AN ANALYSIS OF THE IMPLEMENTATION OF THE SCHOOL SUPPLEMENTARY FEEDING PROGRAMME IN WINDHOEK, NAMIBIA.

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ABSTRACT

The school supplementary feeding programme is a national initiative implemented by the Ministry of Education (MoE) with the Ministry of Health and Social Services (MOHSS). MOHSS offers technical expertise in health related issues through the National Policy for School Health. The objectives of the study were to assess how the implementation of the school supplementary feeding programme is helping to ease the malnutrition burden on school learners, determine the extent to which primary school learners are gaining increased knowledge on nutrition due to the school supplementary feeding programme, establish the extent to which the knowledge has resulted in improved practices in food preparation and nutritional status of learners, and to ascertain the community's acceptance of the school supplementary feeding programme.

The study applied a combination of qualitative and quantitative design with descriptive and comparative approaches. Individual interviews were conducted with 102 learners (both on the feeding programme and those not in the feeding programme) using a structured questionnaire. A focus group discussion was also held with the parents or guardians with regards to their perception of the school supplementary feeding programme (n = 8). The study was conducted at Havana Primary School in the Katutura area of Windhoek.

The study found a total of 90 %(n=51) of the learners in the school supplementary feeding programme were thin, with 59% being moderately to severely thin. The study

also revealed that 67% (n=51) of the learners not participating in the school supplementary feeding programme were also mildly to severely thin. The parents or guardians appreciated the school feeding programme, but from the learners and the parents' responses there was nothing to show that the programme is improving nutrition knowledge to both the learners and their families.

The findings highlighted that the current school feeding supplementary programme implementation was not sufficient and that more still needed to improve its delivery. The school feeding programme is in need of strengthening by implementing more monitoring and evaluation measures to improve the efficiency of service delivery. The Ministry of Health and Social services working more closely with the Ministry of Education can cement the gains already achieved by the school supplementary feeding program. The primary school education curriculum could also be improved to provide more nutrition education to the learners.

Table of Contents

List of Tables

List of Figures

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Dedication

This study is a dedication to my wife Sindisiwe. For all the invaluable support, input and encouragement you gave me in the duration of this study I will forever be grateful. None of this could have been possible without you.

Declaration

I, Dumisani G. Sibanda, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in any other institution of higher education.

……..…….. [signature] Date……

CHAPTER 1

1. INTRODUCTION

1.1 Orientation and background of study

Namibia is relatively a young country with a growing democracy after obtaining its independence from apartheid South Africa in 1990. It is classified as an upper middle-income country (World Food Programme (WFP), 2010) with frequent food deficits because of recurring droughts which have resulted in high rates of malnutrition. The country is food secure at national level, however it is at household level that access to sufficient food for marginalised and vulnerable groups in the society remains a constant challenge, contributing to the current, unacceptable levels of malnutrition. According to United Nations Children's Fund (UNICEF) (2010), assessments in 2009 the estimated overall crop production was 139,000 tonnes, leaving a deficit of 150,000 tonnes, which the country had to import to meet the consumption demand of its population.

Namibia's economy depends on the mining sector and roughly half of her two million population relies on subsistence agriculture. The farming is largely characterised by low productivity and high variability due to water scarcity, erratic rainfall, poor soils, and low capacity to support intensive agricultural methods.

Namibia has one of the highest prevalence of HIV/AIDS in the world. Although the national HIV/AIDS prevalence rate has decreased to an estimated 18.8% over the years (Ministry of Health and Social Services (MOHSS), 2010), there is an increase in the number of orphans and vulnerable children (OVC) in the society (UNICEF, 2010). Chronic food insecurity, recurring weather hazards (drought and floods), and HIV/AIDS have had dire effects on people's lives and livelihoods. There has been a growing concern about the impact of these rising threats on people's health and nutritional well-being in the short, medium and long term.

Food insecurity has resulted in a high rate of malnutrition in Namibia, with nearly one fourth of the children under-five stunted and underweight (27% and 20% respectively) and 7 % of them wasted (MOHSS, 2008). In the past 20 years, there have been efforts towards reducing malnutrition levels, but more still needs to be done. The colonial era brought about major imbalances across all sectors of the economy, and the health sector is no exception.

To address the malnutrition issue among learners, the World Food Programme (WFP) started the school supplementary feeding programme as a way of boosting the nutrition of needy children. The Ministry of Education took over the control of the school feeding programme in 1994. By 2002, the programme had grown to more than 686 schools and fed more than 193,000 children. The goals of this school supplementary feeding programme were to provide additional nutrition to OVCs, improve school enrolment, concentration in class and the overall health status of schoolchildren (Ministry of Education (MoE), 2007).

It is in this vein that the MOHSS, and its local and international partners, has put in place a number of policies to correct the anomalies of the pre-independence era in an endeavour to avail healthcare to everyone in the country. One such policy is the National Policy for School Health, as a comprehensive approach to bring health promotion activities in schools (MOHSS, 2008). The ultimate goal of the school health programme is the attainment of health and social well being for all school-going children.

The policy seeks to redress the imbalances that existed during the colonial era, where only a few schools, in some regions such as Khomas and Erongo, had access to health service outreach programmes. The policy, built on the policies of community involvement and multi-sectoral collaboration among others was formulated against the backdrop of the health problems that were observed among school learners (MOHSS, 2008). These problems include dental cavities, hearing problems, poor vision, sexually transmitted infections and HIV, teenage pregnancy, sexual abuse, mental disorders, drug and alcohol abuse as well as malnutrition at both macro and micronutrient levels.

With the MOHSS offering technical expertise, the MoE with the help of WFP established the school supplementary feeding programme to complement the food provided at home for learners in poor communities, OVCs and all children of school going age who might be having limited food supplies, in an effort to reduce malnutrition (MoE, 2007). According to the Ministry of Education, the school feeding programme also strives to provide nutrition

education through teaching learners about balanced diets, hygienic storing of food and preparation of nutritious food (MoE, 2007). Nutrition education is reinforced in other subjects taught in the school curriculum, such as Life Sciences, Natural Sciences and Health Education, Elementary Agriculture and Social Studies (MoE, 2008).

1.2 Statement of the problem

According to WFP (2004), school supplementary feeding programmes are implemented with the aims of improving nutritional status, alleviate short term hunger, improve school attendance and class concentration and improve household food security among other reasons. It has been sixteen years since the inception of the school feeding programme in Namibia that had as its prime purpose the supplementing of nutrition to the needy children (MoE, 2007) to mitigate the effects of malnutrition in school going children.

There were minimum differences in the rates of stunting, wasting and underweight among the children under five years of age in the 2000 and 2006 Demographic Health Surveys. Stunting decreased from 28% to 27% while wasting went down from 26% to 20%. Underweight decreased from 9% to 7% (MOHSS, 2008).These small changes raise the question as to the extent which the school supplementary feeding programme is being implemented to improve the nutritional status of the primary school learners and their knowledge of food and nutrition. Furthermore there is no evidence of any assessments on childhood nutrition particularly relating to the implementation of the school supplementary feeding programme in Namibia.

In light of the above, the researcher wanted to determine how the school supplementary feeding programme is being implemented as a way of improving the nutritional status of the learners and the extent to which the nutrition knowledge gained is applied to day-to-day living.

1.3 Purpose of the Study

The purpose of the study was to analyse the implementation of the school supplementary feeding programme and its effect on the nutritional status of the learners as well as the learners' attitude and perception towards healthy eating.

1.4 Objectives of the Study

The research objectives were to:

- Assess the implementation of the school supplementary feeding programme and its extent in helping to ease the malnutrition burden on school learners.
- Determine the extent to which primary school learners are gaining increased knowledge on nutrition due to the school supplementary feeding programme.
- Establish the extent to which the knowledge has resulted in improved practices in food preparation and nutritional status of learners.
- Ascertain the parents or guardians' acceptance of the school supplementary feeding programme.

1.5 Significance of the study

The school as a setting for health promotion has a potential snowballing effect for healthy diet promotion from learners to their families. This means that the family members and the community at large are gaining from information obtained from the school, thereby fostering social support. The community can gain from the study as it may assist by showing ways in which the school can promote good eating and hygienic habits to the learners.

The study has the potential to show how much the school supplementary feeding programme has improved school attendance and learning in schools. As an indicator for future studies, the study has potential to reveal how the school supplementary feeding programme can be improved to cover gaps, which may exist in the programme implementation. The research has considerable ability to generate answers to the question 'why?' as well as the 'what?' and 'how?' questions in the implementation of supplementary feeding programmes in schools.

1.6 Theoretical framework

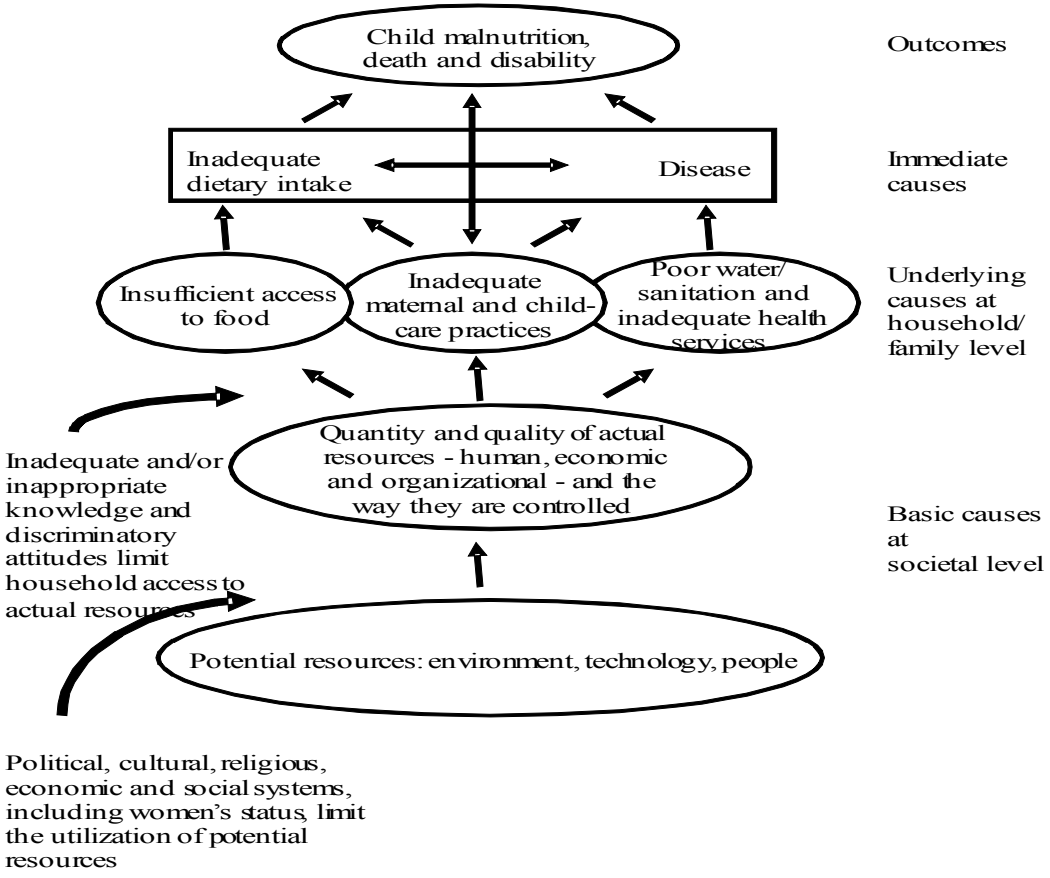
Insufficient intake of nutrients required for normal and sustaining bodily function leads to malnutrition (King & Burgess, 1995). There are reasons why people suffer from malnutrition. Lack of knowledge regarding proper diet can lead a person to actually eat enough food, but not the right foods and therefore lack the required nutrients. Poor absorption power of the body can also be a reason for malnutrition. Poverty is among the most common reasons for malnutrition, and is an especially difficult problem for economically under-developed countries to counter-act. Lack of proper nutrition does not only affect one's body, but it can reduce the intelligence levels of a person. Famine is among the most common reasons responsible for malnutrition among people in a particular region. Famine leads specifically to a severe lack of required amounts of vitamins, protein, and essential minerals in the broad population's diet leading to a weak nutritional status (King & Burgess, 1995).

Nutritional status is determined primarily by a child's growth in height and weight and is directly influenced by food intake and the occurrence of infections. Food intake is not only a result of food availability at the household level, but also of dietary quality and quantity and feeding practices. Optimal infant feeding practices, which include breastfeeding and timely complementary feeding, contribute to the level of food intake in infants and young children (Del Rosso, 1999). In addition, acute and chronic infections have a major impact on nutritional status, because they impair growth by limiting macro- and micronutrient intake and utilization. The political, social, economic and religious systems may also be the basic causes of malnutrition in a society.

UNICEF (1998) described the causes of malnutrition as basic, underlying and immediate causes. The basic causes relate to the ideology of the society and the resources, which societies have. The underlying causes relate to how these ideologies the society shares the resources. These impacts on the access to food, provision of care and the access to health facilities. The immediate causes are concerned with the physiological conditions, which predisposes an individual to malnutrition. The UNICEF conceptual framework in figure 1.1 provides a holistic analysis of the causes of malnutrition.

The causes of malnutrition are a combination of inadequacies in food, health and care. "Even in conditions where food is available and purchasing power may be sufficient, poor monotonous diets low in quantity, quality and variety or dietary diversity of foods is often a major contributing factor" (FAO, 2010, p1).

The causes of malnutrition are illustrated in the diagram below:



UNICEF (1998)

Figure 1.1: Causes of Child Malnutrition

Nutritional status is a critical determinant on children's learning and performance in school. It is vital that children of the school going age are protected from malnutrition because learners who lack certain nutrients in their diet such as vitamin A, iron and iodine, or who suffer from protein-energy

malnutrition, hunger, parasitic infections or other diseases, may not perform at the same level in school as healthy and well-nourished children (Del Rosso, 1999). Weak health and poor nutrition among school-age children diminish their cognitive development either through physiological changes or by reducing their ability to participate in learning experiences or both. Contrary to popular wisdom, nutritional status may decrease with age because of the extra demands on school-age children to perform chores such as or walk long distances to school, create a need for energy that is much greater than that of younger children.

To have healthy and well-nourished learners it is important to address not only the immediate causes but the underlying and the basic causes of malnutrition as well. The school supplementary feeding programme goes to an extent to improve the learners' access to food and dietary intake thus improving both the learners' food and nutrition security. When best implemented, the school supplementary feeding programme can be an important source of nutrition education to both the learners and their families going a long way in improving ideologies and attitudes towards health and nutrition.

Dr Richard Horton (The Lancelet, 2008) noted that under-nutrition is the largely preventable cause of over a third that is 3.5 million of all child deaths with stunting, severe wasting and intrauterine growth restriction being among the most important problems. Prevention of malnutrition in the early stages of life will probably bring about important health, educational, and economic benefits. Thus the children who participate in the school feeding programmes from an early age will have a better opportunity of reversing the effects of malnutrition, especially acute malnutrition experienced earlier in life.

1.7 Definitions of Central Concepts

Anthropometry "is the study and technique of taking body measurements, especially for use on a comparison or classification basis." (Cogill, 2003, p.54)

Body Mass Index (BMI) "is an index that uses the variables of weight and height to measure body fat stores, calculated as weight in kilograms divided by the square of height in metres." (Cogill, 2003, p.54) It thus gives an indication as to the nutritional status of an individual.

Malnutrition "is a condition caused by inadequate or excessive intake of proper nutrients." (World Health Organisation, 2011, p.1) For the purposes of this study, malnutrition shall refer to under-nutrition.

Nutritional Status "is the state of a person's health in terms of the nutrients in his or her diet." (MD Anderson Cancer Centre, 2010, p.1). This can be determined by taking measurements of weight, height and age.

School Feeding is the provision of food to school children (Bundy, Burbans, Grosh, Geli, Jukes & Drake, 2009). In N amibia, the School Feeding Programme (SFP) "is an incentive to help feed the OVCs poor children of the community who may be food insecure to have access to education" (MoE, 2007, p 5).

1.8 Summary

This first chapter provided a background the history of school supplementary feeding programmes and the environment surrounding its implementation in Namibia. The chapter introduced an outline of the problem under study, the goal and objectives of the study and a review of some relevant and available literature. It also presents a general theoretical framework of the causes of malnutrition. A historical outline of school feeding programmes, a framework for their implementation and benefits follow in Chapter Two.

CHAPTER 2

2. LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature about the history of the school supplementary feeding programme both at the global level and at national level. The chapter also goes further into how a school supplementary feeding programme can be implemented and the benefits that result from proper implementation of such a programme.

