

# Nutritional Knowledge and Practices of Pre-School Teachers in Homa Bay County, Kenya

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**Abstract:** The main objective of this study was to investigate nutrition relationship between pre-school teachers' nutritional knowledge and practice in Homa Bay County. The study investigated the following aspects of nutrition knowledge; balanced diet, source of nutrients, food preparation, food storage and preservation. The specific objectives were: to assess the nutritional knowledge and practices between pre-school teachers; Jerome Brunner' (1978) theories on knowledge representation guided the study; his three modes on nutritional knowledge to the teachers and learners basically on cognitive development. The three models are enactive, iconic and symbolic. The study adopted a descriptive design to investigate the relationship between pre-school teachers' nutritional knowledge and practices. Questionnaire, interview schedule and observation checklists were used as instruments of data collection. Data analysis was done qualitatively and quantitatively methods. Findings showed that nutritional knowledge and practices among preschool teachers is very low in Homa Bay County. Most of the respondents knew about only three food groups type, a significant number of them were unable to categorise different food types in their respective groups. Proper nutrition was found to be positively correlated with preschool children academic performance. The study also established that the relationship between pre-school teachers' nutritional knowledge and practices was not significant. The study recommends that strategies need to be put in place to improve nutritional knowledge and practices of preschool teachers in Homa Bay County and country at large, this will be through cooperation of Ministry of Education, Kenya Institute of Curriculum Development and other policy makers in the education sector.

**Keywords:** Nutrition knowledge, Nutrition practices Nutritional status.

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## 1. INTRODUCTION

Nutrition is fundamental for growth and development from conception to adulthood. It is essential for the health and quality of life at every stage in a living organism. A normal healthy child grows at a genetically predetermined rate that can be compromised or accelerated by under nutrition, imbalance intake of nutrients and over nutrition (Pipes, 1989). Globally, a lot of attention is given to child nutritional status for better health and growth for the child. Throughout the world, about two hundred and twenty six million children are stunted while sixty seven million are wasted (UNICEF, 1998). One hundred and eighty three million are estimated to be under weight and two to eight times are more likely to die within the following year than children of normal weight for their age (Young & Jaspars, 1995). Malnutrition is a worldwide problem that needs to be addressed urgently. Furthermore, an analysis done by Pollit (1990) on various studies carried out among school children and nutritional status worldwide including countries like Kenya concluded that growth retardation observed among school age children is striking. It suggests that nutritional status of school children is at risk, although virtually every region in the world will experience a reduction in the absolute numbers of underweight pre-school children by the year 2020, (Garcia, 1994).

In the tropics, the common childhood diseases during pre-school period are; Protein Energy Malnutrition (PEM) especially kwashiorkor, diarrhoea, pneumonia, malaria, diseases related to intestinal worms and whooping cough. Frequently pre-school children suffer from several of these conditions simultaneously. This can seriously affect the growth and development of children (Jellfie, 1985). Death rate in this group is at least 20 times as great in the tropics as it is in Europe and North America. This is worsened by poverty which is also perverted in much of the third world countries. Malnutrition is widespread in Sub-Saharan Africa. Poor maternal health and malnutrition tend to lead to poor growth in infancy and childhood (UNICEF; 1995). According to UNICEF (1989), about 40% of children under five years suffer from PEM in Kenya. It is estimated that five hundred thousand children under five years lose their sight every year

because of vitamin A deficiency. Within a few weeks of becoming blind, two thirds of these children die. Some three million people, mostly children, suffer from cretinism (Iodine Deficiency Disorder [IDD]) causing both mental and physical retardation (UNICEF, 1992).

Nutrition knowledge and practice is important because care givers learn how to make better use of available food resources (Zeitlin and Formacion 1981). Nutrition education includes topics such as preparation of weaning foods; the component of a balanced diet, appropriate diet in pregnancy, lactation and illness, useful methods of food preparation and storage; and the basics of hygiene and sanitation (Kramer, 1990). Nutrition education needs to be integrated in to other essential services, making information more accessible to care givers. Nutrition has been recognized as a major contributor to national development the world over. People's health- their physical and mental development and their capacity to learn, to work and to play; and their full role in the society are dependent on nutrition. It is therefore, treated as a matter of utmost concern in every nation. Good nutrition results in a high nutritional status. Daily nutrition practices reflect unique regional economic and cultural patterns and in turn determine one's nutrition status (Sanjur, 1992 as cited by Atebe 1996). The need for pre-school teachers to have knowledge on nutrition and cooking methods, influences food choice and other health practices of children, parents and recognize problems of nutrition or diet for referral to the nutritionists. For teachers, the application of nutrition knowledge should not be just an understanding of principles but should be part of the training programmes (UNESCO, 1983).

Nutrition education depends upon the target audience, the problems at hand and the active participation of the learners. Use of the local language for instruction is encouraged for the purpose of nutrition knowledge to reach the stakeholders (UNESCO, 1988). Research has greatly emphasized the first years of life as crucial for determining all the developmental needs of a child. These are critical periods in their growth and development. These early years set the direction for the subsequent growth and development. Today, malnutrition in Kenya is on the increase thus as many as 30% of the pre-school children are severely or mildly malnourished, (KIE, 1990).

