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**RELATIONSHIP BETWEEN HOUSEHOLD CHARACTERISTICS  
AND FOOD SECURITY AMONG HOUSEHOLDS WITH SCHOOL GOING  
CHILDREN 6-14 YEARS IN TURKANA COUNTY, KENYA**

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## ABSTRACT

Good nutrition is very essential for proper growth and development of school going children. Malnutrition among school-going children affects their physical and cognitive development leading to low-class attendance hence poor school performance. Despite the economic growth observed in developing countries in recent years, undernutrition is still predominant. This study aims to determine the household food and nutrition security among households with school going children 6-14 years in Turkana County. A cross-sectional study design was adopted where 386 children were sampled for study. Turkana West Sub- County was purposively selected and the wards, locations sub-locations and villages were randomly selected. Systematic random sampling was used to sample households with school going children 6-14 years. A structured questionnaire survey was conducted on parents/guardians. Statistical analysis was performed using Statistical Package for Social Sciences Software (SPSS) Version 25. Data was analyzed using descriptive and multivariate statistics at 95% confidence interval. About 60% (n=228) of the households were headed by males with 62.2% aged between 20-30years. The large proportion of the respondents (58.8%) had attained primary education level only. Charcoal and firewood selling (25.6%) was the main occupation of the household heads, 13.2 % provided agricultural labor and only 2.1% had a formal employment. The rest did not have any source of income. The average dietary diversity score of the individuals was 5 to 7 food groups while the highest dietary diversity score was 8-10 food groups. The school going children (6-14 years) had a medium dietary score with 45.9% while 22.3% had a low dietary diversity score. The study indicated that there was a significant relationship between dietary diversity and the nutrition security of the school going children 6-14 years. Findings of this study are useful in informing the County government of Turkana in the planning and implementation of relevant food and nutrition security programs in the Turkana West community. The study recommends adequate nutrition support to be incorporated in the school feeding program in the locality.

**Key words:** Household Food security, School going Children 6-14 years

## INTRODUCTION

Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life [1]. Food security has four major dimensions: availability, accessibility, utilization and stability. Food availability is dependent on on-farm food production or purchase from the market. Food access is defined by the presence of what is required to physically acquire food while utilization is the ability of the body of an individual to convert consumed food into nutrients [2]. Nutrition security is broader than food security and considers the nutritional value of food and the systemic factors that determine an individual's nutritional status [3]. Nutrition security considers other factors such as hygiene and sanitation, access to healthcare, diversity of diets, and individual health status which may contribute to malnutrition in food secure people.

Globally, more than 200 million school age children experience stunted growth and underweight. This number is estimated to grow to nearly one billion by 2020 [4]. In sub-Saharan Africa, 35 million school-aged children have inadequate nutritional status. Underweight and thinness are most prominent in populations from South-East Asia and Africa, whereas in Latin America the prevalence of underweight or thinness is generally below 10% [5]. In Kenya, the national prevalence estimates are 26% for stunting, 4% for wasting and 11% for underweight [6]. In Turkana County, one in every six children is wasted (18.1%) and one in every five children is stunted (27.8%) [7]. These indices equally include school going children 6-14 years as they are also affected. Children in low and middle-income countries have been known to be at an increased risk of under-nutrition due to poverty and lack of adequate food. Children's physiology and the influence of the family and the community on their behavior may play an important role in the proper development and nutritional status of the child [8].

The food and nutrition insecurity cuts across food availability and food accessibility, thus affecting the food stability. Turkana County is the most food insecure in Kenya with one in five households (19%) having inadequate food to consume [9]. This may be associated with majority of the household heads not attaining any formal education. According to the Turkana County Integrated Development Plan 2018, 84.6% of the household heads have no formal education at all, 5.5% have primary education while 2.6% have secondary education and 1.8% have tertiary education [10]. Therefore, the household heads are not able to recognize signs and symptoms of malnutrition in their school going children [11]. According to recent rankings, Turkana County is the poorest county in Kenya with a poverty index of 79.4%. There is paucity of literature regarding the contribution of household characteristics to food security among households with school going children 6-14 years in Turkana West Sub County [12]. The few studies which have been done among school going children have not established the relationship between household food security and household characteristics, thus creating a gap for further research [13, 14]. The study, therefore, aims to establish the relationship between food security and household factors among households with school going children 6-14 years in Turkana West Sub-County.