2.2 History of School feeding

School feeding originated in the 1930s, when feeding schemes were introduced in the United Kingdom (UK) and the United States of America (USA), with the explicit aim of improving the growth of children (Richter, Griesel, & Rose, 2000). In the United Kingdom, a programme that subsidised milk for

school children, was initiated in 1934 and milk was provided free of charge from 1944 onwards. In the late 1960s and early 1970s, this benefit was withdrawn from all, except for those children considered particularly needy. This was an early example of the targeting approach in school feeding.

South Africa introduced free supply of milk as school feeding in the early 1940s, for white and coloured schools (Tomlinson, 2007). Since then, school feeding has broadened to include the provision of fortified biscuits, nutrient supplementation or full meals. Either the meals are at full or subsidised cost, mostly in the United Kingdom and United States of America, or free which is more typical of countries in the developing world.

Many countries in the world have implemented national school nutrition programmes. These programmes were introduced in response to particular needs that certain countries sought to address at the time. Brazil introduced its School Nutrition and Food Security Programme (SNFS) in schools after the Second World War in 1945. Both the United Nations and the United States Agency supported Brazil's programme through the International Development (USAID) (Swartz, 2009). Because of the vast nature of its country, Brazil adopted a decentralization approach as a strategy to manage the programme. The Local Schools Meals Councils, which comprised of representatives from the government, teachers, parents and civil society organisations, managed the implementation of the programme (WFP, 2010).

India has a School Nutrition Programme and has adopted a similar approach to the one applied in Brazil (Swartz, 2009). Both Brazil and India experienced certain challenges during implementation stages of the programme. The key challenges were a lack of managerial skills among stakeholders involved in the programme such as principals, teachers, food suppliers and members of school governing bodies, a lack of community consultation and

participation, insufficient involvement of intra-and inter-sectoral partners, and inconsistency and low coverage of the number of feeding days (Swartz, 2009).

Within the Southern Africa Development Community (SADC), both Malawi and Zambia are among countries that have implemented the School Nutrition Programmes. In both these countries, the United Nations through the World Bank and WFP (WFP, 2010) support the programme both financially and technically. In Malawi, the programme is called the Food for Education (FFE), and it serves in-school meals and/or snacks in order to reduce short-term hunger and achieve the commonly intended aspects of improving school enrolment, attendance, learning and community-school links (Swartz, 2009). The Malawian FFE programme also provides take-home rations, which target girl learners, orphans and vulnerable children. These rations provide 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 are given priority in the programme. Because of the high poverty level in the country, schools appear to struggle to deny any learners access to the food because every learner appears to come from a poor background (Swartz, 2009).

In Zimbabwe, School Feeding Programmes (SFP) are conducted in partnership between the Ministry of Health and Child Welfare, Ministry of Education Sports and Culture, the WFP and other humanitarian organisations such as World Vision, CARE INTERNATIONAL and Catholic Relief Services among others. The programme targets learners from the lower primary school grades as well as out of schoolchildren who are orphaned and vulnerable. The programme is primarily wet feeding where the learners eat cornmeal porridge during break time (Catholic Relief Services, 2004). Home rations sometimes provided at the end of the school term. Zimbabwe revived school feeding programme in the aftermath of the 2002 drought to mitigate the effects of hunger, malnutrition and increase school enrolment.

School feeding programmes have are essential in any country whether it is developed or is still developing. The benefits of these programmes are immense not only at the individual level but also to the community and society at large. An overview and the benefits of the school feeding programme are outlined below.

2.3 Overview and benefits of School Feeding Programs

The primary assumption of school feeding programmes is that education and learning depend on good nutrition (Briggs, 2008). School health and nutrition also addresses the critical health and nutrition factors that keep children out of school and reducing their ability to learn effectively, such as malnutrition and hunger (Save the Children USA, 2007). Bundy, Burbans, Grosh, Geli, Jukes, and Drake (2009) defined school feeding as the provision of food to schoolchildren. There are two main groups of school feeding approaches, namely 'in-school feeding' and 'take-home rations'.

School supplementary feeding programmes can therefore be implemented as in-school feeding, where the children eat the food in school or as take home rations, where the learners take dry portions of food to consume at home. In-school feeding programmes are better preferred for the learners as their eating can be monitored and they consume the full amount of their daily ration. In take home rations however, the possibility of sharing the food with family is high resulting in the learner not consuming adequate amounts of their daily ration.

School feeding programmes are mainly implemented with the intention to achieve the following results:

- Increase enrolment and attendance

- Alleviate short-term hunger
- Improve nutritional status
- Improve micronutrient status (WFP, 2004)

2.3.1 Increase Enrolment and Attendance in schools

Food can act as a strong incentive for children to attend school on a regular basis. Girls especially benefit from this, as parents feel there are sufficient income-transfer benefits (Del Rosso, 1999). In many communities, girls are culturally disadvantaged such that in hardship situations, male children are given opportunity to go to school over girls. School supplementary feeding programmes can provide a way in which parents can save money by spending less on food and thereby allow the girls to attend school. It is however important to establish that school meals do not replace food that has been part of the children's diet in the household, but rather add to what the family provides. In Jamaica providing breakfast to primary school students significantly increased school attendance. The learners who benefit the most are those wasted, stunted, or previously malnourished (Del Rosso, 1999).

2.3.2 Alleviation of Short-Term Hunger in learners

Much research has also been conducted on the effects of short-term hunger related to learning capacity and in-school meals provided to learners reduce short-term hunger (World Food Programme (WFP), 2004). Learning ability is affected greatly by hunger due to skipped meals. Many factors contribute to

hunger among school children, these include long distances children have to travel to school, cultural meal practices that include no or small breakfasts due to a lack of family time and resources to provide adequate meals to children before and/or during the school day.

Many cultures do not provide breakfast. This means the child's last meal is in the evening. The possibilities of long travelling time mean the child starts the school day hungry and is unable to concentrate. The provision of even a small snack at the start of the day or mid-morning alleviates the short-term hunger and has been linked to increased awareness, activity and learning capacity (Briggs, 2008).

2.3.3 Improve Nutritional Status in learners

The physical growth of a child is a result of a number of interconnected variables, especially in areas where poverty is endemic. Environmental factors, genetics, food consumption patterns, health and illness, hygiene practices, lack of sanitation and the onset of puberty are but a few. Even though data collection on these variables has been inconsistent, some research indicated that undernourished children do benefit from school feeding programs (Bundy, Burbans, Grosh, and Geli, Jukes & Drake, 2009). The school supplementary feeding programmes help to improve the nutritional status and health status of schoolchildren, as they learn better if they are not hungry (King & Burgess, 1995). Poorly fed schoolchildren who are provided with good meal improve their growth and school performance, and prevent anaemia, and other nutritional deficiencies.

2.3.4 Improve Micronutrient Status of learners

School supplementary feeding programs when designed with micronutrients in mind, can greatly improve micronutrient status. This is often referred to as hidden hunger as the effects are not always visible (Briggs, 2008). The three main micronutrients that supplementary feeding programmes impact are iron,

Vitamin A and iodine. All three are linked to mental and learning capacity. School supplementary feeding programmes are designed in such a manner as to meet the micronutrient requirements of the learners.

Micronutrient deficiency can occur at any age and is common in schoolchildren. Estimates suggest that in Sub-Saharan Africa and in India, half of the schoolchildren in poor communities are iron deficient. Intervention at school age offers direct benefits for the schoolchild, as current micronutrient deficiencies, unlike stunting and other long-term consequences of earlier malnutrition are rapidly reversible at any age (Bundy et al., 2007).

The most important micronutrient deficiencies of public health importance are vitamin A deficiency, iodine deficiency and iron anaemia. In South Africa, a randomized placebo-controlled trial demonstrated that fortified biscuits reduced the prevalence of anaemia and low urinary iodine in children ages 6 – 11 (Van Stuijvenberg, Kvalsvig, Faber, Kruger, Kenoyer, & Benade, 1999). Additionally, a study conducted by the Global Alliance for Improved Nutrition (GAIN) provided 61,000 school-age children in India an iron-rich lunch through a school-based midday meal program. The iron-rich meal came in the form of Ultra Rice – a manufactured, micronutrient packed, rice-shaped grain that is blended with traditional rice during the cooking process. The study showed a significant increase in the iron stores of children that consumed Ultra Rice compared to that of the control group. The children who consumed Ultra Rice also experienced a significant reduction in the incidence of morbidities compared to the control group during the study period (Buhl, 2010).

2.3.5 Other benefits of school supplementary feeding programmes.

The other benefits of school supplementary feeding programmes include:

- Increase attention and concentration of students producing a gain in cognitive function and learning. Nutrition affects the development of factors that encourage cognitive development before and after a child is enrolled in school. Conditions such as protein-energy malnutrition and other micronutrient deficiencies can have adverse effects on attention and concentration in school (Pollitt, 1984)
- School supplementary feeding effectively reduces absenteeism and increases the duration of schooling, educational outcomes (performance, drop out, and repetition).
- It increases community involvement in schools, particularly where programmes depend on the community for preparing and serving meals for the children.
- In addition, schools have the potential to reach out not only students but also staff, teachers, parents and community members, including young people not attending school.
- Schools are an ideal setting to promote health and healthy nutrition for the following reasons :
    - Schools reach a high proportion of children and adolescents.
    - Schools provide opportunities to practice healthy eating and food safety.
    - Schools can teach students how to resist unhealthy social pressures since eating is a socially learned behaviour.
    - Skilled personnel are available to provide follow-up and guidance after appropriate training of students, teachers and other service personnel.
    - Teaching school children about nutrition can help other people in the community to learn about nutrition (King & Burgess, 1995).

Evaluations show that school-based nutrition education has the ability to improve eating behaviours of young people (Del Rosso, 1999).

2.4 Framework for an Effective School Supplementary Feeding Programme

The framework is the starting point for developing an effective school nutrition component in broader efforts to improve health status. Schools can effectively deliver some health and nutritional services, provided that the services are simple, safe and familiar, and address problems that are prevalent and recognized as important within the community (Del Rosso, 1999). If these criteria are met, then the community sees the school staff and school more positively, and the staff will perceive themselves as playing important roles. The school supplementary feeding programmes can be very effective if undertaken under the following components:

2.4.1 Health-related school policies

Health policies in schools, including skills-based health education and the provision of some health services, can help promote the overall health, hygiene and nutrition of children. Policies regarding the health-related practices of teachers and students can reinforce health education (Briggs, 2008). Teachers can act as positive role models for their students, for example, by not smoking in school and eating healthy foods. The process of developing and agreeing upon policies draws attention to these issues. The policies are best developed by involving many levels, including the national level, and teachers, children, and parents at the school level.

2.4.2 Provision of safe water and sanitation – the essential first steps towards a healthy physical, learning environment.

The school environment may damage the health and nutritional status of schoolchildren, particularly if it increases their exposure to hazards such as infectious diseases carried by the water supply. Hygiene education is meaningless without clean water and adequate sanitation facilities. It is a realistic

goal in most countries to ensure that all schools have access to clean water and sanitation. By providing these facilities, schools can reinforce the health and hygiene messages, and act as an example to both students and the wider community (Briggs, 2008). This in turn can lead to a demand for similar facilities from the community.

2.4.3 Skills-based health education

This approach to health, hygiene and nutrition education focuses upon the development of knowledge, attitudes, values, and life skills needed to make and act on the most appropriate and positive health-related decisions (Bundy et al., 2007). Health in this context extends beyond physical health to include psycho-social and environmental health issues. Unhealthy social and behavioural factors not only influence lifestyles, health and nutrition, but also hinder education opportunities for a growing number of school-age children and adolescents.

2.4.4 School based health and nutrition services

Schools can effectively deliver some health and nutritional services and address problems that are prevalent and recognized as important within the community. For example, micronutrient deficiencies and worm infections may be effectively dealt with by infrequent (six-monthly or annual) oral treatment; changing the timing of meals, or providing a snack to address short term hunger during school which is an important constraint on learning, can contribute to school performance and providing spectacles will allow some children to fully participate in class for the first time (Bundy et al., 2007). Supporting activities for these components include effective community partnerships, pupil awareness and participation and effective partnerships between teachers and health workers and between the education and health sectors as explained below:

(i) Effective community partnerships

Promoting a positive interaction between the school and the community is fundamental to the success and sustainability of any school improvement process. Community partnerships engender a sense of collaboration, commitment and communal ownership. Such partnerships also build public awareness and strengthen demand. Within the school health component of such improvement processes, parental support and cooperation allows education about health to be shared and reinforced at home. The involvement of the broader community, the private sector, community organizations and women's groups can enhance and reinforces school health promotion and resources (MOHSS, 2008). These partnerships, which should work together to make schools more child-friendly, can jointly identify health issues that need to be addressed through the school and then help design and manage activities to address such issues.

(ii) Pupil awareness and participation.

Children must be important participants in all aspects of school health programmes, and not simply the beneficiaries. Children who participate in health policy development and implementation efforts to create a safer and more sanitary environment, health promotion activities aimed at their parents' other children, and community members, learn about health through practical means (King & Burgess, 1995). This is an effective way to help young people acquire the knowledge, attitudes, values and skills needed to adopt healthy lifestyles.

(iii) Effective partnerships between teachers and health workers and between the education and health sectors

The success of school health programmes demands an effective partnership between Ministries of Education and Health, and between teachers and health workers. The health sector retains the responsibility for the health of the children, but the education sector is responsible for implementing, and often funding, the school based programmes (MOHSS, 2008). These sectors need to identify responsibilities and present a coordinated action to improve health and learning outcomes from children.

School health and nutrition also addresses the critical health and nutrition factors that keep children out of school and reducing their ability to learn effectively, such as malnutrition and hunger (Save the Children USA, 2007). Bundy, Burbans, Grosh, Geli, Jukes, and Drake (2009) defined school feeding as the provision of food to schoolchildren.

2.5 School feeding and education

As stated above, poor health and malnutrition are important underlying factors for low school enrolment, absenteeism, poor classroom performance as well as early school dropout. Programmes to achieve good health and nutrition at school age are therefore essential to the promotion of basic education for all children. Good health and nutrition are not only essential inputs but also important outcomes of basic education of good quality. Children must be healthy and well-nourished in order to fully participate in education and gain its maximum benefits. Early childhood care programmes and primary schools which improve children's health and nutrition can enhance the learning and educational outcomes of school children. Education of good quality can lead to better health and nutrition outcomes for children, especially girls, and for the next generation of children as well (Bundy et al., 2007).

An American study showed the benefits of providing breakfast to disadvantaged primary school students. Before the start of a school breakfast program, eligible (low-income) children scored significantly lower on achievement tests than those not eligible. Once in the program, however, the test scores of the children participating in the program improved more than the scores of non-participants. The attendance of participating children also improved (Del Rosso, 1999).

In Peru, 23 malnourished boys and 29 well-nourished boys aged between nine to 11 years were studied to assess the effects of breakfast on cognitive performance. Each boy served as his own control in a manner comparable to the Jamaica study cited above. Breakfast was a nutritionally fortified beverage and a baked grain product fortified with iron, similar to the meal provided in the government-sponsored school breakfast program. A series of cognitive tests were administered in an experimental setting. Speed in performing a short-term memory test and discrimination of geometric patterns were improved under the breakfast condition in both groups. The effect was more pronounced in the nutritionally disadvantaged children (Del Rosso, 1999).

Ensuring that children are healthy and able to learn is an essential component of an effective education system. This is especially relevant in efforts to achieve education for all in the most deprived areas. Increased enrolment and reduced absenteeism and drop-out bring more of the poorest and most disadvantaged children to school, many of whom are girls. It is those children who are often the least healthy and most malnourished, who have the most to gain educationally from improved health (Bundy et al., 2007) Effective school feeding programmes that are developed as part of community partnerships provide one of the most cost-effective ways to reach adolescents and the broader community and are a sustainable means of promoting healthy practices.

Improving the health and learning of school children through school-based nutrition programs is a concept which many countries have had decades of experience. These common experiences suggest an opportunity for concerted action by a partnership of agencies to broaden the scope of school feeding programmes and make them more effective.

According to Del Rosso (1999), seven steps identify how to develop school feeding programmes that would improve education:

- An agreement reached on policy and objectives that focus on how school feeding can improve education. The agreement reached outlines problems the feeding programme needs to address and who will benefit from the programme and what methods are feasible.
- Develop targeting criteria to reach high-risk children. Targeting is necessary to ensure that children who lack resources benefit from the school feeding programme.
- Analyse and identify alternative financial options for schools such as food aid, the private sector, food selection, community support and sustainability
- Develop appropriate guidelines for the ration composition and time of school meals. Managers should find out the nutritional and health needs of children and find out how the community can participate.
- Identify potential bottlenecks in implementation.
- Develop monitoring programmes that look at programme processes and
- Find opportunities to integrate interventions. If feeding learners at school is integrated with other school-based health interventions, for example, treating children for parasites, it will improve their appetites and the nutritional benefit of the food.