Pre- school teachers belong to the main group of caregivers. Caregivers are those charged with provision of care and services for young children. They are expected to have sound knowledge of how children grow, develop and learn. Growth refers to increase in height, size and weight. It is influenced by the quantity, quality of food the child eats; the state of physical health; and its mental, social, emotional and spiritual well being. A balanced diet is necessary for healthy growth. Caregivers are required to meet the basic needs of children, for example adequate food, love, affection, play, stimulation, identity, participation and protection (KIE, 1999). They provide children with growth monitoring and promotion services (UNICEF, 1994).

Research conducted in Machakos County noted children's poor nutritional status and recommended further investigations on the poor nutritional status among children (Swardener, 1995; Koech & Gakuru, 1995; Bali & Karibu, 1996). Earlier studies pointed to the increase of teenage pregnancies and early mother hood and their impact on children's development and nutritional status (Gachukia, Karibu, Beuta, 1992) unfortunately, subsequent studies have not focused on relationship between pre-school teachers' nutritional knowledge and practices in Homa Bay County. Therefore, there is need for further investigations on the relationship between preschool teachers' nutritional knowledge and practices.

## 2. STATEMENT OF THE PROBLEM

Malnutrition among children remains a big challenge to the developing countries (UNICEF, 1998). Nutrition knowledge is complex – encompassing diverse areas such as foods and nutrient values, equivalences and quantities and appropriate food preparation and storage. Nutrition knowledge has different kinds of sources including formal schooling, informal media, newspapers and training. Cultural and traditional nutrition knowledge is passed from generation to generation. Little seems to be known on nutrition knowledge and practices among preschool teacher within the County. A number of research studies carried out in Homa Bay County noted poor nutritional status of children and some of the underlying causes of this malnutrition have been suggested in other studies. Some of these studies have focused on the families exclusively and not on the preschool teachers (Oniango, (1990).

A number of recent initiatives have been developed to improve children's nutrition status: preschool feeding programs and preschool teacher's nutrition education. Preschool teachers have been exposed to nutrition education by Mwana Mwende Project, (2001) P.H.C, C.C.F and Compassion International and from County Centre for Early Childhood

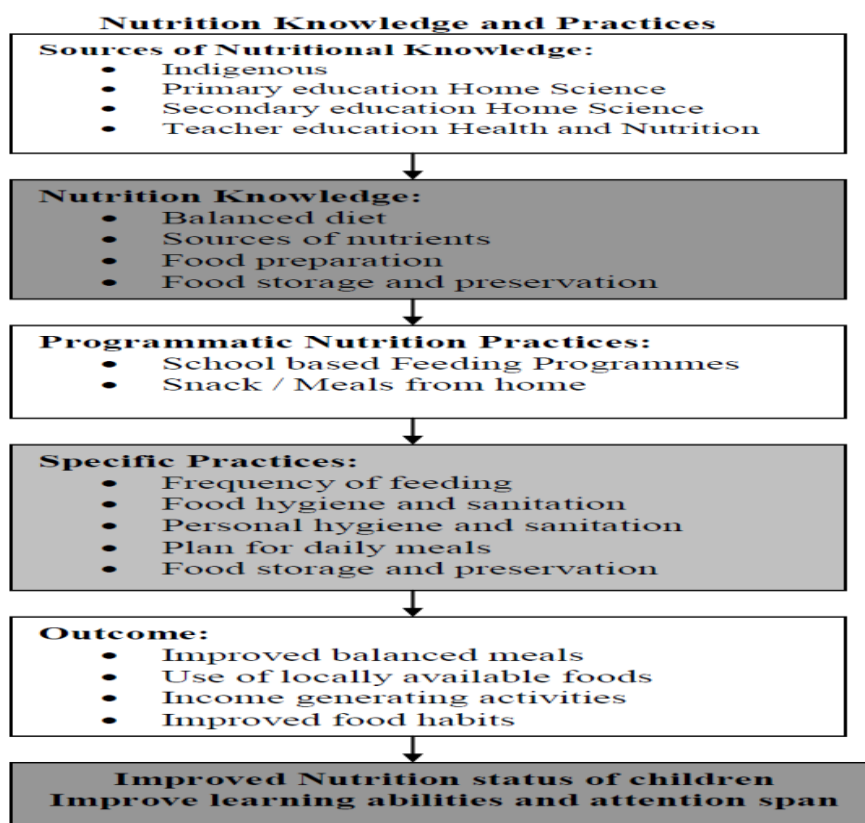
Education. It is not known whether or not these specific initiatives in the County have been effective. Specifically, we do not know if the pre-school teachers with nutrition knowledge differ from those pre-school teachers without the nutrition knowledge. Therefore, nutritional knowledge is critical to caregivers and teachers as it influences children's health, growth and development which in turn impacts on their interest in learning in their formative years. The researcher therefore, sought to establish the relationship between nutritional knowledge and practices among pre-school teachers in Homa Bay County, and its impact on ECDE children.

