THE RELATIONSHIP BETWEEN NUTRITION AND PERFORMANCE OF PRE-SCHOOL CHILDREN IN RABUOR ZONE KISUMU COUNTY, KENYA

BY

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NOVEMBER, 2014
DECLARATION

I declare that this thesis is my original work and has not been presented in any other university/institution for consideration. This research thesis has been complemented by referenced sources duly acknowledged. Where text, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited in accordance in line with anti-plagiarism regulations.

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To my beloved children Chris, Eddy, Laura and Evans for their support.
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This study would not have been completed without the contribution of the following personalities whom I sincerely want to thank very much:

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ABSTRACT

Growth and development occurs more during the early childhood. It is imperative that children get proper nutrition both at home and in school. To support this, the government of Kenya, through the Ministry of Education has constantly advocated for the provision of centralized feeding programme in every pre-school. However, this has not been the case in Rabuor Zone where only about 18% of the pre-schools offer feeding programmes. Furthermore, statistics at the District Education office indicate that pre-school children perform poorly. So far limited studies have focused on the relationship between poor nutrition and learning performance of pre-school children in the Zone. This study therefore investigated the relationship between nutrition and performance of pre-school children in Rabuor Zone, Kisumu County, Kenya. It was guided by the following specific objectives: To assess the nutritional status among pre-school children in Rabuor zone Kisumu County, To establish how nutrition influences pre-school children academic performance in Rabuor zone Kisumu County, To establish the difference in performance of pre-school children from schools with feeding programmes and those without in Rabuor Zone and lastly to establish the approaches set to improve pre-school children’s nutrition Rabuor Zone Kisumu County. Purposive sampling was used to select the target geographical area which has a total of forty four schools. Stratified sampling was used to select 30% of pre-schools and systematic sampling used to select the sample population of 341 pupils together with their parents. Data was collected by use of structured questionnaires, anthropometric data sheet and observation checklist. Statistical package for social sciences (version 20), Epi-info, Nutri-Survey were used to analyze data. Pearson’s Product moment correlation and chi-square was used to test the hypotheses. Validity of the research instruments was assessed using content validity while reliability of the research instruments was conducted using test retest method. The study conducted a pilot study in 2 preschools which were not included in the actual study. The study rejected the hypothesis H01 there is no significant difference between nutrition and academic performance of pre-school children since the results revealed that the p-value was 0.033, which is less than 0.05 (p=0.033<0.05).This implies that statistically there is a significant relationship between the two variables .H02 was also rejected which stated that there is no significance difference between academic performance of schools with feeding programmes and those without since results revealed that the p-value was 0.013, which is less than 0.05 (p=0.013<0.05).This implies that statistically there is a significant difference between the two variables. The study recommended that stakeholders like National Centre For Early Childhood Education (NACECE) and District Centre For Early Childhood Education (DICECE)) should develop curriculum and a programme for equipping parents of preschool Children with knowledge on good nutrition and importance of balanced diet which is vital for good performance. MOE and the parents also need to support all the ECDE Centers in Rabuor to organize and sustain centralized feeding programmes and ensure that foods offered are balanced and healthy.MOE should also partner with other development bodies, NGOs and GOK ministries to identify severely malnourished children and put them on special programmes.
CHAPTER ONE
INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Introduction

This chapter entails background to the study, statement of the problem, purpose of the study, objectives, research hypotheses, significance of the study, limitation and delimitation, assumptions, theoretical framework, conceptual framework and operational delimitation of terms based on the relationship between poor nutrition and performance of pre-school children.

1.2 Background to the Study

Many children in less developed countries suffer from poor health and nutrition. The United Nations estimates that one third of preschool age children in less developed countries – a total of 180 million children under age 5 – experience growth stunting relative to international norms (United Nations, 2000), while hundreds of millions more suffer from tropical diseases, including malaria and intestinal parasites (WHO, 2000). To the extent that poor health and nutrition among children has a negative impact on their education, programs or policies that increase children’s health status will also improve their education outcomes.

Proper Nutrition is essential for growth, development, health and one’s well-being. Good Nutrition facilitates the development of a child in all dimensions and has considerable
long-lasting effects on the child’s life (Beryl, 2000). Recent studies in the field of nutrition reaffirm the importance of nutrition as a prerequisite for good cognitive development in children (Ray 2004 and Becker, 2000). Good nutrition is also essential for country’s general development as children’s, good health eventually translates into good performance thus resulting into brilliant leaders who will be productive economically, socially and in all other areas as “Health is wealth” (Seth and Johnson, 1991).

Globally, Malnutrition affects one in three people and each of its major forms out-do most other diseases (WHO, 2000). There is increasing proof, with resulting international concern that the high level of nutritional deprivation combined with heavy burden of diseases in pre-school children have negative consequences for their long term overall development (Bellisle, 2004). Researchers have attempted to estimate the impact of child health on education outcomes, but there are formidable obstacles to obtaining credible estimates. Data are often scarce (although they are much less scarce than in previous decades), but even more importantly there are many possible sources of bias when attempting to estimate relationships between child nutrition and education.

Research in the United States found that children deficient in iron were twice as likely to score below average on math tests even after allowing for potential confounders and this finding was more pronounced among girls (Halterman, 2001). Another Research conducted on the effects of breakfast on cognition showed that skipping breakfast can have adverse effects on both general energy-levels and cognition of school children.
It was also found out that data on school children were not routinely collected despite growing evidence first, that malnutrition is widespread in this age group and that these nutrition problems adversely affect school attendance, performance and learning (Bellisle, 2004).

For instance in the United States of America (USA), researchers estimated that over 13 million children under twelve years find it difficult to get all the food they need (Bread for the World Institute, 2004). Needless to say, pre-school children are younger and more vulnerable to the effects malnutrition than their older counterparts. Nutritional status is therefore an area of concern for study among school children and a threat to their academic performance as well as later development and productivity and there is therefore need for the study.

Sub-Saharan Africa is the region with the highest proportion of its population under-nourished. Vast numbers of school aged children face major health and nutritional problems that adversely affect their ability to take advantage of the limited educational opportunities available to them. Most of these children are found in Africa where malnutrition problems are attributed to among other things, indiscriminate resource distribution (FAO, 2000).

Furthermore African region has the highest estimated prevalence of stunting at 20-48% and has the lowest rate of improvement especially in East Africa sub-region, where rates of stunting are increasing Bellisle, 2004. In South African Primary Schools, a school
feeding programme was introduced on a national scale in 1994 to alleviate short term hunger by providing 25% of the energy requirement of the child per day. Micronutrient requirement were however not always met and studies have shown that micronutrient deficiencies persisted in some South African Schools despite this programme. Pre-school children were often a neglected group in terms of micronutrient Intervention because they were not reached by the intervention strategies and this highly affects performance. Nutrition and performance is therefore an area of concern for study among school children and a threat to their academic performance and even later development and productivity.

In Kenya, studies done on children’s nutrition have not covered the relationship between nutrition and performance of pre-school children but researched on other variables. Furthermore, they were all conducted outside Rabuor Zone and therefore more studies should be done to underscore the relationship between poor nutrition and performance of preschool children.

Most Pre-schools in Rabuor Zone do not have any centrally organized meals in schools and not all children carry packed snacks to School, obviously due to the socio-economic status of the community. The parents are expected to pack all meals for the children to carry to the ECDE Centers but only a few parents do this. Some parents are either too busy working as casual laborers or are ignorant about the need for proper nutrition to provide good nutrition. Lack of proper food intake (malnutrition) signifies lack of
nutrients which is vital for proper performance. The Zone was cited as one of the areas experiencing acute food shortage and therefore high prevalence of malnutrition (Central Bureau of Statistics, 2009). During the study, it was established whether or not children in Rabuor accessed good nutrition or not. The current study also attempted to establish the relationship between nutrition and learning performance of pre-school children in Rabuor Zone.

1.3 Statement of the Problem

Proper nutrition is essential for growth, development, health and one’s well-being. Nutritional Programmes facilitate the development of a child in all its dimensions and have considerable long-lasting effects on the child’s life (Beryl, 2000). Research conducted by Godlewska and Klerebinski (1981) indicated that one of the most important parameters that affected the development of the children is their nutritional status.

It is known that children who are provided with balanced diet develop holistically. This is portrayed in how they engage in pre-school activities, social play; interact with others, just to mention a few.

Despite efforts by the government to encourage pre-schools to set-up feeding programmes, less has been done and only a small percentage of pre-schools have adhered to that. According to the records in the district education’s office,(2013) only 7 schools out of 44 pre-schools have feeding programmes for the learners in Rabuor Zone.
Many studies done on early childhood education focused on other variables that affect nutritional status of age 5 and below but not relationship between nutrition and performance of pre-school children of age 5 and above such as (Murungi 2009, Mwaniki, 2007, Ndungu, 2004, Waswa, 2005 & Shihundu 2005). It is against this backdrop that the researcher deemed it necessary to investigate the relationship between nutrition and performance of pre-school children in Rabuor Zone, Kisumu County.

1.4 Purpose of the Study

The study sought to establish the relationship between nutrition and performance of pre-school children in Rabuor zone Kisumu County.

1.5 Objectives of the Study

The following research objectives guided this study:

i. To assess the nutritional status among pre-school children in Rabuor zone Kisumu County.

ii. To establish how nutrition influences pre-school children academic performance in Rabuor zone Kisumu County.

iii. To find out the difference in performance of children from pre-schools with feeding programmes and those without in Rabuor Zone.
To establish the approaches set to improve pre-school children’s nutrition Rabuor Zone Kisumu County.

1.6 Research Questions

i. What are the nutrition statuses among pre-school children in Rabuor zone Kisumu County?

ii. How does nutrition influences pre-school children academic performance in Rabuor zone Kisumu County?

iii. What are the difference in performance of pre-school children from schools with feeding programmes and those without in Rabuor Zone?

iv. What are the approaches set to improve pre-school children’s nutrition Rabuor Zone Kisumu County?

1.7 General Hypotheses

HA₁ Nutrition influences pre-school children’s academic performance.

HA₂ Performance of pre-school children in schools with or without feeding programmes is the same academically.

1.8 Significance of the Study

The findings of the study may be of significance to the academicians as the findings may provide useful information for further research.
The study findings could also provide useful information and add value to the existing knowledge on the relationship between nutrition and performance of pre-school children in Kenya since the literature that is available show that very little has been done on the same.

Finally, the results of the study could be used by stake holders like National Centre for Early Childhood Education (NACECE) and District Centre for Early Childhood Education (DICECE) in developing curriculum and a programme for equipping parents of pre-school Children with knowledge on good nutrition and importance of balanced diet which is vital for good performance.

1.9 Delimitation and Limitations of the study

The Delimitations and limitations of the study were as explained below.

1.9.1 Limitations of the study

The study was limited by financial constraints realized. However, this problem was overcome by the use of manageable sample size of 30% of the targeted pre-schools in Rabuor zone.
1.9.2 Delimitations of the study

The study only focused on the relationship between nutrition and performance of pre-school children aged 5 and above years and their teachers in both public and private pre-schools in Rabuor Zone, Kisumu county Kenya. Children below and above the age bracket were not included in the study.

1.10 Assumption of the study

The study was based on the following assumptions:-

i. That the respondents were honest and accurate in the responses they gave.

ii. That the academic progress records maintained by the schools had accurate information on children’s performance.

iii. That all other conditions remained constant and hence not interfered with the outcome. All the above were realized without any difficulties.