2.6 Preventing malnutrition in primary school learners

Early child development programmes show significant long-term impacts on subsequent growth and development, including school performance. Similarly, avoidable early deficits have long-term negative consequences. From this perspective, providing food to school-age children may not reverse some of the damage of early nutritional deficits (Bundy et al., 2007). However, providing supplementary feeding at school level can mitigate the effects of acute food insecurity, which may be present in the children of school going age.

School feeding may not be the only solution when it comes to malnutrition of the children of the learners but it goes a long way in mitigating the effects of the basic and immediate causes. School feeding can increase the access to food especially to learners coming from food insecure households. School feeding programmes also go a long way to increase the adequacy of the dietary intake thereby improving the nutritional status of the learners. The nutritional status of the learners can be measured by taking the measurements of weight, height and age in a method called anthropometry.

2.7 Anthropometry as an indicator of nutritional status

Nutritional anthropometry refers to the measurement of size, weight, and proportions of the body, providing the primary indicators of past and present nutritional and health status of children (Cogill, 2003). These measurements are taken at regular intervals to assess growth, identify and prevent any deficiency. Anthropometric measures used in this study were age, weight and height. These measures are compared to the growth standards

set by the WHO. The WHO Child Growth Standards help to monitor and assess the nutritional status children and can signal if there is a risk of malnutrition (WHO, 2011) In combination, anthropometric indices can distinguish between stunting (low stature), wasting (thinness), and under- and overweight. Each indicator gives a different perspective on the nutritional status of children. Chronic (stunting) and acute (wasting) nutritional problems and general health and nutritional status (under- and overweight) can be assessed at the population level through these measures (Cogill, 2003). The mid-upper arm circumference (MUAC) can also be used to identify children who may be at risk of malnutrition (WHO, 2010).

In order to quickly determine the nutritional status of adolescents, the Body Mass Index (BMI) can be calculated from the measurements of weight, height and age. The result will be compared with the World Health Organisation reference to determine the nutritional status. BMI point being a simple index of weight-for-height that is commonly used to classify underweight and overweight in adolescents and adults and obtained using the following formula:

$BMI=weight/height^2$(WHO, 2010)

Anthropometry provides the data used in the indirect appraisal of body composition. Growth in stature and weight is frequently used as markers of health, nutritional status and developmental progress. Growth is a major, highly variable aspect of infancy, childhood and adolescence. Somatic growth is more than the regular increase of tissue mass in that it includes dramatic alterations in size and proportion. The physique changes that accompany growth may affect the skill, exercise tolerance and injury potential of an individual overtone. These changes can have a profound influence on the mechanics of movement and the physiological capacities of the growing organism. One must consider the individual's potentials and variations. As measures for growth, heights and weights are available on specific tables of:

- Height for age.
- Weight for age.
- Weight for height (WHO, 2010).

Anthropometric measurements have a number of advantages such as that it is possible to become skilled at acquiring reliable measures, most techniques utilize inexpensive equipment that is generally portable, they are no-invasive not posing a risk to the person being measured and it is relatively easy to carry out with a modest amount of training (Cogill, 2003).

2.8 Progression of School Supplementary Feeding Programmes (SFP) in Namibia

In 1991, The World Food Program (WFP) supported a pilot school supplementary feeding programme in the drought-affected areas of Namibia using surplus military food rations from the United Nations operation that supervised elections. The pilot program ran from 1992 to 1994 where the WFP provided vegetable oil, dried skimmed milk and cash support. Some of the vegetable oil was used to purchase maize meal and sugar and children were fed a maize porridge mid-morning. Other donors and non-governmental organisations provided once-off equipment donations (Visser, 2005).

The program introduction was gradual in new areas. After three years following regional workshops that were conducted to educate the community leaders, parents and teachers, the most important outcome was the community's agreement to support the program by providing inputs such as labour and firewood. Food rations were used to pay cook, unless communities decided to raise money to provide cash payments instead (Visser, 2005). The program's intention was never to be national as it targeted drought-affected areas. Schools in those areas used an identification criteria set by teachers to

identify needy learners. The program also fed children in some of the hostels associated with schools in Namibia. The WFP initiated a pilot program that reached 29,000 learners in 1991 and expanded to 78,000 beneficiaries by 1996. After 1994, the Ministry of Education took over the management and responsibilities for the program (MoE, 2007). The meal given to learners is to provide about a third of their daily food requirements. At the beginning of the third term of 2005, there were 100,062 learners receiving one daily ration and 830 cooks receiving three daily rations of 125g of fortified maize meal porridge at 709 schools and hostels spread over the whole of Namibia (Visser, 2005).

The beginning of the programme's establishment was based on the following principles:

- The program will be run in poor, non-crop producing drought affected areas.
- It must be a community project where community members must be empowered to run the program themselves.
- It must be kept as simple as possible with regard to meals and ordering of food (Visser, 2005).

The current Namibian School Feeding Manual (MoE, 2007, p. 5) states the following as programme objectives:

> To provide meals to children who have poor access to food so that there is equal distribution of food to all Namibian children; better nutrition to children who reside in poor church, community, farm or informal hostels; improve community involvement in schools; develop coping mechanisms for the community to run a suitable programme independently.

The School Feeding Manual (MoE, 2007, p. 51) also states that only needy children may receive food. Further, it states that the teachers and the school supplementary feeding committee members have to decide which children may participate using the following specified guidelines:

Have unemployed parents; or a single parent with very low income; or both parents earning very low income; are raised by grandparents on a pension only; are orphans; are neglected or abused; are from marginalised communities;

walk 5 km or more to school and shows visible signs of under-nutrition.

The School Feeding Manual also states that orphaned and vulnerable children within the school's catchment area are eligible to participate in the school feeding programme. The Ministry of Gender Affairs and Child Welfare on behalf of the Namibian Government, has defined Orphaned and Venerable Children (OVC) as "children under the age of 18 whose mother, father, both parents and primary caregiver have died, and/or is in need of care and protection." (Visser, 2005 p 10)

The following groups are excluded from participation in the school feeding program according to the current School Feeding Manual (MoE, 2007, p.9):

All children whose parents have a regular income; all children whose parents are employed by the government, parastatals and private companies; teachers; employed adults; children whose parents own enough cattle, goats or sheep for subsistence and marketing and children whose parents produce enough food for subsistence and marketing.

According to the Khomas Region Hostels Inspector, the school supplementary feeding programme has resulted in 100% school attendance of all the learners participating in the school feeding programme in Khomas region. As of 2011, the school supplementary feeding programme is implemented in 95% of the schools in the region. The remaining 5% have their own feeding schemes which are privately funded (Mr Kazongore, personal communication,

2012). The MoHSS supports the school supplementary feeding programme by providing annual sanitation and hygiene inspections and medical testing for all people involved in food management and preparation.

This progression of the school supplementary feeding has however not come without its own challenges. The major problems in the region include stigma associated with the learners participating in the programme, lack of cooperation from the community in terms of providing labour to prepare the food for the learners and weak stock management at school level.

2.9 Summary

Good health and nutrition are needed for concentration, regular school attendance and optimum class performance. Existing researches make a convincing case that nutrition and health interventions will improve school performance. Schools offer more effective, efficient and equal opportunities than any other setting to promote health and healthy eating. They reach young people at a critical age of development in which lifestyles, including eating patterns, are developed, tested and adapted in schools and through social interactions between students, teachers, parents and others. Literature suggested that, if the school supplementary feeding programme is implemented effectively, it could help correct severe and acute nutritional deficiencies in children in an endeavour to improve health. Chapter three, reflects on the research methodology used in the study.

CHAPTER 3

3. METHODOLOGY

3.1 Introduction

This chapter presents details about the methodology adopted and elaborated on the chosen research methods and the reasons for their selection. Further, this chapter describes the study population, sampling and sample size as well as how the primary data was collected and processed. The chapter outlines the procedure that was used to collect and analyse data for this study.

3.2 Research design

The research design for this study was both quantitative and qualitative in nature, using descriptive, comparative and explorative strategies. The study was a cross-sectional survey, observational in nature.

Using the quantitative approach, the study was aiming at primarily answering the questions to assess whether the supplementary school feeding programme implemented in schools is resulting in the improved nutritional status of learners, improved eating behaviours, as well as improved attitudes toward healthy foods in both primary school learners and their parents or guardians.

Malnutrition prevalence rates can only be determined numerically and therefore the quantitative design approach was used in part of this study as a way of describing the nutritional status of the learners. The use of this approach is based on the idea that social phenomena can be quantified, measured and expressed numerically (Mamia, 2001).

Descriptive and comparative strategies were used in the study with a goal to unfold and attempt to explain the variances of the learners without generating changes. Descriptive research design is a scientific method which involves observing and describing the behaviour of a subject without influencing it in any way (Levi-Faur, 2002). This study took a snapshot view of the implementation of the school supplementary feeding programme in giving a quick cross sectional picture of what is happening on the ground. In descriptive studies, comparison is an adequate method as it gives an opportunity to contrast events. Comparison is one of the most efficient methods for explicating or utilizing implied knowledge or tacit attitudes (Levi-Faur, 2002). This is done by showing in parallel two slides of two slightly different objects or situations and by asking people to explain verbally their differences. The goal is to find out if there are any differences and if so, why; and also to reveal the general underlying structure which generates or allows such a variation.

The study was also qualitative in order to capture peoples' interpretation (Burns & Grove, 1995) of the school supplementary feeding programme; why they have that point of view, how they came to that view, what they have been doing and how they understand the whole programme.
Qualitative research is a field of inquiry that crosscuts disciplines and subject matters involving an in-depth understanding of human behavior and the reasons that govern human behavior. Qualitative research aimed at answering the 'how' questions (Schneider, Lo Biondo-Wood, & Haber, 2003). In this qualitative approach, the study therefore determined to explore the knowledge gained, and the perceptions and attitudes of the parents or guardians. The focus group discussion with the parents or guardians constituted the qualitative part of the study. The study undertook to bring to light views (Saunders, Lewis & Thornhill, 2007) and understanding of the parents or guardians of the school supplementary feeding programme. A focus group discussion was used to collect parents or guardians' experiences with the school supplementary feeding programme.

3.3 Study Populations

Population is the entire group of events, individuals or people that is the focus of the study who may be everyone in the country, or those in a particular location, or a special ethnic, economic or age group, eligible for a data collection investigation (Cogill, 2003). The population for this study was taken from Katutura manly because this is where the bulk of the people in Windhoek live and it thus a closer representation of all the school children in Windhoek. The Katutura community consists mostly of low to middle income earners.

The population for this study was segmented into two groups. One group of population was the upper primary school learners. The second group of the population was the parents or guardians of the upper primary school learners. Learners from the higher primary grades, grade five through to grade seven at Havana primary school in Katutura. Havana primary school was selected by sampling procedures outlined in the next section. These higher primary school learners were selected as they were more mature to understand questions and could communicate better regarding what they have learnt about food. This group was divided into two groups: those participating in the school feeding programme and those not in the school supplementary feeding programme.

The second segment of the population was the parents or guardians of the children in the school supplementary feeding programmes, also in Katutura. The purpose of this segment was to get to know the parents or guardians' understanding and appreciation and the experience they have had with the school supplementary feeding programme.

3.4 Sampling and sample size

Sampling is the process in research of selecting observations for representatives of a population so as to give information about the population as a whole (Cogill, 2003). A representative sample is one whose key characteristics closely approximate those of the population. The purpose of sampling is to increase efficiency in the research study, allowing the researcher to make inferences and generalizations about the population without examining each member of the population.

3.4.1 Sampling for learners

Multi-stage sampling, a form of probability sampling, was conducted to select the school and the learners to be included in the study in an effort to have a representative sample (Cogill, 2003). For the purpose of this study, the study area was Windhoek in the Khomas region of the country. The schools in the region are grouped into circuits by the Ministry of Education. The first stage in the sampling of the learners involved the random selection of one circuit of schools from the four circuits with running school supplementary feeding programmes in Windhoek. This resulted in a circuit from Katutura being selected. This method was done to give each circuit an equal chance of being selected.

The second stage involved the selection of one school from the selected cluster. Due to resources constraints only one school was randomly selected for this study. The sampling frame included a school, which satisfied the following conditions:

- a school in the selected cluster,
- a school that has an equal number or more of the sample of learners who are on the supplementary feeding programme and

- an equal number or more of learners who are not in the school supplementary feeding programme to facilitate comparison.
- a school which has a running feeding programme for at least 1 year

Using this sampling frame, Havana primary school was identified as the school that satisfied the requirements for participating in the study since the school feeding programme has been implemented at the school for years.

The third stage involved the selection of the sample of learners on the school supplementary feeding programme to participate in the study. Only learners from the upper primary grades were considered for this study as they have a higher maturity and therefore have better reasoning ability to answer questions with a better understanding. Havana primary school had a total 54 learners participating in the study who were in grades five, six and seven. From the 54, a total of 51 learners in the school's feeding programme participated in the study. Purposive sampling was then used to select an equal number (51) of learners with similar age, gender and in the same grades from learners not participating in the school supplementary feeding programme. The inclusion of learners participating in the school supplementary feeding programme and those not participating allowed for comparison of findings.

In addition to the purpose of the study and population size, three other criteria were used to calculate and determine sample size. These were level of precision, confidence level and degree of variability. The level of precision or sampling error is the range in which the true value of the population is estimated to be and for this study, the value used was 5% while the confidence level was 95% (Israel, 2009). The degree of variability refers to the distribution of the attributes which are measured in the population. The attribute was malnutrition and the degree of variability used in this study was 20% (MOHSS, 2006). These criteria were used in sample size formulae as follows:

3.4.1.1 Sampling Calculation for learners

n = no / [1+ {(no -1)/N}]

no = z^2x pq/ e^2 (Israel, 2009)

Description: **n**= required sample size, N= population, n_o= sample size for proportion, *z* =confidence level *e* = margin of error, 5% (at 95% confidence level)**,** *p*= variation of nutritional status, 20% (MOHSS, 2006) and *q*= 1-*p*

Calculation:

$n_o = 1.96^2*0.2*0.8/ 0.05^2=246$

n = n_o / [1+ {(no -1)/N}]

n = 246 / [1+ (245/200]

n=111

Though the ideal sample size was 111 for learners participating in the school supplementary feeding programme, the school that was selected for the study, Havana Primary school only had 54 learners from grade five to grade seven who were participating in the school supplementary feeding programme. As already stated earlier, only 51 learners eventually participated in this study. Two of the learners who did not participate did not come to school because of illness, while the third was not comfortable in taking part in the study. The total number of learners who took part in the study was 102, 51 participating in the school supplementary feeding programme and 51 not participating.

3.4.2 Sampling for parents

Convenience sampling was used to select the participants of the focus group discussion. The researcher and a trained moderator collected information from the participants during the focus group discussion. Participants were notified in person a week before the proposed date of the discussion to give them time to prepare. Eight participants, four men and four women were identified to take part in the study. Two participants later indicated that they could no longer participate in the study. They gave reasons that something urgent had come and were no longer available for the study and that they were not comfortable with the discussion as they were not sure of the intentions of the study. Since there were both men, two other men were identified to replace them in order to maintain the number of the focus group at eight. These participants were parents or guardians of Havana primary school learners who either reside near the school or who operate their business close to the school area.

3.5 Procedure

3.5.1 Research tools

Two research instruments were developed for the study to collect data from the participants. These instruments were a semi-structured questionnaire for the learners and a focus group discussion guide for the parents. The researcher designed the questionnaire and the focus group guide with the assistance of his supervisors.

The questionnaire consisted of three parts: the demographics, nutrition knowledge, attitudes, and anthropometric measurements (age, height and weight). The questions were both open and closed ended questions. The nutrition knowledge questions related to the nutrients the learners new, the food they ate both at school and at home. The attitude and practices questions related to the washing of hands, sharing information about food learnt at school and their thoughts about their weight. The anthropometry part of the questionnaire constituted the taking of weight and height measurements.

The discussion guide for the parents or guardians consisted of nine questions. The questions ranged from awareness, benefits, implementation of the school supplementary feeding programme at Havana primary school. The questions also tackled the changes in learners' behaviour and health, and the effect of the school supplementary feeding programme on the household food consumption levels. The last part of the discussion guide required the parents of guardians to suggest improvements for the school supplementary feeding programme.

3.5.2 Pilot Study

A pilot study is a small-scale preliminary study conducted before the main research to check for feasibility and improve on the research tools (Lawrence & Worsley, 2007). A pilot study for this research was conducted to eliminate ambiguous questions and to get feedback to restructure the questionnaires if necessary. The pilot study was done in the Katutura area outside the circuit in which the study was carried out, with the aim of testing the practical aspects of the research study and identifying and resolving problems before investment of substantial resources (Lawrence & Worsley, 2007). Learners from Moses Garoeb, Olof Palme and Bethel primary schools were part of the pilot study.

