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INFLUENCE OF FEEDING PRACTICES ON NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN IN SCHOOLS IN LUANDA SUB-COUNTY, KENYA

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ABSTRACT

Introduction
According to Kenya's Nutrition Profile, as of 2022, from the under-five population of 6.3 million, there are nearly 1.2 million children who are suffering from chronic malnutrition and 631,196 children are underweight. Kenyan rural county governments have made little effort to develop school feeding programs for children in pre-schools in other areas other than the arid and semi-arid areas.

Objective
To determine the influence of feeding practices on nutritional status of pre-school children in schools in Luanda Sub-County, Kenya.

Methodology
This study employed the cross-sectional study design. Stratified random sampling was used to select a sample population of 40 households. The sample included children aged 6 years and below attending preschools whose guardians consented in their involvement in the research. The data collection tools used included questionnaires, FFQs, 24-hour dietary recall, and anthropometric measures: weight, height and MUAC. Nutri survey software was used to analyze nutrition data collected using the 24-hour recall. Data analysis was done using SPSS version 20.

Results and discussion
The study showed that the prevalence of malnutrition among preschool children was 25%. 100% of the children did not meet the RDA for Vitamin A, folate, and calcium. From the participants, 37.5% did not meet their protein RDA, 82.5% did not meet their carbohydrate RDA and 95% did not meet their fiber RDA. 27.5% of the households had not consumed more than two fruit types in the past month. Compromised nutritional status was strongly associated with type of school, mother's education level, presence of school-feeding programs and family size. A possible association was determined between nutritional status and treatment of drinking water and employment of mothers.

Conclusion
It is important that the feeding practices at home and at school be carefully considered to ensure adequacy in the promotion of the nutritional status of preschool children.

Recommendation
Ministry of Education and Ministry of Health to design more effective and efficient school feeding programs that will be affordable for public schools.

INTRODUCTION

Malnutrition remains among major health concerns in Kenya. From the under-five population of 6.3 million, there are 1.13 million children who are suffering from chronic malnutrition and 631,196 children are underweight (Kenya Health Demographic Survey, 2023). As reported by Vihiga County Nutrition Action Plan (2020), the county has a stunting rate of 23.5 %. A total of 2.6% of children under five are wasted and 4 % are obese. The future of nutritional status across the country is greatly dependent on the research conducted in the various 47 counties. There is a gap in the nutrition research done in Vihiga County most especially in Luanda. It is necessary to determine the relationship between feeding practices of pre-school children and how they affect nutrition. Nutrition has been increasingly identified as a major factor in reducing child morbidity, mortality and increasing cognitive and physical growth and development (Vihiga County Nutrition Action Plan, 2020). Additionally, Kenya has made little effort to develop school feeding programs for children in pre-schools in other areas other than the arid and semi-arid areas. Feeding programs implemented in Kenya mostly focus on the Arid and Semi-arid lands (ASALs) and little or no attention is given to regions where agriculture potential is high. Another

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major setback in Kenya's health sector is its inadequate focus of attention and resources in nutrition at the community. Mothers and other caregivers have either obsolete or no information regarding proper complimentary and replacement feeding of children which predisposes them to malnutrition. The aim of this study is to determine the influence of feeding practices on nutritional status of pre-school children. Specific attention will be given to feeding patterns at homes and the feeding programs in schools.

OBJECTIVES

General Objectives

To determine the influence of feeding practices on nutritional status of pre-school children in schools in Luanda Sub-County, Kenya.

Specific Objectives

1. To establish the demographic and socio-economic characteristics of the caregivers of pre-school children in Luanda Sub-County, Kenya.
2. To assess the feeding practices of pre-school children in schools in Luanda Sub- County.
3. To assess the nutritional status of pre-school children in Luanda Sub- County.
4. To determine the relationship between feeding practices and nutritional status of pre-school children in schools in Luanda Sub-County, Kenya.

METHODOLOGY

The study employed a Cross-Sectional study design conducted among pre-school children in pre-schools in Luanda to determine the association between nutritional status and feeding practices, demographic factors, socioeconomic factors and malnutrition occurrence in Luanda, Vihiga County.

Sampling Design

Stratified random sampling was used to sample the households to participate in the study. The strata used were households with preschool children aged 6 years and below consenting to participate in the study. The sample size for this study was 40 households.