1.11 Theoretical Framework

The study was guided by Hull’s theory (1983) of learning as explained below. It explains the relationship that exists between the variables.

Hull’s Theory of learning (1983)
Hull’s theory of learning is a stimulus-response theory. Since only the stimuli and response in a situation are observable, he postulates what are called intervening variable or symbolic construct. In its elementary form the schemata of the total learning situation progress is as follows: A Stimuli (S) impinges on the organism. This results into neutral impulse. If there are two or more stimuli this will need a neutral interaction. The neutral impulse leads to a reaction (R). In order for this to occur, however drive (D) is assumed to be present. Drive is the tension state (poor performance) resulting from a need (poor nutrition). In this case the tension state is poor performance of the pre-school children resulting from the need which is poor nutrition.

In his theory, Hull begins with the assumption that as part of the process of living, the organism finds itself in disequilibrium with its environment. That is, it finds itself deprived of something it needs for example the physiological need for food. In this case drive becomes the state of tension that is associated with the need which causes the organism to become active hence energized. This activity produces its own stimuli and its own response. In this process, an object state or condition is attained that reduces the drive by satisfying the need. This final process is known as reinforcement. The reinforcement promotes learning.

**Application of Hull’s Theory**

Hull’s Theory of Learning which emphasizes the drive to want to reduce the physiological imbalances experienced by human kind was used since studies done in other places such as France on Pre-school children, pointed out that the school
achievement and progress in children is affected by nutrition (Hull 1983). A study carried out in twenty Pre-schools that had school feeding programmes, revealed an improvement in performance as compared to the ones that had not (Hull 1983). Good nutrition had been said to have a favorable effect on educational attainment (Halterman et al 2001). Lack of proper nutrition in Pre-school children will therefore lead to low performance and poor class participation. Reinforcement through provision of balanced diet will improve nutritional status and improved the performance of Pre-school children.

The theory furthers states that if the reaction (provision of good/balanced nutrition) reduces the drive (poor performance) then we have the condition of reinforcement (improved performance). The reinforcement brings about an organization in the nervous system known as a habit (H). During the study, efforts will be made to ensure that causes of poor nutrition are highlighted so as to recommend possible intervention measures.

He however postulates these additional symbolic contracts. It is assumed that the organism has potential for reaction called reaction potential and that this reaction potential is not constant but varies from moment to moment oscillation or (his accounts for the fact that response or reaction to stimulus is not always forthcoming, or that it varies in strength. Likewise, as the organism reacts, work is done. If the reaction is not reinforced, as a result of changes in the organism, the reaction is inhibited. This is known as experimental extinction and accounts for dropping out of reactions (no learning). Relationship between poor nutrition and performance are population specific, hence the need to carry out studies on pre-school children of Rabuor Zone.
1.12 Conceptual Framework

The conceptual diagram below (figure 1.1) shows, the independent variable is nutrition as reflected (balance diet, sufficient amount of meals and fresh foods) and dependent variable, performance (class participation health, performance) and possible intervention measures (sensitization on introduction and sustainability of feeding programme).

Figure 1.1 Conceptual diagram showing the relationship between
nutrition and Performance of Preschool children

Source: The researcher (2012)
The conceptual framework above shows the relationship between nutrition and performance which were the study variables. Nutrition of pre-school children affects their performance either negatively or positively depending on the level of nutrition. However, with possible interventions on parents and pre-schools to initiate and sustain adequate feeding programmes. The end results will be healthy children leading to good performance.

1.13 Operational Definition of Terms

**Academic performance:** Refers to the child’s good test scores results, enhanced participation in pre-school activities measured by analyzing progress reports and observing children engage in activities in class.

**Nutrition**  
Any food commodity provided pre-school children 3-5 times in a day and has value to promote their holistic growth and development and ultimately academic performance.

**Child:**  
Whereas the term „child” refers to a person below the age of 18, this study will focus on children from pre-school. A child will therefore be anybody aged between 5 – 6 years.
Malnutrition: A poor condition of health in pre-school children caused by lack of Food or the right kind of food.

Nutritional status: The condition of the body as influenced by the diet taken and determined by anthropometric measurements.

Pre-school child: Refers to a child who is either a boy or girl aged 5-6 years and attending pre-school.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter deals with the review of literature on the studies that have been done on the area under study. It is guided by the following sub headings:

2.2 Balanced Diet and Nutritional Status of Pre-school Children

A child who is properly fed on a balanced diet develops faster. Such a child is ever active and is always regular in school attendance, very motivated and looks healthy. He /She becomes attentive in class as most of his/ her senses, if not all are functional, (The Sunday Standard 23rd February 2011). Proper Nutrition is essential for growth, development, health and one’s well-being since food is critical need for the survival of the human species (Ake-Tano et al., 2011).

Good nutrition helps to improve child survival, to promote healthy growth and development, to contribute to better cognitive and economic development. It also reduces and mortality rate, and the risk of chronic diseases such as cardiovascular disease, diabetes, kwashiorkor, marasmus, hypertension, even in adulthood (OMS, 2010). Nutritional status of a person is a measurement of the extent to which his / her physiological needs for nutrients are being met. It also refers to the state of health of a
person which is the product of a balance between nutrient intake and utilization by his body (Halterman, 2001).

Good nutrition is essential for physical, intellectual and emotional development. However in Asia; more than 70% of children with protein energy malnutrition exist. Although food is essential, it has often been lacking, in the qualitative and quantitative point of view resulting in the occurrence of malnutrition. Indeed, malnutrition (under-nutrition, over-nutrition) is a public health problem of significant importance in developing countries (Asres and Eidelman, 2011).

Needless to say, pre-school children are younger and more vulnerable to the effects than their older counterparts. Research on the effects of breakfast on cognition by Bellisle (2004) shows that, particularly for younger children, skipping breakfast can have adverse effects on both general energy-level and cognition. Bellisle 2004 further shows that consuming breakfast resulted in better scores on three different types of tests.

According to Bellisle, (2004), the African region has the highest estimated prevalence of stunting (20.2 – 48.1%) and has the lowest rate of improvement. This report further says that in East Africa sub-region, rates of stunting are increasing. An analysis of the nutritional situation was done on various studies carried out among children and their nutritional status worldwide. The analysis concluded that growth retardation observed among school age children is striking and suggests that nutritional status of school children in these countries is at risk (Pollit, 1990). Nutritional status is therefore an area
of concern for study among school children and a threat to their academic performance and even later development and productivity.

In Kenya results from nutrition surveys indicate that the nutritional status of children less than five has deteriorated. There is significant deterioration in nutritional status notable in Western and Nyanza provinces (WHO, 2000). This obviously affects the children in the pre-school years with serious implications on their health as well as learning. In Western Province 37% of the children were stunted which was above the national rate of 33.6%. Vihiga District had the highest percentage of wasted children (12.5%), compared to other districts in the province (Central Bureau of Statistics, 1994). Stunting and underweight levels were higher in other districts.

According to the National Demographic and Health Survey (2003) Routine Statistical Reports, Kisumu East District had the following Health indicators;

Prevalence of stunting children 18%
Prevalence of wasting children 5.5%
Severe malnutrition rate 1.5%
Poverty level 53%

Owing to the current inflation rates, these figures could have gone up.

Protein energy malnutrition is the most common and most devastating form of malnutrition among school age children in Kenya (FAO/WHO, 1992). The general nutrition problem in Kenya is one of insufficient calories and proteins.
Other of studies carried out in Kenya indicate that significant numbers of school children are malnourished. A study carried out by Odoyo (1996) in Homa-Bay District (Kenya) to investigate the occurrence of intestinal helminthiasis and malnutrition among school children, indicated that the prevalence of stunting was higher in boys than girls, although the study population was basically malnourished. A study carried out by (Marjorie, 1983) in Embu district, Kenya, on school children aged seven to nine years showed that 25% of the sample was stunted.

Similarly a study carried out by Kielmann (1998) in Samburu showed a high prevalence of wasting among school children aged five to fifteen years. Though most studies carried out on nutritional status of children concentrate on these below five years of age, there is evidence that malnutrition exists among all ages of children in Kenya. It affects school children directly through absenteeism and frequent illnesses, poor school enrolment, early drop out and poor classroom performance (FAO/WHO, 1992). Thus, generally affects everyone in a community, but infants and children are the most vulnerable because of their high nutritional needs for growth and development (Nkuo-Akenji et al., 2008; Asres and Eidelman, 2011; Lioret et al., 2013).

Most of the pre-schools don’t have centrally organized feeding programmes. KISUMU DICECE (2012). There are ways to intervene so as to improve the nutrition and health of today’s pre-school children which offer the Ministry of Education promising avenues for enhancing the quality of pre-school education. School feeding programmes are one of such interventions. During the study it will be established whether the preschools in Rabuor offer children food in school.
2.3 Nutrition Influences on Pre-School Children Academic Performance

Good nutrition has been said to have favorable effects on educational attainment (Halterman 2001). It is expected that well nourished child will learn more readily than a poorly nourished ones. In a study done in the USA, twenty pre-schools that had school feeding programmes revealed higher increase in attendance rate compared to the ones that had no school feeding programmes. (Marjorie 1983). Three studies done in France on pre-school children pointed out that school achievement and progress of children is affected by nutritional and dietary variables (Pollit, 1983).

Iron helps with the production of red blood cells that carry oxygen around the body. A similar study done on short term fasting and its effects on problem solving in 9 – 11 years old children in France, revealed that those with less nutritious diets performed worse on a standardized literary assessment (Florence, Asbridge, & Veugelers, 2008). Those who missed breakfast were also more easily distracted by stimuli irrelevant to the task at hand. This study showed that variations in the timetable of dietary intake could affect specific processes such as attention and concentration.

Zhang, Hebert, and Muldoon (2005) looked specifically at fats in the American diet, as the customary diet of American children and adults is high in total fat, saturated fat, and cholesterol. Zhang et al. sought to identify associations with fat intake and psychosocial and cognitive functioning in U.S. school-aged children, since it had been unclear whether and how specific fats may affect social and cognitive development.
It is an everyday observation that children who are on a poor diet show little activity and lack energy. The children in pre-school are losing part of the most important period of education. Hough (1987), in his book Education and the National Economy says lack of food, good health and hygiene have a major effect on life and thus performance in education. Many children do not get enough of the right food to eat. They do not grow well, they become ill, many die and they do not grow up as clever, as healthy or as tall as they should be.

Data was used from the Third National Health and Nutrition Examination Survey (NHANES III). Medical and cognitive examinations and interviews were conducted with children and proxy respondents. A total of 5,367 children aged 6-16 participated in the Household Youth Interview. After attrition, a total of 3,666 children remained for the analyses (Zhang et al., 2005).

Mothers were asked a series of questions concerning their children’s behaviors and social skills. Children were administered the Arithmetic and Reading Subtests of the Wide Range Achievement Test, Revised (WRAT-R) and the block design and digit span subtests of the Wechsler Intelligence Scale for Children, Revised (WISC-R). The WRAT-R arithmetic subtest consists of oral and written problems ranging from addition to calculus, and the Reading subtest assesses letter recognition and word reading skills (Zhang et al.2005).
A twenty-four hour diet recall interview was administered to the proxies of the children in the study using a trained dietary interviewer using the Dietary Data Collection System designed to probe for fat and salt used in the preparation of foods. The interviewees were asked to report all foods and beverages consumed during the previous twenty-four hours, from midnight to midnight. Also, proxies were asked to rate their children’s health as excellent, very good, good, fair, or poor. A dichotomous variable was used that compared the children of the study in fair or poor health with children who were in excellent, very good, or good health (Zhang et al., 2005).