Nine questionnaires were administered to nine learners, three from each school. They all, except one, had problems in listing the nutrients they get from food. Another learner was only able to answer after the question was rephrased on the uses of food in the human body. These learners also had problems with the balanced diet questions which they failed totally to answer. Besides these, all the other questions were answered reasonably well.

The pilot study resulted in the simplification and shortening of the questions so that the learners could easily understand and give clearer answers.

3.5.3 Data Collection

The interview schedules were completed for the learners in the school supplementary feeding programme, in one-on-one interviews with respondents. The questionnaire was administered to an equal number of learners who were not on the school supplementary programme for comparison purposes. The quantitative measurements in this study enabled the determination of the nutritional status of the learners. This was done through taking anthropometric measurements (weight and height). Weight measurements were collected using a scale which was reset every time before another participant could be measured while height was taken using a correctly assembled tape measure. The BMI for age was used as a quick measure of the nutritional status of the learners (WHO, 2011). Measurements of learners on school feeding programme were compared to those of learners who are not in the supplementary feeding programme.

Eight parents or guardians were part of the focus group that intended to capture their understanding and appreciation and the experience they have had with the school supplementary feeding programme. The researcher trained a moderator who was better acquainted with the community to lead the discussion. This moderator was an undergraduate student at the University of Namibia. The researcher was taking notes and capturing non-verbal communication while a moderator led the discussion.

The focus group discussion guide, used for the parents or guardians, contained issues relating to the general understanding of basic nutrition and the benefits of the school supplementary feeding programme to the community. The researcher also debriefed the participants to ascertain if he had

understood correctly their input before ending the discussions. After the focus group discussion, the researcher and the moderator went through the notes to ascertain that all the points raised had been captured.

3.5.4 Data Analysis

Data was analysed using the EPI Info Package version 2. The package was used to calculate BMI as well as to create frequency tables, charts and graphs that are used to present the results. The WHO reference for BMI z-scores for adolescents from 5 to 19 years old for both boys and girls was used to determine the nutritional status of the learners (WHO, 2011). The data was analysed to explain behaviour in relation to school feeding and nutrition education. The median age for each learner was used to calculate BMI data as the exact birth dates were not collected.

The data was also analysed qualitatively in a range of processes and procedures moving from the qualitative data that had been collected into some form of explanation, understanding or interpretation of the people and situations investigated (Lewins, Taylor, & Gibbs, 2005). The data that was obtained from the focus group discussion was qualitative, and categorized according to the questions of the focus group discussion guide.

3.6 Research Ethics

Approval and permission from the University of Namibia and the Ministry of Education were sought before carrying out this study. The permission obtained from the Regional Director of the MoE, Khomas region and from the teachers at Havana Primary School was used by the researcher to conduct the study with the learners. The school principal and the teachers serve as proxy guardians of the learners during the time they are at school and thus their permission to conduct the study at the school was crucial as the learners were all under the age of eighteen. Other ethical research practices were also considered and implemented. These included informed consent from the participants as well as their teachers to be part of the study. The study was carried

out in accordance with the ethical requirements of scientific practices and of the law. Participants were being admitted into the study through their own voluntary informed consent (Burns & Grove, 1995). The decision of those learners and parents who did not want to be part of the study was respected. The school timetable was respected and all the data collection took place outside learning hours so as not to disadvantage those learners participating in the study.

The participants were assured of privacy, confidentiality, and anonymity. In this regard, the identity of the participants was not revealed in any way, and access to raw data was limited to the researcher and research supervisors. The participants received uniform and fair treatment during the study to avoid discomfort and harm (Burns & Grove, 1995).

3.6.1 Privacy

All the questionnaires were administered in private for each individual learner. This included taking height and weight measurements. This ensured that only the participant had knowledge of their measurement and no one heard how they responded to the question. It also ensured that the response of one individual did not affect the responses of the next participants.

3.6.2 Confidentiality

For both the learners' questionnaire administration and the focus group discussion, assurance was given to the participants that the information they gave will not be revealed to anyone beside the researcher, the moderator and the researcher's supervisor.

3.6.3 Anonymity

All the participants were assured that their names and identity would not be revealed to anyone. To cement this, no names were taken or written on the questionnaires and focus group discussion notes.

3.6.4 Voluntary

All the participants were recruited upon their choice to participate in the study. All the learners and parents who did not feel comfortable to take part in the study for any reason were not forced or coerced in any way to participate.

3.7 Summary.

This chapter highlighted the research methodology used for this study. The study was both quantitative and qualitative while being cross sectional in nature. For the reason of finding out current situations, descriptive and comparative strategies were used. The study population were learners at Havana primary school as well as parents and guardians of these children who participated in the focus group discussion. The learners for the study were selected through multi-stage sampling while the participants for the focus group discussion were selected by convenience sampling. Chapter four gives the results of the questionnaires and the focus group discussion.

CHAPTER 4

4. RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the researcher discusses the results of the data collected through the questionnaires from the sample of learners at Havana Primary school in Katutura, as well as results of the focus group discussion done with the parents or guardians of learners from Havana Primary school. In this section, the researcher presents the demographic information from the respondents, as well as discusses the learners' response toward the questions asked about the school supplementary feeding programme. Further, the researcher will discuss the perceptions of the parents or guardians towards the school supplementary feeding programme as obtained from the focus group discussion.

4.2 Results for Learners

4.2.1 Demographics

4.2.1.1 Gender of learners

The gender of the learners who participated in the study is shown in tables 4.1 and 4.2.

Table 4.1: Gender of learners participating in the school supplementary feeding programme

Gender	Frequency	Percentage
Male	26	51%
Female	25	49%
Total	**51**	**100%**

Table 4.2: Gender of learners not participating in the school supplementary feeding programme

Gender	Frequency	Percentage
Male	26	51%
Female	25	49%
Total	**51**	**100%**

A total of 102 questionnaires were completed. Fifty-one from the learners in the school supplementary feeding programme and the learners not in the school supplementary feeding programme constituted the other 51. All the learners were from grade five to grade seven. Of these respondents, 52 were male (51%) and 50 were female (49%) as shown above

4.2.1.2 Grades of learners

The grades of the learners who participated in the study are shown in tables 4.3 and 4.4.

Table 4.3: Grades of learners participating in the school supplementary feeding programme

Grade	Frequency	Percentage
Grade 5	14	27.5%
Grade 6	13	25.5%
Grade 7	24	47%

Total	**51**	**100%**

Table 4.4: Grades of learners not participating in the school supplementary feeding programme

Grade	Frequency	Percentage
Grade 5	14	27.5%
Grade 6	13	25.5%
Grade 7	24	47%
Total	**51**	**100%**

From the 102 questionnaires completed for all the learners in the study, 14 (27.5%) were in grade five, 13 (25.5%) were in grade six and 24 (47.5%) were in grade seven for each group. An equal number of learners for the same particular classes were also drawn from the learners who were not in the school supplementary feeding programme to allow for comparison.

4.2.1.3 Age of learners

The age of the learners who participated in the study are shown below in tables 4.5 and 4.6.

Table 4.5: Age of learners participating in the school feeding programme

Age	Frequency	Percentage
11 Years Old	2	3.9%
12 Years Old	17	23.5%
13 Years Old	23	45.1%
14 Years Old	8	15.7%

15 Years Old	5	9.8%
16 Years Old	1	2%
Total	**51**	**100**

Table 4.6: Age of learners not participating in the school feeding

Age	Frequency	Percentage
11 Years Old	2	3.9%
12 Years Old	17	23.5%
13 Years Old	23	45.1%
14 Years Old	8	15.7%
15 Years Old	5	9.8%
16 Years Old	1	2%
Total	**51**	**100**

The age of the participants ranged from eleven to sixteen years old in both groups. Eleven year-olds represented 3.9% of the participants. The twelve year-olds were 23.5% of the learners while the thirteen year-olds were 45.1% representing the largest age group of the study. The fourteen year-olds were 15.7%; the fifteen year-olds were 9.8% and the 16 year-olds were 2% of the learners who participated in the study.

4.2.2 Food Consumption

4.2.2.1 Meals consumed per day

The learners were asked how many meals they ate per day and the responses are presented below in figure 4.1

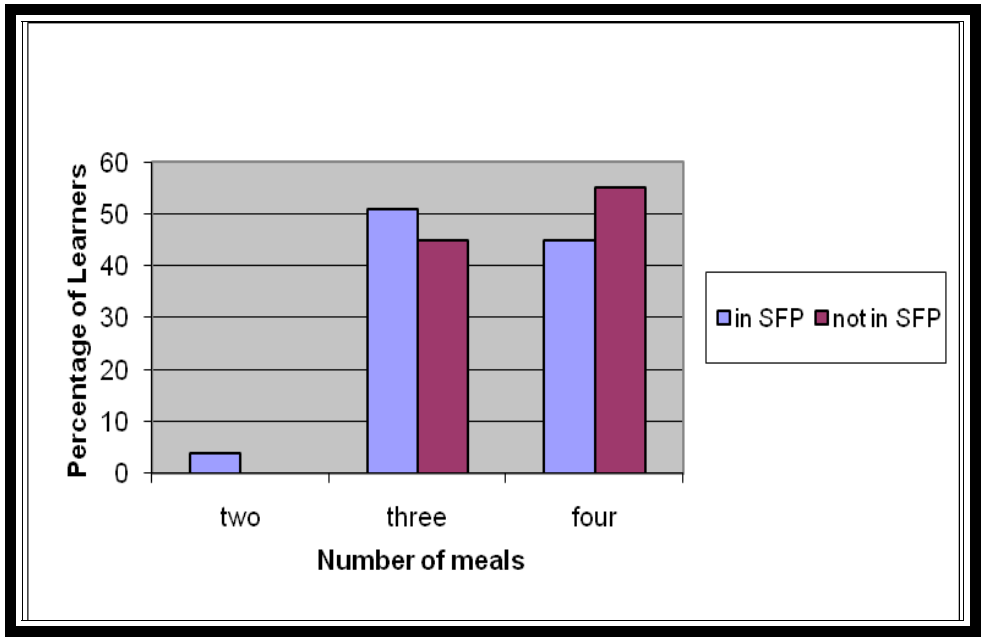


Figure 4.1: Meals consumed per day

Four percent of the learners in the school supplementary feeding programme indicated that they usually have two meals per day including the meals at school, while none of the learners not eating at school indicated that they had two meals a day. Fifty-one percent of the learners in the school supplementary feeding programme said they had three meals per day compared to 45% of those not participating in the programme. Of those not in the school supplementary feeding programme, 55% indicated that they had four meals per day compared to 45% of those participating in the school feeding.

4.2.2.2 Carrying food to school

The learners were asked if they carried food to eat at school and their responses are presented below in figure 4.2

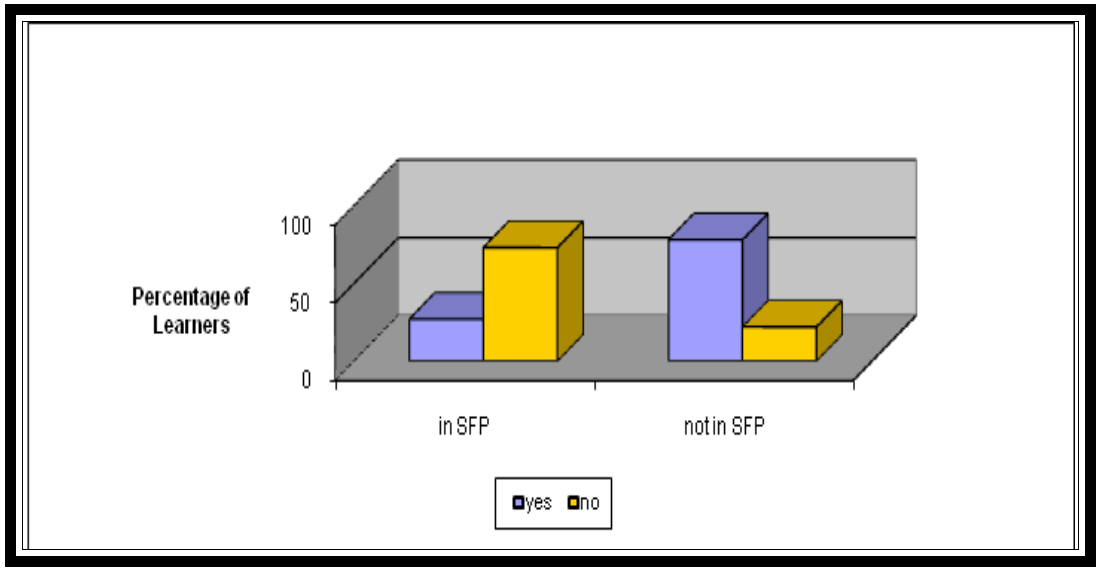


Figure 4.2: Carrying food to school

Only 27% of the learners in the school supplementary feeding programme said they carried food to school while the other 73% did not. In contrast, 78% of the learners who do not participate in the school supplementary feeding programme indicated that they carried food to school while only 22% did not.

4.2.2.3 Food given at school

The learners in the school supplementary feeding programme were asked if they liked the food, they were given at school their responses are presented below in figure 4.3.

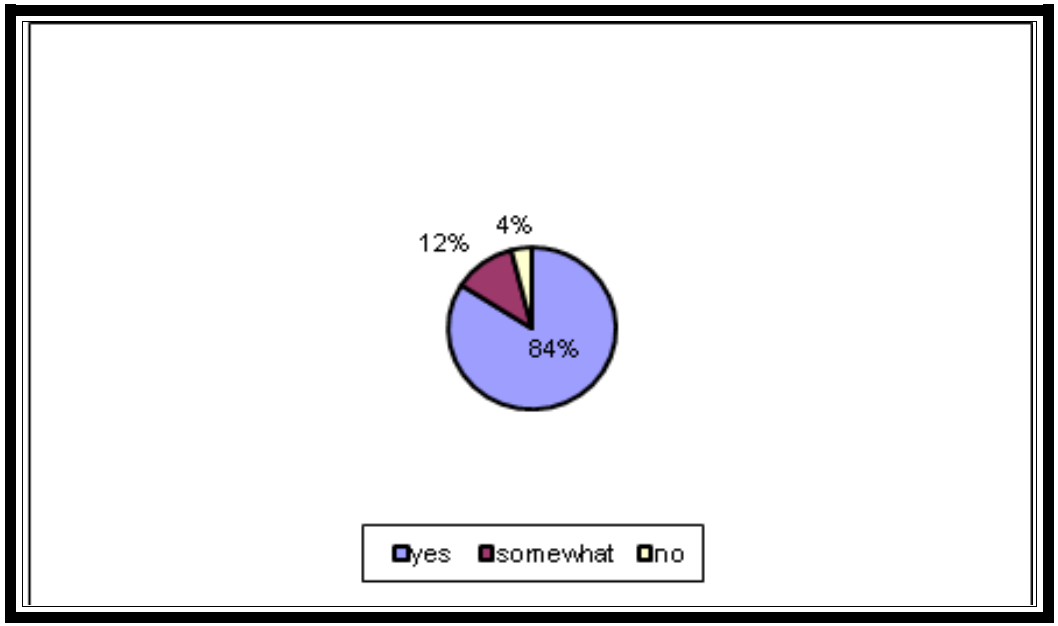


Figure 4.3: Food given at school

This part of the questionnaire was only applicable to learners in the school supplementary feeding programme. Eighty – four percent of the learners indicated that they liked the food they were served at school, while 12% said they somewhat liked the food. Two learners representing 4% of the learners said they did not like the food (n=51). The main reason being that the food served is mainly corn-soy-blend porridge, which is sometimes mixed with soup and spinach. It is the imbalance of the sugar in the porridge and the salt in the soup that causes the learners to dislike the food.

4.2.2.4 Learners who ate vegetables in the previous week

The learners were asked if they had consumed vegetables in the previous week and the responses are presented below in table 4.7

Table 4.7: Learners who ate vegetables in the previous week

	In school Supplementary Feeding programme	**Not on school Supplementary Feeding programme**
Yes	34(66%)	42(82%)
No	17(34%)	8(8%)
Total	**51(100%)**	**51(100%)**

There were 34 (66%) learners who indicated that they had eaten fruits and vegetables in the previous week among the learners in the school supplementary feeding programme. From the learners not participating in the school supplementary feeding programme, 42 (82%) said they had consumed fruits and vegetables in the previous week. The vegetable consumed were carrots, cabbage, potatoes, beans, beetroot, lettuce, onions and tomatoes

The fruits consumed were apples, oranges and bananas while the favourite foods were: Pizza, rice, chicken, fried potato chips, beef, donkey meat, fish, Kentucky Fried Chicken food, Nando's fast foods, pasta and pap.

4.2.3 Nutrition Knowledge

4.2.3.1 Knowledge of nutrients

The learners were asked to list all the nutrients they knew and their responses are shown in the figure below.