Data Collection Tools

Questionnaires

A detailed questionnaire was used to interview and collect data from subjects who had been recruited and who had provided consent to be involved in the study. The questionnaire was divided into four main sections: Section A, B, C and D. Section A collected demographic data on age, sex and religion. Section B involved collection of socio-economic information of the family of the respondent. The information in this section would involve data on education level, household income, occupation of guardians, and family size. Section C of the questionnaire collected information on food availability. This information included components such as farming practices, animal ownership and primary source for food. Section D of the questionnaire collected information on food accessibility and included components such as price of foods, variety, and affordability.

The Food Frequency Questionnaire (FFQ) was also used to collect dietary information on the respondent. The FFQ comprised of common foods in Vihiga County in their specific food groups: Proteins, carbohydrates, fruits, vegetables and fats and oils. Information was gathered on the respondent's food consumption from different food groups on a weekly, monthly, or yearly basis. The food frequency analysis was categorized into the number of times a food was consumed. For instance: daily (seven times a week), weekly/frequently (5 – 6 times a week), moderately (3-4 times a week), occasionally (1-2 times in two weeks), never (food was not consumed at any point during the week).

24-Hour Dietary Recall

The 24-Hour Dietary Recall included in the research was divided into five major sections: meal, name of food, name and amount of ingredients used, amount consumed, and mode of preparation. The meal column was divided into six: breakfast, snack, lunch, snack, supper and, evening snack. The amount consumed was estimated using literal illustrations such as medium sized cup, number of milliliters, palm of hand, closed fist, teaspoons, tablespoons, and plate size. The methods of preparation included in the study were boiling, roasting, fermenting, frying, stewing, baking and steaming. An acceptable response included in the study was "bought" for foods which the child consumed that was not prepared in his home or at the school.

Measurement of variables

Socio-Economic Characteristics

This section comprised of data and information on the occupation, income generation, education, property ownership, family size and the type of family of the respondent. The occupation of the guardians/parents was open ended for those whose occupation did not fall into the category of business, education, farmer and none. The education level of the respondents was considered as the highest level of education attained by the guardians/parents and included options such as no formal education, primary education, secondary education, tertiary education. The sole breadwinner of the family was solicited, and options provided included father, mother and "other' where details/kinship information was needed for the option "other". The family size information involved an open-ended question to determine the total number of people present in a household. This was related to the information sought to determine the type of family on whether it is nuclear, extended or blended. The information solicited and obtained enabled a better understanding of the influence of economic status and level of education on feeding practices.

Demographic Factors

This section comprised of data and information on the age of guardians/parents of the child, their marital status and their

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religion. The age of the parents/guardians was counted as their completed years and recorded as reported by the respondent. The marital status of the respondent was acquired as per the options provided (that is married, divorced, separated, single and widowed). The religion of the family was enquired in which they had four options: Christian, Muslim, Traditionalist, Atheist or Other. In cases where "Other" was an option, it had to be written by the respondent. This information enabled a better understanding of other social influences and religious influences of dietary habits/patterns that affect feeding practices.

Feeding Practices

Data and information collected regarding feeding practices included 24-hour dietary recall and food frequency questionnaire which detail the usual meal patterns and the frequency of food group consumption. These methods are quantitative and qualitative respectively thus collecting information on the amount of food consumed by an individual and the food groups of the various food groups to determine any inadequacy in the diet variety.

Dependent Variables

This comprised of information on nutritional anthropometric assessments such as weight, height and Mid Upper Arm Circumference. The measurements obtained from the assessment of the children will be compared to standardized ranges of healthy population of the same age to determine whether a child is malnourished or has normal nutrition status. The WHO reference values, growth charts, and median ranges to determine nutritional status category of an individual. These anthropometric assessment methods were important in providing information on the nutritional status of the research participants.

Statistical Design

Data obtained was entered into SPSS version 20. Descriptive and inferential statistics were conducted. Logistics regression was carried out to identify independent variables that had a significant association with nutritional status. The data were analyzed at 95% level of significance and the P-value equal to or less than 0.05 was considered significant as shown in the Table 3.1

Table 1: Summary of Data Analysis

Variables	Nature of variable	Data presentation and statistical test
Socio-demographic factors	Categorical	Frequencies, Percentages
	Continuous	Means, Standard Deviation
Economic factors	Categorical	Percentages
	Continuous	Means and standard deviation
Feeding practices	Continuous	Means and standard deviation
	Categorical	Percentages and frequencies