Individuals with a high intake of polyunsaturated fatty acids (PUFAs) had a lower proportion of poor reading performance but a higher proportion of reported difficulties in getting along with peers. However, increasing or decreasing total fat or saturated fat was not associated with cognitive functioning (Zhang et al., 2005).

Kar, Rao, and Chandramouli (2008) examined the effect of stunted growth on the nature of cognitive impairments and on the rate of cognitive development. The study investigated if malnutrition would result in a concentrated impairment and a general slowing in the rate of development of all cognitive processes or these effects could be present for some specific cognitive processes. Effects of malnutrition on cognitive processes were also looked at in relation to impairment without affecting the rate of development and its effect on the rate of development of the cognitive process itself. The
participants were identified as being malnourished or adequately nourished in the age
groups of five to seven years olds and eight to ten years old.
Students in the malnourished group were identified by their height (stunting) and weight
(wasting) of children in the same age categories with reference to the national center of
health statistics (NCHS). Height for age/weight for height score less than two standard
deviations from the mean were considered an indicator for moderate to severe
malnutrition. Adequately nourished students were identified as children who were in or
above the 50th percentile of height and weight as stated by the NCHS standards.
Adequately nourished students were paired with malnourished students with respect to
age and grade level. Each group had 20 participants (Kar et al., 2008).
During the study it will be established whether or not children being provided with meals
in school perform better than those who are not provided with food.

A study on school feeding programme which was aimed at fighting illiteracy was started.
Abu and Hallan (1989). It was based on the premise that poverty induced malnutrition
was by far the most important cause of child illiteracy and school dropout in most parts of
the third world. Through the programme, a midday meal consisting of rice, pulses and
vegetables was provided to 8 million school children. The Programme had intended to
improve enrolment in pre-schools, decreased dropout rate, added growth in height and
weight of children, reduced complaints of deficient subcutaneous fat, poor musculature
and mild anemia in children within three years. The programme proved a success and
was recommended by UNESCO as a model to be followed by poor countries on the road
to the goal of education for all. Good nutritional health could thus enhance educational attainment of pupils.

2.4 Difference in Performance of Pre-School Children from Schools with Feeding Programmes and Those Without

A feeding programme is a scheduled activity of providing enough nutrition and balanced diet to a selected group of people. It is a laid down schedule for a school to give food to children to enhance learning and other activities. In order to encourage good performance a good feeding programme should be there to encourage enrolment and attendance and discourage dropout, provide the child with the right food for health and strength, sustain learning process in children through encouraging participation and concentration, and prevent children from feeling hungry while at school. Hungry children cannot pay attention in class (Mitchell et al., 1999).

Food programmes work towards achieving several Millennium Development Goals (MDGs). The programmes directly address the goals of reducing hunger by half and achieving universal primary education by 2015, and of achieving gender parity in education by 2005 (Sessional Paper, 2005). School meals contribute in, the long term to combating poverty, but it also helps to reduce disease. It provides a platform for directly addressing child health and nutrition, for example through deworming schemes. It can
also be a platform for other health interventions. WFP school meals can take the form of a mid-morning snack or a nutritious breakfast of porridge.

Looking at school attendance and enrolment in comparable to schools with or without SFP or observing changes in pupil’s number and daily attendance after introduction of SFP, a SFP evaluation study was carried in 1991 by Jarousse and Mugat to assess the relative importance of different factors in the learning of pre-schools pupil, in Benin. The study showed that SFP had positive results because children looked healthy and performed better than those who were not provided with a feeding programme.

Learning achievement was measured by comparing tests scores in French and Mathematics at the beginning and the end of the school year. The study found that children in schools with a feeding programme performed better than those in schools without. When looking for possible explanation for such a positive relationship between learning achievement and the existence of a SFP, the research identified two possibilities that there was improved nutrition of children because of SFP and attendance was good in those schools. Attending school regularly improves pre-school children cognitive development, which improves learning and performance (Jarousse and Mugot, 1991).

Students were tested individually in a well-controlled environment. The test they were given was the NIMHANS neuropsychological battery for children. It was developed for
children aged five to fifteen. The battery consists of neuropsychological tests to assess motor speed, attention, executive function, visuospatial relationships, comprehension, learning, and memory. Each section was grouped under a specific cognitive domain on the basis of theoretical rationale and factor analysis (Kar et al., 2008).

Kar et al. (2008) compared the performance of adequately nourished children to malnourished children and also compared age related differences in cognitive function and found that the malnourished children differed from the adequately nourished children on tests of phonemic fluency, design fluency, selective attention, visuospatial working memory, visuospatial functions, verbal comprehension and verbal learning, and memory.

Results for the verbal fluency test show adequately-nourished children achieved higher mean scores in both age categories, five-to seven-year olds and eight-to ten-year olds (4.3 and 5.7 respectively), when compared to their malnourished counterparts (1.36 and 4.4 respectively). Some of the other results had similar findings such as visual construction adequately nourished in both age categories (10.0 and 15.8) score higher than malnourished students (3.0 and 4.8) in the same age categories and also for verbal learning (32.4 and 42.3 vs. 26.9 and 30.7). These results show age related differences within each group as well as between the two age groups. Kar et al. also found a lack of age-related improvement in malnourished children when looking at cognitive functions of attention, cognitive flexibility, visuospatial construction, ability and verbal learning. Malnourished students showed lower results than the adequately nourished students but they did show age related improvement for these same functions. Differences were tested
for statistical significance. Test scores for adequately nourished children between 5-to 7-years old and 8-to 10-year olds were found significant but most of the test scores for undernourished children showed a delay in development of certain cognitive functions.

Halterman, Kaczorowski, Aligne, and Szilagyi (2001) looked at the relationship between iron deficiency and cognitive test scores among school-aged children and adolescents. Their objective of this study was to evaluate the relationship between iron deficiency and standardized test scores among six to 16-year-old US children. This relationship was considered for both children who had iron deficiency with anemia and for children who had iron deficiency without anemia.

Among the 5,398 children in the study, 3% were iron deficient. This translated into 1.2 million school-aged children and adolescents in the United States who have an iron deficiency. Iron deficiency with or without anemia was determined for children with different age, gender, and demographic characteristics. Iron deficiency without anemia was more widespread than was iron deficiency with anemia. Iron deficiency was less than three percent among six-to 11-year-old children. Among 12-to 16-year-olds, iron deficiency was common among 8.7% of females, but only 0.9% of males (Halterman et al., 2001).

Halterman et al. (2001) examined results from the Standardized Test and found a trend of lower scores with diminishing iron status. This trend was most evident in math. Math scores were lower for the iron-deficient children without anemia compared to normal iron
status children. Children with anemia also had lower math scores when compared to
children with Nutrition and Academic Performance 21 normal iron status. Seventy-one
percent of children with an iron deficiency scored below average in math as well as 72%
of children anemia. Only 49% of children with normal iron status scored below average.
There were no real discrepancies found among these students with reading, block design,
and digit span but children with normal iron status performed better. Results from this
comparison were adjusted for age, gender, race, poverty status, caretaker education, and
lead status.

Proper-Nutrition is essential for growth, development, health and one’s well-being. This
statement is supported by the scholar Beryl (2000). Nutritional Programmes facilitate the
development of a child in all its dimensions and have considerable long-lasting effects on
the child’s life (Beryl, 2000).

Nutrition must be recognized as a vital component of a quality early childhood education
programme aimed at good performance. The pre-scholars’ nutrition and health are some
of the factors that determine in part the child’s schooling and performance. Pollit (1984)
says that malnutrition has become the highest risk factor for the educational future of
children. It has serious developmental implications in young children because their ages
are critical in growth and development. Therefore, education on nutrition should form an
integral part of early childhood education programme.
In a Kenyan study, children in the school feeding programme had better nutritional status and a faster growth than those not participating in Kirinyaga district (De moel 2014). Good feeding had contributed significantly to their rapid growth and mental development. The variables considered in this study were nutritional status, food intake and level of living, growth and performance of school children. The government of Kenya noted that the school feeding programmes are recognized as efficient, networks to distribute food to the pre-school and school age children (Kenya Development Plan, 1974 – 78).

Learning achievement was measured by comparing tests scores in French and Mathematics at the beginning and the end of the school year. The study found that children in schools with a feeding programme performed better than those in schools without. When looking for possible explanation for such a positive relationship between learning achievement and the existence of a SFP, the research identified two possibilities that there was improved nutrition of children because of SFP and attendance was good in those schools. Attending school regularly improves pre-school children cognitive development, which improves learning and performance (Jarousse and Mugot, 1991).

2.5 Approaches Set To Improve Nutrition in Pre-School Children

The focus is on school feedings role in maximizing children’s learning capacity through the relief of short-term hunger, and thus improving performance. The national school feeding programme was founded in 1967 guided by the philosophy ‘A hungry child cannot learn. It was mainly using locally produced foods from the
national cereals and produce board. However, this programme alone could not meet the demands for feeding programs in the country. Thus, the government encouraged development partners to join in and assist in this venture. The WFP is among the various development partners who have been very supportive in this area (Republic of Kenya and UNICEF, 1994).

A study in Nepal found that the probability of attending school was 5% for stunted children versus 27% for children of normal nutritional status (Moock and Leslie, 1986). In Ghana, malnourished children entered school at a later age and completed fewer years of school than better nourished children (Glewwe and Jacoby, 1994). The number of days that a child attends school is related to cognition and performance. SFPs can have a positive effect on rates of enrollment and attendance.

In 1981, WFP and the Government of Kenya started a school feeding programme, which was a joint venture. Its long term objective was to help Kenya achieve universal primary education (UPE) in the ASAL regions. Food assistance through this programme is channeled to both the pre-schools and primary schools. The immediate objectives of this programme were to maintain regular attendance rates in the schools, increase attention span of learners through provision of school meal, increase enrollment in pre-schools and primary schools.
According to a WFP 2008 survey, the net enrolment rate for boys and girls raised from 77% in 2002 to 97% in 2007 in Kenya, due in part to free primary education and in part the provision of school meals. While gender ratio is close to parity with schools with feeding programme, this suggests that school meals attract the most underprivileged female students in class and also draw hungry children to school each day.

Pollit (1984) argues that hunger at school is common and it interferes with learning process. Many children go to school without eating breakfast and sometimes miss lunch. This leads to adverse effects of hunger for example cognition, problem solving and concentration. Hungry children are less alert and lethargic. SFPs cannot be expected to make direct measurable contribution to combating malnutrition among school children. Attention has thus been focused on school feeding role in maximizing children’s learning capacity through the relief of short-term hunger, where children are helped to concentrate and assimilate.

Oyugi (2007) in her study stated that feeding programmes in various preschools have given the participation of children direct benefits and that parents, teachers, and stakeholders have acquired better knowledge and skills on issues related to health nutrition and care of the children. SFP is, therefore, of great concern to the well being of children as it plays a great role in their development. Those who care for the
children, for example the pre-school teachers, should, therefore, ensure that the food given to children is well balanced.

2.6 Summary

A well nourished child is able to attain better grades, learn all day and has some energy left to make most of other evening activities like coping with pressure, stress, resist infection have alert and active mind. These are positive ingredients of good performance and even beauty goes hand in hand with key players of correct nutrition as the skin and hair reflects your diet. In order to cater for the health and nutritional needs of pre-schoolers, pre-school institutions are advised to introduce lunches, feeding programmes and milk services. Pre-school teachers should encourage parents to organise mid morning snacks and lunch for children who stay at school the whole day.

