KNOWLEDGE OF MALNUTRITION AND ITS' PREVENTIVE PRACTICES AMONG PRIMARY SCHOOL TEACHERS IN IDO LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

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CERTIFICATION

I, the undersigned supervisor certify that the project titled, "Knowledge of malnutrition and its' preventive practices among primary school teachers in Ido Local Government Area of Oyo state, Nigeria" was duly carried out by Mary Damilola, Adewolu, and also meets the regulation governing the award of the degree of MSc in Epidemiology of the University of Ibadan. This project was duly supervised and is therefore approved for the contribution to knowledge.

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Signature & Date

DEDICATION

This work is dedicated to the soon coming king, the lord Jesus Christ, who has made it possible for me to attain this level

And

my loving parents, Presiding Elder and Deaconess David A Adewolu.

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LIST OF ABBREVIATIONS AND ACRONYMS

FAO : Food and Agricultural Organisation.

COPHSON : Conference of Primary Schools Headmasters of Nigeria.

Grade II : Teachers Certificate level 2

HND : Higher National Diploma

NCE : Nigerian Certificate in Education

OND : Ordinary National Diploma

UNICEF : United Nation Children Emergency Fund

WHO : World Health Organisation

ABSTRACT

Background: In developing countries such as Nigeria where malnutrition in infant and early childhood is high, its prevention among school children cannot be overemphasized. However, knowledge of malnutrition by teachers who are at the vanguard of the implementation of the school based malnutrition prevention is yet to be well studied.

Objective: The study set out to assess malnutrition knowledge and its preventive practices among primary school teachers in Ido Local Government Area of Ibadan, Oyo state.

Methods: The descriptive cross sectional design was used. Four hundred and twenty six primary school teachers selected by multistage random sampling method from Ido Local Government Area of Oyo State, Nigeria were interviewed using a pre – tested self administered questionnaire. Descriptive statistics such as means, range, proportion were used to summarize data. Chisquare and t - test were used to test for association between categorical and continous variables respectively. Level of significance was set at 5 %.

Results: Mean age of respondents was 36.8 ± 9.34 years. Male to female ratio was 1:1.9. The overall mean knowledge score on the causes, effect, features and prevention of malnutrition was 58.49 out of 78. Two hundred and twenty one (57.1%) of the 387 teachers were graded "Good", 149 (38.5%) "Fair" and 17 (4.4%) "Poor" in overall knowledge score. Two hundred and ninety eight teachers (74.8%) accepted their role as key element in the development of healthy eating habit among pupils. There was no significant association between the overall knowledge score; and sex, years of experience as a teacher, educational qualification and the Body Mass Index except with the type of school (i.e. private or public) which shows a significant difference whereby those in private schools demonstrated a better knowledge than their colleagues in public schools. Books (81.8%), Television (72%) and Radio (63.9%) were the major sources of information on nutrition issues while the least utilized resource was the internet (26.5%). Insufficient instructional time and insufficient fund were the major factors respondents gave as barriers to nutrition and physical education within their school system. Regarding meal policies, 91% of participants in public schools compared to 79.3% of private said policy on assessing the appearance of food provided by food vendors is available in their school (Chi Square = 10.19, $p < 0.05$). Similarly, 91.8% of respondents in public schools as compared to 80.6% in private indicated that their school ensure that varieties of food is provided by food vendor (Chi Square = 10.19, $p < 0.05$).

Conclusions: Percentage of teachers with adequate knowledge on malnutrition issues is low with no significant difference with their socio- demographic characteristics. Education and re – orientation of teachers through seminars, workshop and in–service training education programme is recommended.

CHAPTER ONE

BACKGROUND INFORMATION

1.1 INTRODUCTION

Malnutrition, in different magnitude is found in all nations of the world and its effect on human performance, health and survival had been the subject of research for several decades. Studies show that malnutrition affects physical growth, cognitive development, reproduction, physical work capacity and increase morbidity and mortality. *(Pelletier et al, 2002).*

Malnutrition is a condition that results from an inadequate or excessive intake of nutrients, digestive difficulties, inability of the body to absorb nutrients and other medical conditions. Malnutrition includes both undernutrition and overnutrition. Undernutrition has been a prevailing health care problem among primary school children in the developing world especially in south-east Asia and sub-Saharan Africa. In Sub-Saharan Africa, the number of underweight children increased from 29 million to 37 million between 1990 and 2003*(UN Millenium project, 2005).* In Nigeria, some authors have documented 61.2%, 16.8% and 27.6% prevalence of underweight, wasting and stunting respectively in primary school children *(Onimla et al, 2008).*

Despite the burden of undernutrition in Africa, obesity and overweight (which is as a result of overnutrition), previously a feature of industrialized nation is now prevalent in developing countries. Studies suggest that Africans are gradually departing from traditional dietary pattern of eating whole grains, legumes and green vegetables towards a western diet high in saturated fat, sugar and refined carbohydrate, there by increasing their risk for obesity.

Overweight and obesity are independent risk factors for increased morbidity and mortality throughout the lifecycle. For example, overweight and obesity in women are predictors of gestational diabetes during pregnancy and newborns with excessive birth weight *(Institute of medicine, National Academy of Sciences, 1990).* In parallel with the world wide increases in obesity prevalence, overweight and obesity in children are rising *(WHO 2000).* Because obesity in childhood frequently tracks into adulthood, increases in childhood

overweight and obesity clearly are major contributors to adult obesity epidemic (*Dietz et al, 2001 and Samuel et al, 2008).*

In a study carried out in Nigeria, 1.3% prevalence of obesity was found among school children (*Owa et al, 2008).* Obesity in childhood will not only contribute to adverse health consequences in childhood but also track into adulthood and increase the risk of later development of chronic diseases such as coronary heart disease, high blood pressure, diabetes and some types of cancer *(Reilly et al, 2003)*, therefore to prevent the consequences of malnutrition, preventive effort should start early in childhood.

It has been reported that one of the leading contributory factors of childhood obesity is lack of physical activities. *(DH 2006)*. WHO defines physical activities as bodily movement produced by skeletal muscle that requires energy expenditure. Physical inactivity is a dependent factor for chronic diseases. Promoting healthy eating practices and regular physical activity in young children have been shown to benefit the health of children as well as later in life *(WHO 2003)*, as diet and physical activities are key factors to preventing diseases associated with malnutrition. In order for children to adopt and maintain health enhancing behaviour, they need to have adequate knowledge of nutrition and the necessary skills to be self efficacious to assure the health enhancing behaviour.

According to theoretical frameworks such as the Social Cognitive Theory *(Bandura, 1986)* or Bronfenbrenner's Ecological Model *(Bronfenbrenner, 1979)*, schools are an important environmental influence on the dietary behaviours of children and young adolescents, because, approximately 97% of children and adolescents are enrolled in school, where they spend the majority of their day. The school environment can either encourage or hinder healthy eating. Likewise previous research had indicated that comprehensive, well-implemented school based nutrition interventions, as well as intervention focusing on other health behaviours such as physical activity and tobacco-use prevention, can promote healthy behaviours *(Kandiah et al, 2002; Little, et al, 2002; Must, et al, 1999).*

Since obesity had been reported in some of Nigerian school children, adequate preventive measures which are good dietary practices and the promotion of physical exercise must be put in place to prevent the disease from becoming a menace among this particular population.

It has been recommended that effective nutrition interventions for children and adolescents should have a behavioural focus that will minimize the targeted risk factors, utilize

theoretical framework, consist of changes to the environment and include strategies that are developmentally and culturally appropriate. *(Lytle, 1995)*. However, to achieve the desired behavioural changes related to health and nutrition, it will require attainment of adequate knowledge, attitudes, skills and self-efficacy. *(Concento et al 2005, Wardle 2000 and Verrcken et al 2005)*. In other words, for children and adolescents to adopt and maintain health- enhancing behaviours, they need to have adequate knowledge of the health concern and possess the necessary skills and be self-efficacious to assume the health- enhancing behaviour. In fact, health patterns, including nutrition and physical activity behaviours, are solidified by the time a child reaches grade six (primary 6) making early education in these areas critical to the development of healthy lifestyles behaviours. *(Kandiah and Jones, 2002)*. Health education in school which includes nutrition and physical education, will therefore serve as a preventive measure for malnutrition.

Nutrition education is defined as any set of learning experiences designed to facilitate voluntary adoption of eating and other nutrition related behaviour conducive to health and well being. *(Concento, 1995)*. Nutrition education in primary school programme is aimed at building awareness of the benefit of healthy eating and regular exercise, to induce positive behaviour changes towards healthy food and to increase children's knowledge about healthy eating. *(Sharon et al 1998)*. For school-age children, nutrition education has not only been shown to improve knowledge and skills but also eating and physical activity behaviours as well as health status. *(Belansky et al 2006, Yoon et al 2000)*.

Teachers have the potential to play a significant role in an effort to improve or positively influence students dietary behaviours *(Kubik, et al 2002)*. Teachers can facilitate nutrition education and the development of healthy eating habits by the dissemination of nutrition information through formal interactions and by serving as a role model through informal interactions. And on the contrary, they can transmit unhealthy attitudes and behaviours through both formal and informal interactions with students. School teachers' knowledge of malnutrition and their practice of nutrition and physical education is an essential factor in optimising their role as educators in the society.

Given the salience of teachers as part of the environmental influence on nutrition information and behaviour of children, it is important to examine and understand teachers' knowledge of malnutrition and their preventive practices mainly in form of physical and nutrition education. It is only teachers with precise information on nutrition that can

orientate the children rightly. Thus the primary purpose of this study was to assess knowledge of malnutrition and its preventive practices among primary school teachers. Sources of nutrition information and perceived barriers for teaching nutrition and physical education were also explored.

1.2. Why Malnutrition Prevention Intervention in Schools?

In Nigeria, as elsewhere in Africa and the developing world, schools play a key role in impacting important information on human health. *(James et al 2004).* Education in food and nutrition should start in childhood and continue through life to enable the whole population to enjoy a healthy and disease free life as possible. Looking at the basis of prospering societies, nutrition education particularly in schools can indeed contribute significantly to sustainable development in poor countries *(FAO, UN 2005).*

Investment in people's health and nutritional status is fundamental to improving a countries general welfare, promoting economic growth and reducing poverty *(World Bank 1993).* Among the many pillars that form the basis of a thriving nation, three are particularly important: nutrition, health and education. School based nutrition education if properly done, has an impact on every one of them.

Education is essential for development. It creates choices and opportunities for people. Likewise, without health, a country and its population cannot function properly. Thus, given the important role of nutrition, health and education as described above, intervention that address these factors are not only urgent but also have potential to make a major contribution to a countries overall economic and social development. Nutrition education provides pupils with knowledge, skills and motivation to make wise dietary and lifestyle choices, thus, building a strong basis for a healthy and active life. *(FAO. UN 2005).*

Likewise, regular physical activity is associated with a healthier, longer life and with a lower risk of heart disease, high blood pressure, obesity and some cancers *(Eyre et al 2004).* Current recommendations are for children to engage in at least 60 minutes of physical activity each day. Children spent over half of their day in school, so it is reasonable to require that they should get at least 30 minutes of that time in school. Physical activity provides more than some minutes of moderate vigorous activity; it also teaches students how to integrate exercise into their lives in order to establish a lifetime of healthy living. *(American Heart Association).*

Policy measures and education within specific settings such as schools, workplaces or hospitals are valuable strategies to influence health. School provide the most effective and efficient way to reach a large segment of the population: young people, school staff, families and community members *(Aldinger and Jones, 1998; Dixey et al, 1999).* Schools are natural development zones for nutrition and physical education. They are one of the main social context in which lifestyles are developed. Schools provide an excellent setting for positively influencing children.

Comprehensive school health education goes beyond class room. There are three areas where schools can become involved in nutrition and physical education: 1) direct health services (including nutrition and physical education counselling for students and parents. 2) the school environment (including school meals) and 3) classroom based nutrition education and physical education (PE) *(Jasaitis, 1997 and Reniscow et al 1993).* If sound nutrition education programmes are included in the curriculum, children have opportunities to expand their nutrition knowledge and learn to select healthy food choices at schools and at home. *(Lytle et al 1996).* In addition, education programmes may enable children to grasp the significance of health related problems *(Winter et al, 1999).*

In schools, children can be taught, how to resist unhealthy social pressure since eating is a socially learned behaviour that is influenced by social pressures. Skilled personnel are available in schools to provide follow-up and guidance after appropriate training of students, teachers and other staffs and schools provide opportunity to practice healthy eating and food safety. *(WHO/FAO Education, 1998).* Children develop behaviour through interaction with other pupils, teachers, parents, siblings and peer groups, they are influenced by their homes, communities and schools. Thus, the school is part of a network of influences which shape eating patterns and attitudes.

Likewise, schools can reach most children for a number of years on a regular basis. They reach children at a critical age when eating habit and attitude are being established, they provide opportunities to practice healthy eating and food safety through school feeding programmes and through the sales of food in their premises. Schools can also spread the effect by involving families in their children's nutrition education.

Primary schools are particularly suitable because at this stage, nutrition lessons are simple, interesting, colourful and easily learned through demonstration, illustrations, examples and

practical approaches which are natural to primary education. Likewise, Winter et al *(1999)* have it, that behavioural pattern become more resistant to change after grade six: therefore, nutrition intervention is most successful prior to junior high school years. The optimum time for nutrition education has been identified as between ages of 8 and 12 years of development, when preventive measures such as nutrition education may encourage children to improve their nutritional habit. *(Murphy et al 1995)*.

For primary school children, nutrition education has not only been shown to improve knowledge and skills but also improve eating and physical activity behaviours as well as health status. *(Yoon et al 2000, Stewart et al 2004, Belansky et al 2006)*. It has also been indicated that school environment that promotes healthy food choices for children may protect against weight gain and obesity *(WHO 2003)*.

School based malnutrition prevention intervention has the potential of reaching large population of young people in Nigeria. The National Gross Enrolment rate during the 2005 academic year was 96% in primary schools. This translates to 22 million people in primary schools in Nigeria. *(FME 2005: 21-22)*. Thus effective implementation of malnutrition prevention intervention in schools has the potential of reducing malnutrition among young people and reducing this menace in Nigeria.

1.3 Statement of the Research Problem

In Nigeria, undernutrition continues to be a cause of mortality and consequence of disability in children who survives. Likewise the epidemic of obesity and diet-related non-communicable diseases is emerging in the same country and in the same households where undernutrition is already a serious problem *(World Bank 2006)*.

School teachers could be a useful source of nutrition information for students but they would have to possess adequate and accurate knowledge of nutrition issues. Research consistently show that teachers quality, whether measured by content, knowledge, experience, training or credentials is strongly related to the type of information that will be disseminated to students. *(Darling-Hammond, 1999)*.

In the curriculum for primary school education in Nigeria, nutrition and physical education is not taught as a subject on its own but it is integrated into health education and other subjects. A recent study revealed that adequate knowledge of school health programme is low among Nigerian primary school teachers *(Ofovwe 2007)*.

Also, a recent study carried out to evaluate the knowledge of nutrition among children mostly under school based settings in Nigeria have identified gaps in the knowledge, thus recommending nutrition education as an intervention. *(Eboh et al 2006).*

Since teachers play a key role in the development, implementation and evaluation of school-based initiatives *(Mukoma and Flisher 2004: St. Ledger and Nutribeam 2000; Butriss et al 2004),* health education and promotion in schools have to consider the school organisational structure; barriers and facilitators to adoption; and the time the teachers can give to the programme, thus it is important to acknowledge the knowledge of teachers towards such initiatives. *(Macdonald, 1997).*

Evidence shows that the most effective programmes are those that adopt a "whole school approach" *(Boddy 2000; St. Ledger and Nutbeam 2000a; Lister Sharp et al.1999).* A "whole school approach" is an integrative approach, encompassing a number of areas, including curriculum, the environment, health services, partnerships (between the schools, parents, local community) and school policies. This study therefore seeks to explore teacher's experiences of these areas in relation to nutrition and physical education.