Geographical Area

The study was carried out in in Luanda town located in Vihiga County in Western Province. Luanda is located along the Kisumu-Busia Highway. It was previously an administrative division in Emuhaya District between the year 2007 and 2009. The county has a population of 590,013 and Luanda specifically has a population of 13,319 according to the 2019 census (Kenya Bureau of Statistics, 2020). Vihiga County has five constituencies: Sabatia, Vihiga, Hamisi, Luanda and Emuhaya, whose headquarters is located at Mbale. The rural population of Vihiga county is 531,629 while the urban population is 58,384 (Kenya Bureau of Statistics, 2020). As reported by Vihiga County Nutrition Action Plan (2020), the county has a stunting rate of 23.5 %. A total of 2.6% of children under five are wasted and 4 % are obese.

Ethical Considerations

Permission to carry out the research was sought from School of Public Health and Community Development, Maseno University and research permit was obtained from the NACOSTI. The researcher explained to the parents/guardians of the research participants that the research is not associated with any physical risks and invasive assessment methods. The study involved voluntary participation of the respondents and an assent/consent was obtained for this purpose. The respondents/participants were assured that the information obtained was confidential and that it will be used specifically for research purposes. The researcher also explained to the participants that there will be no rewards and incentives involved in the research.

RESULTS AND DISCUSSION

Demographic and socio-economic practices of caregivers

There are various socio-demographic and socio-economic factors that play critical role in determining the nutrition outcome of a preschool child. Some of these factors include education level of caregivers, employment status of caregivers, age of caregivers and overall family size. From the data collected in this research, all the necessitated factors were considered in the questionnaires. The results showed a significant relationship between family size and nutritional status of children. Most of the children who fell below the WHO nutrition cut off points were part of a large family of more than 4 children. However, there were also instances, where in a small size family consisting of three members having children consuming way below their RDAs and having a compromised nutritional status. The children involved attended either public or private preschools in the area. The data showed a significant relationship between the type of school attended by the children and their nutritional status. The results of the research also indicated that there is a possibility of a relationship existing between compromised nutritional status and employment status

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of mothers. There have been various researches in this area with some supporting and refuting the claim. For instance, according to a research conducted by Eshete et al., (2017), maternal employment was not statistically associated with child nutrition status. However, according to a research conducted by Nankinga et al., (2019), there is a significant relationship between maternal employment and nutritional status. Furthermore, the findings of the research showed a significant correlation between parents' involvement in school feeding programs and nutritional status of children. The results of the research also indicated a higher prevalence of malnutrition or compromised nutritional status among households where the mother had primary level education or no formal education compared to households where the mother/caregivers had secondary education or tertiary education. These findings concur with that of a study done in Nairobi slums that found that maternal education is a strong predictor of children's nutritional status (Laksono et al., 2022). Maternal education is important because they are able to recognize the significance of hygiene and providing nutritious foods to their children to meet their physical and mental growth requirements in different stages of the lifecycle (Laksono et al., 2022).

Feeding Practices of Preschool Children

Children in private preschools had better nutritional status compared to those attending private schools. This results concur with the study conducted in India (Ashok et al., 2014) which found out that children attending government schools were more susceptible to underweight while those in private schools were more susceptible to overweight and obesity. This may be due to the better feeding practices at the private schools compared to public schools. For instance, those in public schools complained about various factors associated with food eaten in school and its environs. These complaints included that the food is not diverse, it is not properly cooked, it is not enough, and a combination of two or more. However, those in private schools had lodged no complaints about the food provided at school. Furthermore, most of the children in public schools did not get packed snacks from home and therefore solely depended on breakfast, lunch and supper which most likely failed to meet their nutrient requirements. Conversely, children in private schools reported to carry packed snacks from home. These snacks, however, were not nutritious and mainly comprised of juice, soda, biscuits and other confectionery. These choices may act as foreshadow of increased cases of overweight and obesity among these children due to the reduced physical activity associated with private schools. Additionally, the results reported in dietary diversity table indicated that there was a considerably low consumption of animal food sources, fruits and vegetables, and legumes.