### 3. STUDY OBJECTIVES

1. To assess the level of nutritional knowledge and practices among pre-school teachers, in Homa Bay County,
2. To examine the pre-school teachers' nutritional practices,

### 4. THEORETICAL FRAMEWORK

The study theoretical framework was adapted from Bruner (1978) theories on nutritional knowledge to the teachers especially to the teachers and learners cognitive development. This study has an explanation of the conceptual framework of the study which is later illustrated by a diagram as drawn by Ogada, (2015). From the literature, pre-school teachers' nutrition knowledge has been cited as important to both the teaching and learning process and beneficial to self and the community. This knowledge is obtained from indigenous sources, primary school education in home science, secondary school education in home science, and from teacher education health and nutrition. Acquisition of this knowledge may result in balanced meals, use of locally available foods, involvement in income generating activities and improved food habits. Generally, the outcome may determine nutrition practices in pre-schools. These programmatic practices include initiation of feeding programmes and provision of quality snacks. It is important to the pre-school children's health and learning process as a whole. The specific nutrition practices to consider during feeding programmes and snack giving, frequency of feeding, food hygiene and preparation, personal hygiene and sanitation, plan of daily meals, food storage and preservation. No studies on preschool teacher's nutrition knowledge in relation to practices have been conducted so far. There is need therefore to determine the relationship between pre-school teachers' nutrition knowledge and practices which will in turn impact on children's nutritional status.



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Key		Variables under study
Conceptual	<input type="checkbox"/>	
Pr	-	Primary
Sec.	-	Secondary
Edu.	-	Education
Scie.	-	Science

## 5. LITERATURE REVIEW

### World Child Nutrition:

Article 25(1) of the universal declaration of Human rights in 1948 provides that everyone has the right to a standard of living adequate for the health and well being of himself and his family including food. As articulated by the United Nation World Food Conference in 1974, everyman, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties (FAO, WHO & UN, 1974). Also, specifically for the African child Article 14 of the charter on the right and welfare of the African child states that “every child shall have the right to enjoy the best state of physical, mental, and spiritual health whose strategy include assurance of provision of adequate nutrition. Although freedom from hunger is declared a fundamental human right for everyone yet many people grow hungry and cannot obtain the effective food demanded for survival. Various nutrition surveys have demonstrated the existence of hunger and malnutrition in Kenyan children (1-5) (KIE, 1996). Undernutrition and micronutrient deficiency are the major forms of malnutrition in the Kenyan children. Nutritional deficiencies contribute to the high rates of morbidity, mortality and disability in Eastern Africa (World Bank, 1997).

The magnitude of child malnutrition in the world has been increasing over while, for example in 2005 about 165 million children were stunted in developing countries, 140 million are underweight and 47 million were wasted (UN, 2004). Between 1990 and 2005 there was a shifting locus in global distribution of underweight preschoolers. Addo (2005) reports that there has been an increase in the number of underweight preschoolers in Africa from 16% to 27% while there has been a decrease in Asia and Latin American countries. With regard to preschool children, anaemia prevalence is the highest in Africa and Asia. In Africa the middle part of the continent from the west to the east is the most affected, with anaemia prevalence ranging from 42% to 53%, in Asia the affected sub region is south central Asia. In the Americas the Caribbean is most affected with a prevalence of 39% while anaemia prevalence in South and Central America are similar to those observed in the remaining parts of Africa and Asia (UN, 2004). Among industrialized countries anaemia prevalence are lowest in Northern Europe (2%) and around 5% in Western Europe and North America. Because of its magnitude, its catastrophic impact on child survival and development, and the fact that it often results from international political and economic crises, malnutrition is one of the most significant global problems of the day. In order to resolve this problem, human and material resources must be mobilized at all levels.

### Nutrition for Preschool Children:

In Kenya, preprimary children are given meals or snacks. Sometimes these feeding programmes are linked to those of a nearby primary school. It is required that the preschool children receive a meal providing about 55 percent of their daily energy requirements at school. The foods used should make a meal that is not bulky but rich in energy, protein and essential micronutrients (especially those known to be low in the local diets) (FAO, 1993). If the quality and quantity of daily diet is inadequate, the child will be unable to replenish body stores, growth and physical fitness will be affected. At certain times of the year, household food insecurity is a serious problem in the rural areas, especially for the landless families during time of food scarcity. During such periods, besides the problem of scarcity, meals also lack essential nutrients required for adequate child growth and development (Nkinyangi, *et al.*, 1995). According to Oniang'o (1990), a pre- school child should be fed at least five times a day. Often, their food is an adaptation of adult food. Parents play a key role in pre-school feeding. Oniang'o, (1990) indicated that can parents support a scheme that provides a snack and a hot meal for their children.