1.4 JUSTIFICATION FOR THE STUDY

Information is vital to enable people have accurate understanding of the causes and preventive strategies for malnutrition; teachers are expected to play a major role in the provision of such information to promote knowledge, leading to nutrition behavioural change among pupils. Teacher's knowledge about malnutrition will influence how they will be able to perform this role. However, the literatures on the evaluation of teachers who are the ones to be at the vanguard of the implementation of these school based intervention are limited. Therefore there is a risk that huge investment in malnutrition prevention intervention in schools might not yield the desired result in Nigeria if the concerns of teachers are not addressed.

This study seeks to assess the knowledge and preventive practices for malnutrition among teachers in Ido Local Government Area of Oyo state. This information is important for understanding messages that may be given by teachers to pupils and for planning the necessary intervention that may be needed by teachers so as to enhance effective implementation of school-based nutrition programme and physical activities.

1.5 GENERAL OBJECTIVE

The purpose of this study is to determine malnutrition knowledge and its preventive practices among primary school teachers in Ido Local Government Area of Ibadan, Oyo state.

1.6 SPECIFIC OBJECTIVES

To:

1. Assess teacher's knowledge on malnutrition and its prevention
2. Determine sources of information on nutrition among primary school teachers
3. Determine the preventive practices for malnutrition in primary schools
4. Identify factors influencing the teaching of nutrition education in primary schools.
5. Identify factors influencing the teaching of physical education in primary schools.

1.7 OPERATIONAL DEFINITION OF KEY TERMS

Key terms used in this study are; Knowledge, nutrition education, physical education, teachers and school. The operational definition of these terms in this study is as follows:

1.7.1 Knowledge

According to Oxford Advanced Learners dictionary *(2000:693)* Knowledge refers to organised body of information on an issue. Knowledge might also be defined as believe which is in agreement with fact *(Betrand 1926 cited in the theory of knowledge)*.

In this study therefore, malnutrition knowledge among teachers included knowledge of types, risk factors, effect and prevention of malnutrition.

1.7.2 Nutrition Education

Nutrition education involves the communication of nutrition-related information that will equip individuals, families and communities to make healthy food choices. *(Encyclopedia)*. It can also be defined as a process of learning that influences the knowledge, beliefs, attitudes and behaviour of an individual or a community and allows them to make more intelligent decisions regarding dietary choices in order to improve health and reduce the risk of developing chronic diet-related disorders, such as obesity, diabetes, heart disease, hypertension and osteoporosis. *(Edelstein)*

1.7.3 Physical Education

This is a course taken during primary or secondary education that encourages psychomotor learning in a play or movement exploration setting. The goal of physical education is to provide students with knowledge, skills, capacities, values and the enthusiasm to maintain a healthy lifestyle into adulthood. *(Physical education [OS])*. While physical activities on the other hand refers to bodily movement produced by skeletal muscle that results in energy expenditure. *(Pate et al 1995)*.

1.7.4 Teachers

According to Oxford advanced learners Dictionary *(2000:1228)* Teachers are persons whose job is teaching in a school. That is teachers give lessons to students in schools, colleges and universities. In this study, teachers refer to male and female persons teaching in primary schools in Ido local Government of Ibadan, Oyo State, Nigeria

1.7.5 Schools

Schools are places where children go to be educated *(Oxford advanced learners Dictionary, 2000:1051)*. In this study, school refers to primary schools owned by public and private sectors in Ido Local Government Area. It excludes schools for special and non formal educational centres.

In summary, the global concern of malnutrition and its impact on children as well as the role of teachers in school based malnutrition prevention intervention has been presented in this chapter. It has been argued that malnutrition knowledge among teachers and its preventive practices in schools is an important determinant in effective prevention of malnutrition in school aged children. Therefore a study of malnutrition knowledge and its preventive practices among teachers is necessary to reduce the occurrence of malnutrition among young people.

The next chapter presents a review of literature on malnutrition knowledge and its preventive practices among teachers. The conceptual framework for this study is also presented.

CHAPTER TWO

LITERATURE REVIEW

2.1 MALNUTRITION

Malnutrition is the insufficient, excessive or imbalanced consumption of nutrients. *(Sullivan, 2003)* A number of nutrition disorders may arise, depending on which nutrients are under or overabundant in the diet. The World Health Organisation cites malnutrition as the gravest single threat to the world's Public health, especially among children who cannot fend for themselves and it is the biggest contributor to child mortality, present in half of all cases. *(WHO; 1998)*. Malnourished children grow up with the worse health and lower intellectual educational achievements. Their own children also tend to be smaller. Malnutrition was previously seen as something that exacerbates the problems of diseases such as measles, pneumonia and diarrhoea. But, malnutrition actually causes diseases as well, and can be fatal on its own.

2.2 Types of Malnutrition

a. Undernutrition

Undernutrition occurs when one or more vital nutrients are not present in the quantity that is needed for the body to develop and function normally. This may be due to insufficient food intake, increase loss, increase demand or a condition or disease that decreases the body's ability to digest and absorb nutrients from available food. While the need for adequate nutrition is constant, the demands of the body will vary, both on a daily or yearly basis. The most basic forms of undernutrition are called protein-energy malnutrition (PEM). It results from a diet lacking in energy and protein because of a deficit in all major macronutrients, such as carbohydrates, fats and proteins. Examples includes; Marasmus- caused by a lack of protein and energy with sufferers appearing skeletally thin and Kwashiorkor- caused by inadequate protein but an average calorie intake.

The second type of undernutrition is called Micronutrient deficiency diseases- resulting from a deficiency of specific micronutrients such as vitamins (e.g Vitamin A and D) and minerals (e.g Iodine and Zinc) which are needed in small quantities to enable healthy body function *(London School of Hygiene and tropical Medicine 2009)*.

b. Overnutrition

Overnutrition is a form of malnutrition in which nutrients are oversupplied relative to the amount required for normal growth, development, and metabolism leading to disorder such as obesity. Overnutrition can be caused by changing metabolism, unbalanced diet, overeating and micronutrient poisoning (excess micronutrient intake*). (Malnutrition Matters; 2008)*

2.3 Prevalence of Malnutrition

2.3.1 Global Trend of Malnutrition

Undernutrition affects more than one-third of the world's children. Data from Disability Adjusted Life Year approach confirmed that undernutrition remains the single leading cause of health loss in the world today *(Anon 2006).*

Undernutrition remains prevalent in developing countries and continues to be a primary cause of poor health *(Sawaya et al 2004, Andy et al; 2005).* In 2005, about 165 million children were stunted in developing countries, 140 million were underweight and 47 million were wasted. *(Standing Committee on Nutrition, 2004).* Child underweight for age accounts for 8.7 % of the total disease burden in people living in low and middle income countries, mainly countries in south-Asia and sub-Saharan Africa. *(Berkly et al, 2005).*

Sub-Saharan Africa which accounts for 56.9 million stunted children has not seen a decline in this number over the last two decades, in contrast to other regions. *(Shekar, 2006).* Malnutrition rate has declined in all regions but in Africa, the decline has not been fast enough to offset the growth in population.

On the other hand, the prevalence of overweight and obesity is increasing at an alarming rate all over the world (WHO, 2006). In 2001, chronic diseases contributed approximately 60% of the 56.5 million total reported deaths in the world *(WHO 2002.)*

According to the centre for human Nutrition, John Hopkins Bloomberg school of Public Health, it has been estimated that one-half of children world wide are overweight or at risk of becoming overweight, and also it has been projected that by 2015, 41% of children and adolescents will be obese *(Epidemiol. Rev.2007).*

It is estimated that by 2010 the number of overweight and obese children across European Union will be set to top 26 million with 6.4 million of them being obese *(International Obesity Taskforce, 1996).* Number of Overweight and obese in Europe is rising by 1.3 million a year *(Schokker et al, 2007).*

In the ten years period from 1985 to 1995, in Australia, there was a high increase in the proportion of children who were either overweight but not obese, or obese *(Magarey et al; 2001)*. Table 2.1 shows the percentage increase of overweight and obesity among Australian children in ten years period.

Table 2.1: Percentage increase of overweight and obesity among Australian children

Gender	Year	Overweight but not obese(%)	Obese (%)	Total Overweight and obese (%)
Boys	1985	9.3	1.4	10.7
	1995	15.3	4.7	20.0
Girls	1985	10.6	1.2	11.8
	1995	16.0	5.5	21.5

Source: Magarey et al. (2001)

From Table 2.1, there is 9.3% increase in overweight and obesity among boys, and 9.7% among girls. This means there is 1% increase of overweight and obesity among Australian children each year.

The 1993 Hong Kong growth survey revealed a striking high prevalence of obesity in children and adolescents especially boys with peak before the growth spurt. It is reported that one out of five boys at 11 years old was obese *(Kai-Ming, 1998)*. Besides, the number of obese children aged between 6 and 8 years was estimated to be above 14000 in Hong Kong *(Kai-ming, 1998)*. At age 7 children had a mean testing serum total cholesterol level of 4.57mmol/l, which was found to be the second highest in the world at the same age *(Kai-ming, 1998)*.

In USA, the proportion of population who are either obese or overweight has reached 50% *(Wang, 2004)*. Gavin (2005) says that since 1970s, the percentage of overweight children and adolescents in USA has been more than doubled. 10% of 2 to 5 years old and more than 15% of 6 to 19 years old children are overweight. Accordingly, if the percentage of children who are overweight is combined with the percentage of those who are at risk, about one third (1/3) of children in USA are affected *(Gavin, 2005)*.

2.3.2 Regional Trends of Malnutrition

In developing countries, malnutrition plays a major role in the death of 1.4 million annual child deaths *(WHO 2002)*.

A study on the methodology for estimating regional and global trends of child malnutrition revealed that during 1990-2000 global stunting and underweight prevalence declined from 34% to 27% respectively. Large declines were achieved in South- eastern Asia, while South-central Asia continued to suffer very high levels of malnutrition. Substantial improvement were also made in Latin America and the Caribbean, whereas in Africa, numbers of stunted and overweight children increased from 40 to 45 and 25 to 31 million respectively. *(Mercedes et al, 2004)*.

Developing countries especially African countries are clearly facing a double burden of diseases *(Doak, 2001)*. This is due to increasing prevalence of overweight and obesity among adults and children simultaneously with high rates of deaths resulting from cardiovascular diseases. These concerns are combined with continued need to address the problem of poverty and malnutrition in the continent *(Doak, 2001)*. The situation is worse in South of Sahara, where there is a triple burdens, which are; the poverty related infectious diseases, violence related injuries and increased lifestyle-related to non-communicable diseases such as diabetes, hypertension and heart problems which are all by-products of overweight and obesity *(Doak, 2001)*.

A study of overweight and obesity in South Africa revealed prevalence of 29.2% among young and adult men, and 56.6% among young and adult women *(Puoane et al., 2002)*. In Cameroon obesity was negligible among rural population (0.5%) for men and (3.0%) for women but considerable in urban areas accounting to 22% *(Sobngwi et al., 2002)*.

2.3.3 National Trend of Malnutrition

The magnitude of malnutrition in Nigeria is alarming and on the increase. Recent studies showed a 42% level of stunting in children. The high prevalence is an indicator of long standing dietary deficiency. *(Adenike, 2005)*. Also, a comparative study of urban and rural Nigerian school children, found that malnutrition (underweight, wasting and stunting) constituted major health problems among school children in Nigeria. *(Onimla et al. 2007)*. This was particular in the rural areas and the authors recommended that prevention of malnutrition should be given a high priority in the implementation of the ongoing primary health care programmes with particular attention paid to the rural population

From the health Index studies conducted here in Nigeria, *Owa and Adejuyigbe (1997)* examined 904 Nigerian children of between 5 and 15 years old; male and female of equal percentage. The body fat mass, body mass index and mid-upper arm circumference were determined and 18% of them were found to be obese. A future medical problem was then foreseen with improved living standard in the country. After sometime, *Ansa et al, (2001)* studied 1005 randomly selected children and adolescents aged 6 and 18 years using profile of body mass index. The prevalence of obesity was found to be 2.3% in 6-12 years, 4.0% in 13-15 years and 3.0% in 16-18 years.

In the same vein, Adeleke *(2005)* in a survey of Nigerian children found the prevalence of childhood obesity to be more among children of the higher socio-economic class. A prevalence of 16% and 20% was found among males and females respectively. A survey of 4 year old children by Williams *(2002)* also revealed 5-10% prevalence of obesity in this age group in Nigeria.

The above figure confirms Muoboghare *(2003)* who indicated that children of all ages are fatter than they are 25 years ago even in a developing country like Nigeria and hence the need to nip it in the bud.

2.4 Causes of Malnutrition among school children

The primary determinants of undernutrition, as conceptualized by several authors relate to unsatisfactory food intake, severe and repeated infections, or a combination of the two *[UNICEF, 1998, Schroeder DG et al; 1994)*. The interactions of these conditions with the nutritional status and overall health of the child - and by extension - of the populations in which the child is raised have been shown in the UNICEF Conceptual framework of child survival (UNICEF 1998). Briefly, the model characterizes the correlates of malnutrition as factors that impair access to food, maternal and child care, and health care. It is these very factors that impact the growth of children. Consequently, the assessment of children's growth is a suitable indicator for investigating the wellbeing of children, and as well as for examining households' access to food, health and care. *(de Onis et al 2003. UNICEF 1998)*.

On the other hand, various studies addressed different causes of overweight and obesity among both adults and children which are physical inactivity as well as nutrition. Other causes were such as medications, inheritances and socioeconomic factors *(O'dea. 2003)*.

2.4.1 Inactivity and Dietary Behaviours

Pangrazi (1995) argued that majority of overweight and obesity among children occur as a consequence of inactivity and overeating. If a person consumes food comprising of more fat and carbohydrates than proteins and vitamins, he/she might become overweight or obese, especially when he/she expends little energy compared to what he/she consumes *(Pangrazi, 1995; Wessel and Macintyre, 1997)*. *Ka-iming (1998)* stated that physical activities, such as walking, cooking, washing etc, should be encouraged at household level instead of using a machine in every action. Physical activities can help in cutting down the excess fat deposit in the body.

2.4.2 Metabolic Factors

Resting Energy Expenditure (REE) accounts for approximately 65%-75% of the Total Energy Expenditure (TEE). REE plays a major role in regulation of energy balance and body composition in humans. Low REE is a significant predictor for subsequent weight gain. Mazengo et al (1997) argued that lower physical activity levels contributed to a lower REE in healthy individuals. If the amount of energy expended in tissue metabolism is lower than the total energy consumed, the body finds a new place to store excess energy *(Rowland, 1990)*.

2.4.3 Genetic, Environmental and Medical Complications

Complex interactions between genes, environment and habits are other causes of overweight as well as obesity among children and adults *(Newbold, 2004)*. Endocrine problems, genetic syndromes and medications are associated with excessive weight gain *(Sharkey, 1997)*. It is hypothesized that *in utero* or newborn, exposure to chemicals such as endocrine disruptors (xenoestrogen bisphenol A), in food and drink containers may damage the body's weight-control mechanisms (*Newbold, 2004*). Also children may inherit fatness from their parents or it can occur as a consequence of glandular problems where endocrine glands secrets hormones that exert considerable influence on metabolism, leading to an increase in sugar *(Bourchard and Stephen, 1990)*. Also restrain from underlying emotional and psychological satisfactions contributes to overweight and obesity among children *(Sharkey, 1997)*.

2.4.4 Socio-Economic Factors

O'dea (2003) argued that family's economic status can help in determining overweight and obesity among children. O'dea (2003) further reported that children from families with good economic backgrounds had higher average weights than those from poor families. According to Gavin (2005), children from economic well off families were becoming obese because after getting home from school, nearly all their free time was spent in front of a screen (such as television and computers) rather than actively playing.