Studies have shown that hunger has adverse effects on cognition problem solving and concentration as they contend that hungry children are found to be less alert and lethargic (UNESCO 1990). Kings (1966) argued that more effective methods be sought and it should be noted that children need nutritious foods to support growth, play and learning thus creating interests in schools. He believed that only healthy children could utilize fully the opportunities provided by schools to develop to the full their intellectual potentiality.
CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction
This chapter presents the methodology of the research. It describes the research design that was used, the independent and dependent variables, location of the study and the target population. The sample, sampling techniques, research instruments, data collection methods and data analysis methods have also been discussed.

3.2 Research Design
The study employed correlation research design. Correlation method describes in quantitative form the degree to which variables are related. The degree of relationship is expressed as a correlation coefficient (r) Mugenda and Mugenda (2003). The design was appropriate for the study because the study was dealing with relationships between nutrition status of pre-school children and their academic performance in Rabuor Zone. It enabled the collection, analysis and comparison of both quantitative and qualitative data obtained from the large number of parents and children forming the sample size.
3.2.1 Variables of the Study

The study examined two types of variables, namely, dependent and independent.

- **Independent Variable**
  
The independent variable in the study was nutrition of pre-school children. Specifically, it was any adequate and/balanced food commodity served in pre-school or home that had value to promote holistic growth as well as development in children and ultimately their academic performance.

- **Dependent Variable**
  
The dependent variable in this study was academic performance of the children in pre-school activities as gathered through analysis of pupil’s progress records kept in school and observation of their engagement in pre-school activities during normal class sessions.

- **Measurement of the variables**
  
The independent variable (nutrition) was measured by:

  i) **Number of meals**: the number of meals served to children per day and their types both at home and at pre-school were considered. Pre-school children are supposed to be fed with balanced meals distributed to at least five to six meals a day (Murungi, 2009). For the purpose of this study if children were served with at least three main balanced meals in a day then that indicated adequate
food intake and less than three balanced meals per day indicated inadequate food intake.

ii) Anthropometric indices: i.e. weight for age (underweight) and height for age (stunting) were also used as described below:

- **Weight**: The weight of pre-school children was measured using a weighing scale machine and finally compared to standard weight (see table 3.1) to identify a child who might have been underweight. According to the above table, a five to six year old child who weighed 15-16; 20-21 kgs was deemed under weight, 17-18; 22-23 kgs normal and above 19; 24 kgs over weight.

- **Height**: It was determined by a measuring tape and specifically, it was done to assess whether the children had stunted or normal growth in terms of height. Their height was finally compared to standard height as shown in table 3.1 below. For a height between 106-107; 109-110 cms. the child was termed as stunted, 108-109; 111-112 cms. normal and above 110; 113 cms. beyond normal height.

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>STD. WEIGHT (KG)</th>
<th>STD. HEIGHT (CM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>18</td>
<td>109</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
<td>112</td>
</tr>
</tbody>
</table>


iii) Observation: the observation of children was assessed and indicated through tallying the presence of the following behaviours in children during one school
term: Going late to school, Sleeping /dozing in class; Crying during class session; Reluctance in doing assignments; Sneaking out of school; Being dormant in participation during class activities; Having poor eating habits; Displaying poor class room concentration; Reluctance in participation in physical activities

iv) **Academic performance** pre-school children’s performance in learning activities was determined through examining document analysis (pupil’s progress records) kept in school and observation of children’s engagement in pre-school activities during normal class sessions using a 3-point scale based on the Ministry of Education 2007 (KESRAT tool) for children: 3 = very good, 2 = good and 1 = fair was used to score the children’s competence in language in relation to the following variables: Listening to and telling a simple short story using the language of the catchment area; Talking about three items related to a given sub theme; Identifying three colors in a given picture; Writing any three 3-letter words; Writing own full name and Reading at least three 3-letter words.
Table 3.2 Pre-school Children’s Rating Scale

<table>
<thead>
<tr>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Ministry of Education 2007 (KESRAT tool) for children

According to the above rating scale, a child with highest performance was rated 3 meaning very good performance, a child who got 2 was good and while a child who scored 1 was fair and had the lowest performance.

As shown in the table above 3 is the highest score while 1 is the lowest.

Other confounding factors that may also influence performance were not looked into. The researcher only focused on those schools that provide children with meals and those that don’t.

3.3 Location of the Study

The study was carried out in Rabuor zone of Kisumu county Kenya. It is located Latitude: S 0° 49' 2.93” and Longitude E 34° 8' 24.29. It is one of the poorest zones in Kisumu East District due to unreliable and scanty rains coupled with seasonal flooding which destroys houses and crops hence leading to prolonged drought, therefore lack of enough and balanced meals for the pre-school children in the area. Socio economically, the parents
are not highly placed. Most pre-school parents earn their living by working in rice plantations. The area has the highest number of pre-schools in the district.

3.4 Target Population

The study targeted pre-school children and their parents in Rabuor zone. According to District Education officer (DEO) Kisumu East District and the DICECE statistical records 2013, Rabuor zone has 44 pre-schools 30 public and 20 private with a total of 3282 children enrolled 115 teachers and approximately 3282 parents. Out of this, the researcher sampled out 13 pre-schools and 13 teachers one from each school selected for the study, 341 pre-school children and 341 parents of the sampled children. This study targeted children from both public and private pre-schools.

<table>
<thead>
<tr>
<th>School</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>14</td>
<td>31%</td>
</tr>
<tr>
<td>Public</td>
<td>30</td>
<td>69%</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
</tr>
</tbody>
</table>
3.4.1 Sampling Techniques

The researcher selected 30% of the 44 pre-schools available in Rabuor zone for study. This translated in a total of 13 pre-schools. This is in line with Cohen and Manion (2003) who established that selecting at least 30% of the total sampling units in a population is sufficient. The sample of 13 preschools was selected using stratified random sampling technique. These included 9 public and 4 private pre-schools. Mugenda and Mugenda (2003) states that stratified random sampling technique is used to achieve desired representation from various sub groups in the target population. Using a list of preschools sought from the District Education officer (DEO) Kisumu East District, the schools were stratified into private and public schools and later 13 schools were randomly selected giving equal allocations to the bases in the Zone.

3.5 Sample Size

The sample size constituted 13 pre-schools. This was a 30% of the total 44 schools in the zone. According to Orodho (2005), 10-30% of the population is an adequate sample. Which was further subdivided in the same percentages as of the sample size.
Table 3.4 Sampling Frame

<table>
<thead>
<tr>
<th>School Sampled</th>
<th>No. of schools</th>
<th>No. of children</th>
<th>No. of teachers</th>
<th>No. of parents</th>
<th>Sample (in percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>4</td>
<td>102</td>
<td>4</td>
<td>102</td>
<td>30%</td>
</tr>
<tr>
<td>Public</td>
<td>9</td>
<td>239</td>
<td>9</td>
<td>239</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>341</td>
<td>13</td>
<td>341</td>
<td>30%</td>
</tr>
</tbody>
</table>

Source: District Education Officer (DEO) Kisumu East District

3.6 Research Instruments

The following research instruments were used in this study to collect data from parents, teachers and pre-school children.

3.6.1 Questionnaires for the Parents and Teachers of Preschool Children

Closed ended questionnaires were used to collect data from the parents of the preschool children and teachers. The instruments questioned them on the type of food the children eat at home and at school, the class performance, participation, of pre-school children and intervention programs available.
3.6.2 Performance Observation Checklist

Progress records were analyzed to evaluate pre-school children’s performance in order to determine high and low performing children. This was achieved through analyzing their general performance as indicated in the progress records of each term kept in the school. Observation of the children’s performance in preschool activities during normal classes was also done and recorded by the researcher.

3.6.3 Anthropometric Assessment sheet

It is the physical measurement of the human body and is commonly used to estimate the nutritional status of children. Anthropometry measures have been extensively used for identification and classification of children suffering from protein-energy malnutrition (PEM). Different anthropometric measurements are combined as ratios or indices such as weight-for-age, weight for height and height for age. This study used anthropometric measurements to determine children’s nutritional status. It measured weight for age and weight for height to determine stunting and underweight in children.

3.6.4 Pilot Study

Pilot testing is a trial run of procedures and instruments that were used. It was used because Piloting may prevent costly mistakes. Pilot testing was conducted for 10% of the entire preschools in Rabuor zone. The researcher assessed and gave the feedback to
questions that had ambiguities and difficulty in understanding. Based on the respondents’ feedback the questionnaire was fine-tuned in readiness for the actual data collection.

3.6.5 Validity of the instruments

Validity of the instruments was important in the study as it ensures that inferences based on the collected data were accurate and meaningful (Mugenda and Mugenda, 2003). Both face and content validity were tested in this study. Face validity minimized the likelihood that a question was misunderstood or misinterpreted by the respondents. The questions and answers given to respondents were scrutinized to see whether they gave a common understanding and if not the improvements were made.

Content validity was checked through item analysis. To ensure content validity, the researcher made sure that the items on the instruments covered all the objectives of the study. Every item was then checked against the responses given by the respondent. Most of the responses given (98%) corresponded to the laid down objectives. The instruments were therefore considered valid. Orodho (2005) asserts that validity is the degree to which results obtained actually represent the phenomenon under investigation.
3.6.6 Reliability of Research Instruments

The test-retest technique was used to measure the degree to which the research instruments yield consistent results. The questionnaires were administered and after two weeks the same set of questionnaire were filled again by the same subjects. The findings were compared to check whether they yielded consistent results.

Spearman’s rank order co-relation was used to compute the correlation coefficient in order to establish the extent to which the contents of the questionnaires were consistent in giving similar responses every time the instrument was administered.

A reliable measure is one in which the scores remain the same over a few measurement points. If the test is very stable then the test-retest coefficient is high (e.g. 0.75). Cronbach’s Alpha Coefficient was computed from the data collected during the pilot study to confirm the reliability of the instrument used. This shows that the questionnaire was reliable. Creswell (2005) states that a positive correlation of 0.8 and above shows that the instrument is reliable.
Table 3.5: Reliability coefficients

<table>
<thead>
<tr>
<th>Research instruments</th>
<th>Reliability coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of nutrition status</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; administration</td>
</tr>
<tr>
<td>Influence of nutrition on academic performance.</td>
<td>0.83</td>
</tr>
<tr>
<td>Difference in performance between child with and those without school feeding programme</td>
<td>0.93</td>
</tr>
<tr>
<td>Approaches set to improve pre-school children’s nutrition</td>
<td>0.84</td>
</tr>
</tbody>
</table>

3.7 Data Collection Techniques

A research permit to conduct the study was obtained from National Commission for Science, Technology and innovation (NACOSTI) The researcher then reported to the County Commissioner and The County Education Officer to inform them about the intended study. Thereafter schools we revisited with consent of the Head Teachers. The activity progress documents and reports for children were accessed and analyzed and Observation checklists were used to record their participation and performance in activities to corroborate the information. The parents of the sampled children also
answered the questionnaires in school. The data collection procedure took 15 working
days after which the results were presented for analysis.

3.8 Data Analysis
Statistical Package for Social Sciences (SPSS) was used to prepare and organize data for
analysis to test significance levels between variables at 0.05% level of significance. Data
was analyzed statistically using descriptive and inferential statistics. Descriptive analysis
involved use of means, standard deviation and percentages. The Pearson Product Moment
Correlation Coefficient was utilized to test following research hypotheses;

HO₁ There is no significance influence of nutrition on pre-school children
academic performance.