### Presentation of Nutritional Knowledge:

Once a person is exposed to knowledge, it is presented in different forms for example, by actions, use of senses and use of language and reason. Bruner (1941) was a cognitive psychologist who was highly interested in the learning process. He

tried to extend the scope of the existing theory of cognitive development by creating his “Three modes of Representation” and pointing out the close relationship between cognitive development and theory institution. According to Bruner (1966), he explains these Modes of Representation on nutritional knowledge to the learners and pre-school teachers as:

**Enactive:** Learners acquire knowledge by action, past events and patterned motor response.

**Iconic:** Learners perceive outside with internal images by using visual and other sensory organizations.

**Symbolic:** Learners can understand knowledge by language and reason. Moreover, they start trying to solve problems by thinking creatively (Bruner, 1966:64).

The first mode, **enactive**, deals with actions with food, nutrition and malnutrition. It can be represented through initiation of preschool feeding programmes, growth monitoring sessions for preventive care and provision of health facilities for malnourished children. Preschool teachers can also organize for cooking demonstrations for the learners by use of locally available foods. They can have children sing songs about food, nutrition and malnutrition. Preschool children may recite poems on the mentioned topics, dramatize and role – play mother or family members cooking.

The second mode, **iconic** can be presented by stories about food, nutrition and malnutrition. Stories about how different kinds of food smell, taste, feel (texture) and look are represented in this mode. Discussions about foods that are eaten raw and those that are cooked to make them tender and tasty are represented in iconic mode.

The third mode, **symbolic**, means the language which is used to describe food, nutrition and malnutrition. The language to be used is expected to be that of the catchments area in line with the cultural context for better knowledge creation. The preschool teacher’s nutrition education should be linked to what was learned in primary and secondary education. The relevance of these modes to the study is to include the instruments like interviews and observation schedules which will help to give the real situation at the study area as far as activities on food, nutrition and malnutrition is concerned. Stories about locally available foods will be discussed along with their importance to our preschool children. Language is an essential means to the creation of knowledge. Language is social in that it includes the way we acquire food, preserve, prepare, cook, serve and eat it. In the study language will be used to give information about food, nutrition and malnutrition.

Bruner (1966) said “Any body of knowledge can be presented in a form simple enough so that any particular learner can understand it in a recognizable form”. The order of these modes is not fixed; rather it can be flexible according to the specific individual. In the variant sequence of stages, the significant factor which affects the process of intellectual development is social and cultural context (environment). In ECDE, the stages of these modes depend on the environment in which the learners and the teachers are. For instance lack of adequate food.

#### **Studies on Nutrition Knowledge and its Relation to Practices:**

Nutrition knowledge is significant as a determinant of food selection and consumption. Consumption patterns are positively correlated with the level of caregivers’ nutritional knowledge (Pursell, 1972 in Atebe, 1996). The UNICEF (1991) Report states that ‘as a child grows older and for the adult population as a whole and adequate diet is an obvious human priority’. Therefore, there is need to have knowledge about what the adequate diet is. According to Kihato (1987), Ojefeitumi and Olufokumbi (1986), the food intake and food preferences to the subjects in their studies did not reflect their nutrition knowledge in food selection. Despite the subjects’ knowledge of nutrition, their food preferences were not for highly nutritious foods. Findings by Kibuga (1990) established that the personal experience of the caregiver played a bigger role in determining food selection and consumption. Similarly, the caregiver’s nutrition knowledge did not translate to food selection and consumption if he/she could afford the food. The main concern was to satisfy hunger rather than meet nutritional standards.

Sri-Lankan women from the lower socio-economic strata were unable to put nutritional knowledge into practice due to financial constraints (Wandel & Ottensen, 1998 as cited by Atebe 1996). Thus their main concern was to satisfy hunger as opposed to meeting nutritional needs. Hoorweg *et al.*, (1984) reported that cultural patterns and availability of foods were important variables to nutritional knowledge in food selection. Thus child nutrition was not decided by individual cognition of the mother but rather by prevailing cultural patterns and the availability of resources. Chernichovsky and Mesook 1984 (as cited by Ojefeitumi and Olufokumbi 1986) reveal that inadequate diets were prevalent among the better

off and educated. This they attributed to the fact that some of this advantaged people consumed more expensive fast foods but not necessarily nutritious diets. In their study on preschool nutrition status, Nkinyangi *et al.*, (1995) established that hunger at school was common in rural areas. Hunger is a stressful state that can interfere with the learning process as some children may become disruptive when hungry. Many school children go for long periods of time without eating. Some go to school without breakfast and many miss lunch. Others miss both breakfast and lunch. School days are long and hungry children get tired and distracted easily. Numerous scientific studies among school children have shown the adverse effect of hunger on cognition, problem solving and concentration (Nkinyangi 1995). Hungry children are found to be less alert and lethargic. Sending children home for lunch is no guarantee that they will eat or be fed due to insufficient food as the food may not be available. It is common for mothers to prepare and serve only one meal a day, usually in the evening. In another study by Nkinyangi *et al.*, (1990), among the pre-schools visited the facilities were found to be poor and overcrowded. Some had a feeding program for which parents were required to contribute a fee each term (in some establishments, about Kshs. 30 a term for provision of food twice a week not realistic in the current situation). The kitchens of those pre-school however, were generally unsanitary.