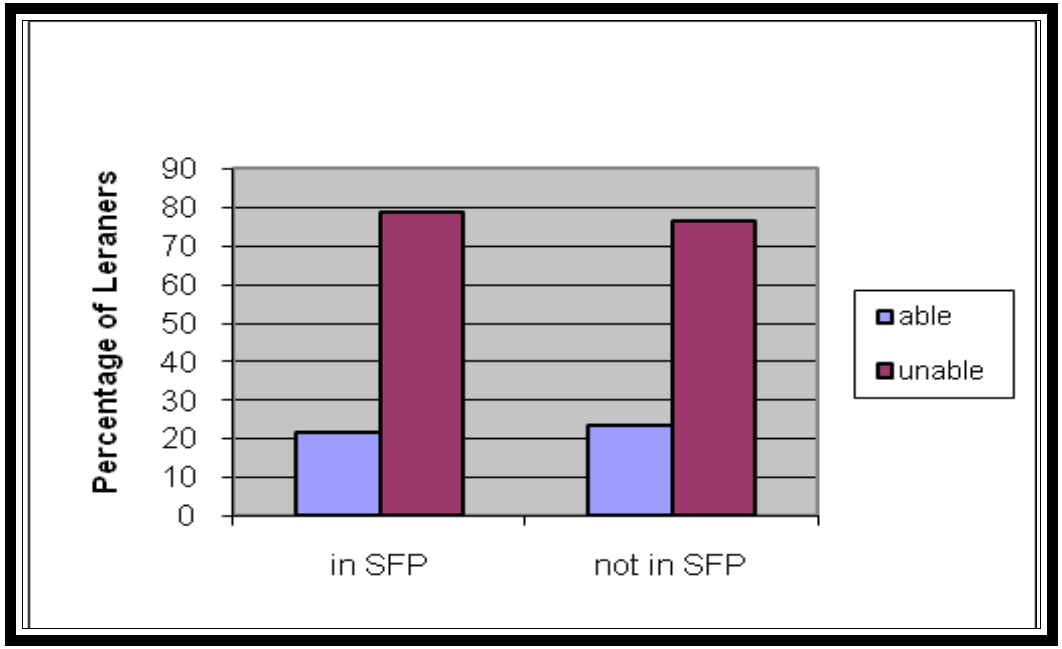


Figure 4.4: Knowledge of nutrients.

There was not much difference in the ability to list at least one nutrient between the two groups. Only 22% of the learners in the school supplementary feeding programme were able to list at least one nutrient while twelve learners, 24%, of those not participating in the feeding programme were able to identify at least one nutrient. The only nutrients known to the learners were proteins, vitamins and energy.

4.2.3.1.1 Knowledge of nutrients by Grade

The responses of the learners on the nutrients they knew according to their grades are show below in figure 4.5.

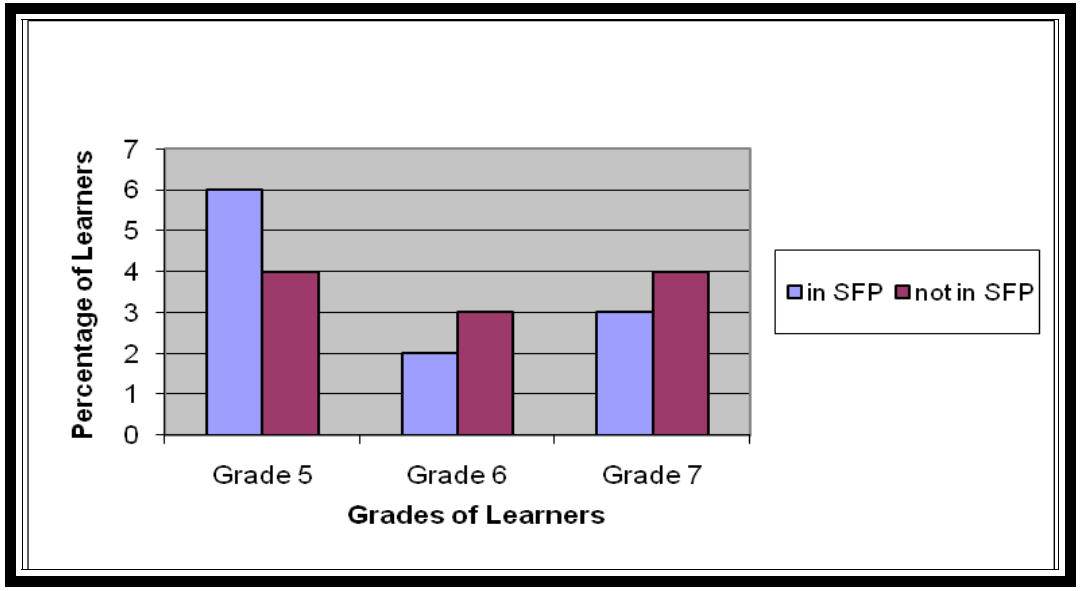


Figure 4.5: Knowledge of nutrients by Grades

More learners in the school supplementary feeding programme in grade five were able to list nutrients they knew than in those in grade 6 and grade seven.

There were more learners not in the SFP in grade 6 and grade 7 who were able to list nutrients they knew than those in SFP.

4.2.3.2 Weight concerns.

The learners were asked if they were worried about their weight and their responses are shown in the figure below.

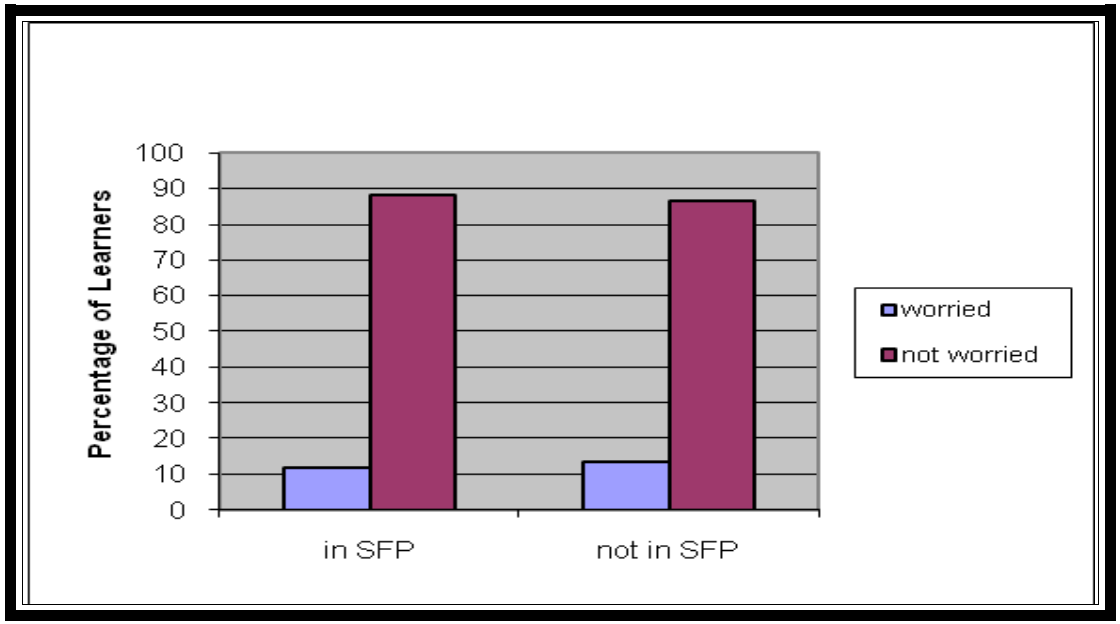


Figure 4.6: Weight concerns.

There was also not much difference noted between learners in the feeding programme and those not participating when it came to concerns about their weight. Eighty nine percent of the learners in the feeding programme indicated that they were not worried about their weight. Almost equal to that was the 88% of the learners not in the feeding programme who also indicated that they were not worried about their weight.

4.2.3.3 Knowledge about balanced diet

The learners were asked if they knew what a balanced diet is and their responses are shown below:

Table 4.8 Knowledge about diet

	In school Supplementary Feeding programme	**Not on school Supplementary Feeding programme**
Knowledgeable	3(5%)	5(10%)
Do not know	48(95%)	46(90%)
Total	**51(100%)**	**51(100%)**

Only six percent of the learners in the feeding programme were able to define or at least describe what a balance diet is. A slightly higher number of learners, 10% of those not participating in the school supplementary feeding programme were also able to define or describe a balanced diet.

4.2.3.4 Importance of a balanced diet

The learners were asked if they knew the importance of a balanced diet is and their responses are shown below:

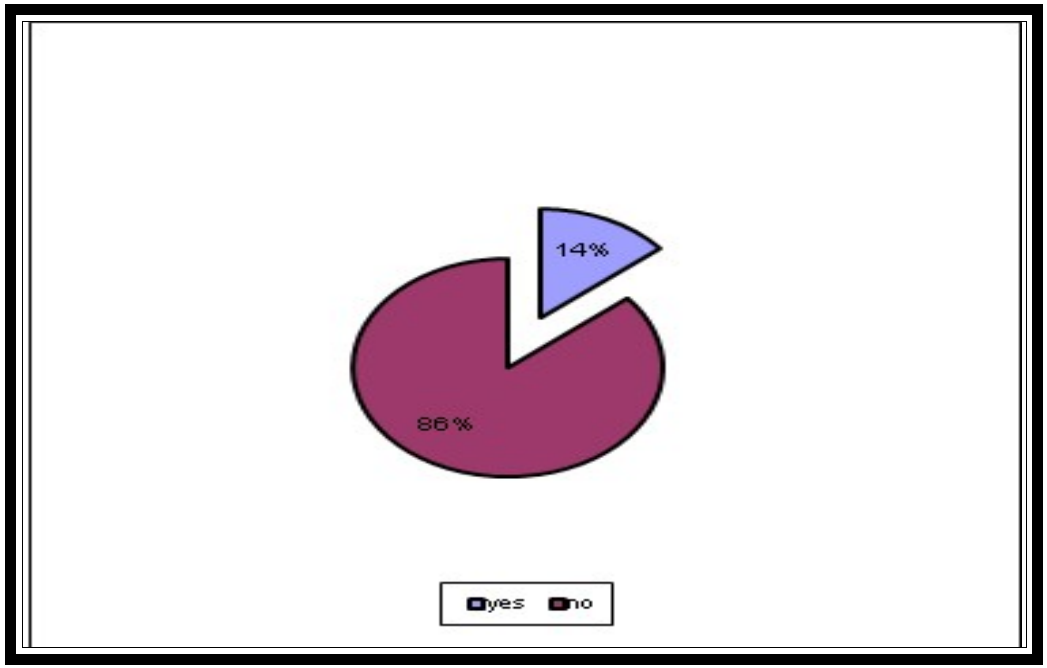


Figure 4.7: Importance of a balanced diet.

Only 14% of all the learners in both feeding and non-feeding groups(n=102) in the study stated that it was important to have a balanced diet, while an overwhelmingly appalling 86% of the learners did not see it as important to have a balanced diet. The results are for both the learners participating in the school supplementary feeding programme and those not participating, as they are all part of the same lessons in class.

4.2.4 Hygiene and sanitation

4.2.4.1 Washing of hands

The learners were asked if they washed their hands before eating. Their responses are shown in the tables below.

Table 4.9: Washing of hands

	In school Supplementary Feed-ing programme	**Not on school Supplementary Feeding programme**
Yes	36 (70.6%)	31(61%)
Sometimes	15(29.4%)	20(39%)
No	0	0
Total	**51**(100%)	**51**(100%)

All the learners indicated that they wash hands either always or sometimes before eating food. For those in the school supplementary feeding programme, fifteen (29.4%) said they sometimes wash their hands before eating while 36 (70.5%) learners not participating in the school supplementary feeding programme said they wash their hands every time before they eat. Twenty (39%) of the learners not in the school supplementary feeding programme indicated that they sometimes wash their hands before eating and the other 61% said they wash their hands all the time before eating.

4.2.4.2 Suffered from diarrhoea in the last two weeks

The learners were asked if they have suffered from diarrhoea in the previous two weeks. Their responses are shown in the table below.

Table 4.10: Suffered from diarrhoea in the last two weeks

	In school Supplementary Feeding programme	**Not on school Supplementary Feeding programme**
Yes	8(15.6%)	2(4%)
No	43(84.4%)	49(96%)
Total	**51**(100%)	**51**(100%)

Eight (15.6%) learners indicated that they had suffered from diarrhoea in the previous three months among the learners in the school supplementary feeding programme. This number represents a four-fold increase in comparison to the two (4%) learners who indicated that they had suffered from diarrhoea in the same period among the learners who were not in the school supplementary feeding programme.

4.2.5 Water intake

The learners were asked how many glasses of water they consumed per day. Their responses are shown in the figure below.

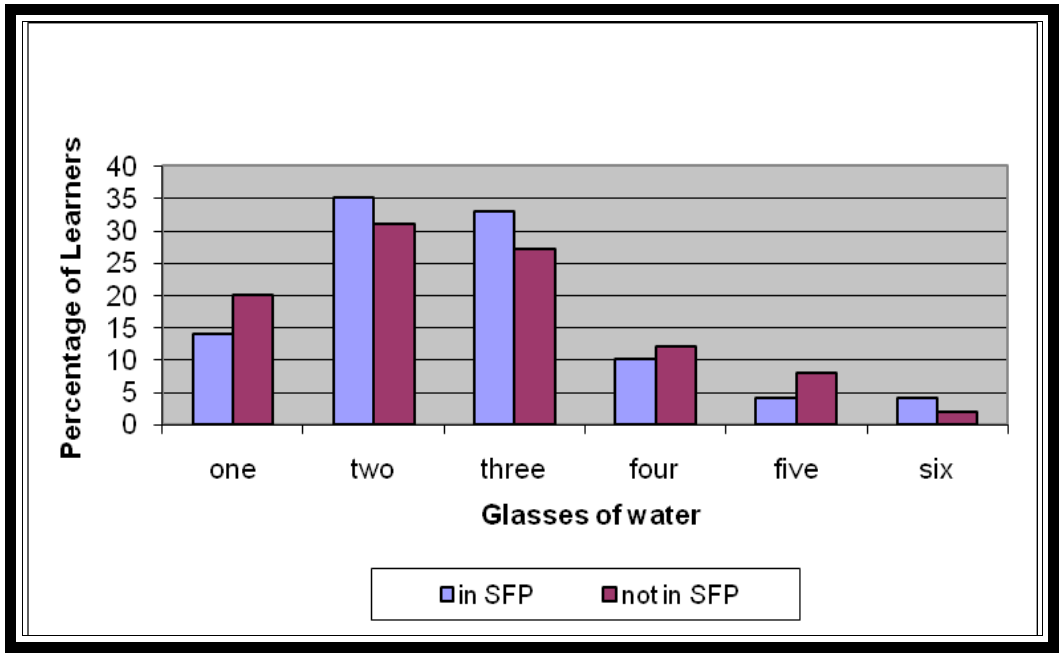


Figure 4.8 Glasses of water per day.

The most common average number of glasses of water consumed per day, were two with 18 (35%) and 16 (31%) of the learners in the feeding programme and those not participating respectively. Only two learners in the school supplementary feeding programme and one learner not taking part in the feeding programme indicated that they consumed six glasses of water daily on average.

4.2.6 Sharing educational information about food.

The learners were asked if they shared the knowledge and information, they would have learnt at school. Their responses are shown in the figure below:

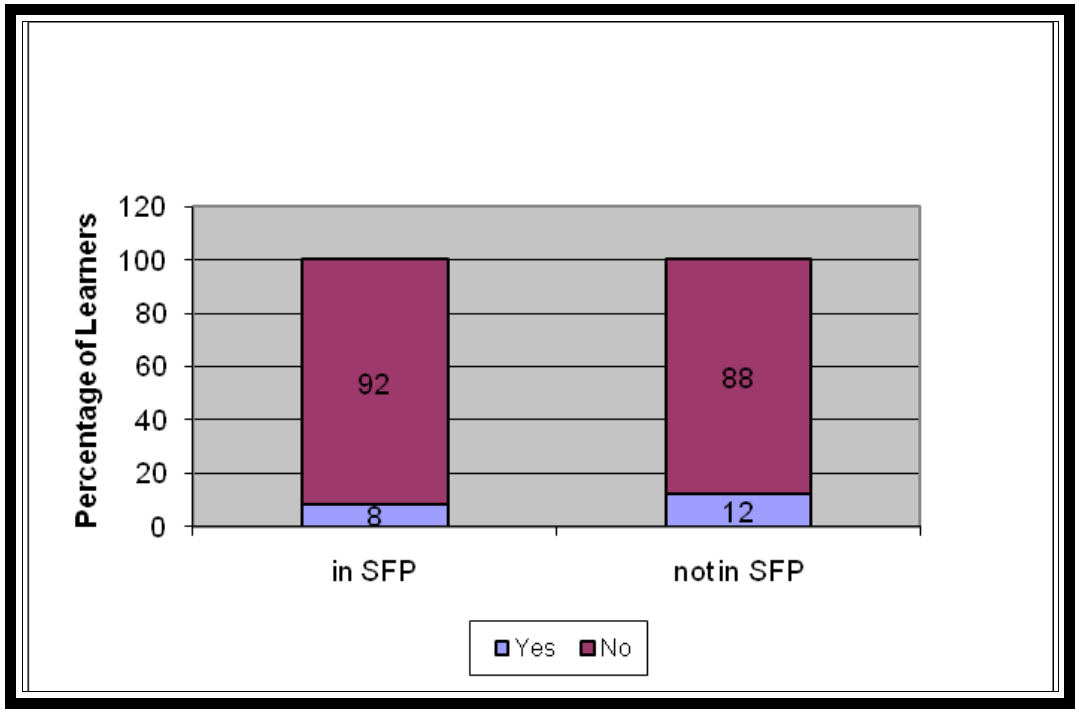


Figure 4.9: Sharing educational information.