HO₂ Testing, No Significant Difference in Performance of Pre-School
Children from Schools with Feeding Programmes and those Without

The inferential statistics using a chi Square for goodness of fit testing the difference
infrequency of respondents who were given meals, correlation between nutrition and
academic performance and correlation between nutrition and growth and development.
The findings of the study were reported on the basis of objectives and hypotheses.
3.9 Logistical and Ethical Considerations

A research permit was obtained from NACOSTI and the county commissioner and Education Officers informed accordingly about the intended study. The researcher ensured that the nature and purpose of the study, the methods used, possible benefit and harm were well explained to the respondents to enable them give their informed consent for their participation in the studies. All ethical considerations were regarded. The respondents were assured that the information they gave would be used for research purposes only and that it would be treated with utmost confidentiality.
CHAPTER FOUR

FINDINGS INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents findings which have been discussed under the thematic areas and sub-sections in line with the study objectives. The objectives were:

i. To assess the nutritional status among pre-school children in Rabuor zone Kisumu County.

ii. To establish how nutrition influences pre-school children academic performance in Rabuor zone Kisumu County.

iii. To find out the difference in performance of children from pre-schools with feeding programmes and those without in Rabuor Zone.

iv. To establish the approaches set to improve pre-school children’s nutrition Rabuor Zone Kisumu County.

The presentation and discussions were in line with the objectives.

4.2 Study Response Rate

This section presents the response rate of the study respondents. The study targeted 13 teachers, 341 children and their parents. Even though the study was unable to get a 100%
response rate, there was a high response rate. Table 4.1 below shows the response rate of the study.

### Table 4.1 Study Response Rate

<table>
<thead>
<tr>
<th></th>
<th>Response rate</th>
<th>Non- response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Teachers</td>
<td>13</td>
<td>100%</td>
</tr>
<tr>
<td>Parents</td>
<td>293</td>
<td>85.95%</td>
</tr>
<tr>
<td>Children</td>
<td>341</td>
<td>100%</td>
</tr>
</tbody>
</table>

The study obtained 100% (13) respondents from the teachers, whereas children recorded 100% (341) while parents recorded a response rate of 85.95% (293) parents non-response (those who did not turn for the study were 14.05% (43). This was due to the busy schedule of most parents and some of them could not come to school to be interviewed. In which according to Hagger *et al.*, (2003), the researcher should strive to achieve a response rate of 50 percent, 60 percent or 75 percent.

### 4.3 Demographic information of parents, teachers and children

Demographic information gives the background information of the respondents in a study. Below is the demographic information of the various respondents sought, namely;
1) Gender of parents, teachers and children.

2) Age of parents and teachers

3) Level of education of parents and teachers.

4) Parents income

The results are discussed in tables 4.1, figure 4.1, table 4.2 and figure 4.2 below.

4.3.1 Gender

The gender distribution of teachers, parents and pre-school children is presented according to sex. The result in the table 4.2 below shows the findings.

**Table 4.2 Gender**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>F</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Parents</td>
<td>F</td>
<td>79</td>
<td>214</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>27%</td>
<td>73%</td>
</tr>
<tr>
<td>Children</td>
<td>F</td>
<td>167</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>49%</td>
<td>51%</td>
</tr>
</tbody>
</table>

From the results in the table 4.1 above the results indicate that majority 69% (9) of teachers were female whereas 31% (4) were male teachers. Majority 73% (214) of the parents respondents were female while 27% (79) were male parents. Lastly, majority 51% (174) of children involved in the study were female while 49% of them were male.
4.3.2 Age of parents and teachers

The table 4.3 below shows age distribution of respondents (teachers and parents) of the study. The results were analyzed and the findings are as shown below.

Table 4.3 Age of parents and teachers

<table>
<thead>
<tr>
<th>Years</th>
<th>Teachers</th>
<th></th>
<th>Parents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>percentage</td>
</tr>
<tr>
<td>18-22</td>
<td>0</td>
<td>0%</td>
<td>46</td>
<td>16%</td>
</tr>
<tr>
<td>23-27</td>
<td>7</td>
<td>51%</td>
<td>59</td>
<td>19%</td>
</tr>
<tr>
<td>28-32</td>
<td>3</td>
<td>23%</td>
<td>142</td>
<td>46%</td>
</tr>
<tr>
<td>33-37</td>
<td>2</td>
<td>15%</td>
<td>37</td>
<td>12%</td>
</tr>
<tr>
<td>38-42</td>
<td>1</td>
<td>11%</td>
<td>22</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100%</td>
<td>293</td>
<td>100%</td>
</tr>
</tbody>
</table>

From the results in the table 4.3 above, is evident that the majority 46% (142) and 51% (7) of parents and teachers were between the age bracket (28-32) and (23-37) respectively followed by 19% (59) and 23% (3) were in the age bracket of (23-27) and (28-32) years respectively then 16% (46) and 15% (2) were in the age bracket (18-22) and (33-37) years respectively whereas 12% (37) and 11% (1) were in the age bracket (33-37) and lastly 7% (22) and (38-42) years were in the age bracket (38-42). This indicates that most parents and teachers were in the capacity of tackling Nutritional problem of their children.
4.3.3 Level of education of parents

Results of teachers and parents levels education are presented in the table 4.4 below

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Teachers</th>
<th>Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Primary</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Secondary</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Post secondary /collage /professional training</td>
<td>11</td>
<td>98%</td>
</tr>
<tr>
<td>University</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No schooling</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

It was necessary to establish the education level of parents since it has been strongly associated with health of children and also the importance attached to education. Research indicates that highly educated parents seek medical advice (Gering et al., 2006). From the results in the table 4.4, majority 98% (11) of the teachers reached up to Post secondary /collage /professional training while 2% (2) attained up to secondary school level of education. Majority 51% (149) of parents have studied up to Post sec /collage /professional training, 17% (50) only
reached primary level, 14% (41) studied up to secondary level, 13% (38) reached up to university level of education while 5% (15) never went to school.

4.3.4 Parents’ Level of Income

Section 4.3.4 sought to examine the distribution of parent’s level of income. Figure 4.1 below show the distribution of parent’s level of income.

From the figure 4.1 above the findings indicate that majority 78% (229) of the parents lived below 1$ a day whereas the rest 22% (64) had an Average income to sustain their
families. This indicates that most of the parents cannot afford a balanced diet for their children which are essential for both cognitive and physical development.

4.4 Assessment of Nutritional Status of Pre-School Children

This was the first objective of the study and it dealt with assessment of nutrition status of pre-schools children. The information sought to establish nutrition status was:

- Number of meals served to children in a day
- Type of packed meals offered to children
- Children’s weight for age (underweight) and height for age (stunting)
- Nutritional status Z scores.

The results are presented in figures 4.3, 4.4, 4.5 and 4.6 and figure;

4.4.1 Number of meals served to Pre-school children in a day

The results in the figure 4.2 below shows the results of responses by parents when they were asked the number of meals they offer to their children in a day.
Figure 4.2: Number of meals served to children in a day

The figure 4.2: show that majority 29% (144) of the parents give their children’s a meal a day whereas 58% (82) give their children three meals in a day while 13% (67) give to their children two meals a day.

4.4.2 Types of packed meals offered to pre-school children

Parents were asked the type of meals they offer their kids. And the figure 4.4 below shows the results of the findings
Figure 4.3: Types of packed meals offered to children

From the figure 4.3 above the results indicate that majority 46% (135) of the respondents offered Ugali and Vegetables to their children, 23% (67) offered githeri, 21% (62) of the respondents offered porridge’ whereas 10% (29) offered beans and rice.

4.4.3 Children’s Age, weight and height

The anthropometric measurements of age, weight and height of pre-school children were sought. Table below 4.5 shows the results.
Table 4.5: Children’s age, weight and height (N=341)

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Childs weight(kg)</th>
<th>Childs height (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>60.5</td>
<td>15.550</td>
<td>37.1</td>
</tr>
<tr>
<td>Median</td>
<td>62.1</td>
<td>15.738</td>
<td>37.379</td>
</tr>
<tr>
<td>Mode</td>
<td>63.0</td>
<td>14.0</td>
<td>36.72</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>9.9905</td>
<td>2.6911</td>
<td>3.878</td>
</tr>
<tr>
<td>Range</td>
<td>72.0</td>
<td>23.0</td>
<td>45.2</td>
</tr>
<tr>
<td>Maximum</td>
<td>63.0</td>
<td>24.482</td>
<td>48.2</td>
</tr>
</tbody>
</table>

According to table 4.5, the average age was five years (60.5 months) and most of the children in the study were aged 63 months. The mean weight of children was 15.550 kg and height was 37.1 inches. Majority of the children had a weight of 14kg and were measured to have a height of 36.72 inches. The children’s maximum weight was 24.482 kgs and maximum height was 48.2 inches or 122.6 centimeters. This finding is also closely related to that of Mwema (2006) that the number of meals consumed in a day is related to stunting. To get the height in centimeters, the inches were converted.

Using the information derived from tables; 4.5 on children’s age, weight and height.

4.4.4 Nutritional Status (height for age Z scores) (stunting)

This information was categorized and summarized into nutritional status in terms of stunting and underweight using the cut-off points given in table 4.6 and 4.7 to establish
nutritional status.

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (Z ≥ -2)</td>
<td>133</td>
<td>39%</td>
</tr>
<tr>
<td>Moderate (-3 ≤ Z ≤ -2)</td>
<td>167</td>
<td>49%</td>
</tr>
<tr>
<td>Severe (Z ≥-3)</td>
<td>41</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>341</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Means less than, ≥ Means greater than or equal to, ≤ Means less than or equal to.

Children’s nutritional status in terms of stunting was further characterized into three groups; the normal, the moderate and the severe. Table 4.6 shows that among the 341 pre-school age going children in Rabuor zone Kisumu County, majority of children 167 (49%) were moderately stunted, 133(39%) of them were normal and only 41(12%) were severely stunted.
Table 4.7: Nutritional Status (Weight for Age Z Scores) (Underweight)

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (Z ≥ -2)</td>
<td>53</td>
<td>15.4%</td>
</tr>
<tr>
<td>Moderate (-3 ≤ Z ≤ -2)</td>
<td>269</td>
<td>78.9%</td>
</tr>
<tr>
<td>Severe (Z ≥ -3)</td>
<td>19</td>
<td>5.7%</td>
</tr>
<tr>
<td>Total</td>
<td>341</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

< Means less than, ≥ Means greater than or equal to, ≤ Means less than or equal to.

From table 4.7 it is shown that among the 341 pre-school age going children in Rabuor zone Kisumu County many of them 208 (78.9%) were moderately underweight, 53 (15.4%) of them were normal and only 19 (5.7%) were severely underweight. These findings corroborate with findings of Bellisle 2004 which concluded that growth retardation observed among school age children in East African sub region is striking and their nutritional status is at risk hence the importance of this study.

4.5 Influence of Nutritional Status on Academic Achievement of Pre-School Children

This was the second objective of the study under which the following subheadings were discussed; performance in the pre-school children’s previous tests, participation in ongoing activities and how nutrition influenced academic performance.
4.5.1 Influence of nutrition on pre-school children academic performance

The parent and teacher participants in this study were asked if nutrition status affected pre-school children’s academic performance and their responses were as shown in the table 4.8 below.