2.5 Health, Social and Economic Implication of malnutrition

2.5.1 Health Implication of undernutrition

Undernutrition is considered to be the underlying cause of more than 50% of all childhood deaths in the world. *(Pelletier et al; 1995)* Undernutrition diminishes the ability of all systems of the body to perform properly, with particularly grave consequences in young children. The relationship between underweight status and ill health, however, is complex because ill health often results in undernutrition and undernutrition increases susceptibility to disease, particularly severe disease. Numerous studies have demonstrated associations between undernutrition and growth retardation, impaired mental development, and increased susceptibility to infectious diseases. *(Tomkins and Watson; 2003)*.

2.5.2 Health Implication of Overweight and Obesity

Overweight and obese children are at risk of serious health conditions such as high cholesterol, insulin resistance, bone problems, joint problems and shortness of breath that make exercise, and physical activity greatly difficult such that they may aggravate the chances of developing asthma *(Johnson, 2002)*. Accordingly, problems of restless or disordered sleep patterns and tendency to mature earlier than usual are common Overweight children may be taller and more sexually mature than their peers.

Overweight girls may have irregular menstrual cycles; fertility problems in adulthood, gall bladder diseases and depression are common - all once considered exclusively adult diseases *(Ekblom, 2005)*. Children are more susceptible to easy fracture due to osteoporosis and too much weight that cannot be sustained by leg bones (*Gavin, 2005*). Accordingly, many people have been suffering from degenerative diseases of weight-bearing joints, such as knees. Such osteoarthritis is a very common complication of overweight and obesity.

Pains in the lower back are also more common in obese people and may be one of the major contributors to obesity-related absenteeism from work as well as schools *(Newbold, 2004)*.

Overweight and obesity entail health risks to the affected individual and the public. Some of the health risks of overweight and obesity include occurrence of chronic diseases *(Johnson, 2002)*. The relationship between obesity level and associated health risks are illustrated in Table 2.2.

Table 2.2: Classification of Body Mass Index (BMI) versus Risk Level

BMI (kg/m^2)	Classification	Risk of comorbidities
Less than 18.5	Underweight	Low (but increases the risk of Other clinical problems)
18.5 to less than 25	Normal weight range	Average (desirable)
25 to less than 30	Overweight	Increased
30 to less than 35	Obese class 1	Moderate Increase
35 to less than 40	Obese class 2	Severe Increase
40 or more	Obese class 3	Very severe Increase

Source: WHO data base (2004)

From Table 2.2, BMI beyond 30 may cause health, social and psychological problems. BMI above 40 is dangerous and requires closer medical attention *(Newbold, 2004)*.

2.5.3 Social Implication of Undernutrition

According to a 2004 University of Southern California study, undernutrition in the first few years of life leads to antisocial and aggressive behaviour throughout childhood and late adolescence. For 14 years, researchers followed the nutritional, behavioural and cognitive development of more than 1,000 children who lived on an island in the Indian Ocean off the coast of Africa. At ages 8, 11 and 17 years, the researchers looked at how the children were behaving in school and at home. At age 8, teachers gave feedback on how the subjects were acting out in school ranging from irritability to picking fight with other children. At age 11, the parents reported that their children were found lying, cheating, bullying others, destroyed properties and used obscene language. At age 17, both teachers and parents reported antisocial behaviour such as stealing, drug use, destroying properties or deliberately cruel to others. Compared to those in the control group (i.e the group that did

not suffer from nutritional deficiencies), undernourished children showed a 41% increase in aggression and delinquency at age 8, a 10% increase in aggression and delinquency at age 11 and a 51% increase in violent and antisocial behaviour at age 17.

2.5.4 Social Implications of Overweight and Obesity

Overweight children are prone to low self-esteem which results from being teased, bullied, or rejected by peers *(Janssen et al ; 2006)*. They are likely to develop unhealthy dieting habits and eating disorders, such as anorexia (eating disorder due to prolonged loss of appetite) and bulimia nervosa (too much eating). They are also prone to depression and substance abuse. Gavin (2005) cautioned that "...obese children have to contend with discrimination from peers..." Of no less importance than health, is the effect that obesity has in psychological and physical appearance of one's body image. Wessel and Macintyre (1997) argued that desires for participation in pleasurable activities such as sport, is influenced by weight. Obese children may be rejected by peers because they are perceived as lazy, dirty, stupid, ugly and cheats *(Janssen et al., 2006)*.

2.5.5. Economic implication of Undernutrition

Undernourishment of the body usually results into physical weakness, lack of stamina for sustained work, lack of initiative, sluggishness and increased susceptibility to diseases which renders such individual to be economically unproductive.

Everyday, national economics suffer significant yet unnecessary losses in productivity due to undernutrition. In countries with the highest number of people living with physical and intellectual impairments, the lost potential for economic growth is staggering. Mothers tending to sick or disabled children lose days of work. Adults living with reduced energy and intelligence are unable to fully contribute to the society. *(WHO Global Report, 2009)*

2.5.6 Economic Implication of Overweight and Obesity

The Health Protection Association (2006) argues that economic costs of overweight and obesity account between 2% and 7% of the total health care costs all over the world. In France, direct costs on obesity-related diseases amounted to 2% of total health expenditure. In Netherlands, the proportion of the country's total expenditure attributable to obesity is around 3-4%. Accordingly, overweight and obesity accounted for 9.1% of total U.S.A

medical expenditures in 1998, and may have reached $78.5 billion or $92.6 billion in 2002 (*Health Protection Association, 2006)*.

2.6 Implication of Malnutrition in children's learning

Undernourished children have been found to have poorer school grades than matched controls. This is so inspite of the children been matched with controls from the same class and school. (*Galler et al;1990)*. Studies also revealed that intelligence of severely malnourished children who are adopted by more affluent families, improves markedly when health care and nutrition are provided continually. *(Colombo et al 1992)*

Likewise, overweight and obesity are said to affect children's psychosocial outcomes, leading to low self-esteem and depression which all together affect other aspects of children's lives, such as academic performance with potentially even more serious adverse social outcomes in the long term *(Swan, 2002)*. Datar et al (2004) reports that lower educational achievements among adults are associated with obesity and obese adolescents consider themselves worse students than normal weight students.

Social and psychological effects of obesity, which result from teasing and bullying, have also been undermining overweight and obese children's ability in academic performance *(Datar et al., 2004)*.

Swan (2002) revealed that teachers had negative impressions over obese children. In due regards, they were paying little attention to overweight and obese children during teaching and learning process. Swan (2002) added that both pre-service and in-service teachers perceived obese children more negatively than average weight children. Rejections from teachers and peers cause majority of overweight and obese children to be underperformers in academic and fail to complete their studies.

2.7 PREVENTIVE PRACTICES FOR MALNUTRITION IN SCHOOLS

Education sectors have a strong potential to make a difference in the fight against malnutrition. They offer an organised and efficient way to reach large number of school aged children- the group most receptive to efforts that seek to influence behaviour. Therefore, school based Malnutrition prevention intervention provides opportunity for preventing malnutrition among children and youth.

2.7.1 NUTRITION EDUCATION IN SCHOOLS

Department of Education for U.S Institute of education sciences conducted a survey on Nutrition education in all its Public elementary and Secondary schools and reported that practically all public schools (99%) offer nutrition education somewhere within the curriculum and many integrate it within the total curriculum (70%). Majority of the schools (61%) have no nutrition education educator, so teachers are responsible for their own lessons. Over 90% of all schools offer nutrition through school meal program. The most common placement of nutrition education is within the health curriculum (84%), but many schools also teach nutrition through science classes (72%), or through health program (68%). *(Healthy people, 2000)*

In the same vein, Phillipa et al *(1997)* reported that teachers believed elementary schools should provide children with food and nutritional instruction but two- third taught this subject only one- quarter of the school year, providing a total of up to 15 hours of classroom instruction.

In a research conducted among primary school teachers in Lagos state, Nigeria, among the respondents, less than one third (31%) have had any formal or informal training on nutrition and a similar proportion (30%) felt confident about teaching nutrition in the class. An overwhelming proportion of respondents taught nutrition was important for their personal life (99%) and the children should be taught this topic at school (98%).

Among the teachers, 36% reported teaching nutrition to their students. The majority of those who taught nutrition to their class did so by integrating this topic into other curricular subjects (53%). Among the teachers who taught nutrition, 11% reported doing so for an hour or less, and only 16% taught nutrition for more than 15 hours per academic year. Whereas, 82 % of teachers who taught nutrition reported using magazines and newspapers, only 34% reported using the school curriculum for preparing their nutrition lessons. *(Bonike et al 2003)*

In South Africa, Charlton et al *(2004)* reported that black women sourced nutrition information from family and friends (54.6 %), health professional (48.5%) among others. The media (television and radio) were indicated by 72.1% and 73.4% of the respondents respectively as important source of information.

2.7.2 Perceived Barriers Toward Teaching Nutrition.

Hyunyi and Michael *(2004)* conducted a survey in USA and the results suggest that successful implementation of quality lunch and nutrition education programs require not only collaborative efforts of school administration and staff but also the support of parents, community and mass media.

In Nigeria, Bonike et al(*2003*) reported in a study conducted on "nutrition education needs" in a primary school in Lagos State that, vast majority of teachers indicated to a "great extent" that lack of time and lack of resources were important barriers to teaching nutrition at school. Fifty percent of the teachers agreed to a "moderate extent" that insufficient time prevented them from teaching nutrition. Likewise majority indicate that lack of administrative support was "not at all" a barrier to improve nutrition education in the class room. Almost all teachers were aware that nutrition is important for children's physical and intellectual development.

2.7.3 Time allotted to nutrition education

An important consideration for those in health education is the contradiction between the time required for sufficient learning and integration of health messages and the time allotted for educational initiatives. *(Olander 2007)*. Successful lifestyle change requires significant time to practice translating health messages into new behaviours, a challenge in the school environment where educators have a limited amount of time to engage individuals in learning activities (*Olander 2007*).

The amount of exposure an individual has to a particular message includes the number of encounters a person has with a particular message, as well as the length of time (duration) they are exposed (*Olander 2007*).

In school health education, children can be exposed to the same message while in the classroom with teachers and peers , while at home with parents or caregivers, while in the community through advertising, special promotions and events.(*Olander 2007*)

A study on nutrition education in schools showed a small, but significant, effect on health outcomes with 12-15 hours of exposure (*Concento, 1995 and Olander, 2007*). Larger, consistent effects on health outcomes were not seen until nutrition education programmes provided between 30-50 hours of exposure (*Concento 1995 and Olander, 2007*). Most often, interventions in the school setting providing 10-15 hours of educational exposure over the course of one to four months resulted only in minimal behaviour change (*Concento 1995 and Olander, 2007*). Current research also reinforces that even though effects on

behaviour change may be small with low-dose exposure, nutrition knowledge acquisition still occurs (*Olander, 2007*).

Research indicates that, the larger the time allocated to educational messages, the greater the changes in outcome measure (*Olander, 2007*).This result are confounded by many variables. First, the amount of education given during an intervention is not always the amount participants receive (*Olander, 2007*). Second, studies of longer duration and higher dosage are often delivered by highly trained personnel (such as nutrition professionals) and are more likely to attract highly motivated participants (*Olander, 2007*). In a school environment, these factors are especially true, as the amount of time necessary to see large scale changes is not possible with rigorous academic demands. In addition, it is almost impossible to guarantee that the education that is delivered will be what is received by the students.

2.7.4 Physical Education (PE) in Schools

Ken Hardman *(2007)* reported in survey carried out on global perspective of physical education in schools that 89% of primary schools world wide had legal requirement for physical education in schools.

The "gap" between official policy and regulations and the actual practice is geographically wide spread and factors responsible for this include; loss of time allocation because time is taken up by other competing prioritized subjects, lower importance of school PE in general, lack of official assessment, financial constraints, inadequate material resources, deficiencies in number of properly qualified personnel and attitude of significant individuals such as head teachers.

The survey also reported that the allocated amount of physical education curriculum time can be determined from policy and/ or curriculum documents but local levels of actual control of curriculum time allocation give rise to variations between schools and, therefore difficult in specifying definitive figures for a country or region. However, generally primary schools across the world allocate an average of 100 minutes to physical education during the school phase year with a range of 30-250 minutes per week.

High proportions of perceived lower status of PE were seen in Africa (80%) and Asia (75%). In Nigeria, it has been reported that PE is considered to be less important than other subjects and is held in low esteem in schools and society *(Salokun 2005)*.

Also availability of facilities and equipment were collectively addressed in the world wide survey and 37% of countries indicated relative dissatisfaction with the quality of facilities

in their primary schools with around a third (37%) deeming the quality of facilities as "adequate". Regionally, the quality of facilities is generally regarded as lower in economically developing regions (Africa, 60% and Asia, 59%).

In a study carried out in Edo state Nigeria, 83.5% of schools engage their pupils in physical education while in school. Among the private schools, 86.5% engage pupils in physical education compared to 72.4% among public schools. *(Ofovwe and Ofili 2007)*

2.7.5 Practice of Components of School health Programme.

The school health programme (SHP) was established to ensure physical, mental and emotional benefit to children while in school. A school Health Programme should include the following eight components: (1) parent and community involvement; (2) healthful school environment; (3) health services; (4) health education; (5) physical education; (6) nutrition services; (7)counselling, psychological and social services; and (8) health promotion for school staff.*(Guide to school health programme and Virginia school health guidelines)*. For the purpose of this study, only school practices on health services, nutrition, and physical education will be reviewed. (nutrition and physical education have been discussed above)

2.7.5.1: Health services

Among head teachers of primary schools in Egor Local Government of Edo state Nigeria, 51% in private schools compared to 27.6% in public schools performed medical inspection of pupils on school entry and from time to time. *(Ofovwe and Ofili 2007)*.

2.7.5.2: Nutrition Services

In a study carried out in Edo state Nigeria, among the schools that participated, 92.5% had school meal policy. However, only 16.5% of the schools undertake medical screening for food handlers/vendors. 20.2% of private schools compared to 3.4% of public schools undertake medical screening for food handlers and vendors. *(Ofovwe and Ofili 2007)*.
Musa and Akande *(2002)* also reported that 76.2% of the food vendors in secondary schools in Ilorin, had medical test done before they were allowed to sell food in their respective schools. Out of this percentage of those who had the initial medical examination done, only 21.3% had ever gone for periodic medical examination.

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In U.S.A, the states Institute of education sciences reported that 93% of all the elementary school offer nutrition education in some way to their pupils through the school meal programme while more than half of the elementary schools reported displaying nutrition information on the cafeteria bulletin board and sponsoring a "school lunch week" where parents eat with pupils and participate in other activities. (*Celesbuski et al ; 2000)*

2.8 Summary

Literature on malnutrition and its prevalence, nutrition and physical education in schools were reviewed in this chapter to provide an insight into the study.

Guided by the findings of the review discussed in this chapter, the research design and methodology for the study of malnutrition knowledge and its preventive practices among Primary school teachers in Ido local government of Oyo state, Nigeria will be described in the next chapter. The study sample and population, the process of data collection and analysis, as well as ethical consideration for the study will also be presented.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter presents the study area, the research design, the study population, the method and procedure for the development of data collection instrument. Data collection exercise including ethical considerations, the measures to control reliability and validity, as well as data analysis procedure were also discussed.

3.2 STUDY AREA

The study was conducted in Ido Local Government Area (LGA) of Oyo state, Nigeria. Ido local government is located in the sub-urban part of Ibadan in Oyo state. Ibadan region covers a total of 3,123.30km^2 out of which the urbanized zone covers about 463.33km^2 and it is made-up of five (5) urban Local Governments of Ibadan North, Ibadan North East, Ibadan North-West, Ibadan South-East and Ibadan South-West and six (6) Sub-urban Local Governments of Akinyele, Egbeda, Ido, Lagelu, Oluyole and Ona-Ara.

Ido LGA is further divided into six (6) zones namely Apata, Akufo, Apete, Idiya, Ido and Omi.