Only four (8%) learners from those participating in the school feeding programme indicated that they shared what they have learnt about food in school with people at home. There was no significant difference with the six (12%) of those not in the school supplementary feeding programme, who said they shared the knowledge about food gained in school with other at home. The notable information shared was about hygiene.

4.2.7 Nutritional status

The assessment of nutritional status is based on the rationale that in a well-nourished population, there are statistically predictable distributions of children's height and weight at a given age. The variations in height and weight approximate a normal distribution (Cogill, 2003). To examine differences in the anthropometric status of various populations and subpopulations, a standard reference population is used for comparison. For the purposes of the study, World Health Organization (WHO, 2011) standards were used.

Each of the three indicators for under nutrition is expressed in standard deviations (Z-scores) from the mean of the population. Deviations of the indicators below -1 standard deviation indicate mild malnutrition; below -2 standard deviations (SD) indicate that the children are moderately affected, while deviations below -3 SD indicate that the children are severely thin. The Body Mass Index (BMI) being a simple index of weight-for-height that is commonly used to classify underweight and overweight in adolescents and adults. The WHO z-scores for BMI were used to determine the nutritional status of the learners after taking their age, weight and height measurements (Cogill, 2003).

The learners' heights, weights and age were taken and were used to calculate their Body Mass Indices to get their z-scores. The results are shown in the graphs below:

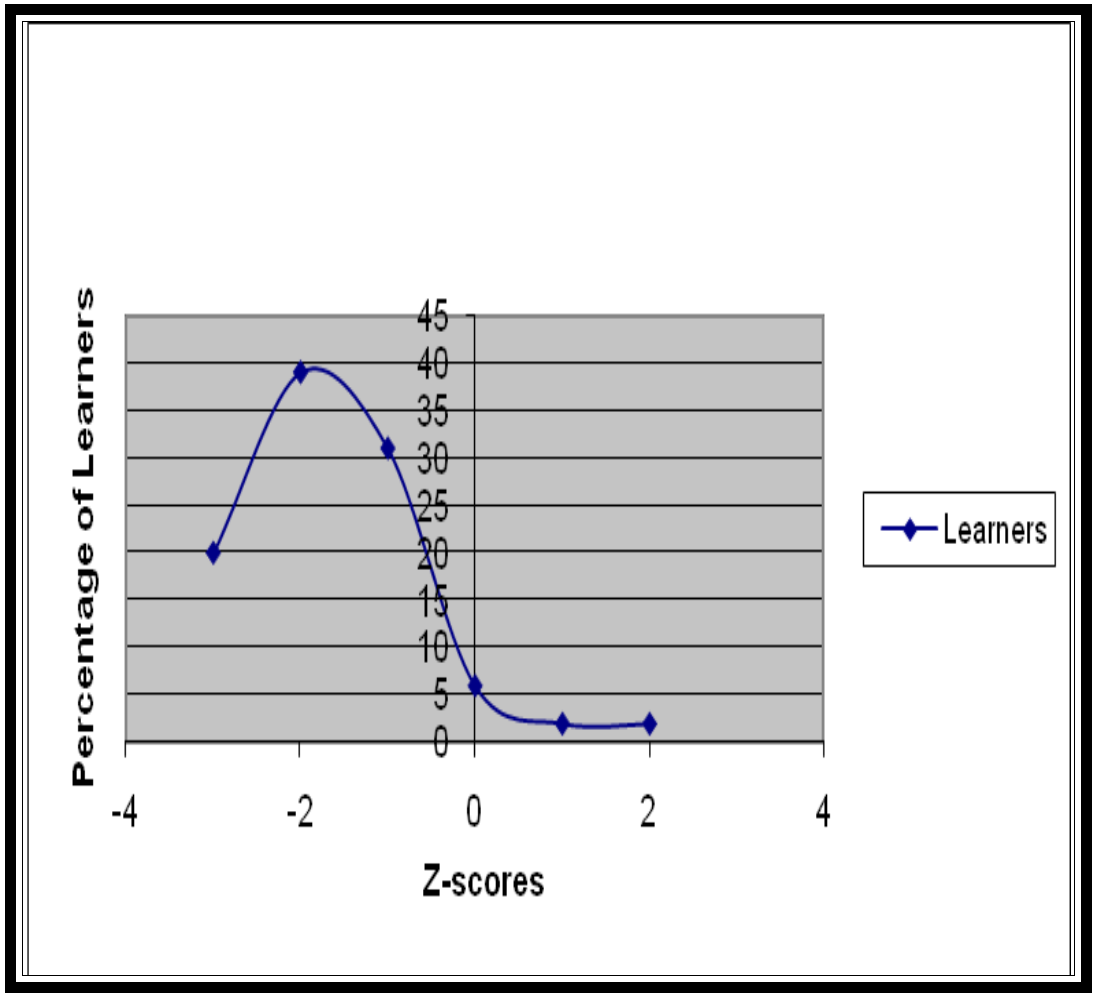


Figure 4.10: BMI for Age distribution for learners in school supplementary feeding programme

Z-SCORE	-3	-2	-1	0	1	2

Percentage Learners	**20**	**39**	**31**	**6**	**2**	**2**

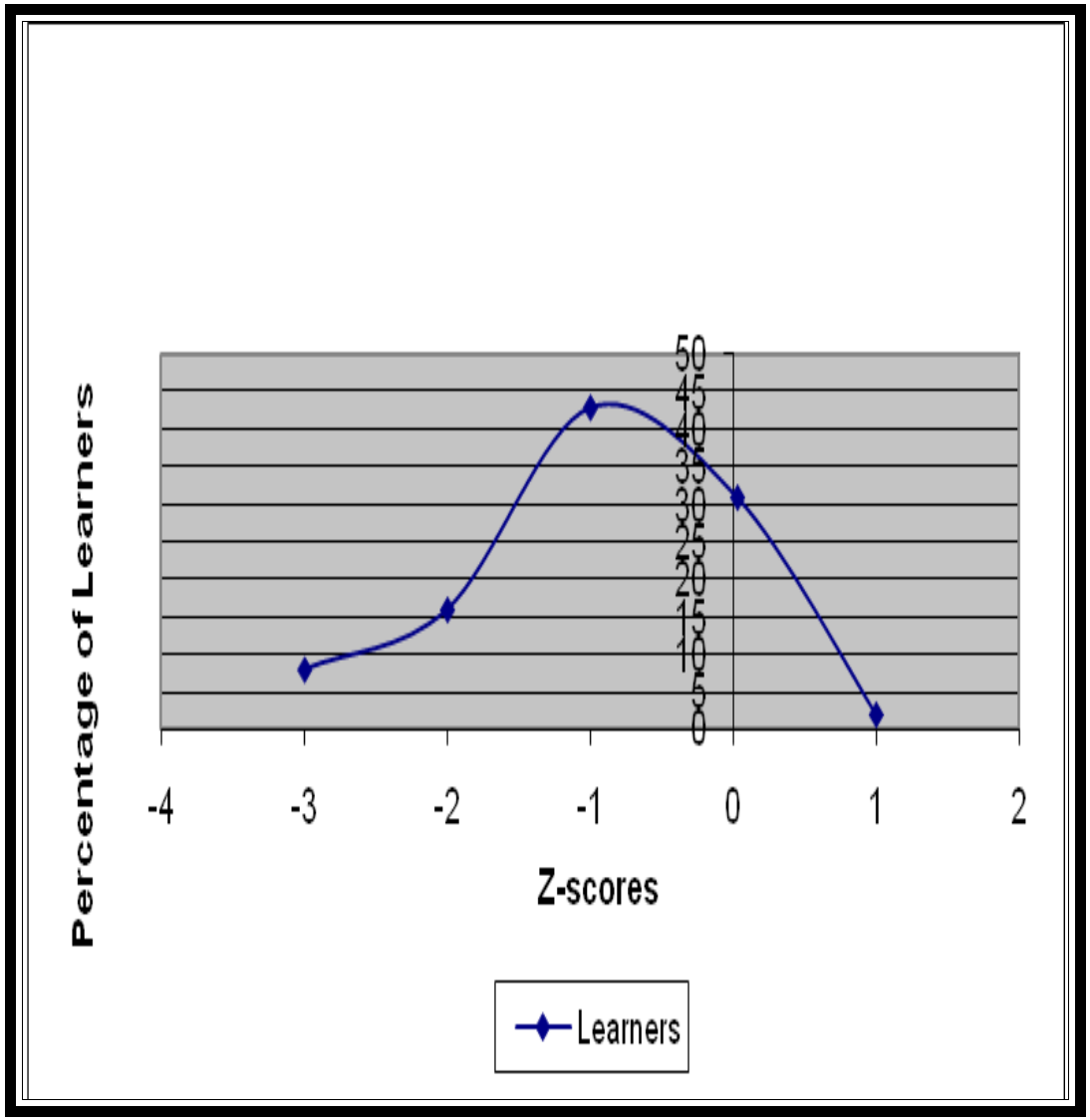


Figure 4.11: BMI for Age distribution for learners not in school supplementary feeding programme.

Z-SCORE	-3	-2	-1	0	1	2
Percentage	8	16	43	31	2	0

Learners						

Ninety percent (90%) of the learners in the school supplementary feeding programme are in different stages of malnutrition. Of these, 31% were mildly thin (-1 standard deviation), 39% were moderately thin (-2 standard deviation) and 20% severely thin (-3 standard deviation). There were only 10% of the learners who were not malnourished with a standard deviation of zero (6%), one (2%) and two (2%).

Of those not participating in the school supplementary feeding programme, 67% of the learners were in different stages of malnutrition. Of these, 43% were mildly thin (-1 standard deviation), 16% were moderately thin (-2 standard deviation) and 8% severely thin (-3 standard deviation). There were 33% of the learners who were not malnourished with a standard deviation of zero (31%) and one (2%).

The graph below shows a comparative graph to illustrate the difference in Body Mass Index (BMI) in both groups of learners.

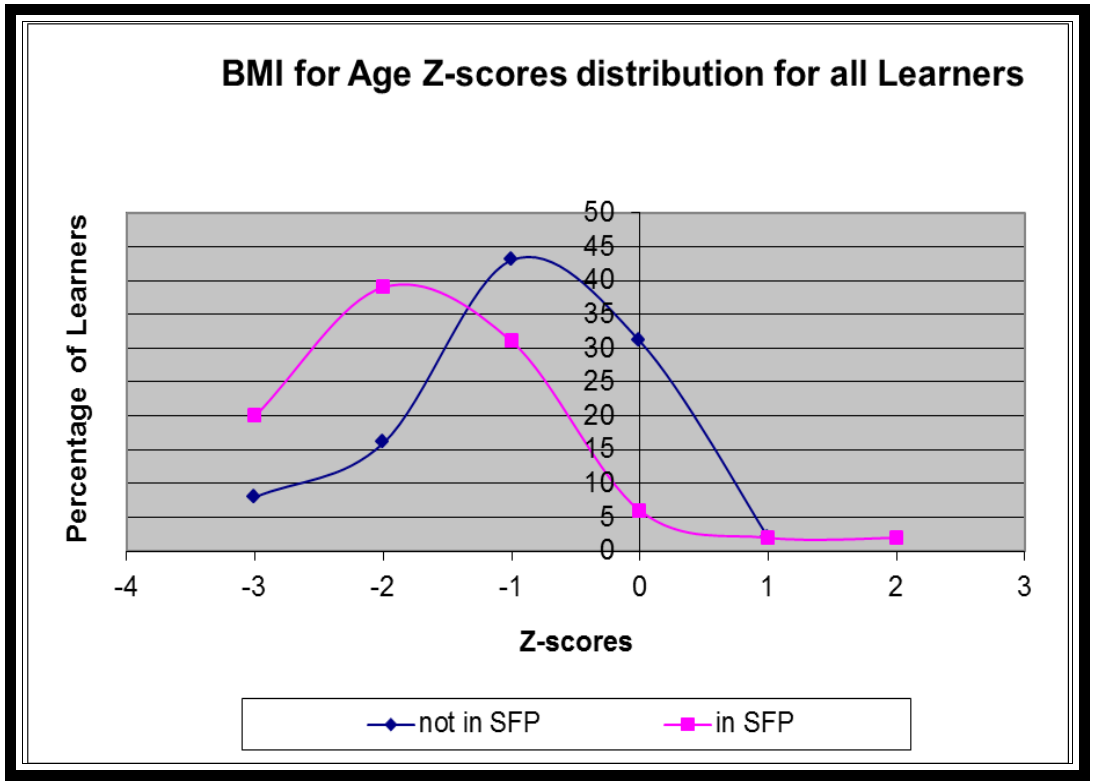


Figure 4.12: BMI for Age distribution for all learners in the study

4.3 Results from the Focus Group Discussion with the parents or guardians

A focus group discussion was held with eight participants, four men and four women. These were parents or guardians of the learners at Havana primary school. The findings of this focus group discussion were grouped into the following themes below:

4.3.1 Awareness of the school supplementary feeding programme

All the participants were aware that there is a school supplementary feeding programme being run by the Ministry of Education at Havana Primary school. They were informed of the programme by the school staff as well as by the learners of the programme. However, one of the participants informed the group that many people who are aware of the existence of the school supplementary feeding programme are those who reside in the areas with schools which have ongoing school supplementary feeding programmes. "*There was a lady who was speaking on a phone in programme on the radio the other day recommending the government to start school feeding programmes! She was later informed by the disc-jockey that such a programme is there, something that surprised her. This goes to show that not enough work has been done to create awareness of the existence of the school feeding,"* the participant said.

The participants agreed that it was not enough that only some segments of the society know about the school supplementary feeding programme, but it is something which the whole nation should know about as it benefits the children who are tomorrow's leaders.

4.3.2 Objectives of the school supplementary feeding programme

In as much as they knew of the existence of the school feeding programme at Havana primary school, none of the parents or guardians in the focus group discussion knew the specific objectives of the school supplementary feeding programme. They understood the main goal of the programme to be that of aiding the well-being to the learners especially the poor and needy ones**.** *"All that we know is that this programme is good because the learners eat more and thereby increase their health status. This enables them to fight diseases and increases attention at school so that they learn better,"* said one of the participants. One participant pointed out that most of what they knew about the goals and objectives of the school supplementary feeding programme they

had derived it themselves. The participant noted that though the programme was good for the society, the ministry ought to do more in informing the public about the specific objectives. The rest of the group agreed as they also felt that not much is being done to educate the public about the programme.

4.3.3 Benefits of the school supplementary feeding programme.

All the participants agreed that the learners will benefit the most from the school supplementary feeding programme. In this aspect, half of the group saw the immediate benefits in improving the health of the learners. These benefits included being able to concentrate in school, increase in enrolment and consistence in class attendance. The respondents also acknowledged that the school supplementary feeding programme was a good initiative but it did not affect school enrolment that much. *"We send our children to school not only because it is their right but also to make them responsible citizens of this country and good future leaders,*" said one man during the group discussion. They suggested that school enrolment and attendance may be increased by the food offered at the schools in the rural areas, possibly because of the higher levels of poverty and lack of food.

Two of the women in the group discussion also noted the long-term benefits of the school supplementary feeding programme. These benefits were "*continuous involvement of the community in the school activities leading to a good synergistic relationship between the school and the community.*" The other benefit noted was "*to mitigate the effects of malnutrition at a tender age so that the learners will grow up to be healthy individuals who will help develop the community and the economy at large.*"

4.3.4 Changes in the learners' knowledge and attitudes resulting as a result of the school supplementary feeding programme

The participants identified the only changes in increased nutritional status as leading to a better health status. This has resulted in increased activity in some learners. There were no changes in attitudes toward eating healthy food which they could attribute to the school supplementary feeding programme. The only improvement noticed by three of the participants was the washing of hands before eating as the positive behavioural changes exhibited by the learners as a result of the school feeding programme.