Table 4.8 Whether nutrition influences academic performance of preschool children

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Parents</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>percentage</td>
</tr>
<tr>
<td>Yes</td>
<td>196</td>
<td>67%</td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>33%</td>
</tr>
<tr>
<td>Total</td>
<td>293</td>
<td>100%</td>
</tr>
</tbody>
</table>

From the table 4.8 above the results imply that, majority (67% (196) parents, 79 %( 10)) teachers agreed that nutrition influences pre-school children academic performance whereas 33% (97) parents and 21% (3) teachers did not agree to that statement.
4.5.2 Teachers’ Responses on Level of nutritional influence on academic performance of pre-school children

a) Teachers were presented with line-kert scale questions of (1-5) to indicate their level of agreement on statements of how nutrition influences academic performance of their children and the results in the table 4.7 show their responses.

b)

Table 4.9 Level of nutritional influence on academic performance of pre-school children

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither disagree nor agree</th>
<th>agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Children, who go to school hungry, or without breakfast, tend to have lower math scores and are more likely to have to repeat at least once in the same class.</td>
<td>1 8.8</td>
<td>2 14.5</td>
<td>2 16.9</td>
<td>3 23.6</td>
<td>5 36.2</td>
</tr>
<tr>
<td>2. Academic problems, as well as emotional and behavioral difficulties can be tied directly to poor nutrition.</td>
<td>0 0</td>
<td>3 21</td>
<td>2 13.9</td>
<td>5 40.5</td>
<td>3 26.7</td>
</tr>
<tr>
<td>3. Undernourished kids tend to score lower on cognitive tests than those who get the right nutrition.</td>
<td>1 5.4</td>
<td>1 5.7</td>
<td>2 12.5</td>
<td>2 19.9</td>
<td>7 56.4</td>
</tr>
<tr>
<td>4. Children, who eat breakfast at school, closer to the time they take tests, perform better on standardized tests.</td>
<td>0 0</td>
<td>1 8.8</td>
<td>3 26.4</td>
<td>4 29.4</td>
<td>5 38.2</td>
</tr>
<tr>
<td>5. Children who participate in school breakfast programs tend to show improved math grades, and have higher attendance and punctuality.</td>
<td>2 15.9</td>
<td>3 24.7</td>
<td>1 6.8</td>
<td>5 35.8</td>
<td>2 16.9</td>
</tr>
</tbody>
</table>
From the results in the table 4.10 above, majority 36.2% (5) of teachers strongly agreed that Children, who go to school hungry, or without breakfast, tend to have lower math scores and are more likely to have to repeat at least once in the same class. 23.6% (3) agreed, 16.9% (2) neither agreed nor disagreed to the statement, whereas 14.5% (2) disagreed while 8.8% (1) strongly disagreed.

Majority 40.5% (5) agreed that, Academic problems, as well as emotional and behavioral difficulties can be tied directly to poor nutrition. 26.7% (3) strongly agreed, 13.9% (2) neither agreed nor disagreed to the statement whereas 21% (2) disagreed. On the statement ‘Undernourished kids tend to score lower on cognitive tests than those who get the right nutrition.’ Majority 56.4% (7) strongly agreed, 19.9% (2) agreed, 12.5% (2) neither agreed nor disagreed whereas 5.7% (1) disagreed while 5.4% (1) strongly disagreed.

Once again, majority 38.2% (5) of respondents strongly agreed that, children, who eat breakfast at school, closer to the time they take tests, perform better on standardized tests. 29.4% (4) agreed to the statement whereas 26.4% (3) neither agreed nor disagreed while 8.8% (1) disagreed. The results indicate that Children who participate in school breakfast programs tend to show improved math grades, and have higher attendance and punctuality. Since majority 35.8% (5) agreed to that, followed by 24.1% (3) who disagreed while 16.9% (2) strongly agreed whereas 15.9% (2) strongly disagreed and lastly 6.8% (1) neither agreed
nor disagreed. These results are consistent with findings from other studies, including Kabubo-Mariara et al. (2009) in Kenya and Mbuya et al. (2010) in Zimbabwe.

4.5.3 Test scores in the previous exams.

It was of great essence for the study to establish the test score of the pre-school children, thus a linkert scale of 1-5 was used to rate the individual performance of children in the pre-school institution and the findings were as tabulated in table 4.9 below.

<table>
<thead>
<tr>
<th>Performance</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>52</td>
<td>15%</td>
</tr>
<tr>
<td>Good</td>
<td>89</td>
<td>26%</td>
</tr>
<tr>
<td>Fair</td>
<td>200</td>
<td>59%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>341</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From the results in the table 4.10 above, the study indicate that majority 59% (200) of the pre-school children performed fairly, followed by 26 % (89) whose performance were good while only 15% (52) performed very good. This indicates that the pre-school in Rabuor zone performance record was fair.
4.5.4 Performance Observation checklist

The researcher observed children’s participation, involvement and performance in class activities conducted by the teacher that relate to their academic outcomes. Thus the researcher used an observation checklist to determine pre-school children performance in various activities as indicated in the table 4.11 below.

<table>
<thead>
<tr>
<th>Nature of discipline</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateness to school</td>
<td>266</td>
<td>78%</td>
</tr>
<tr>
<td>Sleeping /dozing in class</td>
<td>276</td>
<td>81%</td>
</tr>
<tr>
<td>Crying during class session</td>
<td>259</td>
<td>76%</td>
</tr>
<tr>
<td>Reluctant in doing assignments</td>
<td>269</td>
<td>79%</td>
</tr>
<tr>
<td>Sneaking out of school</td>
<td>283</td>
<td>83%</td>
</tr>
<tr>
<td>Dormant in participation in class activities</td>
<td>286</td>
<td>84%</td>
</tr>
<tr>
<td>Poor eating habits</td>
<td>310</td>
<td>91%</td>
</tr>
<tr>
<td>Poor class room concentration</td>
<td>297</td>
<td>87%</td>
</tr>
<tr>
<td>Participation in physical activities</td>
<td>280</td>
<td>82%</td>
</tr>
</tbody>
</table>

From the findings in the table 4.11 above the results indicate that a great number of children’s 283(78%) arrive to school very late. This might be due to laxity in coming to school or having meals late or no meals at all in the morning. The findings also indicate
that 276(81%) of students are prone to sleeping /dozing in class which may be coursed by overeating or not having taken any meal at all. Also majority 259(76%) were observed to be crying in class without no course which is an indication of hunger.

A greater number 269(79%) especially from schools without feeding programmes were observed to be reluctant in doing class assignments, which was due to lack of concentration and hunger, and thus leading almost all 286(84%) to be dormant in participation in class activities. As most of the 310(91%) were observed to be having poor eating habits while others 283(83%) sneaked out of school.

It was observed that most 297(87%) were poorly concentrating in class while majority 280(82) were observed to have little participation in physical activities. It affects school children directly through absenteeism and frequent illnesses, poor school enrolment, early drop out and poor classroom performance (FAO/WHO, 1992).

4.5.5 Test of Hypothesis: No Significance Influence of Nutrition on Pre-School Children Academic Performance

Pearson Product Moment Correlation Coefficient was utilized to test this hypothesis. The Correlation was tested at 0.05 significant levels. Table 4.13 presents findings for this hypothesis;
Table 4.12 HO1 There is no significance influence of nutrition on pre-school children academic performance

<table>
<thead>
<tr>
<th></th>
<th>Related</th>
<th>Not related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related</td>
<td>Pearson correlation sig (2-tailed) N</td>
<td>1.372*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td></td>
<td>341</td>
</tr>
<tr>
<td>Not related</td>
<td>Pearson correlation sig (2-tailed) N</td>
<td>1.372*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td></td>
<td>341</td>
</tr>
</tbody>
</table>

Table 4.12 indicates that there was a positive correlation between the two variables where $r = 1.372$, $p = 0.033$, $n = 341$. There was therefore a positive correlation between nutrition and academic performance of pre-school children. The results also revealed that the p-value was 0.033, which is less than 0.05 ($p=0.033<0.05$). This implies that statistically there is a significant relationship between the two variables. It also means that an improvement in nutrition status significantly relates to an improvement in performance. The null hypothesis was therefore rejected. The results here therefore agrees with Halterman 2001, that good nutrition has been said to have favorable effects on educational attainment and it is expected that a well nourished child will learn more readily than poorly nourished one, hence the need for this study.
4.6 Difference in Performance of Pre-School Children from Schools with Feeding Programmes and Those Without

This section 4.6 ought to find out the difference in performance of children in pre-schools with or without feeding programmes as stated in objective three and the results are discussed as per the sub-objective;

- Attendance of pre-school children
- Effects of school feeding programmes on performance of pre-school children
- Comparison of performance of school with and those without feeding programmes.
- HO2: No Significant Difference in Performance of Pre-School Children from Schools with Feeding Programmes and Those Without

4.6.1 Attendance of Pre-school children

The table below 4.13 shows the results of the findings of attendance of pre-school children.
Table 4.13 Attendance of Pre-school children

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Schools with a feeding Programme</th>
<th>Schools without a feeding Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>Percentage</td>
</tr>
<tr>
<td>Term 1</td>
<td>89.3%</td>
<td>94.7%</td>
</tr>
<tr>
<td>Term 2</td>
<td>82.6%</td>
<td>96.1%</td>
</tr>
<tr>
<td>Term 3</td>
<td>85.2%</td>
<td>97.8%</td>
</tr>
</tbody>
</table>

Table 4.13 above shows the attendance of pre-school children in the year 2012 and 2013 for the three terms. The results indicate that in the years 2012 and 2013 the schools with a feeding programme had a higher attendance than the schools which do not have an SFP. This shows that a feeding programme is one of the factors influencing the attendance of the pre-scholar.
4.6.2 Effects of School Feeding Programme on the Performance of Pre-school children

In the area of performance, the respondent teachers from the schools with the feeding programme confirmed that there has been an increasing trend in performance with many pre-school children being attentive in class. On the other hand, schools without feeding programme had an increasing trend in performance during earlier years while in the present years the trend was on the decline. This was most likely attributed to changes in the feeding programme in the schools.