## MATERIALS AND METHODS

### Study Site

The study was conducted in Turkana West Sub-County, Turkana County, Kenya. It is one of the 7 Sub-Counties of Turkana County with the headquarters being Kakuma town. Turkana County lies between the Geographic Positioning System (GPS) coordinates 3°09'N 35°21'E. The researchers sampled four wards namely: Kakuma, Lopur, Nanam and Lokichoggio. The Sub-County borders Uganda to the West and South Sudan to the North.

### Study design

The study was a household-based survey and the researchers adopted a cross-sectional research design. This design allows data to be collected at a point in time, and describes the characteristics associated with the subjects under study and report them as they are.

### Study Population

The research was conducted among school-going children aged 6-14 years who were in good health and whose nutrition status was able to be assessed at the time of study. Study participants were drawn from various households in the four selected wards of Turkana West Sub-County. The researchers included only the households which were either headed by a parent or a guardian and had a school going child aged 6-14 years. The key respondents were the household heads while the nutrition statuses of the children were assessed.

### Sampling

Turkana West Sub-County in Turkana County was purposively selected. Random sampling by the use of random number generator was used to select Wards, whereby all the 7 Wards were listed and the generator selected only 4 Wards. Households were selected using systematic random sampling. Children from the households that met the criteria of having the school going children 6-14 years were randomly selected. A sample size of 386 calculated using Fisher's formula at 95% confidence interval and 5 % marginal error was used.

### Data Collection

A pretest was done in Turkana North Sub-County among respondents in order to assure the validity and reliability of the data collection instruments. The respondents in the pretest area had similar characteristics as those of actual study area. The researchers collected quantitative data using semi-structured interviewer administered questionnaires. The researchers collected data on the household head individual characteristics: age, gender, level of education and occupation, household demographic and economic characteristics. Data on household food and nutrition security was collected using a Dietary Diversity Score.

### Data Analysis

Quantitative data was coded, entered, cleaned and exported into Statistical Package for Social Sciences (SPSS) version 25 as descriptive and inferential statistics were presented using charts, tables, and graphs. Univariate analysis was used to describe the

distribution of each of the variables in the study objective while bivariate analysis was used to investigate the strength of the association and check differences between the outcome variable and other independent variables. Chi-square test of independence at 0.05 level of significance was used to determine if there was a relationship between variables.

### **Ethical Considerations**

The study obtained ethical approval from Masinde Muliro University of Science and Technology (MMUST) Institutional Ethical Review Committee [Approval No: MMUST/IERC/094/2019]. The study was also approved and licensed by the National Commission for Science, Technology and Innovation [NACOSTI License No: NACOSTI/P/19/2846]. Permission to conduct the study was obtained from Turkana County, Ministry of Education Office of the director and area Ward administrator. The researchers explained the purpose of the research, the risks and benefits to the research participants. The household heads who agreed to participate in the study were consented using a written consent and those who were unable to write used their finger prints. Assent was sought from the children to participate. The participants were assured of privacy and confidentiality of the data they provided to the researchers.

## **RESULTS AND DISCUSSION**

### **Socio-demographic characteristics of households in Turkana West Sub- County**

As detailed in Table 1, results show that 59.1 % (n=228) of the households were headed by males, the mean age of the household heads was 29.8 years and the majority 62.2% (n=240) of the household heads' age was between 20-30 years. According to education level in the study, 58.8% (n=227) had attained primary education. Among the 58.8% only 4.7% attained tertiary level, 21.8% had no formal education. Among the households, 25.6% (n=99) depended on charcoal and firewood selling as their main occupation, 13.2% (n=51) provided agricultural labour while 2.1% (n=8) had a formal employment. The findings of this study are similar to the 2018 Turkana County Smart Survey Report that reported little progress in attaining literacy levels among household heads. This is a major hindrance to improved care practices, capacity for knowledge and technology transfer at the community level and ultimately improved income and livelihood security for optimal health and nutrition outcomes.