4.3.5 Effect of the school supplementary feeding programme on household food consumption levels

Some participants outlined that "*if properly implemented the school supplementary feeding programme may play some part in changing the food consumption at the household level.*" At the current level however, all the participants noted that the school supplementary feeding programme has had no tangible effect on the consumption of food in the homes. If anything they think the school supplementary feeding programme can actually help the learners with an added meal for the day since the cost of living including food is continuously going up making it difficult to meet adequately the food needs for the family.

4.3.6 Suggestions for improvement

Generally, all the participants were happy with the school feeding supplementary programme but six of the participants thought there are many problems associated with it. They noted that there have been many cases of late delivery of food supplies. All the participants also noted that, "*there is need for increased communication between the school and the community. This will not only increase awareness of the supplementary feeding programme, but also give a platform to allow the program to run as intended.*" An example given was that there is need to have a good roster for the cooks so that the amount and quality of the food given to the learners is not affected by the cooks turn up.

The participants bemoaned the lack of adequate information regarding the school supplementary feeding programme. They noted that some people are not aware that the Ministry of Education has such a programme running. They attributed the problems in the implementation of the programme to this lack of information.

Some participants suggested that, "*it would be better if the programme was implemented in all the schools in the country so that it helps all the children to have a better future.*" They noted that the current situation whereby some schools and some learners are in the school supplementary feeding programme presence a form of stigma to those eating the food. Though acknowledging the magnitude of the resources required, the participants suggested that the school feeding programme need to cover all the school and all the learners so that they all eat comfortably without stigma.

4.4 Discussion of the results

The school supplementary feeding programme should be efficient and effective to achieve the Millennium Development Goals (MDGs), as set out as part of the Millennium Declaration (Swartz, 2009). By feeding primary school children, they have an incentive to attend and complete their primary school education, and by feeding poorer learners, one enters a process of eradicating extreme poverty (Swartz 2009). It is important therefore that the school supplementary feeding programme in Namibia be carried out efficiently as it contributes to mitigate the effects of hunger and poverty in the long term.

4.4.1 Discussion of the results from the Learners

4.4.1.1 Demographics

The demographics of the learners in this study do not accurately depict the actual situation of the Namibian population with a ratio of 48.5% males to 51.5% females (MOHSS, 2006-7). In this study, there were more males, 26 than females, 25 giving a ration of 50.9% and 49.1% respectively. The reason for this disparity is that only learners in the school supplementary feeding programme from grade five to grade seven at Havana primary school were taken and compared to those not feeding.

4.4.1.2 Food Consumption

The learners at Havana primary school supplementary feeding programme mainly consume porridge, which is sometimes mixed with cooking oil, soup and spinach. This porridge is a blend of maize-meal and ground soya otherwise known as corn-soy-blend. The porridge is vitamin and mineral enriched and contains protein powder, salt, sugar and vegetable fat (MOE 2007). Both macro and micronutrient deficiencies are common among schoolchildren in poor communities (Bundy et al, 2009). Unlike stunting and other consequences of long-term malnutrition, micronutrient deficiencies can be rapidly reversed, lending support for the incorporation of fortified foods or supplements into school supplementary feeding programs. The process of fortification involves the addition of small quantities of vitamins and minerals to foods and condiments that are regularly consumed by a significant proportion of the population. Simply adding micronutrients such as iron, iodine, and vitamin A to commonly eaten foods such as salt, flours, or oils can effectively reduce micronutrient deficiencies. The addition of the soup and spinach to the porridge at Havana Primary School not only increases the palatability of the food but also improves the nutrition quality of the meal.

The school supplementary feeding meal is supposed to provide a third of the learner's daily nutritional needs as per the Namibian School feeding Manual (MoE, 2007). From the study, four percent of the learners in the study who are in the school supplementary feeding programme indicated that they had two meals per day including the meal they had at school. This means that these learners were not consuming food that was meeting their daily nutritional requirements. Fifty-one percent of the learners in school feeding said they had three meals per day including the one supplied at the school, while the remaining forty-five percent indicated that they were having three meals at home and the fourth meal from school.

In contrast to the learners in the school feeding, there were no learners who ate less than three meals per day from the learners who were not participating in the school supplementary feeding programme in this study. Forty-five percent said they had three meals per day while the remaining fifty-five percent said they consumed four meals per day. This could explain why they were not participating in the school supplementary feeding programme though 78% said they carried food to school. Their nutritional status however gave a different picture on the adequacy of the meals they were having in relation to their nutritional requirements.

The learners in school supplementary feeding programme generally liked the food they were given at school with only four percent saying they did not like the food compared to the 84% who liked the food. Only 12% said they somewhat liked the food. The reasons given for not liking the food were due to palatability and taste of the food. The mixing of porridge and soup brought about some imbalance of salt and sugar, which were both added during preparation, reducing the palatability of the food at times.

It was interesting to note the food, which the learners identified as their favourite foods. In a country where meat is consumed in large quantities, it was not surprising to have beef, chicken and donkey meats amongst the favourite dishes. Fast foods such as pizza, fried potato chips, Nando's chicken and Kentucky fried chicken were also identified as favourite foods. It was of great concern to note that none of the learners mentioned fruits, vegetables and dairy products as some of their favourite foods. It is important that the learners be educated on the importance of a balanced diet and eating healthy from a tender age in order to decrease incidences of obesity in future form bad eating habits. These findings were in accordance to Peckenpaugh (2010) that children between the ages of 10-18 years old need to be educated on healthy food choices especially when it comes to fast foods as they are easily attracted to unhealthy foods at that stage.

Only sixty-six percent of the learners in the school supplementary feeding programme said they had consumed fruits and vegetable in the previous week in contrast to eighty-two percent for those not in the school supplementary feeding programme. This may show that the learners not participating in the school supplementary feeding programme ate more food in both quality and quantity as reflected by the number of meals they had and the higher percentage of those who had consumed fruits and vegetables the previous week. Because the study focused on the weekly consumption, it could not be shown how much of their daily allowances the learners were consuming even though Gleason and Suitor, 2000, postulated that research indicates that less than twenty percent of school children eat their recommended fruit and vegetables daily allowances. The importance of cultivating good eating habits from a tender age cannot be over emphasised, as it will help develop responsible citizens as eating habits that contribute to health problems in life tend to be established early in life.

4.4.1.3 Nutrition Knowledge

There is need to re-orient and put more importance in the issues of diet in the school curriculum because very few learners were able to list the nutrients they knew. Only 22% in the feeding programme and 24% of those not feeding were able to list a few nutrients. From these findings, the school supplementary feeding is not helping in improving the learners' knowledge of nutrients. The same trend was also seen in the knowledge of balanced diets and their importance. Only 14% percent of all the learners in the study said it was important to have a balanced diet.

The school supplementary feeding programme is meant to provide an effective medium of imparting health and nutrition education to learners. From the findings of this study, these benefits of the school feeding were not realised to the maximum which might indicate that there may be flaws in the way the programme is being implemented at Havana primary school. This may also be an insight into how the school supplementary feeding programme is being implemented throughout the country.

4.4.1.4 Hygiene and Sanitation

All the learners pointed out that either they washed their hands sometimes or every time they eat food. There were some cases of diarrhoea, 15.4% for those in the feeding programme and 4% for those not in the programme. There are many causes of diarrhoea and the possibility of lack of proper hygiene including consistent washing of hands is one of them. There is need for proper and consistent monitoring of the learners when they wash their hands before they are given their plates of food at school. From the study, it is impossible to identify whether the diarrhoea was caused by the food eaten at school or elsewhere. To eliminate the chances of the school food being the cause of diarrhoea, it is important that good hygiene and sanitary conditions be maintained. This can be done by training teachers and the cooks on hygiene and sanitation. Hygiene and sanitation issues in school feeding are not particular to Namibia. Buhl (2010) noted that some of the school feeding challenges in Ghana included lack of training in hygiene and nutrition for school cooks.

4.4.1.5 Sharing educational information about food

The use of the school environment as a platform to convey information and educate the family as outlined by Tomlinson, 2007, was not evident at Havana primary school. Only 8 and twelve percent of the learners in school supplementary feeding programme and those not in the school supplementary feeding programme respectively said they had shared information and knowledge gained about food with their families. Children often share what they learn with their parents and other relatives. Thus, teaching school children about nutrition should help other people in the community to learn about nutrition (King & Burgess, 1995).

4.4.1.6 Nutritional Status

The Namibian school feeding manual identified the school meal as a means to combat malnutrition that is common among learners where the most common problems are stunting, underweight, iodine deficiency and vitamin A deficiency (MoE, 2007). The manual also stated that the range of malnutrition in the country is from 40% in the north to 25% in the south. In this study, 90 %(n=102) of all the learners were in different levels of thinness. Those participating in the school supplementary feeding programme were more malnourished than those not participating. This could be the reason why they are in the school supplementary feeding programme in the first place or that the programme is not really performing in the way it was planned to. In comparison to Ghana and South Africa, Namibia has higher levels in the rate of stunting, wasting and underweight of 27%, 20%, and 7% respectively among the children under five years of age (MOHSS, 2008).

4.4.2. Discussion of the results from the FGD with parents or guardians

4.4.2.1 Awareness of the school supplementary feeding programme

The results of the focus group discussion show that the community is not fully aware of the school supplementary feeding programme's goals and objectives to the society. This was in contrast to the ministry of education official who indicated that all the school managers are conducting awareness campaigns about the school supplementary feeding programme. The participants of the focus group discussion showed their willingness to learn more about the school supplementary feeding programme such that its implementation is more efficiently to meet the intended goals.

4.4.2.2 Benefits of the school supplementary feeding programme

The school supplementary feeding programme is used to attract poor and hungry children to school and to ensure that they get the nutrition, education, health and other basic services that they need to thrive in different countries across the world. With the assistance of non-governmental organizations and the private sector, feeding programmes could enhance the quality of their assistance and share the challenge of providing it quickly and more efficiently (Buhl, 2010). Educated children tend to have more choices in life when they grow up, they earn more money, marry at a more mature age and have fewer and healthier babies, whereas a hungry child does not grow and cannot learn as well, and faces several risks in the future. There is no better single investment in future development than education. However, schools, textbooks and teachers are not enough if classrooms are empty and children are too hungry to fill them. School supplementary feeding programmes can bring children back into school and out of hunger. At school going age, the fundamental capacity to learn is still being shaped and hunger can prevent them from making the most of their opportunities (WFP, 2004).

A commitment from the community, especially parents or guardians, is imperative. It is important that parents or guardians contribute from the beginning, whether it is with cash or in-kind support. School feeding schemes has had an incredible impact on enrolment rates in primary schools, especially in Mozambique (Buhl, 2010) where parents and the community played an important role in their success and sustainability.

4.4.2.3 Effect on household food consumption

With the increase in the cost of living especially in urban areas, nothing could show that the implementation of the school supplementary feeding programme is resulting in easing the hunger at home significantly. The meals do benefit the learners who are consuming the meals at school only and the families are still struggling to keep up with the ever-increasing food prices. Most of the learners in the school supplementary feeding programme are consuming three meals per day including the meals eaten at school.

4.4.2.4 Suggestions for improvement

From the responses in the focus group discussion, it is clear that the community appreciates the school supplementary feeding programme. There is need to improve the way it is implemented especially with regard to the consistency of food deliveries. This results in disruption in the meals, which the learners get. There is also need to increase awareness of the school supplementary feeding programme so that people may know the precise objectives and so assist in the implementation, monitoring and meeting these objectives. This can assist in the community knowing more about the school supplementary feeding programme. These finding are in line with Visser, 2005 who noted that the lack of training programs for head office officials, regional officials, teachers, cooks and other community members involved in the school supplementary feeding programme is a major factor that may has weakening the entire program. Government readily allocated funds for the purchase of commodities, but does not so readily provide resources specifically for workforce training. This has led to millions of dollars' worth of food aid being lost during the cooking process. New staff members are thrown in at the deep end and everybody expect them to teach themselves from school feeding manuals that are not easily available (Visser, 2005).

4.5 Summary

In this chapter, the researcher presented and discussed the results of the learners' response, which were collected through a questionnaire, as well as the results of the focus group discussion carried out with the parents or guardians of the learners of Havana primary school. The results showed that learners, both participating in the school supplementary feeding programme and those not are generally malnourished. There are also not many changes in knowledge and attitude towards healthy food, which can be attributed to the implementation of the school supplementary feeding at the school. The results also show that the parents or guardians appreciate the presence of the school supplementary feeding programme but do not have knowledge of its specific objectives. Chapter five will give the conclusions made in this study and the recommendation to address the problems identified.

CHAPTER 5

5. LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will present and discuss the limitations encountered in the course of the study, conclusions drawn and recommendations made.

As stated in the introductory chapter, the objectives of this study were:

- Assess the implementation of the school supplementary feeding programme and its extent in helping to ease the malnutrition burden on school learners.

- Determine the extent to which primary school learners are gaining increased knowledge on nutrition due to the school supplementary feeding programme.
- Establish the extent to which the knowledge has resulted in improved practices in food preparation and nutritional status of learners.
- Ascertain the parents or guardians' acceptance of the school supplementary feeding programme.

5.2 Limitations

A major constraint faced by the researcher was the limited resources available resulting in the study subjects coming from one school and one area therefore is impossible to generalize the results. A total number of 102 learners were used for the sample of learners as opposed to the ideal number of 222 calculated for the sample. This was the maximum possible number that could be used as 51 learners participating in the school supplementary feeding programme opted to take part in the study and this number was matched with an equal number of learners not participating in the school supplementary feeding programme.

Data collection for this study was carried out during the period running up to the regional and local government elections period and care was taken to decrease any chances of stimulating any suspicions within the population. This mainly affected the selection of the focus group participants who were chosen conveniently rather than randomly.

There was also the possibility of the learners giving responses to impress the researcher as shown by presence of a number of learners who had suffered from diarrhoea in the previous week while all the learners had indicated that they wash their hands before eating. Median ages were used to calculate BMI data as the exact date of births of the learners were not available.

There is generally lack of literature resources in Namibia about nutrition since there has not been many studies done on the subject. It was a major constraint to get information regarding school feeding since the Ministry of Education is still to conduct studies to assess how the programme has been implemented and how it has influenced the community.

5.3 Conclusions

The conclusions drawn of the study were based on the specific objectives.

Objective 1: Assess how the implementation of the school supplementary feeding programme is helping to ease the malnutrition burden in the school learners.

There have been successes recorded in terms of the expansion of the school supplementary feeding program both at regional (Khomas Region) and at national level. The school supplementary feeding programme has also resulted in increased enrolment levels in primary school in the Khomas region. However, high levels of malnutrition in both learners in the school supplementary feeding programme and those not feeding (figure 4.12) indicate that

there could be widespread malnutrition problem in the community. The disruption of the meals caused by inconsistent delivery of food supplies results in learners going without school meals for some days. With some learners consuming one or two meals only at home and with most learners unable to carry food to school, the implementation of the school supplementary feeding programme does not seem to be doing enough to help ease the malnutrition burden in the community.

From the anthropometric measurements, about 90% (figure 4.10) of all the learners in the school supplementary feeding programme were thin. This shows that they are not eating enough food to meet their nutritional requirements. The hunger burden is therefore still high among the learners in the school supplementary feeding programme.

Objective 2: Determine whether primary school learners are gaining increased knowledge of nutrition because of the school supplementary feeding programme.

The learners generally could not list nutrients, describe a healthy diet or say the importance of having a balanced diet. In as much as the school feeding manual (MoE, 2007) stated that the school supplementary feeding programme is to help learners know more about nutrition in addition to other subjects such as science and geography, the results of this study does not show evidence of this. The results indicate that the school feeding is not aligned with the school curriculum and therefore not helping to increase to nutrition knowledge of the learners. This knowledge can be gained from such subjects as natural sciences and health education and elementary agriculture from the upper primary education curriculum (MoE, 2009).

The parents or guardians also pointed out that they did not see any noticeable change in the learners' behaviours and attitude attributable to the school supplementary feeding programme in their children. The learners did not demonstrate any knowledge of basic nutritional fundamentals.

Objective 3: Establish whether such knowledge has resulted in improved practices in food preparation and nutritional status of learners.

There were more learners from those who are not participating in the school feeding, 65%, who said they washed hands before they eat than those in the school supplementary feeding programme, 42%. There was little knowledge if any which learners have obtained from the school supplementary feeding programme, which can be attributed to any change in improvement in food preparation practices and nutritional status. The learners need to be taught more about eating health and hygiene and this education should be incorporated into the school supplementary feeding programme.

Children often share what they would have learnt at school with their families at home; therefore teaching learners about nutrition helps the people in the community learn about nutrition as well (King, F and Burgess, A, 1995). This way knowledge gained by the learners is also transferred to the community thereby improving eating habits towards healthy foods of both learners and the community.