All the teachers from the schools offering the feeding programme further graded their school feeding programme as good and all respondent teachers noted the effects of the feeding programme on performance as good. This indicated that the feeding programmes had a positive impact on performance. This was further supported by the fact that children’s participation in activities before meals was slow and there was poor concentration as opposed to participation after meals where concentration was good and the children were jovial. The children’s favorite meal was ugali.
4.6.3 Comparison of Performance in Pre-Schools with School Feeding Programme with Those without the Programme

Table 4.14 Comparison of Pre-schools’ Performance

<table>
<thead>
<tr>
<th>School A</th>
<th>Schools with a feeding Programme 2013</th>
<th>School H</th>
<th>Schools without a feeding Programme 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td>13.5</td>
<td>Term 1</td>
<td>12.3</td>
</tr>
<tr>
<td>Term 2</td>
<td>18.9</td>
<td>Term 2</td>
<td>11.5</td>
</tr>
<tr>
<td>Term 3</td>
<td>19.9</td>
<td>Term 3</td>
<td>12.8</td>
</tr>
<tr>
<td>Mean</td>
<td>17.5</td>
<td>Mean</td>
<td>12.2</td>
</tr>
<tr>
<td><strong>School B</strong></td>
<td></td>
<td><strong>School I</strong></td>
<td></td>
</tr>
<tr>
<td>Term 1</td>
<td>18.7</td>
<td>Term 1</td>
<td>16.3</td>
</tr>
<tr>
<td>Term 2</td>
<td>17.4</td>
<td>Term 2</td>
<td>17.0</td>
</tr>
<tr>
<td>Term 3</td>
<td>17.9</td>
<td>Term 3</td>
<td>15.7</td>
</tr>
<tr>
<td>Mean</td>
<td>18.00</td>
<td>Mean</td>
<td>16.3</td>
</tr>
<tr>
<td><strong>School C</strong></td>
<td></td>
<td><strong>School J</strong></td>
<td></td>
</tr>
<tr>
<td>Term 1</td>
<td>16.6</td>
<td>Term 1</td>
<td>15.4</td>
</tr>
<tr>
<td>Term 2</td>
<td>19.4</td>
<td>Term 2</td>
<td>14.4</td>
</tr>
<tr>
<td>Term 3</td>
<td>17.4</td>
<td>Term 3</td>
<td>13.4</td>
</tr>
<tr>
<td>Mean</td>
<td>17.8</td>
<td>Mean</td>
<td>14.4</td>
</tr>
<tr>
<td><strong>School D</strong></td>
<td></td>
<td><strong>School K</strong></td>
<td></td>
</tr>
<tr>
<td>Term 1</td>
<td>18.4</td>
<td>Term 1</td>
<td>14.3</td>
</tr>
<tr>
<td>Term 2</td>
<td>19.6</td>
<td>Term 2</td>
<td>14.3</td>
</tr>
<tr>
<td>Term 3</td>
<td>19.8</td>
<td>Term 3</td>
<td>14.1</td>
</tr>
<tr>
<td>Mean</td>
<td>19.3</td>
<td>Mean</td>
<td>14.2</td>
</tr>
<tr>
<td><strong>School E</strong></td>
<td></td>
<td><strong>School L</strong></td>
<td></td>
</tr>
<tr>
<td>Term 1</td>
<td>17.9</td>
<td>Term 1</td>
<td>13.2</td>
</tr>
<tr>
<td>Term 2</td>
<td>17.3</td>
<td>Term 2</td>
<td>13.2</td>
</tr>
<tr>
<td>Term 3</td>
<td>18.6</td>
<td>Term 3</td>
<td>13.2</td>
</tr>
<tr>
<td>Mean</td>
<td>17.9</td>
<td>Mean</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>School F</strong></td>
<td></td>
<td><strong>School M</strong></td>
<td></td>
</tr>
<tr>
<td>Term 1</td>
<td>16.9</td>
<td>Term 1</td>
<td>11.6</td>
</tr>
<tr>
<td>Term 2</td>
<td>16.9</td>
<td>Term 2</td>
<td>12.8</td>
</tr>
<tr>
<td>Term 3</td>
<td>17.0</td>
<td>Term 3</td>
<td>12.5</td>
</tr>
<tr>
<td>Mean</td>
<td>16.0</td>
<td>Mean</td>
<td>12.3</td>
</tr>
<tr>
<td><strong>School G</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pre-schools within Rabuor Zone do a common examination every term. Table 4.14 shows the end of term results for pre-schools, which offered children feeding programme and those that were without it. The comparison of the mean of schools which had a feeding programme with those which did not have one shows that the former had performed better.

The lowest mean for the schools which had a feeding programme was 17.0, while the lowest mean for the schools that did not have a school feeding programme was 12.2. The highest mean for the schools that had a feeding programme was 19.8, while the highest mean for the schools that did not have a feeding programme was 16.3.

This clearly indicates that an SFP was one of the factors that contributed to performance of Pre-schoolers. The fact that some schools which did not have a feeding programme were performing better than those that had a school feeding programme shows that there were other factors that contributed to improved performance and not a feeding programme alone.
4.6.4 HO₂ testing, No Significant Difference in Performance of Pre-School Children from Schools with Feeding Programmes and Those Without

Pearson Product Moment Correlation Coefficient was utilized to test this hypothesis. The Correlation was tested at 0.05 significant levels. Table 4.5 presents findings for this hypothesis;

Table 4.15 No significant difference in performance of pre-school children from schools with feeding programmes and those without

<table>
<thead>
<tr>
<th>Related</th>
<th>Pearson correlation sig (2-tailed)</th>
<th>Related</th>
<th>Not related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related</td>
<td>N 13</td>
<td>1</td>
<td>0.090*</td>
</tr>
<tr>
<td>Not related</td>
<td>Pearson correlation sig (2-tailed)</td>
<td>0.013</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>N 13</td>
<td>0.013</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.15 indicates that there was a positive correlation between the two variables where $r = 0.090$, $p = 0.013$, $n = 13$. There was therefore a positive correlation between nutrition and academic performance of pre-school children. The results also revealed that the p-value was 0.013, which is less than 0.05 ($p=0.013<0.05$). This implies that statistically there is a significant relationship between the two variables. It also means that an improvement in nutrition status significantly relates to an improvement in performance. The null hypothesis was therefore rejected. These findings support Kar et al.
(2008) which stated that malnourished children showed lower results than the adequately nourished ones on different tests administered.

4.7 Approaches Set to Improve Nutrition of Pre-School Children

This was the fourth and last objective of the study. It explored the strategy put in place to improve nutrition of preschool children.

When respondents (teachers and parents) were asked approaches that they have in place to improve nutrition of their pre-school children. They all agreed that they do have strategies in place of improving their children’s nutrition and suggested the following strategies that are underway in their school;

i. Out of the 6 schools which did not have a feeding programme, respondents indicated that there are children who do not carry food to school. They further mentioned that such children are sent home during lunch hour and their parents are advised accordingly.

ii. All the respondent schools with a collaborative programme noted that they ask parents to contribute toward a common meal.

iii. Further the researcher noted that the teachers normally met with the head teacher and discussed how to make the feeding programme better. Their meeting was done occasionally and they discussed issues to deal with, meal times, food serving, how the meals were prepared, need for additional of facilities
and to give any feedback on the programme as conveyed by the pre-schoolers.

iv. They all agreed that the meetings had an impact on the feeding programme where the issues discussed were looked into to improve the programme performance in delivering service and the quality of meals. They also conveyed the feedback to WFP.

### 4.8 Summary of the Findings

This chapter has focused on the questionnaire return rates, demographic and background of the respondents as well as presentation of findings. The findings have been summarized as follows: Majority of the questionnaires was returned. The ages of the pre-school teachers and pre-school parents confirmed that they were all mature enough to overcome nutritional problems.
CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS,
RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

5.1 Introduction
This chapter presents the summary of the study based on the analysis of findings the research objectives. The study had four objectives namely: To assess the nutritional status among pre-school children in Rabuor zone Kisumu County, To establish how nutrition influences pre-school children academic performance in Rabuor zone Kisumu County, To establish the difference in performance of pre-school children from schools with feeding programmes and those without in Rabuor Zone, To establish the approaches set to improve pre-school children’s nutrition Rabuor Zone Kisumu County.

5.2 Summary of the Findings
The study was carried out to establish the relationship between nutrition and performance of pre-school children whose finding are discussed below.

5.3 Summary of objectives findings
5.3.1 Nutritional status of the children at baseline
A number of indicators were used to classify the nutritional status of the school children. These include Weight for age, Height for age. Z-scores for these indices
were used in the classification into stunted, underweight or wasted categories according to the WHO standard growth references (WHO, 2007).

A general tendency towards under nutrition, that is, stunting and underweight as the mean indices (HAZ & WAZ) lay below the standard means. It can be deduced that the general nutritional status of the children was below the optimal levels as defined by WHO (2007) criteria.

5.3.2 Influence of Nutrition on Academic Performance of Pre-School Children

The study findings indicated that nutrition has a great influence on the academic achievement of pre-school children. Most children who were undernourished recorded lower performance as compared to those who were well fed and had good nutrition status. The study also found out that most pre-school children are not offered sufficient meals which provide a balance diet for them hence results to low concentration in class and dormancy in class participation.

5.3.3 Difference in Performance of Schools with Feeding Programmes and Those Without

The study found out that there is a great difference in performance between schools with feeding programmes and those without feeding programmes. Schools with feeding programmes performed better in class than the other schools without feeding programmes.
5.3.4 Approaches To Improve Nutrition of Pre-School Children

Stakeholders in pre-schools children’s nutritional status which include teachers, parents, and governments have put in place several measures in various schools to improve nutritional status. At the ground level parents and the community contribute money to finance the school feeding programme in seven pre-schools.

5.4 Observation of children’s performance

The results showed that majority of the children had not performed well in the previous tests as indicated in their progress records. The researcher took time to study the children in the morning, before and after lunch.

The findings indicated that in the morning the children looked happy to be in the school, although they looked pale. This could have been due to lack of breakfast in the morning and poor diet in their evening meals. Those interviewed especially from schools outside the feeding programme indicated they even had to sacrifice some evening meal to get enough carry to school to avoid discrimination.

Some hours before meal the children looked jovial and were in a hurry to leave the classrooms. They were observed to fight and made irregular queues to be served first. The best moments were in the afternoon after the meals where the children looked
happy and satisfied and concentrated in class. However, some pupils engaged themselves in play and slept peacefully in the afternoon.

5.5 Conclusions

The study concludes that nutrition status of pre-school children greatly affects their academic performance and according to the research findings the study indicates that hungry children’s have high tendency of performing poorly due to lack of concentration and dormancy in class.

The parent noted that the feeding programme had benefited their children positively and gave out the following advantages of the programme: balanced diet, allows time for their children to actively participate in activities since they don’t have to think about their lunch meal, offers a good base for concentration in activities and allows all children to view others equally since they eat a common meal.

This study also concludes that the school menu in all schools was porridge for break and ugali/rice/githeri for lunch interchangeably. Parents in schools with feeding programme supported the feeding programme by constructing the kitchen, paying the cooks, offering facilities like, spoons, plates, and sufurias, offering materials like firewood, taking part in kitchen cleaning activities and volunteering to serve the children.
According to Meyer (1989), alleviating hunger in school children helps them to perform better in school. This corresponds with the findings of this study where the performance of the pre-school children in the feeding programme was better than that of pre-schoolers who were not in the feeding programme. In the poorest parts of the world, school meal programmes can double primary school enrolment in one year (Sessional Paper, 2005). This was proved in the study where the schools which had a feeding programme had a better performance than those that had none.

5.6 Recommendations of the Study

The researcher found out that only 20% of the schools had centrally organized feeding programme which negatively affected children nutrition and academic performance. The researcher, therefore, would recommend the management to come up with solutions so as to allow improvement of nutrition which would help improve performance in schools.

To solve the malnutrition problems in pre-school children, all parties need to be involved and held accountable, the WFP should ensure continued availability of the adequate food in the schools and parents should not neglect their role in feeding their children at home.
The stakeholders like National Centre for Early Childhood Education (NACECE) and District Centre for Early Childhood Education (DICECE) should develop curriculum and a programme for equipping parents of preschool Children with knowledge on good nutrition and importance of balanced diet which is vital for good performance. MOE and the parents also need to support all the ECDE Centers in Rabuor to organize and sustain centralized feeding programmes and ensure that foods offered are balanced and healthy. MOE should also partner with other development bodies, NGOs and GOK ministries to identify severely malnourished children and put them on special programmes.

5.7 Suggestions for Further Research

In relation to the findings and the conclusion in this study, the researcher recommends that further studies should be done on the relationship between nutrition and performance of pre-school children.