There were seventy five (75) public and fifty nine (59) registered private primary schools in Ido local Govt. Area. There were 714 teachers in the public schools of which 24 were degree holders, 579 posses National Certificate Examination (NCE), 91were Grade II certificate holders while the remaining 11 possed Arabic school certificate.

Majority of Ido LGA inhabitants are farmers and petty traders.

3.3 STUDY DESIGN.

A descriptive cross- sectional design was used.

3.4 STUDY POPULATION

Inclusion criteria

Teachers in public primary and registered private schools during the 2009/2010 school year constituted the study population.

Exclusion Criteria

Teachers in private schools not registered, those in special education schools as well as non- formal education/ literacy centres in Ido Local Government were excluded from the study.

3.5 SAMPLE SIZE DETERMINATION

The ~~sample~~ size for this study was calculated such that the results obtained were within 95% confidence interval. Literature search revealed no previous study documented percentage responses on the knowledge of malnutrition and preventive practices among ~~primary~~ school teachers; therefore 50% was adopted for the study as estimate of teachers that have knowledge of malnutrition and preventive practices.

~~Sample~~ size was estimated using the formula:

$$n = \frac{Z_\alpha^2 [p(1-p)]}{d^2}$$

Where,

n = minimum sample size

p = anticipated population proportion =50%

d = degree of accuracy desired, usually set at 0.05

Z = standard normal deviate= 1.96

$$\text{Therefore, } n = \frac{z_\alpha^2 p(1-p)}{d^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384$$

The calculated sample size was 384.

In anticipation of a response rate of 90%

$$\text{Sample size selected } (n_s) = \frac{n}{0.9}$$

Where, n_s = sample size to be selected

n = original sample size

0.9 =anticipated response rate,

The sample size was increased to 426

3.6 SAMPLING TECHNIQUE

Multistage sampling technique was used in this study.

Stage one: Selection of zones

Three zones (Apete, Apata and Omi) were randomly selected through balloting out of the six zones in the study area.

Stage two: Selection of required number of schools

This was done using probability proportion to size technique

It is to be noted that; there were 75 public and 59 private primary schools in Ido LGA .The three randomly selected zones had 32 public primary schools with a total of 344 teachers as listed in the Universal Basic Education Authority (UBEA) data base during the 2009/2010 academic session. Effort was made to get the data base of private school teachers but such was not available.

Therefore, an average of 11 teachers per school was estimated (344 teachers/32 schools) based on the available public school data.

$$\text{Number of schools required for the study} = \frac{\text{Calculated Sample size}}{\text{Average number of teachers per school}}$$

$$= \frac{426}{11}$$

$$= 38.7 \text{ schools, approximately 39 schools.}$$

Since the total number of schools needed for study was 39, a ratio of 2:1 was allocated between public and private schools respectively based on the total number of schools in the entire LGA (i.e 75 public and 59 private schools). Therefore, at least 26 public and 13 private schools were needed for the study.

Stage three: Selection of schools from the three zones

Sampled schools from each zone were randomly selected using balloting method. This ensured that all schools were chosen in such a way that they had an equal and independent chance of being selected.

***Stage four:* Selection of respondents in each school**

All respondents were studied in schools where the total number of respondents was less than or equal to 11, while respondents were selected through balloting in schools with higher number of teachers.

3.7. QUESTIONNAIRE DESIGN

A new questionnaire was developed for this study using information gathered from the review of relevant literature. The construction of the questionnaire was guided by the research objectives *(Araoye 2003:133)*. The questionnaire was developed only in English

language. Clear, simple wordings were used to minimize the possibility of the questions being misunderstood. *(Anthony. S, 2002:94)*

Closed ended questions were used throughout in the questionnaire. The answer categories were mutually exclusive, and special instructions were provided where necessary for ease of understanding (*Araoye 2003:134)*

Malnutrition knowledge and its preventive practices were explored in the questionnaire. A five scale Likert response type was provided as answer options for each statement.

3.7.1 Content of the Questionnaire

The questionnaire has 4 major sections namely background information, malnutrition knowledge, sources of information on nutrition issues, preventive practices for malnutrition in schools and barriers to nutrition and physical education. Prior to these sections is the preliminary part of the questionnaire which comprised the introduction and instructions.

a. Preliminary part

The introduction provided information about the purpose of the research and assured respondents of the confidentiality of the information provided. The instructions informed the respondents what is expected of them in completing the questionnaire.

b. Section 1: Background Information

This section comprised question items on the bio-data of the respondent as well as the name and location of the school where each respondent teach. This section also sought to ascertain if the respondent teaches subjects containing nutrition and physical education and the years spent in teaching profession.

c. Section 2: Malnutrition Knowledge.

The section comprised questions on the types of malnutrition, causes, effect and prevention of malnutrition. It also explores the knowledge of the respondents on the trends of malnutrition in Nigeria. Some statements were made and participants were requested to agree or disagree with each. If a participant was in doubt, he/ she were requested to choose "undecided".

d. Section 3: Knowledge of symptoms of malnutrition and sources of information on nutrition

It also explores knowledge of the symptoms of undernutrition and overnutrition.

A 78 – point scale was used to assess the general level of knowledge of respondents by assigning 2 points to each correct response. The major sources of information on nutrition issues were also assessed in this section.

f. Section 4: Preventive practices for malnutrition and barriers to nutrition and physical education

This section contains statement on the extent to which nutrition and physical education is taught in the respondent's school, factors serving as barriers to effective nutrition and physical education, the available school policies and measures aimed at preventing malnutrition. The weight and height of respondents were also measured.

3.7.2 Validity and Reliability of the questionnaire

The face validity of the questionnaire lied in the fact that the question items were derived from literature review. In addition, the questionnaire was sent to different subjects for review to ensure the relevance, appropriateness and adequacy of the questionnaire in meetings the objectives of the study.

The research questionnaire was pilot tested among twenty teachers from other schools not included in the study and appropriate modifications were made to ensure easy comprehension by research respondents. Also, using alpha cronbach `s test of SPSS version 15, a reliability co efficiency 0.877 was obtained.

3.8 DATA COLLECTION

The data collection was carried out between October and November 2009 by the researcher and three other research assistants. Training for the research assistant was conducted by the researcher to acquaint them with the content of the questionnaire so as to reduce inter-observer variability. The research assistants were deployed to schools in pairs for the data collection exercise.

3.8.1 Measurement of BMI

The body Mass Index (BMI) was determined through measurement of weight in relation to height. A Salter bathroom scale and a measuring tape were used for measuring each teacher's weight and height respectively. The data were later used in the calculation of BMI, which was calculated as a ratio of weight in kilograms to height in meters squared.

3.9 Ethical Consideration in Data Collection

Approval to conduct the study was obtained from the Ethical review board of the State Ministry of Health (SMOH) in Oyo state, and also permission was taken from the education board of Ido Local Government to access schools included in the study. The letter of approval from the education secretary was presented to the head teachers of selected schools to secure his/ her consent.

The concept of the study was carefully explained to the respondents to ascertain that they thoroughly understand the aim of the study, they were also assured of the confidentiality of their responses and voluntary participatory nature of the study, there after, respondents were instructed to append signature on the instrument to indicate agreement to participate.

3.10.0 DATA MANAGEMENT AND ANALYSIS

Questionnaires were checked after return by respondents for completeness prior to leaving the field. The responses in the completed questionnaire were coded, collated and entered into a data entry template under the supervision of the statistician. Data entry and analysis was done in SPSS 15.0 version.

Descriptive statistics was employed in the analysis. Univariate analysis, which includes frequency distribution of key variables on malnutrition knowledge and its preventive practices in the schools where respondent teaches were presented. Bivariate analysis (cross tabulations) were utilized to describe the research respondents, and to compare malnutrition knowledge among different subgroups of respondents. Specifically, tables were utilized to explore the relationship between (i) Educational qualification and the knowledge of malnutrition (ii) The type of school (i.e. public or private) of respondents and the knowledge of malnutrition, (iii)Body Mass Index and the knowledge of malnutrition (iv) teaching of nutrition education to students and knowledge of malnutrition (v)Type of school and barriers to teaching of nutrition and physical education (vi)Type of school and the time spent in teaching nutrition and physical education to students (vii) Type of school and the presence of policies on school meal programmes (viii)Type of school and availability of some preventive practices for malnutrition as stipulated in the questionnaire.

In cross tabulations for exploring malnutrition knowledge, the variable: educational qualification includes Grade II, NCE, Bachelors and Masters degree and all other qualification such as OND, HND were grouped as other qualification. Likewise, the five likert scale responses for malnutrition knowledge were grouped into three-"Yes" (inclusive

of strongly agree and agree), "No" (inclusive of strongly disagree and diasgree) and "I don't know" for "uncertain "

Anova and students t - test were used as test statistics for comparison between items such as general knowledge score of malnutrition, barriers to nutrition and physical education and the background characteristic of respondents.

CHAPTER FOUR

RESULTS

4.0 INTRODUCTION

Four hundred and twenty six questionnaires were administered during the field exercise. In some instances, the respondents did not return the questionnaire, others did not respond to majority of the question items, ultimately 387 questionnaires were adequately completed given a response rate of 91%.

This chapter presents the results of the study. Results are presented in the form of tables and charts depicting the background characteristics of the respondents and the different concept of malnutrition knowledge, its preventive practices and the source of information on nutrition issues among respondents.

4.1 BACKGROUND CHARACTERISTICS OF RESPONDENTS

The background characteristics of the respondents are presented in Table 1 to 3 and figures 1 to 3.The age of the respondents ranged from 20 to 59 years with a mean age of 36.8 ± 9.34 years. The age distribution indicated that 176 (54.5%) were below 40 years while those aged 40 years and above were 147 (45.5%). Majority, 253 (66.8%) of the participants were females. Christianity (75.2%) topped the list of religion professed by the participants. Others were Islam (23.0%), Traditional religion (0.5%) and a few (1.3%) mentioned other religion. One hundred and fifty (42.7%) of the teachers were teaching junior classes (Nursery, Primary 1 or 2), 96 (27.4%) were teaching middle classes (Primary 3 or 4) and 98 teachers were teaching in the senior classes (Primary 5 or 6). Six head teachers and 1 Arabic teacher who teaches grade 1 through six participated in the study. (Table 1).

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS.

Demographic Characteristics	No	%
Age; (Years)		
20- 29	95	29.4
30-39	81	25.1
40-49	117	36.2
50 years and above	30	9.3
Sex:		
Males	130	33.6
Females	257	66.4
Religion		
Christianity	291	75.2
Islam	89	23.0
Traditional	2	0.5
Others	5	1.3
Class Taught presently		
Nursery,primary 1 or 2	150	42.7
Primary 3 or 4	96	27.4
Primary 5 or 6	98	27.9
Head teachers	6	1.7
All grades (Arabic Lessons)	1	0.3

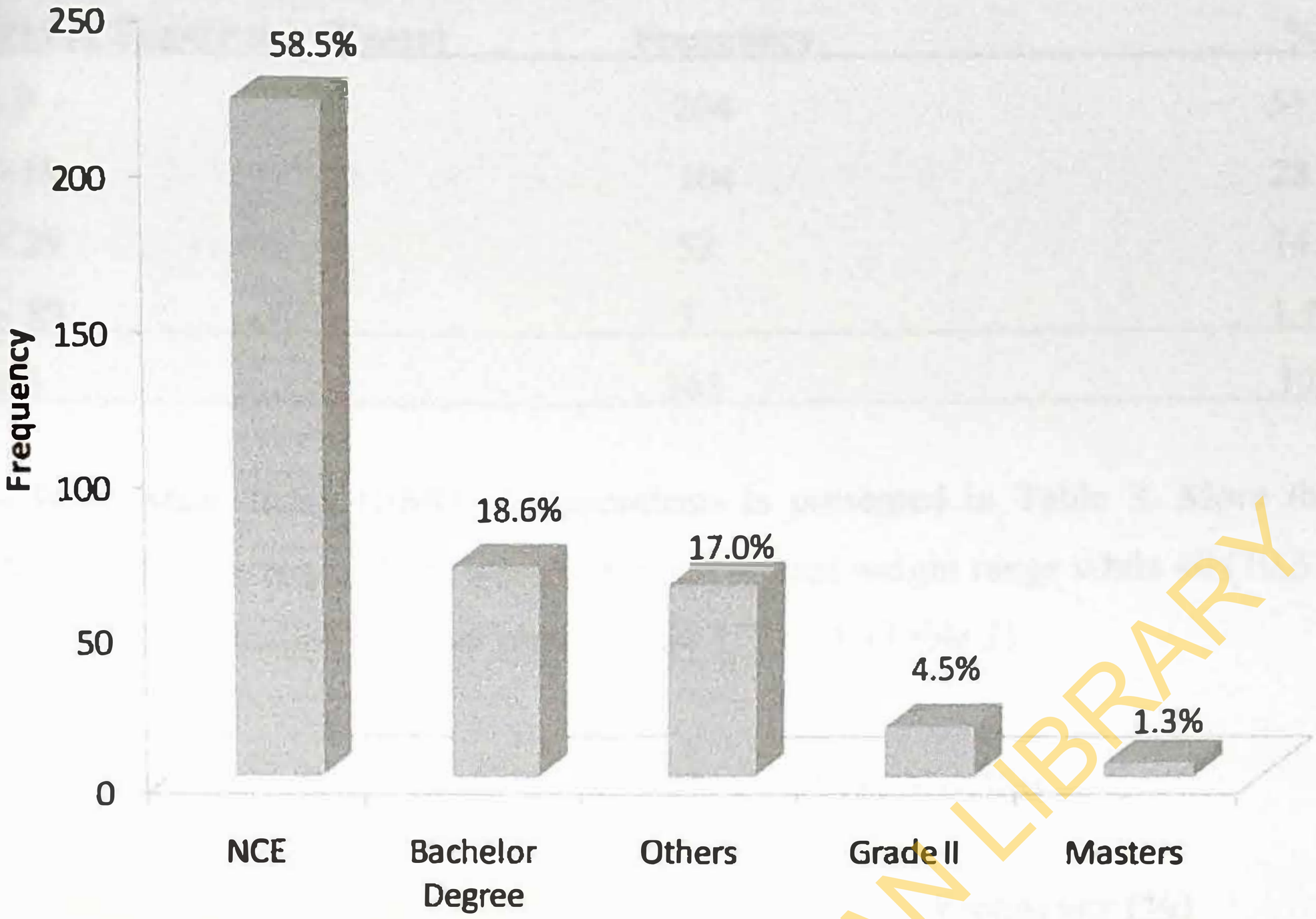

Figure 1: Highest Educational Qualification of Respondents

The educational qualification of the respondents are presented in figure 1.Three hundred and seventy six respondents gave information about their highest educational qualification, out of which 220 (58.5%) held the Nigerian Certificate in Education (NCE). Other respondents had a Bachelors degree 70 (18.6%), Grade II 17(4.5%) and 5 (1.3%) had a masters degree. The remaining 64 (17%) of the respondents had other qualifications which include Ordinary National Diploma (OND), the Higher National Diploma (HND) and Senior School Certificate Examination (SSCE).

At the time of the study, 249 (64.3%) of the respondents were teaching in public school while 138 (35.7%) were in private schools. Three hundred and thirty seven (89.9%) respondents indicated that they taught subjects containing nutrition education while 326 (91.6%) taught subjects containing physical health education.

The duration of the respondents teaching experience ranged from one to 34 years with a mean of 10.14 ± 8.24 years. A majority, 308 (84.4%) of the participants had working experience below 20 years. Details of the participants working experience in years are shown in Table 2.