## 6. MATERIALS AND METHODS

A Descriptive design was used in the study to investigate the relationship between the pre-school teachers' nutritional knowledge and practices. The study was conducted in Homa Bay County ECDE Centres in Nyanza Province. Homa Bay County is located on the western part of Kenya in Nyanza province covering the Lake Victoria Basin Region. The target populations of this study were pre-school teachers within Homa Bay County. Homa Bay County education boundary is made up of seven (7) Divisions; Asego, Riana, Ndiwa, Nyarongi, Rangwe, Upper Nyokal and Lower Nyokal with an estimated population of 5,779 pre-school children and 462 pre-school teachers. The study applied Morgan's (1990) Model Table in determining the sample size, according to the Table our sample size was composed of 196 respondents since our target population consisted of 462 respondents. Stratified sampling procedure was used in selecting schools with feeding programme and those without forming two groups. The existing schools with or without feeding programme were more or less represented in the sample. Simple random sampling was done in selecting preschool teachers from both types of schools. Questionnaires and observation schedules were used to collect data in this study. A Cronbach's alpha coefficient was used to calculate the reliability of the research instrument (interview schedule) the value was  $r=0.756$  which Kerlinger (1978) considers valid. Data from interviews were analysed using descriptive statistics by use Statistical Package for Social Sciences (SPSS Version 16). Data collected was presented in tables, pie-charts and graphs.

## 7. RESULTS AND DISCUSSIONS

The study involves establishing the relationship between preschool teachers' nutritional knowledge and practices within Homa Bay County. Participants included male and female preschool teachers within the sampled population of whole County covering seven divisions; Ndiwa, Lower Nyokal, Upper Nyokal, Asego, Riana, Nyarongi and Rangwe divisions. Female participants comprised 77% while their female counterparts were 23%. These findings show that most preschool teachers spread out within the division are females as it is the same scenario with research carried out by Swadener *et al.*, (1995) who established that most pre-school teachers around the country were females.

**Table 1 Demographic information of respondents**

<b>Number of years</b>	<b>Freq</b>	<b>%</b>
0-2 yeas	24	12.6
2 - 5 years	79	41.4
6 - 10 years	48	25.1
Over 11 years	35	18.3
Over 30 years	2	1.0
<b>Total</b>	<b>188</b>	<b>98.4</b>
<b>Teachers Professional Qualifications</b>		
Trained	130	68
Untrained	9	4.7
Under training(did not complete training)	49	25.7

<b>Total</b>	<b>188</b>	<b>98.4</b>
<b>Pre-teachers formal schooling level</b>		
Primary level	17	8.9
Secondary level	90	47.1
Tertiary	79	41.4
<b>Total</b>	<b>186</b>	<b>97.4</b>

The findings also showed that most 41.4% of preschool teachers had 0–3 years of experience, 26.1% had 6–10 years, 18.3% had over 11 years and only 12.6% had between 0–2 years of teaching experience. These findings show that a significant number of preschool teachers within the County have enough work experience in their professions. The study also established that most 67.5% of pre-school teachers had adequate training in early childhood development education, 25.7% were under trained and only 0.5 of the teachers were untrained. These findings concur also with Swadener *et al.*, (1995) that identified teachers who underwent training had greater knowledge and showed favourable attitudes in class work activities. In line with these findings, the maximum and minimum age for preschool teachers were 20 – 31 years with a mean age of 31 years. It was also observed that some schools had untrained teachers who volunteered themselves in serving the community as they waited to joining university and colleges.

## 8. NUTRITION KNOWLEDGE/EDUCATION

Nutrition education/knowledge is any set of learning experiences designed to facilitate voluntary adoption of eating and other nutrition related behaviour conducive to health and well-being'. Preschool teachers' nutritional knowledge was assessed. Teachers were asked if they had ever participated in any nutrition education since they started teaching. According to the responses, 136 (74%) had attended nutritional seminar/courses/workshops. Training on nutritional education was carried out by Non Governmental Organisations, DICECE members and volunteers (nutritionists). From these findings, we can see that NGOs play a great role in promoting nutritional education to preschool teachers within the County, the government and other stakeholders need to support and provide necessary resources to these organisations so as to improve nutritional knowledge and practices among ECD teachers in the County the whole country at large. In line with these findings, NACECE (1999) identified that teachers who had taken nutrition courses and had greater nutritional knowledge showed more favourable attitudes towards teaching nutrition. Similarly, Ojefeitumi and Olufokumbi (1986) on a survey on nutrition status of children in Nigeria found out that nutrition education in school is most effective when delivered in the context of a comprehensive health education program and when school meal programs serve as "laboratories" where children could practice what they learn in class. Also, Kibuga (1990) found out that personal experience of caregivers in preschools played a bigger role in determining food selection and consumption. Therefore, considering school staffs have an inevitable effect on children's nutritional behaviour, a more serious programme should be considered for teaching this important and effective group.