Since there are more learners who said they was their hands before eating from those not participating in the school supplementary feeding programme than there are in those participating, it shows that the programme is not improving attitudes and practices towards healthy eating.

Objective 4: Ascertain the community's acceptance of the school supplementary feeding programme.

The community accepted the school supplementary feeding programme positively. There is no doubt that the community appreciates the programme though the actual goals and objectives are not known and understood. However, the participants demonstrated lack of awareness of the school supplementary feeding programme. There is poor awareness of the school supplementary feeding programme in the community and this is attributed to less than desirable levels of communication between the Ministry of Education, the school and the parents or guardians. This has resulted in less understanding of the programme which negatively affects the extent to which the community participation.

Proper awareness of the school feeding programme must result in the community participating in regularly preparing food and providing other resources to support the government's (MoE, 2008). When the community is properly involved in the school supplementary feeding programme, the programme acts as a platform for the implementation of other activities which are beneficial to the community such as HIV/AIDS among others (WFP, 2004)

5.4 Recommendations

Based on the results and conclusions drawn in this study, the following recommendations are made to the Ministry of Education, the Ministry of Health and Social Services, Havana Primary School and the community.

5.4.1 Recommendations to the Ministry of Education

The following recommendations could be considered by the MoE:

- The Ministry of Education should embark on a major awareness drive to inform and educate the society about the existence of the school feeding programme and clearly elaborate on the goals and objectives. This can be done by developing mass media programmes that increase school supplementary feeding programme awareness and conducting meetings with the communities.
- The Ministry of Education should also implement proper vigorous monitoring to improve efficiency especially in maintaining consistent and regular supplies of food in the schools. A strong monitoring plan to be developed with the Ministry of Health to ensure that the gains of the school feeding are maintained through regular growth monitoring. This can be done by encouraging regular growth and development monitoring of learners in school supplementary feeding programme in collaboration with MOHSS.
- The Ministry of Education should extend the school feeding programme to all the learners in the schools to avoid stigmatization of the learners who are currently participating in the school supplementary feeding programme.
- The primary school education curriculum could also be improved to provide more nutrition education to the learners.
- There should be more rigorous training on stock management, sanitation and hygiene and nutrition among the teachers and the cooks for better delivery of service and to reduce hunger and diseases.

- Together with individual schools, the Ministry of education and should encourage more community participation in education through Parents and Teachers Associations, school infrastructure improvement projects, income generation projects, and other activities.

5.4.2. Recommendations to the Ministry of Health and Social Services

The following recommendation could be considered by the MoHSS:

- As part of the National Policy for School Health, the Ministry of Health and Social Services' district, Primary Health Care supervisor should conduct regular monitoring visits to asses and provide technical assistance on the school supplementary feeding programme so that better health and nutritional status can be obtained among the learners. The current annual inspections and training could be increased to be done quarterly.

5.4.3. Recommendations to Havana and other Primary Schools

The following recommendations could be considered by the Primary Schools:

- The primary schools have to come up with programmes to teach the learners participating in the school supplementary feeding programme one or two principles about nutrients at daily at a specific time before they receive food. This might be done during a short assembly to educate the learners about the benefits of the food they eat. In conjunction with this, the learners in school supplementary feeding programme can also be taught one positive eating and healthy habit at a time once a week before they receive food.

- The teachers should increase proper and consistent monitoring of the learners' hygiene so that they wash their hands before they are given their plates of food at the school. This can be done by training the teachers and the cooks on hygiene and sanitation.

- Where possible the use of school gardens should be encouraged and collaborate with teachers and communities to assure appropriate use of school gardens as an education tool as well as a source of vegetables or income. This can be done as part of activities to improve the learners' knowledge about health and nutrition.

5.4.4. Recommendation to the schools and the community

The following recommendation could be considered by the Primary Schools:

- The community should participate more in activities that encourage the effective implementation of the school supplementary feeding programme in the schools. These activities include cooking the meals for the learners and providing the firewood.

5.4.5. Recommendations for further research.

The following recommendations could be considered for further studies by MoHSS and MoE:

- The extent of micronutrient deficiencies among the learners in Namibia was beyond the scope of this study, but further research is required in this regard, as this can provide information for better planning and re-orient the study to address such deficiencies.

- The MoHSS, MoE, academic institutions and Non-Governmental organisations should team up to conduct more studies in school feeding programmes in Namibia to find way in which these programmes can be improved to meet the intended objectives.

5.5 Summary

This chapter provided the limitations encountered in the course of the study, the conclusions drawn and the recommendations made based on the results obtained. The school supplementary feeding programme has not shown to improve the learners' knowledge, practices and attitudes on nutrition and nutritional status. However, the parents have an appreciation of the school supplementary feeding programme they do know and understand the programme's objectives. The Ministry of Education needs to implement better strategies to improve awareness and monitoring systems so that the school supplementary feeding programme becomes more efficient.

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Annexures

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Telephone: +264 61 206 3312/ 3237 Fax: +264 61 206 3320 Email: siipinge@unam.na or aamutenya@unam.na

UNAM HIV/AIDS UNIT

OFFICE OF THE FOCAL PERSON

12 April 2010

TO WHOM IT MAY CONCERN

This is to confirm that **Mr Dumisani Sibanda** (STD Number 200938720) is a dully registered student at the University of Namibia doing Masters in Public Health. He is doing his second year. He is busy developing a research proposal and has shown interest in the School Feeding Programmes as applied in Schools in Namibia, as he is a nutritionist by profession.

Kindly assist him to access the information necessary for his project.

For any queries, please do not hesitate to contact me at information on the letterhead.

Thanking you in anticipation

Best regards

UNIVERSITY OF NAMIBIA

Private Bag 13301, 340 Mandume Ndemufayo Avenue, Pionierspark, Windhoek, Namibia

FACULTY OF HEALTH SCIENCES
SCHOOL OF NURSING AND PUBLIC HEALTH
UNIVERSITY OF NAMIBIA

Letter of permission:
Post graduate students

Date: 12 October 2010

Dear Student: D G Sibanda

The post graduate studies committee has approved your research proposal.

An analysis of the implementation of the school supplementary feeding programme in Windhoek

Flat 8 Shawnees Place,
Pioneerspark, Windhoek,
Namibia

13 October 2010

The Regional Director
Khomas Region
Ministry of Education
6th Floor Frans Endongo Gardens
Windhoek, Namibia.

Dear Sir

RE:REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

I hereby request to conduct a research study at a primary school in Katutura within your region.

The study is part of a thesis done in partial fulfillment of the requirements for the Master in Public Health degree with the University of Namibia. This study seeks to anayse the implementation of the school supplementary feeding programme in Windhoek.

I would like to conduct the study at Marti Ahtisaari primary school within the next two weeks before the learners commence their end of year examinations. The study consists of a questionnaire which will be administered to a sample of learners and a focus group discussion with a group of parents of the surrounding community. Height and weight measurements of the sample learners will also be taken.

Please find attached a letter confirming that the research proposal has been approved by

DUMISANI SIBANDA, UNAM M.P.H. Student.
Nutritionist, B. Sc DN (University of Zimbabwe)

Title: An Analysis of the implementation of the school supplementary feeding programme in Windhoek

This study is part of a thesis submitted in partial fulfillment of the requirements for the Master of Public Health (MPH) degree of the University of Namibia.
You are identified as a participant in the study and your cooperation is very much appreciated. Your name will not be written on this questionnaire. All information collected during this study including your personal health information will be kept confidential and will not be shared with anyone outside the study unless required by law. You will not be named in any reports publications or presentations that may come from this study.

NUTRITION KNOWLEDGE AND ATTITUDES

1. Learner's information Sex: M F Age_____ Grade_____
2. How many meals does you have each day? _____
3. Including the meal at school? ( ) Yes( ) No
4. Do you carry any food to school? ( ) Yes ( ) No If yes, what food do you carry to school?
   _____
   _____
5. Do you like the food you get at school? ( ) Yes Somewhat ( ) ( ) No If No why
   _____
   _____

6. What food do you get at school?
   _____
   _____

7. Can you list all the nutrients that you know?
   _____
   _____

8. Are you worried about you weight? ( ) Yes ( ) No Why? _____

9. What is a balanced diet? _____

10. Why is it important to eat a balanced diet?
    _____
    _____

11. Do always wash hands before eating? ( ) Yes Sometimes ( ) ( ) No

12. Have you suffered from diarrhoea in the last three months? ( ) Yes ( ) No

13. How many fruits do you eat each day? _____ Vegetables _____

14. Please list kinds of fruits and vegetables you have eaten in the last week? _____

15. How often do you drink water per day? very often( ), sometimes( ), none( )

16. How many glasses? _____

17. What is your favourite food? _____

18. Are you on a special diet? (example - diabetic, vegetarian) ( ) Yes ( ) No

19. Specify type of diet_____

20. Who recommended it? _____

21. Do you share the information you learn at school about food with people at home? ( ) Yes ( ) No

22. If yes, give examples_____
_____

ANTHROPOMETRY

Weight _____ Height _____

Annexure B

DUMISANI SIBANDA, UNAM M.P.H. Student.
Nutritionist, B. Sc DN (University of Zimbabwe)

Title: An Analysis of the implementation of the school supplementary feeding programme in Windhoek

This study is part of a thesis submitted in partial fulfillment of the requirements for the Master of Public Health (MPH) degree of the University of Namibia. All information collected during this study including your personal health information will be kept confidential and will not be shared with anyone outside the study unless required by law. You will not be named in any reports publications or presentations that may come from this study.

Instrument Title: Discussion Guide: Focus Group: The school supplementary feeding programme in Windhoek

Introduction

This study is intended to elicit and clarify the knowledge, attitudes, and perceptions regarding the implementation of the schools supplementary feeding programme as carried out by the Ministry of Education.

Discussion Guidelines:

I would like the discussion to be informal, so there is no need to wait for us to call on you to respond. In fact, you are encouraged to respond directly to the comments other people make. If you do not understand a question, please let us know. We are here to ask questions, listening, and make sure everyone has a chance to share.

If we seem to be stuck on a topic, we may interrupt you and if you are not saying much, we may call on you directly. If we do this, please do not feel bad about it; it is just our way of making sure we obtain everyone's perspective and opinion is included.

We do ask that we all keep each other's identities, participation and remarks private. We hope you will feel free to speak openly and honestly.

Discussion

1. Are you aware that there is a school supplementary feeding programme being conducted by the Ministry of Education? If so how were they informed?
2. What do you know are the objectives of this programme?
3. Who benefit from this programme according to your knowledge?
4. Are you happy with how the programme is being implemented?
5. Are you aware of any change in the learners' knowledge and attitudes towards eating healthy food as a result of supplementary feeding programme? What changes have you observed?
6. Describe any changes at home in the knowledge and practices in eating healthy food in your children as a result of the school feeding programme.
7. How has the school supplementary feeding programme affected the household food consumption levels?
8. How did the school feeding programme influence the school attendance?"
9. What do they suggest can be changed to improve the programme?

Closing

- Closing remarks
- Thank the participants

BMI-for-age BOYS

5 to 19 years (z-scores) Z-scores (BMI in kg

/ m^2)

Year: Month	MLon th	MSD	-3 SD	-2 SD	-1 SD	Medi an	1 SD	2 SD	3 SD
5: 1	61	-0.7387	15.2641	0.08390	12.1	13.10	14.1	15.13	16.16	18.3	20.2
5: 2	62	-0.76211	15.2616	0.08414	12.1	13.10	14.1	15.13	16.16	18.3	20.2
5: 3	63	-0.78556	15.2604	0.08439	12.1	13.10	14.1	15.13	16.17	18.3	20.2
5: 4	64	-0.80889	15.2605	0.08464	12.1	13.10	14.1	15.13	16.17	18.3	20.3
5: 5	65	-0.83222	15.2619	0.08490	12.1	13.10	14.1	15.13	16.17	18.3	20.3

5: 6	**6**	-	1	0	1	1	1	1	1	1	2
	6	0	5	.	2	3	4	5	6	8	0
		.	.	0	.	.	.	.	.	.	.
		8	2	8	1	0	1	3	7	4	4
		5	6	5							
		5	4	1							
		4	5	6							
5: 7	**6**	-	1	0	1	1	1	1	1	1	2
	7	0	5	.	2	3	4	5	6	8	0
		.	.	0	.	.	.	.	.	.	.
		8	2	8	1	0	1	3	7	4	4
		7	6	5							
		8	8	4							
		5	4	3							
5: 8	**6**	-	1	0	1	1	1	1	1	1	2
	8	0	5	.	2	3	4	5	6	8	0
		.	.	0	.	.	.	.	.	.	.
		9	2	8	1	0	1	3	7	4	5
		0	7	5							
		1	3	7							
		5	7	0							
5: 9	**6**	-	1	0	1	1	1	1	1	1	2
	9	0	5	.	2	3	4	5	6	8	0
		.	.	0	.	.	.	.	.	.	.
		9	2	8	1	0	1	3	7	4	5
		2	8	5							
		4	0	9							
		3	1	7							
5:10	**7**	-	1	0	1	1	1	1	1	1	2
	0	0	5	.	2	3	4	5	6	8	0
		.	.	0	.	.	.	.	.	.	.
		9	2	8	1	0	1	3	7	5	6
		4	8	6							
		7	7	2							
		1	7	5							
5:11	**7**	-	1	0	1	1	1	1	1	1	2
	1	0	5	.	2	3	4	5	6	8	0
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		9	2	8	1	0	1	3	7	5	6
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6: 0	**7**	-	1	0	1	1	1	1	1	1	2
	2	0	5	.	2	3	4	5	6	8	0

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			9	3	8	1	0	1	3	8	5	7
			9	0	6							
			2	6	8							
			1	2	2							
6: 1	**7**	-	1	0	1	1	1	1	1	1	2	
	3	1	5	.	2	3	4	5	6	8	0	
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6: 2	**7**	-	1	0	1	1	1	1	1	1	2	
	4	1	5	.	2	3	4	5	6	8	0	
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		0	3	8	2	1	1	3	8	6	8	
		3	2	7								
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		5	5	1								
6: 3	**7**	-	1	0	1	1	1	1	1	1	2	
	5	1	5	.	2	3	4	5	6	8	0	
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		0	3	8	2	1	1	3	8	6	9	
		5	4	7								
		8	0	7								
		4	8	1								
6: 4	**7**	-	1	0	1	1	1	1	1	1	2	
	6	1	5	.	2	3	4	5	6	8	1	
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		8	5	8								
		0	4	0								
		1	0	2								
6: 5	**7**	-	1	0	1	1	1	1	1	1	2	
	7	1	5	.	2	3	4	5	6	8	1	
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		0	6	8								
		1	7	3								
		7	9	3								
6: 6	**7**	-	1	0	1	1	1	1	1	1	2	
	8	1	5	.	2	3	4	5	6	8	1	
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		2	8	8								

		3	2	6							
		0	5	5							
6: 7	**7**	-	1	0	1	1	1	1	1	1	2
	9	1	5	.	2	3	4	5	6	8	1
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		4	9	8							
		4	7	9							
		1	8	8							
6: 8	**8**	-	1	0	1	1	1	1	1	1	2
	0	1	5	.	2	3	4	5	6	8	1
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		1	4	8	2	1	2	4	9	8	3
		6	1	9							
		4	3	3							
		9	7	1							
6: 9	**8**	-	1	0	1	1	1	1	1	1	2
	1	1	5	.	2	3	4	5	7	8	1
		.	.	0	.	.	.	.	.	.	.
		1	4	8	2	1	2	4	0	9	3
		8	3	9							
		5	0	6							
		6	2	4							
6:10	**8**	-	1	0	1	1	1	1	1	1	2
	2	1	5	.	2	3	4	5	7	8	1
		.	.	0	.	.	.	.	.	.	.
		2	4	8	2	1	2	4	0	9	4
		0	4	9							
		6	7	9							
		0	3	8							
6:11	**8**	-	1	0	1	1	1	1	1	1	2
	3	1	5	.	2	3	4	5	7	9	1
		.	.	0	.	.	.	.	.	.	.
		2	4	9	2	1	2	5	0	0	5
		2	6	0							
		6	5	3							
		1	0	3							
7: 0	**8**	-	1	0	1	1	1	1	1	1	2
	4	1	5	.	2	3	4	5	7	9	1
		.	.	0	.	.	.	.	.	.	.
		2	4	9	3	1	2	5	0	0	6
		4	8	0							
		6	3	6							
		0	2	8							

7: 1	**85**	-1.2656	15.5019	0.09103	12.3	13.2	14.2	15.5	17.1	19.1	21.7
7: 2	**86**	-1.2849	15.5210	0.09139	12.3	13.2	14.2	15.5	17.1	19.1	21.8

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