Table 2; Respondents working experience in years:

Working Experience (Years)	Frequency	%
1 – 9	204	55.9
10 - 19	104	28.5
20 - 29	52	14.2
30 - 39	5	1.4
Total	365	100

The Body Mass Index (BMI) of respondents is presented in Table 3. More than half; 222(58.4%) of the respondents were within the normal weight range while 40 (10.5 %) falls within the classification of either obesity class 1, 2 or 3. (Table 3)

Table 3: Respondents Body Mass Index (BMI) N= 380

BMI (Kg/M^2)	Classification	Frequency (%)
Less than 18.5	Underweight	10 (2.6)
18.5 to less than 25	Normal weight range	222 (58.4)
25 to less than 29.9	Overweight	108 (28.5)
30 to less than 34.9	Obese class 1	25 (6.5)
35 to less than 39.9	Obese class 2	12 (3.2)
40 or more	Obese class 3	3 (0.8)
Total		380 (100)

4.2 KNOWLEDGE OF MALNUTRITION

4.2.1. Causes of malnutrition

Table 4 highlights respondent's level of knowledge about causes of malnutrition

Majority, 302(80.7%) of the respondents stated that "inadequate food Hygiene and childcare can result into malnutrition" and "high consumption of dietary fat, carbohydrate and sweetened drinks can cause obesity" [306 (80.3%)], and 301(79.2%) were aware that "a child can become malnourished if he/she lacks knowledge about food nutrients and right food choices" and "inadequate dietary intake and diseases are immediate causes of malnutrition", 291 (78.9%) (Table 4).

Table 4: Respondents Knowledge of the Causes of Malnutrition

Knowledge Items	Yes n (%)	No n (%)	Don't know n (%)	Total
Inadequate dietary intake and diseases are immediate causes of malnutrition	291(78.9)*	41(11.1)	37(10.0)	369
Frequent infection and diseases in children can result into malnutrition	247(66.8)*	71(19.2)	52(14.1)	370
Inadequate food Hygiene and childcare can result into malnutrition	302(80.7)*	50(13.4)	22(5.9)	374
A child can become malnourished if he/she lacks knowledge about food nutrients and right food choices	301(79.2)*	41(10.8)	38(10.0)	380
High consumption of protein rich food causes kwashiorkor in children	142(38.3)	184(49.6)*	45(12.1)	371
High consumption of dietary fat, carbohydrate and sweetened drinks can cause obesity	306(80.3)*	40(10.5)	35(9.2)	381

* Correct responses

4.2.2. Effect of Malnutrition

Respondents' knowledge of the effect of malnutrition is shown in Table 5. Majority, 338 (87.3%) knew that "malnutrition affects children's brain thereby resulting into low intellectual power" and 311 (80.4%) knew that "adequate nutritional status in children can be responsible for better attendance and high enrolment in school". Two hundred and twenty seven (60.7%) of the respondents knew that "obesity can result into poor attention and poor memory in school children".

Many, 218 (58.0 %) of the respondents disagree with the statement that "malnutrition can cause improved performance in academic work" and 175 (45.2%) stated correctly by

disagreeing with the statement that "malnutrition cannot result into frequent infection (such as malaria, diarrhoea)". (Table 5.)

Table 5: Respondents knowledge of the effect of malnutrition

Statements	Yes n (%)	No n (%)	Don't know n (%)	Total
Children's brain can be affected by malnutrition resulting into low intellectual power	338 (88.7)*	20 (5.2)	23 (6.0)	381
Malnutrition cannot result into frequent infection(such as malaria, diarrhoea)	127 (33.7)	175(46.4)*	75 (19.9)	377
Adequate nutritional status in children can be responsible for better attendance and high enrolment in school	311 (82.5)*	38 (10.1)	28 (7.4)	377
Malnutrition in children can cause improved performance in academic work	111 (12.5)	218(58.0)*	47 (12.5)	376
Obesity can result into poor attention and poor memory in school children	227(60.7)*	91 (24.3)	56 (15.0)	374

* Correct responses

4.2.3. Prevention of malnutrition

Respondents' knowledge relating to how malnutrition can be prevented is shown in Table 6 Most, 348 (93%) of the respondents stated that "school children's participation in physical activities is a way of promoting a healthy lifestyle" while 340 (89%) were aware that "a healthy and adequate diet is important in the prevention of diseases such as pellagra, ricket, obesity and Kwashiorkor". Majority, 312 (82.5%) of the participants were aware that "commitment of the school to promoting healthy food intake in her environment can prevent malnutrition" while 298 (79.5%) knew that teachers are key elements in the development of healthy eating habit among pupils. (Table 6)

Table 6: Respondents knowledge of prevention of malnutrition

Statements	Yes n (%)	No n (%)	Don't know n (%)	Total
A healthy and adequate diet is important in the prevention of diseases such as pellagra, ricket, obesity, Kwashiorkor e.t.c	340 (89.0)*	17 (4.5)	25 (6.5)	382
School children's participation in physical activities is a way of promoting a healthy lifestyle	348 (93.0)*	8 (2.1)	18 (4.8)	374
Teaching Nutrition and physical education at the primary school level can prevent malnutrition in children	311 (74.8)*	0 (0.0)	0 (0.0)	311
Commitment of the school to promoting healthy food intake in her environment can prevent malnutrition	312 (82.5)*	29 (7.7)	37 (9.8)	378
Nutritional habit at maturity depends on nutritional habit in childhood	272 (72.5)*	54 (14.4)	49 (13.1)	375
Teachers are key element in the development of healthy eating habit among pupils	298 (79.5)*	46 (12.3)	31 (8.3)	375
Consumption of food rich in Vitamine A can prevent scuvry (bleeding gum) in children	287(77.2)	34 (9.1)*	51 (13.7)	372
A balanced diet is one that contains high proportion of carbohydrate and fat	186 (49.1)	177(46.7)*	16 (4.2)	379
Whole grains(e.g. rice, maize) represent the best calorie needed by the body	175 (47.4)*	109 (29.5)	85 (23.0)	369
High level of physical activities is an important factor in the prevention of childhood obesity	326 (78.4)*	29 (7.6)	26 (6.8)	381

* Correct responses

4.2.4. *Features of Malnutrition*

Knowledge of respondents on features of under and overnutrition are shown in Tables 7 and 8 respectively.

Table 7: Respondents Knowledge of the features of undernutrition

Symptoms of Undernutrition	Yes n (%)	No n (%)	Don't Know n (%)	Total
Fatigue	311 (85.2)*	31 (8.5)	23(6.3)	365
Poor eye sight	335 (89.1)*	30 (8.0)	11 (2.9)	376
Poor growth	362 (97.1)*	11 (2.9)	0 (0.0)	373
Dry sparse hair that falls out easily	293 (77.1)*	36 (9.5)	51 (13.4)	380
Restlessness	286 (75.9)*	61 (16.2)	30 (8.0)	377
Dry and scaly skin	292 (78.3)*	31 (8.3)	50 (13.4)	373
Decaying teeth	216 (57.4)*	108(28.7)	52 (13.8)	376
Pot belly	43 (12.4)*	305 (87.6)	0 (0.0)	348

* Correct responses

Table 8: Respondents knowledge of the features of overnutrition

Symptoms of overnutrition	Yes n (%)	No n (%)	Don't Know n (%)	Total
Inability to sleep well	323(85.0)*	30 (7.9)	27 (7.1)	380
Bone and joint problems	222(61.0)*	88 (24.2)	54(14.80	364
Increased blood pressure	222(60.2)*	97 (26.3)	50 (13.6)	369
Protruding abdomen	272(73.3)*	35(9.4)	64(17.3)	371
Prominent facial bone	165(45.0)	104(28.3)*	98(26.7)	367
Prominent collar bone	152(42.0)	96 (26.5)*	114931.5)	362

* Correct responses

4.2.5. Trends of Malnutrition

Most 357 (94.2%) of the respondents knew that malnutrition is a problem among Nigerian ~~primary~~ school children and 359 (95.5%) stated correctly that malnutrition can occur in a child ~~that~~ is ~~undernourished.~~ One ~~hundred~~ and fifty one (43%) have the knowledge ~~that~~ ~~malnutrition~~ can also occur in a child that is overnourished while 275 (72.6%) of the respondents know that "it is possible for primary school children to be overweight/ obese". (Table 9)

Table 9: Respondents knowledge of the presence of malnutrition in Primary School children

Statements	Yes n (%)	No n (%)	Don't know n (%)	Total
Malnutrition is a problem among Nigerian primary school children	357 (94.2)*	12 (3.2)	10 (2.6)	379
Malnutrition can occur in a child that is undernourished	359 (95.5)*	7 (1.9)	10 (2.7)	376
Malnutrition can occur in a child that is overnourished	151 (43.3)*	135 (38.5)	65 (18.5)	351
It is possible for primary school children to be overweight or obese	275 (72.6)*	83(21.9)	21(5.5)	379

* Correct responses

4.2.6. Overall Knowledge

The ranges of scores are highlighted in Table 9. Participants mean knowledge score was 58.5± 9.23 points with a range of 20 – 78 points. Over half, 221(57.1%) had scores ranging from 60 – 78 points while a few, 17 (4.4%) had scores which ranged from 20-39 points while the least score obtained by participants was 20 (Table 10).

Table 10: Respondents general knowledge scores: (N= 387)

Range of scores	Frequency	Percentage
Poor (20 – 39)	17	4.4
Fair (40 – 59)	149	38.5
Good (60 – 79)	221	57.1
Total	387	100

4.2.7. Comparison of mean knowledge scores

A comparison of the mean knowledge scores of the respondents by their background characteristics are presented in Tables 11 and 12. The mean knowledge scores of participants with Grade II was (56.1 ± 11.3), NCE (58.1 ± 9.3), Bachelors degree (59.5 ± 9.3), Masters (62.4±5.5) and those with other qualifications (59.5±8.1). A comparative analysis of the mean score by level of education showed no significant difference. (p = 0.378).

The mean knowledge score by sex were compared using the student's t- test where the mean score of the males (59.0±8.7) was found not to be significantly different from that of females- 58.2 ± 9.4 (p = 0.396). (Table 11)

The comparisons of mean knowledge score by type of school shows that the mean scores obtained by participants in public school, (57.8 ± 9.8) was significantly different from that of their colleague in private schools, (59.7 ± 8.02).(P = 0.044) (Table 11).
Participants with 1-9 years of teaching experience had a mean score of 58.86 ± 8.65; those with 30-39 years of working experience had a mean score of 58.0 ±8.89.There was no significant difference between mean scores by years of teaching experience (p = 0.729). (Table 11).

The participants were differentiated into two groups- those who taught nutrition education and those who did not. There was no significant difference between the mean score (58.69 ± 9.24) of those who taught subject containing nutrition and those who did not (58.53 ± 7.50) (p = 0.914). (Table 11).

Participants mean knowledge score compared with their body Mass Index (BMI) shows no significant difference (p = 0.687). (Table 12).

Table 11: Comparison of respondents mean knowledge score by background information.

Background Characteristics		$\bar{X}$	SD	Frequency	Test-statistics and p value
Educational Qualification				n = 376	
	Grade II	56.1	11.33	17	
	NCE	58.1	9.26	220	**f = 1.05; p = 0.378**
	Bachelors	59.5	9.29	70	
Degree		62.4	5.51	5	
	Masters	59.5	8.11	64	
	Others				
Sex		n = 387			**t = 0.849; p = 0.396**
	Male	130	59.1	8.74	
	Female	257	58.2	9.47	
Type of School		n = 387			**t = -2.02; p = 0.044***
	Public	249	57.78	9.78	
	Private	138	59.7	8.03	
Teaching experience (years)		n = 365			**f = 0.434; p =0.729**
	1-9	204	58.86	8.66	
	10-19	104	59.98	8.33	
	20-29	52	57.40	9.71	
	30-39	5	58.00	19.17	

Table 11 continued.

Background characteristics	$\bar{X}$	SD	Frequency	Test statistics and p value
Teaches nutrition education Yes	58.69	9.25	337	t =0.108; p = 0.914
No	58.52	7.51	38	

* significant at 5 % level of confidnece

Table 12: Comparison of mean knowledge scores of respondents by their body mass index

Ranges of BMI	$\bar{X}$	SD	Frequency	Test statistics and p value
Less than 18.5	56.20	11.25	10	
18.5 to < 25	58.61	9.10	222	
25 to < 29.9	58.94	9.01	108	f test = 0.687;
30 to < 34.9	57.64	9.69	25	p = 0.634
35 to < 39.9	56.17	8.51	12	
> 40	65.00	3.00	3	
Total			380	

4.3 SOURCES OF INFORMATION ON NUTRITION ISSUES

Many of the respondents, 311 (81.8%) read about nutrition in books, 273 (72.0%) through television and 100 (26.5%) got their information through the internet, (Table 13). Sources of information on nutrition issues based on educational qualification are presented in Table 13. Among those unit, Grade II certificate holders, 14 (87.5%) read about nutrition in books, 12 (75.0%) heard through television and 11 (68.8%) claimed that they received information on nutrition during their tertiary education. One hundred and seventy two (80.0%) of the NCE holders read about nutrition issues from books while 134 (62.6%)) and 151 (70.2%) got the information from newspapers and television respectively. Majority, 57 (81.4%) of the bachelor degree holders had books as their source on nutrition information, 55 (79.7%) through the television and 39 (56.5%) had the information from newspapers. (Table 13)

Table 13: Sources of information about nutrition issues irrespective of educational qualification, (N= 367)

Sources of information on nutrition issues	n	%
Books	311	81.8
Television	273	72.0
Radio	242	63.9
Newspaper	228	60.3
Tertiary institution education	190	50.1
Workshop/seminar	177	46.9
Friends and Family	168	44.4
Internet	100	26.5

Note: Multiple responses

Table 14: Sources of information based on highest educational qualification

Sources of information about nutrition	GradeII (n=16) n (%)	NCE (n=214) n (%)	Bachelors Degree N=69 n (%)	Masters n=5 n (%)	Others n=53 n (%)
Books	14(87.5)	172(80.0)	57 (81.4)	5(100.0)	54(85.7)
Newspapers	8 (50.0)	134(62.6)	39 (56.5)	4 (80.0)	37(58.7)
Television	12(75.0)	151(70.2)	55(79.7)	3(60.0)	47(74.6)
Friends and family	7 (43.8)	91 (42.3)	32 (47.1)	2(40.0)	31(49.2)
Workshops/Seminar	10(62.5)	107(50.0)	33(48.5)	3 (60.0)	18(28.6)
Tertiary institution education	11(68.8)	101(47.2)	41(58.6)	2(40.0)	29(46.0)
Internet	2(12.5)	56(26.2)	26(38.2)	2(40.0)	13(20.6)
Radio	8(50.0)	141(65.9)	44(62.9)	3(60.0)	40(63.5)

Note: Multiple responses4.4.0 PREVENTIVE PRACTICES FOR MALNUTRITION IN SCHOOLS

4.4.1 NUTRITION EUDCATION

4.4.1.1. Nutrition education materials

A large proportion 281 (77.6%) of the respondents reported that they have nutrition education materials for teaching their pupils.

Those who reported that they have nutrition education materials for teaching their pupils were asked to determine the extent to which some factors (such as status and appropraitness) are true of the nutrition education materials they used. Majority, 103 (90.2%) of participants stated that the materials were appropriate for age only to a moderate extent while 121 (52.7%) responded that the materials were appropriate for age only to a "small extent" (Table 15)

Table 15: Participants responses on status of nutrition education materials used for pupils

Status of nutrition education materials	Not at all n (%)	Small Extent n (%)	Moderate extent n (%)	Great extent n (%)	Total
Materials are up to date	28 (10.1)	137 (48.8)	76 (27.0)	36 (13.0)	227
The materials are age appropriate	24 (8.7)	121 (52.7)	103 (90.2)	27 (9.8)	275
Pupils find materials appealing	22 (8.2)	94 (33.5)	106 (39.4)	47 (17.5)	269
There are enough materials for all the pupils to use	72 (26.9)	117(43.7)	60 (22.4)	19 (7.1)	268

4.4.1.2. Integration of nutrition education into subjects

Table 16 presents participants responses on the extent to which they integrate lessons about nutrition into some subject areas. More than a quarter 92 (26.4%) of the respondents indicated that they integrate lessons about nutrition into health and physical education at a "great extent" while 130 (42.6%) and 105(34.7%) indicated that they integrate nutrition lessons into home economics and agric science respectively to a "great extent". (Table 16).