### **Household Food Security**

#### **Household farm production and farm produce utilization**

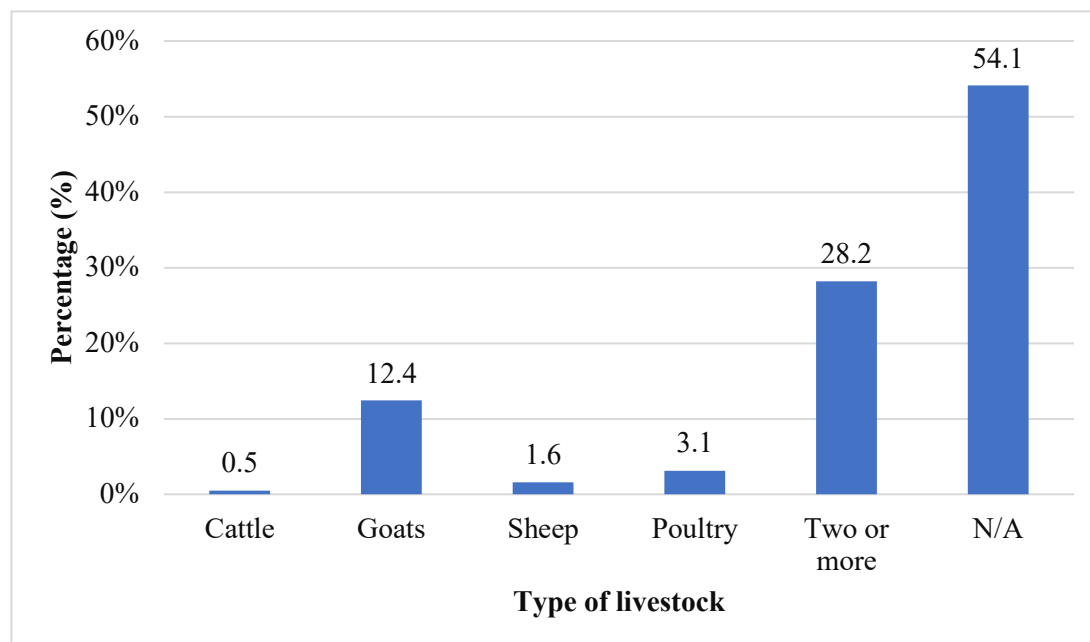
As summarized in Table 2, the study found 54.7% (n = 211) of the households had their farm produce last only for one season while 2.3% (n = 9) the respondents were not able to tell exactly how long their produce lasted. The study also determined the utilization of the farm produce as an aspect of household food security. Among the households selected, 59.3% (n = 229) produced food for own consumption, 3.4% (n=13) produced food for sale while 7.5% (n= 29) households produced food both for their own consumption and for sale. About 30% (n=114) did not provide a clear of how they utilize their foods. The World Food Program and Turkana County Government, 2016 [9] reported that household food access and utilization in Turkana County was facing a serious challenge. The community is majorly dominated by pastoralists. This coupled



with poor and unreliable sources of income and compromised food production opportunities seriously impacts food security in the region. Findings of the Value Chain Analysis of Priority Commodities for Food and Nutrition Security in Turkana County, 2017 [7] revealed that Turkana County is largely a net importer of food but has a potential for improvement. Lack of proper storage facilities among this community is also a major challenge that requires urgent attention. Households highly experience post-harvest losses due to destruction of food materials by pests and rodents [11].

### Household livestock keeping

Turkana County is a pastoralist community and thus livestock ownership was looked into as a measure of food security. Results for the livestock ownership show that 46.1% (n = 178) of the households kept livestock. Those who kept livestock had an average of 12 livestock per household with goats mostly reared, 28.2% of the respondents kept more than one type of livestock, 12.4% reared goats while only 0.5% reared cattle. Livestock was kept for both subsistence use in the house hold as well as for sale. These findings concur with a study done by Situma *et al.* [12] which reported that livestock contributes to the households' economy in different ways: as a source of pulling power, source of cash income, source of supplementary food and means of transport. Besides, livestock is considered a means of security and means of coping during crop failure and other calamities. It is however important to note that almost half of the study population neither did farming on their own land nor had livestock. This implies that these households were more vulnerable to food insecurity as compared to those which engaged in farming and livestock keeping.