Respondents defined balanced diet as; food containing all nutrients (60.2%), provision of food containing all nutrients required by the body (ECD) children in right proportions and quantities. However, it can be seen that a significant number of pre- school teachers do not know the correct definition of balanced diet. Locally available foods in the study area were; carbohydrates (maize, millet, sorghum, wheat, potatoes and rice), proteins (eggs, meat, and fish) fats, minerals and vitamins (fruits and vegetables). It was also observed that some preschool teachers could not be able to differentiate between; carbohydrates, vitamins and proteins (as it is commonly known). On the identification of food type and purposes, they were asked to name foods that help a child to grow, the responses were; protein (68.1%) while the rest named carbohydrates, vitamins and minerals as foods that help a child to grow (Table 4.4). On foods required for energy giving, they identified carbohydrates as the main type (79.6%), proteins (7.3%) and vitamins (1.6%) respectively. On foods required for protecting the body from nutritional deficiency diseases, they identified; vitamins (81.7%) and proteins (5.8%).

On food required for children's proper digestions, they identified roughage (55%), water (34%) and other food stuffs (5%). Following preschool teachers' identification of different categories of food items, we can see that there is a particular number of preschool teachers who have no knowledge of food classification food items according to; protective ones, energy giving, ones that help in digestion and body building foods. We can therefore deduct that preschool teacher's participation in nutritional courses/seminar will be of paramount importance in providing nutritional knowledge and

practices to ECD children, otherwise, if this is not done, increased cases of malnutrition in our preschools thereby risking pre-school children health to nutrient deficiency diseases.

The study findings showed that not all food items prescribed for ECD children were provided by the school authorities or at home. Traditional customs and practices affected provision of certain foods nutrient to young children as it is against their cultural and religious practices. These food items not provided for by preschools are nutritious and offer great support in the development and growth of a child. Among identified food types were; eggs (interfere with speech organ – tongue), kidney (should not be eaten by girls), beef, rabbit, pigs (those who proclaim Muslim religion), sweets and cooked food. Cultural, religious beliefs by members of the community needs to be abandoned as they are denying children important nutrients required for their body growth, as WHO (2008) observed that some foods prohibited by certain members of the community/society have the ability to increase child's intelligence and help digestion and growth.

Using suitable ways of improving nutritional practices and promoting the health quality of the diet should be a priority to every stakeholder concerned. We also see that food consumption is associated with foods that are available and accessible at homes. Several studies have reported that despite adequate nutrition awareness and knowledge and positive attitude towards healthy nutrition, lack of food availability and accessibility experienced by the children or individuals in low socioeconomic households may remain as an important deterrent in the achievement of a healthy and varied diet (WHO, 2008).

From the findings, it was clear that preschool teachers knew a great deal about food ingredients, nutritional values of food groups and food items, effects on health and disease, and recognizing healthy nutritive foods as well as healthy ones. Teachers were asked to give diseases types associated with malnutrition; among the diseases identified were; kwashiorkor (57.1%), Marasmus (14.1%), rickets (10.5%), obesity, scurvy, malaria, beri beri, headache, goitre, scabies, night blindness and diarrhoea. These findings imply that still there are some pre-school teachers who are not aware of diseases associated with malnutrition; these could have a great impact on preschool children future growth and development.

Feeding times varied from one preschool to the other. Results showed that 55.5% reported that children are fed five to six times a day, 24.6% four times, 14.7% three times and only 0.5% ten times. Observing the results we can see that there is no standard times in which a children needs to be fed, but feeding times for these preschool children need to be taken with caution through provision of balanced diet to help them in child growth and development. Oniango (1988) on the handbook 'Feeding the Child' recommends that a child should be fed six times a day with an interval of two to three hours. This is not the same situation being carried out by preschool teachers within Homa Bay County.

Vitamins are essential food components required for protection of the body of the child against diseases. Respondents were asked what would happen if Vitamin C was cooked. According to their findings, 50.8% said that if cooked vitamin C will be denatured, 6.3% said that vitamin C will dissolve, prevent scurvy (2.6%) and food poisoning and improves appetite (1%). These findings imply that 49.2% of pre-school teachers do not know what would happen if vitamin C is cooked, the reasons for their responses may be due to lack of adequate knowledge in nutrition knowledge/education and practices. It was also seen that 65% of respondents knew that people are advised to wash vegetables before cooking to remove germs with 68% of preschool teachers indicating that washing of vegetables before cooking assists in retaining nutrients (vitamins). Respondents also said that consumption of vegetables like carrots improved children seeing at night. Carbohydrates (ugali, githeri, porridge, rice, bread/wheat and potatoes) were the main food component required by the children in playing. These results are not in agreement with UNESCO (1988) manual for developing nutrition education curriculum that emphasizes that vitamins (A and K) are essential in supporting children's growth and development of a child. Preschools teachers' nutritional education was also assessed when they were asked to identify appropriate method of preventing children suffering from diarrhoea. Most 91% of the respondents agreed that provision of balanced diet food with a lot of fluids to children suffering from diarrhea was the appropriate method of controlling the disease.

In addition, in examining the level of nutritional knowledge by preschool teachers, they were asked to identify two sources of carbohydrates, among those identified were; bread, wheat, millet, sorghum, rice, potatoes, maize and cassava. Addo (2005) also found out that primary education teachers in Nigeria have Inadequate or improper education, which was often an underlying cause of malnutrition.