Table 16: Responses on the extent to which participants integrate lessons about nutrition into some subject areas.

Subjects	Not at all n (%)	Small extent n (%)	Moderate extent n (%)	Great extent n (%)	Total
Health/physical education	13(3.7)	85(24.4)	159 (45.6)	92 (26.4)	349
Social studies	24 (7.7)	69 (22.1)	127 (40.7)	92 (29.5)	312
Home Economics	14 (4.6)	45 (14.8)	116 (38.0)	130(42.6)	305
Reading/language arts	44 (15.0)	68 (23.1)	99(33.7)	83 (28.2)	294
Agric Science	25 (8.3)	67(22.1)	106 (35.0)	105 (34.7)	303

4.4.1.3. Time Spent on Nutrition Education

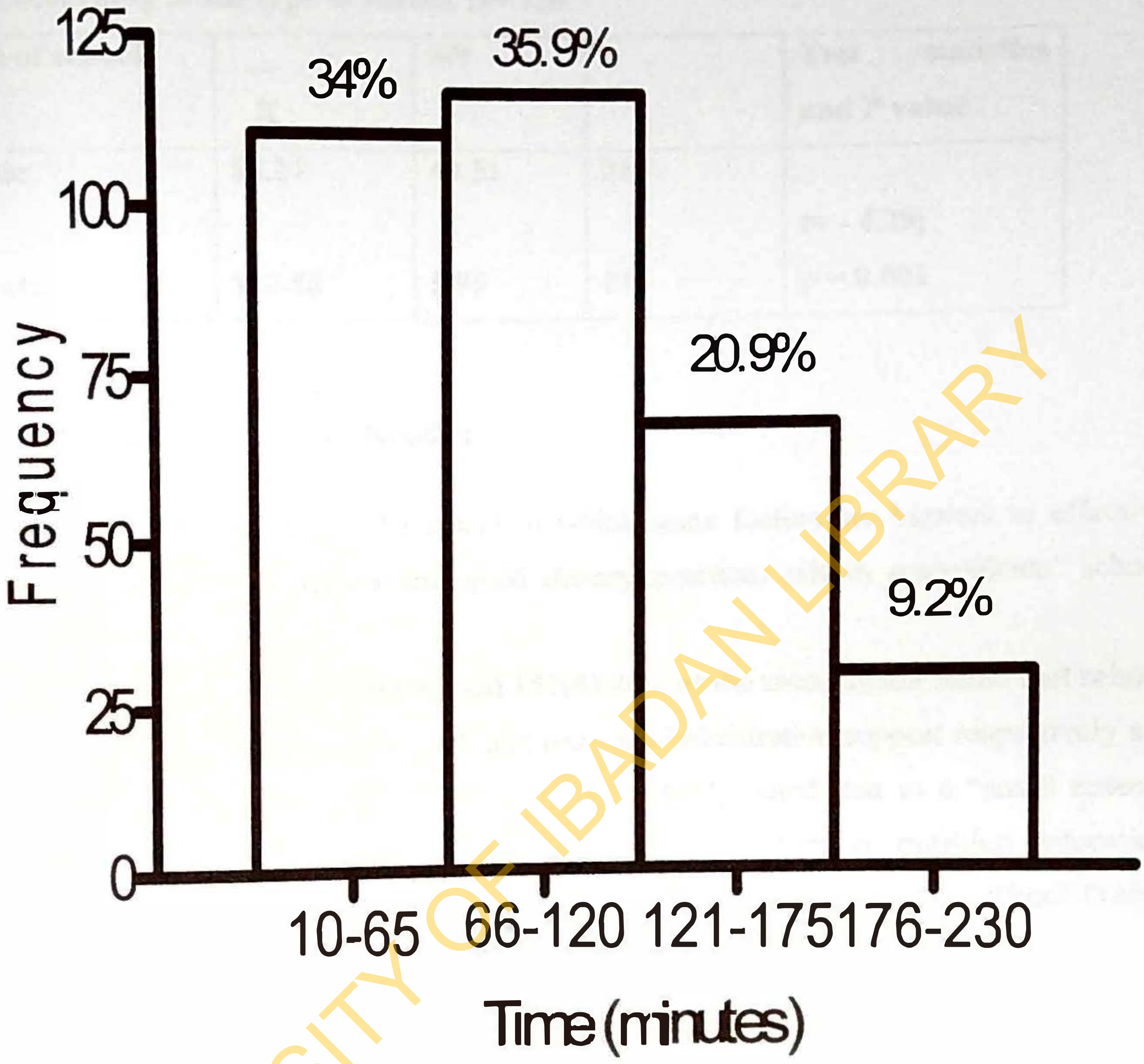

Figure 2: Participants responses on average time spent on nutrition education per week.

Figure 2 shows the average minutes (per week) spent in teaching nutrition education to pupils. A mean time of 96.7 ± 53.07 was spent with a range of 10 – 230 minutes.

Comparison of the average minute per week spent on nutrition education according to the type of school of respondents is presented in Table 17. Average minute spent by those in private school was significantly different from those in public school (p = 0.001),with more time spent in the private schools.

Table 17: Comparison of average time (minutes) spent on nutrition education per week according to the type of school. N= 326

Type of school	$\bar{X}$	SD	n	Test statistics and P value
Public	88.27	49.51	213	t= - 4.29; p = 0.001
Private	112.58	5.95	113	

4.4.1.4. Barriers to nutrition education

Table 18 shows responses on the extent to which some factors are barriers to effective teaching of nutrition education and good dietary practices within respondents' school system.

One hundred and ninety five (56.9%) and 151(43.4%) of the respondents stated that school teachers not practicing what they teach and lack of administrative support respectively are "not at all" a barrier while 162 (45.8%) and 141 (40.2) stated that to a "small extent" insufficient instructional time and insufficient fund to support nutrition education respectively are barriers to effective teaching of nutrition education in their school (Table 18).

Table 18: Participants general responses on barriers to effective teaching of nutrition education within their school system.

Barriers	Not at all n (%)	Small Extent n (%)	Moderate extent n (%)	Great extent n (%)	Total
The way the school meal is operated (e.g outside food vendor, school canteen)	106 (31.2)	113(33.2)	92(27.1)	29 (8.5)	340
Insufficient instructional time to fit in activities	96 (27.1)	162(45.8)	70(19.8)	26(7.3)	354
Insufficient fund to support nutrition education	101(28.8)	141(40.2)	60(17.1)	49 (14.0)	351
Lack of administrative support or approval	151 (43.4)	93 (26.7)	72 (20.7)	32 (9.2)	348
School teachers not practicing what they teach.	195 (56.9)	73 (21.3)	53(15.5)	22 (6.4)	343

A comparison of the participants who reported that any of these factors are barriers to effective teaching of nutrition education within their school system was made by the school type with view to determine any association. (Table19).

Table 19: Barriers to effective teaching of nutrition education based on types of school

Barriers		Public School n (%)	Private School n (%)	Level of significance
The way the school meal is operated (e.g outside food vendor, school canteen)		(N=216)	N=124	
	Not at all	52(24.1)	54(43.5)	X^2= 18.903
	Small Extent	71 (32.9)	42(33.9)	df = 3
	Moderate extent	71(32.9)	21(16.9)	p = 0.000*
	Great extent	22(10.2)	7(5.6)	
Insufficient instructional time to fit in activities		(N=226)	(N=128)	
	Not at all	44(19.5)	52(40.6)	X^2= 20.404
	Small Extent	115(50.9)	47(36.7)	df = 3
	Moderate extent	46(20.4)	24(18.8)	p = 0.000*
	Great extent	21(9.3)	5(3.9)	
Insufficient fund to support nutrition education		(N=224)	(N=127)	
	Not at all	52(23.2)	49(38.6)	X^2= 11.280
	Small Extent	92(41.1)	49(38.6)	df = 3
	Moderate extent	43(19.2)	17(13.4)	p = 0.10
	Great extent	37(16.5)	12(9.4)	
Lack of administrative support or approval		(N=224)	(N=124)	
	Not at all	84(37.5)	67(54.0)	X^2 = 9.375
	Small Extent	67(29.9)	26(21.0)	df = 3
	Moderate extent	52(23.2)	20(16.1)	p = 0.025*
	Great extent	21(9.4)	11(8.9)	
School teachers not practicing what they teach. (i.e. not good role models)		(N=217)	(N=126)	
	Not at all	102(47.0)	93(73.8)	X^2= 29.326
	Small Extent	60(27.6)	13(10.3)	df = 3
	Moderate extent	43(19.8)	10(7.9)	p = 0.000*
	Great extent	12(5.5)	10(7.9)	

* significant at 5% level of confidence

Comparison of teaching nutrition education by the body mass index of respondents shows no significant relationship. (p = 0.279)

4.4.2 PHYSICAL EDUCATION

4.4.2.1. Availability of sport activities

A large proportion 331(95.9%) of the respondents indicated that sport activities are available to pupils in their schools.

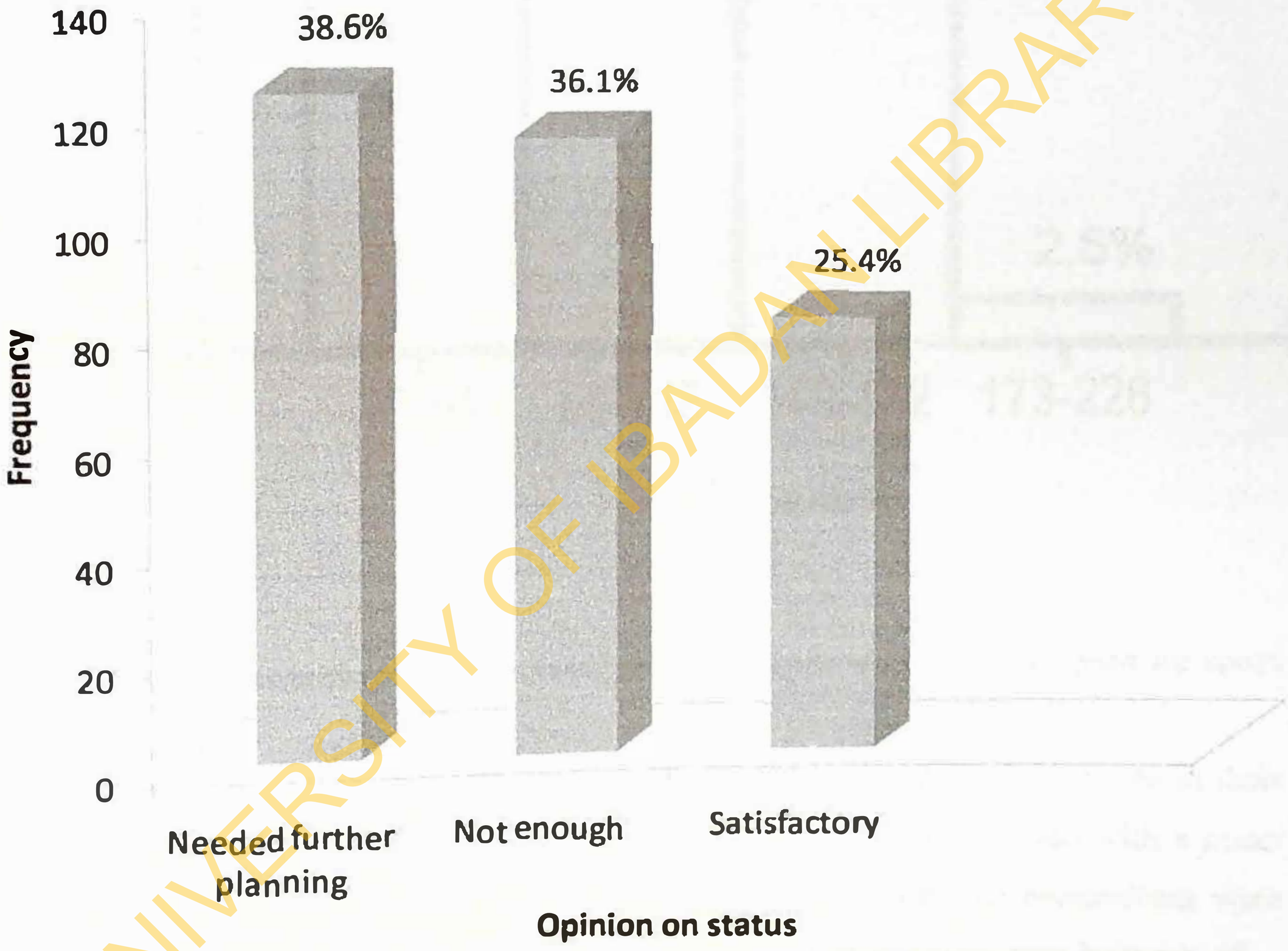

Figure 3: Respondents opinion on the status of sport activities available to pupils in their school

Participants who reported availability of sport activities to pupils in their schools were asked of their opinion on the status of the available sport activities ; 115(36.1%) indicated that the sport activities in their school was not enough, 81 (25.4%) are satisfied with the level while 123 (38.6%) indicated that the sport activities available in their school is satisfactory but needed further planning (i.e improvement in the co- ordination). (Figure 3)

4.4.2.2. Time spent on sport activities

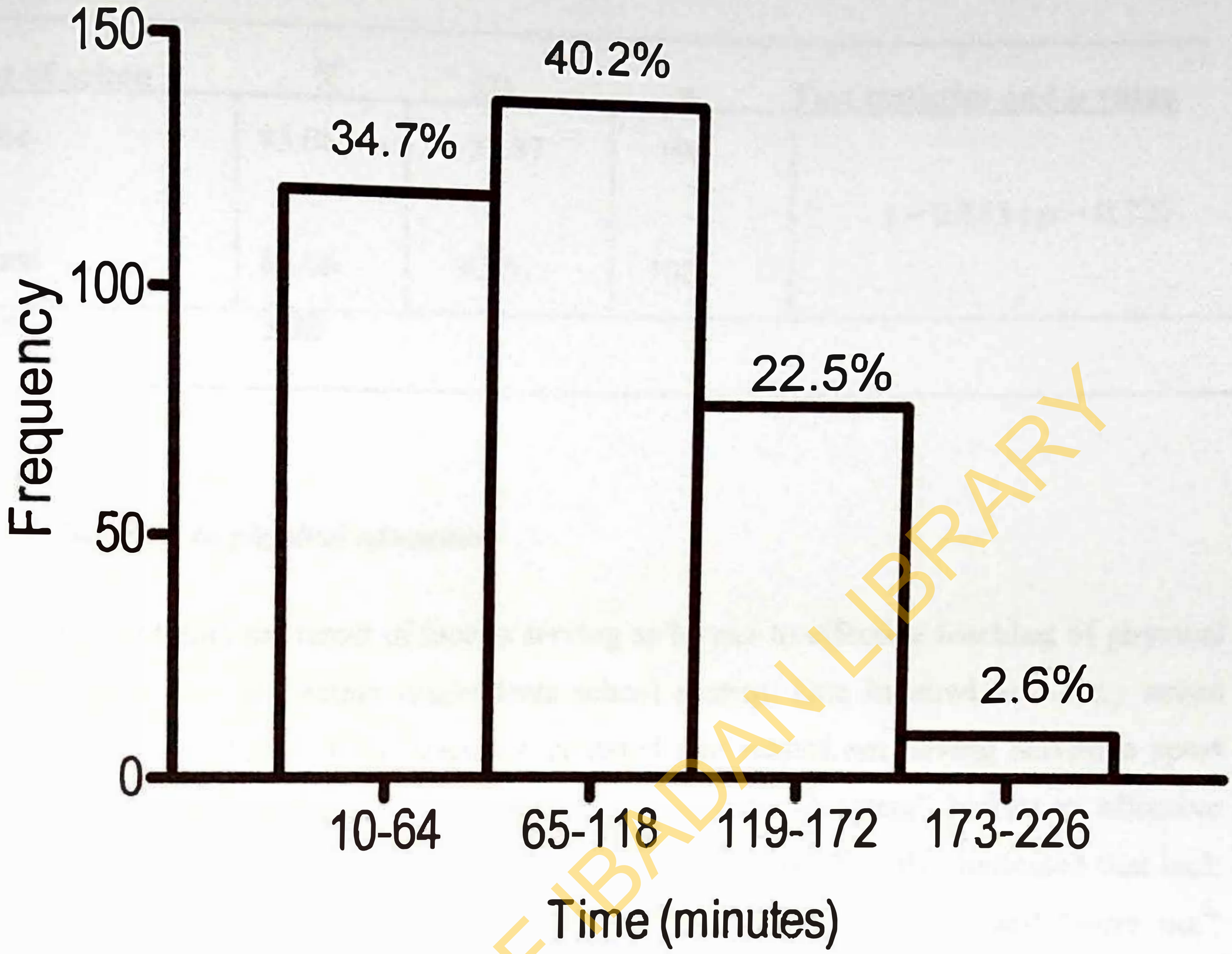

Figure 4: Participants responses on average minute (per week) pupils spent on sport activities

Participants responses on average time (per week) pupils spent on sport activities in their school are presented in Figure 4. Time spent ranges from 10 – 226 minutes with a mean time of 83.64 ± 39.97 minutes. Large proportion, 139 (40.2%) of the respondents were within the range of those whose average time spent on sport activities was between 65 – 118 minutes. A few, 9 (2.6%) respondents indicated that their pupils spent between 173 - 226 minutes on sport activities per week. (Figure 4)

Comparison of average minute per week pupils spent on sport activities according to school type was done using the student's t-test and the result is shown in Table 20. There was no significant difference ($p > 0.05$) in the average time; 84.64.± 43.51 spent by private schools as compared to 83.06 ± 37.87 in public. P value = 0.724 (Table 20).