Table 2: Food Variety in the Households (n = 40)

Food groups	Frequency of Consumption			
	Daily n (%)	Weekly n (%)	Occasionally n (%)	Never n (%)
Cereal	4 (10)	12 (30)	24 (60)	0
Animal sources	0	15 (37.5)	14 (35)	11 (27.5)
Legume sources	1 (2.5)	13 (32.5)	13 (32.5)	13 (32.5)
Vegetables	3 (7.5)	13 (32.5)	22 (55)	2 (5)
Fruits	0	10 (25)	21 (52.5)	9 (22.5)
Fats/oil	39 (97.5)	1 (2.5)	0	0
Beverage	4 (10)	17 (42.5)	19 (47.5)	0

Where: Daily implies 7 days in a week
Weekly implies 5-6 times in a week
Occasionally implies 1-2 times in a week
Never implies no consumption in the past month

The low consumption of animal food sources can be directly linked to economic status. For instance, 72.5% of the population consume animal food sources weekly or occasionally and 27.5% of the population has not consumed any form animal food source in the past month. Legumes are a good source of protein when consumption of meat is low and can act as a healthier alternative due to the absence of saturated fat in legumes hence their low biological value. However, even with the low consumption of animal food sources, 32.5% of the population have not consumed more than one type of legume in the past month. These animal food sources are usually high in Vitamin A, high biological value protein, iron, and calcium. Furthermore, 22.5% and 5% of the population has not consumed more than one type of fruit or vegetable in the past month respectively. Fruits and vegetables are the main source of minerals and vitamins which are essential for strengthening immunity thus promoting overall health.

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Nutritional status of Preschool Children

The nutritional status of preschool children was influenced by dietary intake and utilization of food and nutrients respectively.

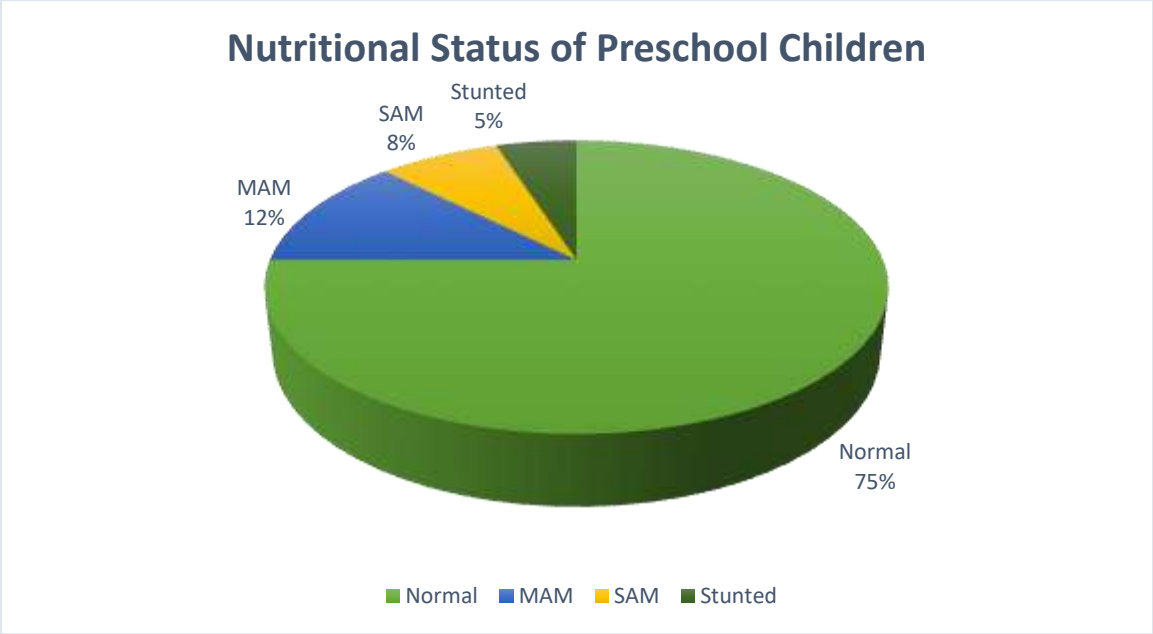


Figure 1: Nutritional status of children

The WHZ and WAZ was used to determine the nutritional status of the children as represented in table 5.1 below. From the 40 households in which the research was conducted, there were children who fell under the category of normal nutritional status, moderate acute malnutrition, severe acute malnutrition, and stunted. The results showed that 12.5 % of the children suffered from MAM, 7.5 % of the children suffered from SAM and 5% of the children were stunted. The results showed an even distribution of malnutrition among both genders: boys and girls. From the 10 children who were malnourished, five were boys and five were girls. This differs with research conducted by Awan (2003) which showed that female children were more vulnerable to malnutrition compared to male children due to intra-household food allocation that favors boys more than girls. From the findings of the research, various nutrient RDAs were not met by food intake. For instance, only 17.5% of the population met their carbohydrate RDAs while 82.5% did not. 62.5% of the population met their RDAs for proteins while 37.5% did not. Under fiber, 5% of the population met their RDAs while 95% did not. From the findings, 62.5% of the children are able to meet their RDAs for Vitamin C. The children from the sample population, however, are more likely to suffer from 'hidden hunger' due to their tendency to consume far much less than their micronutrient RDAs. For instance, 100% of the population did not meet their RDAs for Vitamin A, Folate and Calcium with only 10% meeting their RDA for Iron.