Table 2. Nutritional Analysis Table

Sources of Carbohydrates	Frequency	Percent
Rice	82	25
Bread	42	13
Maize	114	34
Sweet potato	75	22
Millet	21	6
<b>Diseases due to Protein Deficiency</b>		
Kwashiokor	84	44.0
Marasmus	18	9.4
Weakness	12	6.3
Retarded growth	4	2.1
Anaemia	3	1.6
Scabies	2	1.0
Rashes (rough body)	2	1.0
Oedema	1	.5
<b>Lack of Carbohydrates Symptoms</b>		
Obesity	77	40.3
Weakness/fatigue	49	25.7
Weak and thin	24	12.6
Dry skin (cracks)	22	11.5
Sleepy	8	4.2
Anaemia	5	2.6
Nausea	3	1.6
Night blindness	1	.5
<b>Sources of Vitamins</b>		
Fruits	114	48
vegetables	103	44
Sun (vitamin D)	18	8
<b>Signs and Symptoms of Lack of Minerals</b>		
Pale eyes/hands appear white	48	25.1
General body weakness	43	22.5
Lack of blood	29	15.2
Weak	16	8.4
Swollen body	4	2.1

According to pre-school teachers, protein deficiency in children caused; kwashiokor, Marasmus, general body weakness, retarded growth, anaemia, scabies, rashes, and Oedema. Looking at the findings we can see that not all preschool teachers know the protein deficiency disease which is kwashiokor. On signs and symptoms of fats, they identified; obesity, weakness/fatigue, dry skin, sleepiness, and night blindness. These findings also indicate that still nutritional knowledge for pre-school teachers is in question and this therefore affects preschool children health and development. The same

situation was witnessed in Nigeria where the 47% of children were found to be chronically hungry and malnourished thereby making them to suffer from nutritional deficiency diseases (Addo, 2005). Also, WHO (1992) established that in Africa, the middle part of the continent from the west to the east is the most affected, with anaemia prevalence ranging from 42% to 53%.

On sources of vitamins, an overwhelming majority of respondents indicated the sources as; fruits, vegetables and sunlight (for vitamin D). On signs and symptoms of minerals, they indicated; paling of the body, general body weakness, anaemia, weak bones and swollen body. These findings indicate that most preschool teachers have adequate knowledge on the signs and symptoms of body lacking minerals. The main method of preserving cowpeas was through drying (64.4%), boiling (15.2%), cooking (5.8%) and smoking (0.5%). These findings show that there is less disparity of how different people preserve cowpeas for future uses, the results also show that a large proportion of respondents agree that the best method of preserving cowpeas is through smoking according to respondents.

Iodine is an important mineral in child growth. According to respondents, deficiency of iodine in the body of a child causes goitre (79.4%), anaemia (8.9%), rickets (1.6%) and mental disorder (0.5%). These findings show that a good proportion of respondents are aware that iodine deficiency in children causes goitre, with a small proportion of the teachers being unaware of iodine deficiency. In line with this findings, WHO (2004) found out that that iodine deficiency is recognized as a significant public health problem in 18 countries, and one third of the population is estimated to be at risk of developing iodine deficiency disorders, which have dramatic consequences on the fatal brain and on cognitive and functional development in early childhood. Swadener *et al.*, (1995) also found out that iron deficiency and anaemia occur among large numbers of preschool children. Anaemic children do not do well on math, reading, vocabulary, problem-solving, or psychological tests. Even mild iron deficiency causes fatigue and a shortened attention span. These findings show that preschool children nutrient deficiency affects their participation in class and body development.

## 9. NUTRITIONAL PRACTICES

On nutritional practices, the study found out that most (51.3%) of preschools in Homa Bay County do not have feeding programmes, only 47.1% of schools assessed by researcher had feeding programmes at their schools (through observation schedules) (Table 3).

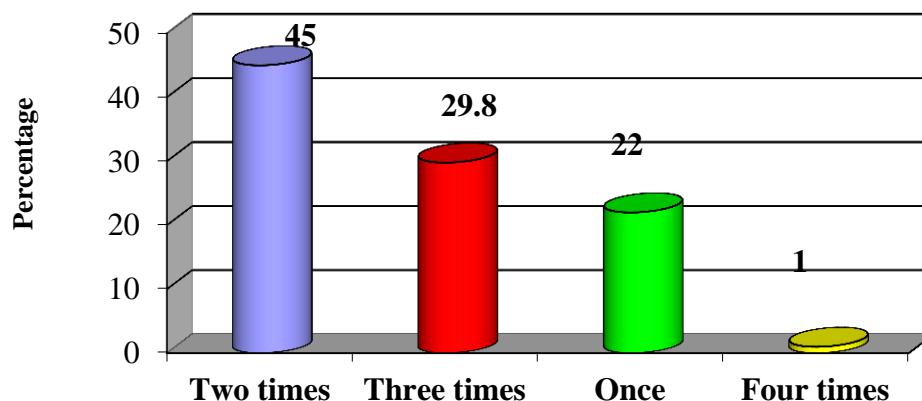
**Table 3. Existence of feeding programmes in schools**