Table 20: Comparison of participant's responses on the average minute pupils spent on sport activities spent per week according to the type of school. N= 306

Type of schoo	$\bar{X}$	SD	n	Test statistics and p value
Public	83.06	37.87	198	t = 0.353 ; p = 0.727
Private	84.06	43.51	108	
Total	306			

4.4.2.3. Barriers to physical education

Table 21, highlights the result of factors serving as barrier to effective teaching of physical education and exercise within respondents school system. One hundred and sixty seven (45.3%) and 140 (38%) of the respondents stated that school not having adequate sport facilities and classes taking too much time were to "a small extent" barrier to effective teaching of physical education while 150 (45.7%) and 230 (66.9%) also indicated that lack of administrative support and physical education not taken to be important "were not" barriers to effective teaching of physical education within their school system.

A comparison of these barriers by school type is presented on Table 22

Table 21: Responses on barriers to effective teaching of physical education and exercise within the school system

Barriers to physical education and exercise	Not at all n (%)	Small Extent n (%)	Moderate extent n (%)	Great extent n (%)	Total
School does not have adequate sport facilities	96 (26.0)	167 (45.3)	60 (16.3)	46 (12.5)	369
Classes for other subject takes too much time	96 (26.1)	140 (38.0)	85(23.1)	47(12.8)	368
Insufficient fund to support physical education	110(29.9)	107(29.1)	61(16.6)	90 (24.5)	368
Lack of administrative support or approval	150 (45.7)	94 (26.9)	62 (17.7)	34 (9.7)	350
Physical Health Education not important.	230 (66.9)	39 (11.3)	47 (13.7)	28 (8.1)	344

Table 22: Barriers to effective teaching of physical education and sport activities based on types of school

Barriers		Public School n (%)	Private School n (%)	Test statistics and p value
School does not have adequate sport facilities		(N=236)	N=133	
	Not at all	62 (26.3)	34 (25.64)	X^2= 5.687
	Small Extent	104 (44.1)	63 (47.4)	df = 3
	Moderate extent	34 (14.4)	26 (19.5)	p = 0.128
	Great extent	36 (15.3)	10 (7.5)	
Classes for other subject takes up too much time		(N=237)	(N=131)	
	Not at all	53 (22.4)	43 (32.8)	X^2= 6.183
	Small Extent	91 (38.4)	49 (37.4)	df = 3
	Moderate extent	58 (24.5)	27 (20.6)	p =0.103
	Great extent	35 (14.8)	12 (9.2)	
Insufficient fund to support physical education		(N=239)	(N=129)	
	Not at all	69 (28.9)	41(31.8)	X^2= 18.837
	Small Extent	60 (25.1)	47 (36.4)	df = 3
	Moderate extent	35 (14.6)	26 (20.2)	p = 0.000*
	Great extent	75 (31.4)	15 (11.6)	
Lack of administrative support or approval		(N=223)	(N=127)	
	Not at all	83 (37.2)	77 (60.6)	X^2 = 21.056
	Small Extent	75 (33.6)	19 (15.0)	df = 3
	Moderate extent	41 (18.4)	21 (16.5)	p = 0.000*
	Great extent	24 (10.8)	10 (7.9)	
Physical education is not important		(N=223)	(N=121)	
	Not at all	135 (60.5)	95 (78.5)	X^2 = 14.036
	Small Extent	34 (15.2)	5 (4.1)	df = 3
	Moderate extent	34 (15.2)	13 (10.7)	p = 0.003*
	Great extent	20 (9.0)	8 (6.6)	

*significant at 5% level of confidence

4.5. SCHOOL MEAL SERVICES

Table 23 presents policies about school meal program according to the school type. Many respondents; 186 (79.8%), 212 (91%) and 213 (91.8%) from public schools indicated availability of meal policies; medical screening for food vendors, assessment of food appearance and ensuring that variety of food is provided by food vendor respectively. (Table 22)

Table 23: Participants responses on availability of meal policies in schools based on school type

Meal Policies		Public n (%)	Private n (%)	Level of Significance
Medical Screening for food vendors		N= 233	N=131	
	Yes	186 (79.8)	98 (74.8)	$X^2 = 1.232$ df = 1 p = 0.293
	No	47 (20.2)	33 (25.2)	
Assessing the appearance of food Provided by food vendor		N=233	N=135	
	Yes	212 (91.0)	107 (79.3)	$X^2 = 10.186$ df = 1 p = 0.002*
	No	21 (9.0)	28 (20.7)	
Ensuring that varieties of food is Provided by food vendors		N= 232	N=134	
	Yes	213 (91.8)	108 (80.6)	$X^2 = 9.990$ df = 1 p = 0.003*
	No	19 (8.2)	26(19.4)	

*significant at 5% level of confidence

4.6: OTHER ACTIVITIES TO PREVENT MALNUTRITION IN SCHOOL CHILDREN

Participants' responses on availability of some other preventive activities for malnutrition according to school type are presented in Table 24. Slightly over half 124 (52.3%) of respondents from public school indicated the availability of de- worming programme for their pupils while majority 129 (94.2%) in public school indicated that periodic health talk is available to pupils (Table 24)

Table 24; Participants responses on other activities in school to prevent malnutrition based on school types

Activities		Public n (%)	Private n (%)	Level of Significance
Periodic health talk to parents		N= 239	N=135	X^2 = 0.48
	Yes	207 (86.6)	118 (87.4)	df = 1
	No	32 (13.4)	17 (12.6)	p = 0.874
Periodic health talk to pupils		N= 239	N= 137	X^2 = 5.221
	Yes	207 (86.6)	129 (94.2)	df = 1
	No	32 (13.4)	8 (5.8)	p = 0.024*
De-worming programmes for pupils		N= 237	N= 131	X^2 = 2.613
	Yes	124 (52.3)	80 (61.1)	df = 1
	No	113 (47.7)	51 (38.9)	p = 0.125
Weighing of pupils		N= 238	N= 134	X^2 = 0.042
	Yes	152(63.9)	87 (64.9)	df = 1
	No	86 (36.1)	47 (35.1)	p = 0.910

*significant at 5% level of confidence

CHAPTER FIVE

DISCUSSION

Teachers are part of the environmental influence on nutrition information and behaviour of children, it is important to ~~examine~~ and understand teachers' knowledge of malnutrition and their preventive practices mainly in form of physical and nutrition education as only teachers with precise ~~information~~ on nutrition can orientate the children rightly. Good nutrition promotes not only physical health and reduced susceptibility to disease but had also been demonstrated to contribute to cognitive development and academic success, therefore nutrition education in school can strongly influence childrens eating bahaviours, whether through examples provided by teachers in the classroom or the food provided in the school premises.

This chapter discuss the findings of malnutrition knowledge of teachers and its preventive practices in primary schools. It should be noted that there is paucity of information on knowledge of malnutrition and its preventive practices among primary school teachers in Nigeria, hence available information from other developing and developed countries are mostly used.

5.1: Background Information.

Majority of the participants were below 40 years of age (mean age = 36.8 8 ± 9.34 years) and had working experience below 20 years (mean working experience in years of 10.14 ± 8.24 years). The mean age of participants does not deviate radically from studies among primary school teachers in Enugu, Nigeria by *Ojinanka (2002)*. Seventy eight percent were aged 40 years or less among participants in Enugu while the result of another study among teachers in Ogun state, Nigeria by Alaba (2010) reported a mean age of 35.7 years.

Large proportions (66.4%) of the participant were females. This findings is consistent with study among primary school teachers in Cross river State, which reported that females accounted for 69.9% of the population studied *(Asim et al 2006)*. A similar study in Ilorin, Nigeria by Jekayinfa and Yusuf (2005) reported that females were 56.5% of the population. The fact that females were more than males among teachers may be explained by the fact that females in these environment opt for teaching job since working hours is not too much and gives the opportunity to have more time for family care. And also the educational

qualification (NCE) possessed by most of the female teachers is lower than the requirement for other graduate jobs.

An average proportion of the participants have their Body Mass Index within the normal weight range while a few (10.5%) were obese. These finding is different from the survey among teachers in India where 68.5% of school teachers in the national capital were obesed and overweight *(Diabetic foundation of India; 2009)*. This finding is not healthy for the promotion of nutrition and physical education in children because school teachers are expected to be role models. Meaningful change requires exemplary leadership. School teachers can play a strong role in improving the lives of young people through their physical outlook, practice of physical activities and healthy eating. In – service trainnig should emphasize teachers role as role model to his/her students and provide effective ways of facilitating effective transmission of health messages (through both formal and informal route) to their students. Teachers should also be provided health education and be encouraged to keep their normal weight.

The highest educational qualification of majority of the respondents (58.59%) was the National Certificate of Education (NCE), the minimum qualification for primary school teachers in Nigeria *(National Policy on education, 1998)*. However, a few (4.5%) of the respondents indicated that their highest educational qualification was the teachers Grade II certificate. The current findings are in line with the findings of the situational and Policy Analysis jointly published by the UNICEF and Federal Government of Nigeria (1993) that the Teachers Grade II certificate is still found among the qualifications of teachers in Nigerian Primary schools in many states in the country. In addition current findings proves Lassa's (1998) assertion that there is a fault in the implementation of the policy thrust towards the replacement of the Teachers Grade II certificate with the NCE as the basic qualification for entry into the teaching profession. In this study, respondents whose highest educational qualification was Grade II were seen to have the lowest overall mean knowledge score. This might affect their ability to effectively teach nutrition and physical education, as teachers qualification significantly affect the quality of teaching and education provided to young children and higher qualifications in school teachers have both short and long term positive effect on their pupils *(Albudkadir; 2008)*. Therefore, stakeholders in education should always endeavour to organise refresher courses and

sponsor Grade II teachers for further training to equip them with improved knowledge and teaching skill

5.2 Participants level of knowledge about malnutrition

One of the major findings of the study is that, on the overall, only about half of the participants had good knowledge about malnutrition and related issues. For example, ~~approximately~~ half of the respondents disagrees with the statement that high consumption of protein rich food causes kwashiorkor in children and some of the participants agreed with the fact that teachers are key element in the development of healthy eating habit among pupils and that nutritional habit at maturity depends on nutritional habit in childhood.

However, majority was not aware that malnutrition can occur in a child that is overnourished and that prominent collar and facial bone are not features of overnutrition. Moreover, more than half of the respondents are not aware that malnutrition can result into frequent infection (such as malaria, diarrhoea) and that whole grain (e.g rice, maize) represents the best calorie needed by the body. This finding is comparable to the report of FAO (2000c) on dietary study of knowledge, attitude and practices which reveals that malnutrition was not generally recognised as a disease, except in acute cases, and the idea of a good diet preventing illness was not widespread.

The knowledge of teachers about malnutrition is very important because early habits for a healthy community with healthy individuals are formed firstly in schools through pupils' interaction with their teachers and it continues on. Thus, teachers who have sufficient ~~information~~ and knowledge can help develop healthy eating community, assume a bigger responsibility than parents in this respects. *(Sezenler and Caglar; 2007).*

Nutrition education and update training opportunities are needed to raise the level of knowledge of the teachers in the areas where there are gap in the knowledge (such as features, effect and preventive measures for malnutrition). To enhance confidence in nutrition education, there is need for staff development programs that emphasize teaching methods and the provision of curricula specific to children's nutrition *(Hoelscher et al., 2002).*

5.3 Participants source of information on nutrition issues

A significant proportion of the respondent had book, the media and what they were taught at the tertiary institution as their major source of information on nutrition issues. The

sources especially the first (books), are more likely to discuss current recommendations and it is a consistently reliable source of nutrition information (*Whitney and Rolfes, 2001*). However, the internet which is now a very powerful source of information was only indicated by a few of the respondents as their source of nutriton information. This shows that teachers need to be educated on the usefulness of this medium for getting information on all areas of human endeavours.

5.4 Preventive practices for malnutrition in schools

5.4.1 Nutrition Education in the teaching Curriculum

This study ~~found~~ that majority of the respondents teaches nutrition and they do so by integrating it into other subjects especially home economics and agricultural science. This finding is consistent with a study in Lagos, Nigeria where Bonike et al (2003) reported that majority of primary school teachers who taught nutrition did so by integrating it into other subjects in the curriculum.

Likewise, the mean average time spent on nutrition education per week was 96.7 ± 53.07 minutes, which is less than the recommended 15 hours of teaching nutrition education per academic year. This might have resulted from the present policy of integrating nutrition education into other curricular subjects. A study on nutrition education in schools showed a small, but significant, effect on health outcomes with 12-15 hours (per academic year) of exposure. Larger, consistent effects on health outcomes were not seen until nutrition education programmes provided between 30-50 hours of exposure. Successful lifestyle change requires significant time to practice translating health messages into new behaviours (*Concento 1995 and Olander, 2007*). To ensure effectiveness of nutrition education, it is required that enough time be dedicated to it. This can be achieved by making nutrition education a seperate subject in the primary school curriculum.

5.4.2 Physical activities in schools

A large proportion 331 (95.5%) of the respondents indicated that sport activities are available to pupils in their schools. Out of these proportion, only 81 (36.1%) indicated that the available sport activities are enough, while the rest was of the opinion that the available sport activities was not enough and needed further planning (i.e improvement in the coordination). Likewise the mean time pupils spent on sport activities per week was 83.64 ± 39.97 minutes. This corrobates a finding from the physical education world wide summit

which confirmed a decline of physical activities in many schools of the world ; with perceived deficiencies in time allocation and material resources ; and that, many schools are not able to engage their pupils in the recommended minumum sport activities of 120 minutes per week . *(Kenherdamn and Joe Marshal, 2000)*. Physical education is taught as a seperate subject in primary school, out of the time allocated to this , there is need to ensure that pupils are engaged in adequate physical activities, as regualr physical activity in young children had been shown to benefit the health of children as well as later in life. *(WHO 2003)*.