Relationship between feeding practices and nutritional status of preschool children

For an optimal nutrition status, the following play a key role in child growth and development; frequency of feeding, the daily nutrient requirements, energy density of foods, and dietary diversity. The primary caregiver has control over the frequency with which foods are offered to the young child, the amount served, composition of these foods and the level of encouragement or forcefulness used to feed the child. The feeding practices of preschool children are therefore solely dependent on the caregivers and the school feeding programs. From the results, most of the children with compromised nutritional status did not meet their RDAs for most nutrients. For instance, from the 10 malnourished children, only one met their RDA for carbohydrate. This can therefore imply that dietary intake is a great determinant of nutritional status especially carbohydrates because it is the main source of glucose in the body. In instances, where carbohydrates is inadequate the body begins to utilize the fat stores and ultimately the protein stores leads to wasting in children. The presence of stunting in the sample population is also an indicator of chronic food inaccessibility, gap in feeding knowledge and practices, and inadequate intake. Additionally, environmental factors affect nutritional status due to the relationship that exists between environmental conditions causing infections that lead to increased nutrient requirements or decreased nutrient intake leading to a compromised nutritional status (Karienye, 2017). The findings from this research showed a weak relationship between the treatment of drinking water and the nutritional status of the children. These findings differ with the results of a study conducted in Sudan which showed that children in households with unsafe source of water were 2.6 times more likely to suffer from wasting compares to those using piped wells and treated water (Khalid et al., 2021).

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RECOMMENDATIONS

Recommendation for policy

Policy makers in the Ministry of Education and Ministry of Health to design more effective and efficient school feeding programs that will be affordable for public schools. These programs should consider quality, quantity and variety of the meals provided. This intervention will greatly reduce the gap that exists in the nutritional status of children attending public and private schools.

Recommendations for practice

To improve the feeding practices and ultimately the nutritional status of children in preschools:

- Encourage parents/guardians of preschool children to pack for their children healthy snacks when going to school.
- Encourage schools to involve parents in discussions regarding the feeding program available in the school.
- Empower women to participate in more income-generating activities to increase their livelihoods and hence improve the quality and quantity of food availed in a household.
- Encourage mothers to boil or treat the water they use for drinking and preparation of meals to prevent the infection-nutrition cycle.

Recommendations for training/education

To improve the overall nutritional status of preschool children:

- Train the health care staff on focused MCH nutrition counselling that emphasizes the various important components of feeding children below five years for optimum growth and development.
- Educate the public on the ideal food plate for a preschool child and nutrient-conservative methods of food preparation.
- Educate mothers on how to start income generating activities to improve the socio-economic status of the family.

CONCLUSION

- The prevalence of malnutrition among preschool children was 25%.
- The mother's employment and education status were significantly associated with nutritional status. Other socio-demographic factors such as age of the mother and marital status had no significant association with nutritional status.
- The type of school is significantly associated with nutritional status.
- The anthropometrics, dietary diversity data, number of meals consumed by a child, the type of school a child attends, whether the child attends school with packed snacks or lunch, the quality and quantity of food provided at school were significantly associated with the nutritional status of the children.

AREAS FOR FURTHER RESEARCH

In this research we identified some gaps which help generate more information on which factors necessarily influences the nutritional status of children 3-6 years of age. The following are some suggestions given.

- There are factors which can affect the nutritional status of a child whose implications carry on into the future for example exclusive breastfeeding, timely introduction to complimentary foods, deworming, and immunization among others. it is imperative to include this information in the research to identify whether the feeding practices at home and in schools have an impact on the nutritional status
- Caregivers, in this case parents and teachers play a role of authority in children at this age. This is when children start to develop food habits, aversions and behaviors. It is also important to consider the attitude of the caregivers during mealtime that is their level of encouragement or forcefulness. Further research should be done which takes care of tis confounding variable.

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