you do when there is a shortage during serving?

P3: " they have to cook for them , last they never cook for them"

Question : Reason ?

P3 : " I don't know , I don't know , I don't know**"**

Q. Looking at the meals that you prepare at Malubisi is it nutritious enough for our learners ? Is it balanced ?

P3 : " No it is balanced , yes"

Q. Are they having enough propotion , like size of the plate ?

P3: " Yoo (laughing) I would say its too little , too little , some come for some more"

(it will be a good idea to add more)

Q. Is there anything you would like to add ?

P3 : "I have realised that some of the kids don't get food because of the teachers , teachers taking them out late , punishing them I don't know for what during break while children need to come and get food from feeding skeem , most of the kids repeat themselves , coming twice , coming twice ,where as some are still in class . I think as a school we need to have a list of kids that eat , yes register".

INTERVIEW WITH THE SUPPLIER

DATE : 17/08/2016

VENUE : IPOLOKENG PRIMARY SCHOOL (STAFF ROOM)

TIME : 10: 20 am

Interviewer: How many learners do cater for at Ipolokeng Primary?

Supplier : " Ehh its …. 599 "

Interviewer : How do you ensure the food safety during transportation ?

Supplier: "Ok we always make sure that we give extra hours in the morning and … so that during the transportation we have a certain limit of speed while we are carrying food , because we can't go at 120 while carrying food , so you need to go on 80 speed and try to be careful as possible as I have also two assistant , those assistant make sure that the food is nicely packed there at the back of the truck."

Interviewer : How do you prevent physical or microbiological contamination of the food ?

Supplier : "Ok we … have a the system of saying like every day because in a week we do have may be one or two days which we are not occupied so we use those days to to make sure the truck is clean , you know and at times we do be under pressure but we minimize that every day at least 30 minutes to make sure …. Ya to clean the truck."

Interviewer : Is the freight compartment of the vehicle used for packed or wrapped products is it liquid proof and dustproof sealed container ?

Supplier : " Yes , it does have a sail… dust ….mmh"

Interviewer : How do you ensure that the food does not come into contact with the floor of the vehicle , some could walk on or anything could pollute the food ?

Supplier : "Ok what happen is that a a a as since we get the staff in bulk , so we do have pallets at the back … we normally use…have pallets so that the food is not on the ground so it will be on the pallet ya…. Eh ….not be on the ground …so it becomes easier"

"Yes its safely packed"

Supplier : "Ya we…re normally do it on day to day basis …..."

"Yes .. yes …yes"

Interviewer : In terms of of faulty or damaged goods what do you do with such products concerning the claim ?

Supplier : "Yes , that's a …. The relationship we have with our manufactures because also its their policy like if you find something damaged in because may be the bottom , some may be some one thing is damaged and they will let you know that if you find … come across any damage thing you are entitled to bring it back to us and then we gonna exchange yee…"

Interviewer : Failure to deliver on time or not at all, how do you cover up the gap ?

Supplier : "ya we…we … that's normally…. Normally have another …we outsourced , some other transport companies so that may be should be it happen we supposed to deliver yesterday and then we couldn't due to the faulty of the transport ya that is why we have a standby transport …. Than yes ,on time"

Interviewer : What happens to the food items that have past their use by date ?

Supplier : " Yes , we normally ask the …the… co-ordinators that should they come across any staff that has been expired and or haven't used it and then unfortunately may be the expiring date it… it has met the expirery date they are entitled to let us know and then we take it back.

Interviewer : have you have ever experience the convenient lies of providing food for more learners **?**

Supplier : "Yes . we … yes we have come across that incident like in one of the schools in Fine town , the government eh…. What they did they've increased the number of the kids but they never informed us service providers that they have increased the the number of learners , so and it's not only Fine town I think it's ….it's… 2 or 3 schools that have experienced the same problem …..yeh and then …yes …yes …"

Interviewer : So … on my side I have asked all the questions I wanted to ask, thank you sir. Unless you have something you wish to add or have an imput as you are delivering food to our school .

Supplier : "(Laughing) ….. no may be I would like to… may be to… it's a request that the …project leaders at the schools if they can make time like …. especially for soya , you know… cause we only hear from the ladies that are doing the cooking complaining that the kids don't like soya , but we as service providers , we don't have the power to say Government the….. kids …can you substitute the soya with… and put something else yaa….."

Interviewer : I have been observing in the past weeks , I saw that most of the learners don't even come to the kitchen on the day for soya …. So fa are there any other challenges **?**

Supplier : " The ladies that are preparing food…if they can have a system of assisting kids to wash their hands after eating because normally I have seen the kids are eating they just wipe them with their school uniform so…..yes …."

Interviewer : Ok thank you Sir for your time .

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