5.4.3 Barriers to nutrition and physical education in schools

Majority of the respondents indicated that insufficient fund to support nutrition education and insufficient instructional time to fit in activities are major barriers to effective teaching of nutrition and physical education within the school system. Comparison of these (barriers) across school type also gives a similar result. This finding is consistent with another study by Odegbami et al (2003) who found that teachers often have serious time constraint and limited access to resources to enable them to improve their nutrition teaching skill and time. Likewise in other studies (USDA, 1992), lack of time and resources were identified as key barriers for offering nutrition education in the schools.

5.4.4 School Meal Policies

Large proportion of respondents indicated that meal policies such as medical screening for food vendors, assessing the appearance of food provided by food vendors and ensuring that varieties of food is provided by food vendors is available in their school. However, comparisons of the availability of meal policies by type of school shows a significant difference with the exception of medical screening for food vendors. Generally, present practice of medical examination for food vendors is not enough to ensure food safety. There is need to improve on this practice to prevents pupils in the study location particularly in the public schools from being exposed to public health hazard through consumption of food from unscreened food vendors. Presently, not all school children purchases food from food vendors in schools but to ensure practice and demonstration of healthy eating to pupils, they should be allowed the opportunity of eating at least a meal in the school. This can can be supplied at a subsidized rate or free of charge.

5.5: CONCLUSION

Findings from this study clearly revealed that aproximately half of the teachers had good knowledge of malnutrition ; insufficient funds and instructional time to fit in activities were seen as the major barriers to effective teaching of nutrition and physical education within the school system. To improve preventive practices for malnutrition in schools ; there is need for allocation of adequate time to nutrition education, this can be achieved by making nutrition education a seperate subject in the primary school curriculum and increase sufficient fund should be invested into both physical and nutrition education. More regular capacity building on nutrition and physical education programmes should also be implemented for teachers.

5.6 : LIMITATION OF THE STUDY

The descriptive nature of the research design limits the ability of this study to establish causal relationships between Malnutrition knowledge and its preventive practices with background characteristics of the respondents in this study. Findings in this study however indicate statistically significant relationship between malnutrition knowledge ;policies on meal services and type of school of respondents. Other findings indicated that teaching of nutrition education do not influence the malnutrition knowledge of teachers in Ido Local Government. Further studies are however required to establish the causal relationships (if any) between these variables.

5.7: RECOMMENDATION

1. The study revealed that nutrition and physical education in school is grossly under funded. Adequate funding is needed to provide appropriate, appealing and adequate educational materials for pupils. Government needs to ensure there is improved funding of the programme. The dedication to children's health and education is an investment that is impossible to ignore; rather it should represent one of the highest priorities of the government. Investing in the future of healthy, educated children is investing in the future success and advancement of Nigeria.

2. There is need for school authorities in Oyo state to provide relevant and modern textbooks, pamphlets, posters, and other related instructional materials for nutrition and

physical education in primary schools since these constitute most of the mentioned source of information.

3. The following list identifies strategies that could be considered to address the spectrum of both under and over nutrition in children

- Implement nutrition education for children, parents and child care givers using teacher- child-parent nutrition education.
- Promote age-appropriate physical activities
- Increase awareness of the importance of physical activity among teachers and pupils.
- Increase time spent on nutrition and physical education in schools and at home

4. The State Ministry of Education should have at least one experienced nutrition education staff who is familiar with the implementation and the instructional strategies of nutrition education curriculum. Such staff in the Inspectorate Division of the Ministry should visit the school regularly to ensure that the teachers are adequately implementing the nutrition education.

5. The State Ministry of Education should ensure nutrition education is a separate subject in the school curriculum. This is to ensure that adequate time is dedicated to it since this is required for consistent effect of nutrition education on health.

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APPENDIX

QUESTIONNAIRE

STUDY ON KNOWLEDGE OF MALNUTRITION AND ITS PREVENTIVE PRACTICES AMONG PRIMARY SCHOOL TEACHERS IN IDO LOCAL GOVERNMENT.

Informed Consent Form

A. INTRODUCTION

Malnutrition ~~remains~~ a major development problem in Nigeria. In order to manage the problem, we need to improve the quality of ~~information~~ teachers possess on the disease as teachers have a great influence on the dietary habit of young people. By completing this questionnaire you will be contributing to the body of knowledge available to improve teaching nutrition and physical education in Nigerian primary schools.

This questionnaire is part of a survey being conducted in partial fulfilment of the award of a Masters' degree in Epidemiology by the University of Ibadan, Nigeria.

- ~~Information~~ collected with this questionnaire will be treated as confidential and your answers will never be associated with your name, as you are **NOT** required to provide your name in the questionnaire.
- During this exercise, your weight and height will also be measured
- Participation is voluntary and you have the right to withdraw at any time if you wish to
- Giving honest information will help with the understanding of Malnutrition knowledge and preventive practices among teachers in this local govt. and assist to make appropriate recommendations to the relevant government agencies and ~~parastatal~~ for appropriate intervention to reduce the incidence of malnutrition among primary school children.

CONSENT: Now that I understand the content and purpose of the study, I will be willing to take part in the programme.

.....

SIGNATURE OF RESPONDENT INDICATES AGREEMENT TO PARTICIPATE.

.....

Signature of interviewer/Date

B. INSTRUCTIONS

1. The questionnaire consists of 4 sections and each section has a number of questions with multiple choice answers.
2. Please answer all the questions as complete as you can, **BY TICKING √ OR BY CIRCLING O** the response code that corresponds to your chosen response.

Thank you very much for your cooperation

Date.....

Study No.....

School name and location.....

.....

SECTION I: BACKGROUND INFORMATION

Q/NO	QUESTION	QUESTION OPTION	CODE	LEAVE BLANK
1.1.1	What is your gender?	Male.....	1	[ ]
		.....		
		Female.....	2	
1.1.2	What is your highest educational level?	Grade II.....	1	[ ]
		NCE.....	2	
		Bachelor's Degree.....	3	
		Masters.....	4	
		Others,pls specify.....	8	
1.1.3	Please indicate your religion	Christianity.....	1	[ ]
		Islam.....	2	
		Traditional.....	3	
		Others(pls specify).....	8	
1.1.4	Do you teach subjects containing nutrition education?	Yes.....	1	[ ]
		No.....	2	
1.1.5	Do you teach subjects containing physical health education?	Yes.....	1	[ ]
		No.....	2	

1.1.6. Please indicate your age as at the last birthday? .....years

1.1.7. How many years have you spent in the teaching profession? .....years

1.1.8. What class do you teach presently? .....

1.1.9. Year of most recent qualification.....

SECTION 2
MALNUTRITION KNOWLEDGE

Please evaluate each statement by using the following keys

1=SA (Strongly Agree)
2=AG (Agree)
3=UD (Undecided)
4=DA (Disagree)
5=SD (Strongly Disagree)

S/NO	STATEMENT	EVALUATION CODE					Leave Blank
2.1.1	Malnutrition is a problem among Nigerian primary school children	1	2	3	4	5	[ ]
2.1.2	Malnutrition can occur in a child that is undernourished	1	2	3	4	5	[ ]
2.1.3	Malnutrition can occur in a child that is overnourished	1	2	3	4	5	[ ]

2.1.4	Inadequate dietary intake and disease are immediate causes of malnutrition	1	2	3	4	5	[ ]
2.1.5	Frequent infection and diseases in children can result into malnutrition	1	2	3	4	5	[ ]
2.1.6	Children's brain can be affected by malnutrition resulting into low intellectual power	1	2	3	4	5	[ ]
2.1.7	Malnutrition cannot result into frequent infection(such as malaria, diarrhoea)	1	2	3	4	5	[ ]
2.1.8	Inadequate food Hygiene and childcare can result into malnutrition	1	2	3	4	5	[ ]
2.1.9	A child can become malnourished if he/she lacks knowledge about food nutrients and right food choices	1	2	3	4	5	[ ]
2.1.10	High consumption of protein rich food causes kwashiorkor in children	1	2	3	4	5	[ ]
2.1.11	A healthy and adequate diet is important in the prevention of diseases such as pellagra, ricket, obesity, Kwashiorkor e.t.c	1	2	3	4	5	[ ]
2.1.12	School children's participation in physical activities is way of promoting a healthy lifestyle	1	2	3	4	5	[ ]
2.1.13	Teaching nutrition and physical education at the primary school level can prevent malnutrition in children	1	2	3	4	5	[ ]
2.1.14	Commitment of the school to promoting healthy food intake in her environment can prevent malnutrition	1	2	3	4	5	[ ]

2.1.15	Malnutrition in Nigerian children is just a recent issue	Yes..... No..... Don't know.....	1 2 9	[ ]
2.1.16	Do you know any child who is malnourished?	Yes..... No..... Don't know.....	1 2 9	[ ]
2.1.17	Do you know a child who has died as a result of malnutrition?	Yes..... No..... Don't know.....	1 2 9	[ ]

SECTION 3

Please evaluate each statement by using the following keys

1=SA (Strongly Agree)
2=AG (Agree)
3=UD (Undecided)
4=DA (Disagree)
5=SD (Strongly Disagree)

S/NO	STATEMENT	EVALUATION CODE				Leave Blank	
3.1.1	Adequate nutritional status in children can be responsible for better attendance and high enrolment in school	1	2	3	4	5	[ ]
3.1.2	Malnutrition in children can cause improved performance in academic work	1	2	3	4	5	[ ]
3.1.3	Nutritional habit in maturity depends on nutritional habit in childhood	1	2	3	4	5	[ ]
3.1.4	Teachers are key element in the development of healthy eating habit among pupils	1	2	3	4	5	[ ]
3.1.5	Consumption of food rich in Vitamin A can prevent scurvy(bleeding gums) in children	1	2	3	4	5	[ ]
3.1.6	A balanced diet is one that contains high proportion of carbohydrate and fat	1	2	3	4	5	[ ]
3.1.7	Whole grains(e.g rice, maize) represent the best calorie needed by the body	1	2	3	4	5	[ ]
S/NO	STATEMENT	EVALUATION CODE				Leave blank	
3.2.1	It is possible for primary school children to be overweight/ obese?	1	2	3	4	5	[ ]
3.2.2	High consumption of dietary fat, carbohydrate and sweetened drinks can cause obesity	1	2	3	4	5	[ ]
3.2.3	High level of physical activities is an important factor in the prevention of childhood obesity	1	2	3	4	5	[ ]
3.2.4.	Obesity can result into poor attention and poor memory in school children	1	2	3	4	5	[ ]

SYMPTOMS OF UNDERNUTRITION IN CHILDREN INCLUDE;

3.3.1 Fatigue yes.....(1) No.....(2) I don't know.....(3)

3.3.2 Poor eye sight yes.....(1) No.....(2) I don't know.....(3)

3.3.3. Poor growth yes.....(1) No.....(2) I don't know.....(3)

3.3.4 Dry sparse hair that falls out easily yes.....(1) No.....(2) I don't know.....(3)

3.3.5 Loss of appetite yes.....(1) No.....(2) I don't know.....(3)

3.3.6 Dry and scaly skin yes.....(1) No.....(2) I don't know.....(3)

3.3.7 Decaying teeth yes.....(1) No.....(2) I don't know.....(3)

3.3.8 Pot belly yes.....(1) No.....(2) I don't know.....(3)

3.3.9 Inability to sleep well yes.....(1) No..... (2) I don't know.....(3)

3.3.10 Bone and joint problems yes.....(1) No..... (2) I don't know.....(3)

3.3.11 Increased blood pressure yes..... (1) No..... (2) I don't know.....(3)

3.3.12 Protruding abdomen yes..... (1) No..... (2) I don't know.....(3)

3.3.13 Prominent facial bone yes..... (1) No..... (2) I don't know.....(3)

3.3.14 Prominent collar bone yes..... (1) No..... (2) I don't know.....(3)

3.4.0. Please, indicate your source(s) of information on nutrition issues (Multiple response is allowed, tick√ as applied to you.

- Books.....1 [ ]
- Newspapers .....2 [ ]
- Television .....3 [ ]
- Friends and family .....4 [ ]
- Workshops/Seminar..... 5 [ ]
- Tertiary institution education..... 6 [ ]
- Internet.....7 [ ]
- Radio.....8 [ ]
- Others(pls specify).....10 [ ]

SECTION 4

Preventive Practices for Malnutrition and Barriers to Nutrition and Physical Education

4.1.1. Do you have nutrition education materials (e.g charts. posters, videoclips) for teaching your pupils? Yes.....(1) No.....(2)

4.1.2. If your answer to question **4.1.1** above is yes, To what extent are the following things true of the nutrition education materials you use?

	Not at all	**Small extent**	**Moderate extent**	**Great extent**
a. The materials are up to date.....	1	2	3	4
b. The materials are age appropriate	1	2	3	4
c. My pupils find the materials appealing	1	2	3	4
d. I have enough materials for all my pupils to use	1	2	3	4

4.1.3. To what extent are the following factors barriers to effective teaching of **nutrition education and good dietary practices within the school system?** If you feel there are no barriers, check here and skip to Question **4.1.4**

	Not at all	**Small extent**	**Moderate extent**	**Great extent**
a. The way the school meals program is operated (e.g., outside vendor)	1	2	3	4
b. Insufficient instructional time to fit in activities.....	1	2	3	4
c. Insufficient fund to support nutrition education.....	1	2	3	4
d. Lack of administrative support or approval.....	1	2	3	4
e. School teachers not practicing what they teach(i.e not good role model).....	1	2	3	4
f. Other barriers *(specify* _____)	1	2	3	4

4.1.4. To what extent do you integrate lessons about nutrition into the following subject areas?

	Not at all	**Small extent**	**Moderate extent**	**Great extent**
a. Health/physical education.....	1	2	3	4
b. Social studies	1	2	3	4
c. Home Economics	1	2	3	4
d. Reading/language arts.....	1	2	3	4
e. Agric Science.....	1	2	3	4
f. Some other subject *(Pls specify*.....).	1	2	3	4

4.1.5. Pls. estimate the average minute per week, you spend in teaching lessons on nutrition to your pupils(include both time dedicated specifically to nutrition lessons and time spent on integrated lessons .....minutes

4.1.6. Are physical/sport activities available to students in your school?

Yes (1)..... No (2).....

4.1.7. What do you think about the available sport activities? Pls pick only one answer

(a) Not enough

(b) Satisfactory

(c) Satisfactory but needed further planning

4.1.8. Pls. estimate the average minute per week, your pupils spend on physical/sport activities .....minutes

4.1.9. To what extent are the following factors barriers to effective teaching of **physical education and exercise within the school system?** If you feel there are no barriers, check here and skip to Question **4.1.10.**

	Not at all	**Small extent**	**Moderate extent**	**Great extent**
a. The school does not have adequate facility	1	2	3	4
b. Classes take up too much time.....	1	2	3	4
c. Insufficient fund to support physical education.....	1	2	3	4
d. Lack of administrative support or approval.....	1	2	3	4
e. Physical education is not important	1	2	3	4
f. Other barriers *(specify* _____).....	1	2	3	4

4.1.11 Is any of the following activities or measures put in place by your school to prevent malnutrition among pupils?

- Periodic health talk to parent Yes.....(1) No.....(2)
- Periodic health talk to pupils Yes.....(1) No.....(2)
- De-worming programmes for pupils Yes.....(1) No.....(2)
- Weighing of pupils Yes.....(1) No.....(2)
- Physical examination of pupils Yes.....(1) No.....(2)

4.1.12. Do you have the following policies about school meal programmes in your school?

- Medical screening for food vendors Yes.....(1) No.....(2)
- Assessing the appearance and nutritional quality of food provided by food vendors Yes.....(1) No.....(2)
- Ensuring that varieties of food are provided by food vendors. Yes...(1) No.....(2)

4.1.13. May we have your comment or information on other nutrition education practices at your school?tell us about the interesting things you are doing.

_____

_____

_____

THANK YOU FOR COMPLETING THE QUESTIONNARE