A similar study should be conducted in an urban setting to establish the relationship between nutrition and academic performance of pre-school children in urban areas.
REFERENCES


British Journal of Nutrition, suppl. 2: S227-S232


APPENDICES

APPENDIX I: INTRODUCTORY LETTER TO THE RESPONDENTS

Through

School of Education

Kenyatta University

Dear respondent

I am a student at Kenyatta university main campus taking M.ED course. In partial fulfillment of the course requirement I am conducting a research on the relationship between nutrition and performance of pre-school children in Rabuor zone Kisumu County. With regards I request you to spare a few minutes to fill in the questionnaire as diligently as possible. The information in this questionnaire will be strictly confidential and will not be used for any other purpose than for this research. Your assistance in facilitating this research will be highly appreciated.

Thanks in advance.

MARGARET K. APONDI

M.E.D STUDENT, KENYATTA UNIVERSITY
APPENDIX 2: QUESTIONNAIRE FOR TEACHERS

The purpose of the study is to investigate the effect of nutrition on performance of pre-school children in Rabuor Zone, Kadibo Division.

Instructions

Put a tick where appropriate and fill in the gaps. The information will be treated with utmost confidentiality.

School teacher questionnaire

**Demographic information**

1. School ...........................................................................................................

2. Age bracket 18-22 ( ) 23-27 ( ) 28-32 ( ) 33-37 ( ) 37-42 ( )

3. Highest academic certificate?

   Primary ( )

   Secondary ( )

   Post sec /collage /professional training ( )

   University ( )

   No schooling ( )

**Section C: Nutrition and Performance**

4. Is there any noticeable difference between performance of activities of the children with poor nutritional levels and those with proper nutritional levels?

   Yes ( ) NO ( )

5. If yes in question four above, kindly indicate your level of agreement with the statement in the table below about the influence of nutrition on academic performance of preschool children. Using a scale of 1-5, (1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree and 5. Strongly agree).

   [Table with options for scoring]
disagree) Please indicate using a tick (√) your level of agreement with the statement.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither disagree nor agree</th>
<th>agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Children, who go to school hungry, or without breakfast, tend to have lower math scores and are more likely to have to repeat at least once in the same class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Academic problems, as well as emotional and behavioral difficulties can be tied directly to poor nutrition.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Undernourished kids tend to score lower on cognitive tests than those who get the right nutrition.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Children, who eat breakfast at school, closer to the time they take tests, perform better on standardized tests.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Children who participate in school breakfast programs tend to show improved math grades, and have higher attendance and punctuality.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Section D: Difference in Performance of School with Feeding Programme and Those Without

**Those Without**

11. Does your school have a feeding programme?

Yes ( ) No ( )
If yes in six above, please indicate what types of meals are offered in your school feeding programme

1. ……………………………………
2. ……………………………………
3. ……………………………………
4. ……………………………………

12. Does the school feeding programme affect academic outcome of pre-school children in your school?

Yes ( ) No ( )

13. Kindly indicate in the table below the pre-school mean score per term in the year 2013

<table>
<thead>
<tr>
<th>Term</th>
<th>Mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td></td>
</tr>
<tr>
<td>Term 2</td>
<td></td>
</tr>
<tr>
<td>Term 3</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td></td>
</tr>
</tbody>
</table>

Section E: Approaches to Improve Nutrition of Pre-School Children

14. Does your school have strategies to improve nutritional status of pre-school children?

Yes ( ) No ( )

15. Kindly state the approaches that are in place to improve nutritional status of pre-school children in your school

i. ………………………………………………………………………………………………………

ii. ……………………………………………………………………………………………………

iii. ……………………………………………………………………………………………………

Thank you for your cooperation.
APPENDIX 3: PARENT’S QUESTIONNAIRE

1. Gender Male ( ) Female ( )

2. Age bracket
   18-22 ( ) 23-27 ( ) 28-32 ( )
   33-37 ( ) 37-42 ( )

3. Highest academic certificate?
   Primary ( )
   Secondary ( )
   Post sec /collage /professional training ( )
   University ( )
   No schooling ( )

Section B: Nutrition Status of Pre-School Children

4. How many meals do you serve your child / children in a day?
   One meal [ ] Two meals [ ] Three meals [ ]

5. Do you provide your child with packed meals to carry to pre-school?
   Yes [ ] No [ ]

6. i) does your child’s school have a feeding programme
   Yes [ ] No [ ]
   (ii) If yes, state the type of foods
   provided…………………………………………………………………………………………
   ………………………………………………………………………………………………………

7. Which opinion would you give to help improve the school nutrition status of children?
   ………………………………………………………………………………………………………
   ………………………………………………………………………………………………………

Thank you for your cooperation.
APPENDIX 4: CHILDREN’S PERFORMANCE OBSERVATION CHECKLIST

The observation checklist below is for pre-school children aged 5 years or more.

**Section A: General Information**

i) Child’s identification number [  ]

ii) Gender [  ] Male [  ] Female [  ]

v) Test score in the previous exam. Very good [  ] good [  ] very poor [  ] poor [  ]

**Section B Child’s Performance**

Check list for performance of the child in the disciplines listed below to be indicated by tallying, as appropriate in the space provided for response..

<table>
<thead>
<tr>
<th>Nature of discipline</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateness to school</td>
<td></td>
</tr>
<tr>
<td>Sleeping /dozing in class</td>
<td></td>
</tr>
<tr>
<td>Crying during class session</td>
<td></td>
</tr>
<tr>
<td>Reluctant in doing assignments</td>
<td></td>
</tr>
<tr>
<td>Sneaking out of school</td>
<td></td>
</tr>
<tr>
<td>Dormant in participation in class activities</td>
<td></td>
</tr>
<tr>
<td>Poor eating habits</td>
<td></td>
</tr>
<tr>
<td>Poor class room concentration</td>
<td></td>
</tr>
<tr>
<td>Participation in physical activities</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 5: READINESS ASSESSMENT TOOL FOR CHILDREN AGED 5-6 YEARS

GENERAL INFORMATION

Name……………………………………
Sex……………………………
Date of birth……………………
ECD center…………………………
Zone…………………………
District…………………………
Month of assessment………………

A1: LANGUAGE COMPETENCIES

A 3-point scale: 3 = very good, 2 = good and 1 = fair based on Ministry of Education 2007 (KESRAT tool) for children was employed to rate their competence in language through ticking, using the following variables below:

<table>
<thead>
<tr>
<th>Rating of child’s ability during routine ECD thematic activities</th>
<th>V. Good</th>
<th>Good</th>
<th>Fair</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Listening to and telling a simple short stories using the language of the catchment area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Talking about three items related to a given sub theme</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identifying three colors in a given picture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Writing any three 3-letter word</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Writing own full name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reading at least three 3-letter words</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 6: ANTHROPOMETRIC DATA SHEET

Data-recording form for Anthropometric measurements

Name of child/index of child________________________________________

Sex (M/F) _____________________   DOB (dd/mm/yyyy) __________________

Age (months) _________________________

<table>
<thead>
<tr>
<th>MEASUREMENTS</th>
<th>1ST READING</th>
<th>2ND READING</th>
<th>AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height(cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight(kg)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX 7: TIME SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2011 – Jan 2012</td>
<td>Proposal, instruments development and refining</td>
</tr>
<tr>
<td>Feb-May 2012</td>
<td>Proposal presentation and correction</td>
</tr>
<tr>
<td>July, 2013</td>
<td>Piloting and validating the instruments</td>
</tr>
<tr>
<td>July- Aug. 2013</td>
<td>Data collection</td>
</tr>
<tr>
<td>Sept. 2013</td>
<td>Data analysis</td>
</tr>
<tr>
<td>September 2013 – January 2014</td>
<td>Thesis writing</td>
</tr>
<tr>
<td>February to March 2014</td>
<td>Defense of thesis, correction and binding-final copies</td>
</tr>
<tr>
<td>April – May 2014</td>
<td>Correction</td>
</tr>
<tr>
<td>June 2014</td>
<td>Graduation</td>
</tr>
</tbody>
</table>
APPENDIX 8: RESEARCH PERMIT

National Commission for Science, Technology and Innovation

RESEARCH PERMIT

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.

2. Government Officers will not be interviewed without prior appointment.

3. No questionnaire will be used unless it has been approved.

4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.

You are required to submit at least two (2) hard copies and one (1) soft copy of your final report.

5. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.


This is to certify that

Ms. MARGARET K. APONDI, D.T.U., F.O.D., M.P.H., M.B.A., M.H.S., has been permitted to conduct research in Kisumu County on the topic: THE RELATIONSHIP BETWEEN POOR NUTRITION AND PERFORMANCE OF PRE-SCHOOL CHILDREN IN RABUOR ZONE KISUMU COUNTY, KENYA for the period ending 31st December, 2014

In accordance with the Research Permit No. NACOSTI/P/140/0747/566

Date Of Issue: 17th January, 2014

Fee Received: Kshs Kshs 2000.00

National Commission for Science, Technology and Innovation

Secretary

[Signature]

[Name]

[Position]

National Commission for Science, Technology and Innovation
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349,310571,2219420
Fax: +254-20-3198249, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote
Ref: No.

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APPENDIX 9: RESEARCH AUTHORIZATION LETTER

Date: 17th January, 2014

NACOSTI/P/14/0747/566

Margaret K. Apondi
Kenyatta University
P.O.Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “The relationship between poor nutrition and performance of pre-school children in Rabour Zone, Kisumu County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Kisumu County for a period ending 31st December, 2014.

You are advised to report to the County Commissioner and the County Director of Education, Kisumu County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

Said Hussein
FOR: SECRETARY/CEO
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:

The County Commissioner
The County Director of Education
Kisumu County.

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telephone: Kisumu 2022219/Fax: 2022219
Email: cklisumucounty@gmail.com

COUNTY COMMISSIONER
KISUMU COUNTY
P. O. BOX 1912-40100
KISUMU

Ref: CC/KC/2(126) 20th January, 2014

Deputy County Commissioner
KISUMU Sub County

RESEARCH AUTHORIZATION
MARGARET K. APONDI- KENYATTA UNIVERSITY

This is to inform you that the above named student has been granted authority to undertake a research study on "The relationship between poor nutrition and performance of pre-school children in Rabuor Zone, Kisumu County, Kenya". The research period ends on 31st December, 2014.

The purpose of this letter is to ask you to accord her any necessary assistance she may need during the research period.

L. A. ODERO (OGW)
COUNTY COMMISSIONER
KISUMU COUNTY

Copy to:

Margaret K. Apondi
Kenyatta University
P. O. Box 43844-00100
NAIROBI
APPENDIX 11: RESEARCH AUTHORIZATION FROM THE COUNTY DIRECTOR OF EDUCATION KISUMU COUNTY

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
STATE DEPARTMENT OF EDUCATION

Telegram: "schooling", Kisumu
Telephone: Kisumu 057 - 2024599
Email: Ckisumu@education.go.ke

When replying please quote

NP/6A/23/8 VOL.II/77

20th January, 2014

All Headteachers
Rabuor Zone
Kisumu County

RESEARCH AUTHORITY FOR MARGARET APONDI -- ADM. E55/OL/14817/2009

The above has been given authority to collect data in your schools for her Masters Degree research thesis.

The study topic is “The relationship between poor nutrition and performance of preschool children in Kisumu County.

You are requested to give her assistance. Please note that the exercise should not interfere with normal school programme.

J. ODONGO
For: COUNTY DIRECTOR OF EDUCATION
KISUMU COUNTY