Availability	Frequency	Percent
No	98	51.3
Yes	90	47.1
Non response	3	1.6
<b>Total</b>	<b>191</b>	<b>100.0</b>

The main funding for preschools feeding programme came from donors, community based organisations and parents. The major source of funding for preschool feeding programme came from parents themselves, this made most of preschools feeding programme in many ECD centres fail because most parents were reluctant to contribute. The main problem faced by many ECD centres not implementing feeding was due to; poverty, lack of community mobilisation, lack of cooperation by community members, poverty and ineffective management system. Similar results of these studies were confirmed by Pollit (1990) who established that children of all socioeconomic levels are at-risk for poor nutrition in United States. This was because some children do not get enough to eat each day because their families lack money to buy sufficient food. The same setting applies in Homa Bay County where most community members are in abject poverty thereby subjecting preschool children to malnutrition.

The main food provided by these preschools was balanced diet, mixture of maize and beans, porridge and vegetables. But on observation, the researcher saw that many preschools offered carbohydrates and protein rich foods (mixture of maize and beans and porridge). According to teachers, considerations before preparing food were; nutrient content, quality, age, taste, cleanliness, costs and quantity of the food. The findings show that most preschool teachers have adequate practices in nutritional practices. The results is as reported by Nkinyangi *et al.*, (1995) where he indicated that at certain times of the year, household food security is a serious problem in rural areas that make children to be fed with only one type of meal

(nutrient content) in a day, this observation relates to the actual situation in Homa Bay County, Kenya. Frequency of feeding for preschool children was determined. It emerged that 45% of preschool children are fed two times a day, 29.8% feed them three times, 22% feed them once and only 1% feed them once.



**Figure 2. Frequency of Feeding at Pre - Schools**

The results for children to be fed less than three times a day is mainly because of the poverty level within the County and partially influenced by preschool teachers inadequate nutrition education practices. The results relate to what Sheriff *et al.*, (2008) observed that even though the classroom teachers in Malaysia were trained to carry out the implementation of the nutrition intervention and related teaching aids were provided, he pointed out that there might be variations in teaching styles of the teachers that could influence learning by children. This was occasioned by irregular feeding of preschool children. Oniango, (1990) on an evaluation of pre-school feeding and health programmes in Kenya recommended that a pre-school child should be fed at least five times a day, this is contrary to the study results that shows that most pre-school children are fed two times a day.

Findings show that most (40%) of pre - school teachers reported that they have never had cases of illness of preschool children at school with only 30.7% reporting that they have witnessed children illness at their schools. For those who indicated that they have experienced children illnesses at their school, among the notable illnesses; stomachache, malaria, nose bleeding, headache, diarrhea, typhoid, anaemia, convulsions and kwashiorkor. Most of the defined illnesses above are mostly caused by nutrient deficiency to preschool children. Action taken by preschool teachers for ill children was that they took the children to hospital, informed their parents and sometimes bought medicine to them. Contrary to our study results Pollit (1990) observed that cases of children illness in schools in the United States were below 25%. This is because schools in America have organized and well implemented policies regarding nutrition education in schools unlike Kenya, a developing nation.

## 10. CONCLUSIONS

The nutritional knowledge of preschool teachers in most centres sampled by the study appeared to be low. Most preschool teachers had only secondary level of education with a significant number of them having participated in nutrition education seminar/workshop in the last few years. Most preschool teachers were aware of three food groups nutrients; protein, vitamins and carbohydrates. Most schools within the County were found to have implemented school feeding programmes. However for those preschool centres that were reported to be having school feeding programmes, they provided feeding that was not balanced diet, private ECD centres were found to be the ones who had at least implemented balanced diet in their respective schools. Among the foods identified to be provided at these ECD centres were; mixture of maize and beans, porridge, rice, cabbages, yams, sweet potatoes among other traditional foods items. The study observed that most preschool teachers were not able to classify/differentiate different types of food to their respective groups. Further, the study found that most preschool teachers were not well versed in the signs and symptoms of various nutritional deficiency diseases. Health and sanitation facilities were found to be in dilapidated states in most preschool visited by the researcher. Most of the dining facilities were dirty with some of them infested by cockroaches, rats and

flies. The pattern of provision of meal to children was irregular as it was seen that a particular number of these children only had one meal a day thereby impacting negatively on their growth and development.

## 11. RECOMMENDATIONS

The study makes the following recommendations to:

1. Implementation of nutrition education from preschool through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviours.
2. Provide nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies.
3. Provide preschool teachers involved in nutrition education with adequate pre-service and ongoing in-service training that focuses on teaching strategies for nutritional knowledge.
4. Coordinate school food service with nutrition education and with other components of the comprehensive school health program to reinforce messages on healthy eating. This is because preschool teachers have a great potential influence on child's health and nutrition than any other group outside the home.
5. Regularly evaluate the effectiveness of the school feeding programme in promoting healthy eating, and change the program as appropriate to increase its effectiveness.
6. Teachers have an obligation to provide children with accurate information and help them establish good habits and attitudes. Often these behaviours become well established during the early years and are carried over into adulthood.

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