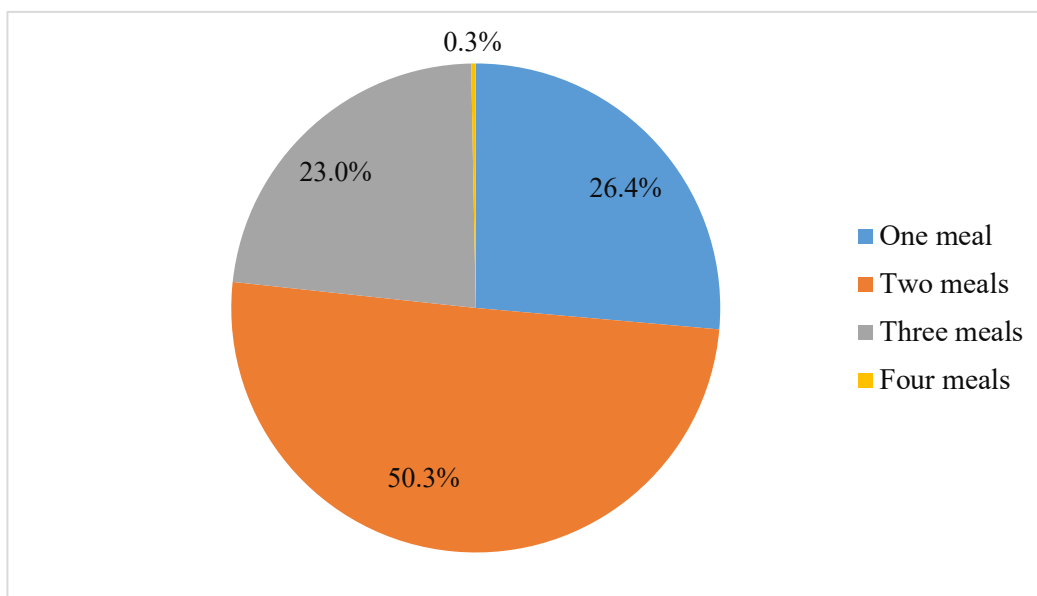


**Figure 1: Type and population of livestock kept by the households**

### Household Nutrition Security

Household nutrition security was measured using a combination of tools: a Household Dietary Diversity Score and Food Frequency questionnaire [13]. Food Frequency

Questionnaire results showed that a half (50.3%) of the school going children 6-14 years took 2 meals a day with 26.4% taking 1 meal a day and 23.0% taking 3 meals per day. Only 0.3% of the respondents indicated having four meals per day. The Food and Agricultural Organization (FAO) 2004, Family Nutrition Guide recommends that the frequency of eating for school going children should be at least three meals and three snacks daily [14]. The results from the current study thus differ from the guideline recommendations. This could be attributed to the food security situation in the households in Turkana County [15, 16]. The food production and utilisation by the study population was poor hence a few meals were consumed a day. The results are as illustrated in Figure 2.



**Figure 2: Number of meals consumed by the school children in a day**

As summarized in Table 3, the results from Dietary Diversity Score show that the most frequently consumed food items were: oils and fats (including camel fat, goats' fat) (79.0%), porridge made from CSB, unimix, millet, sorghum, maize flour (76.9%), legumes and nuts (75.9%) and grains, roots and tubers (72.5%). Similar food groups were found to be the most consumed by the study population according to the 2018 Turkana County Smart Survey [7]. Despite the community practising pastoralism, the least consumed food items were meats and meat products (40.4%) and eggs (23.8%). This can be attributed to the fact that, in Turkana County, possession of cows, goats and sheep is seen as a measure of wealth. The more animals one has, the higher they are ranked as wealthy. Thus, majority of the people opt to keep the animals for the prestigious ranking rather than consuming them [17]. School age is the active growing phase of childhood and is a dynamic period of physical growth and mental development and children's dietary intake at this age must supply all the nutrients needed for their growth, development and also for body maintenance and energy for physical activities [18]. The dietary diversity reflects the nutrient quality of one's diet thus it is an important factor especially in school going children's nutrition. Diverse diets are therefore recommended for the school going children population.



Findings from this study concurred with those of Situma *et al.* [19] which found that school going children consume diets rich in plant-based foods such as cereals and tubers as well as legumes. This could be because both study areas were rural settings and these are the only available foods. Despite the study area being a pastoralist community with half the households rearing livestock, the consumption of livestock products by the school going children 6-14 years was low. Results of the types of foods consumed by the households with school going children 6-14 years indicated that eggs and dairy products were the least consumed foods. Findings from this study are similar to a study done by Mukherjee *et al.* [20] on the dietary intake of school aged children in developing countries which found that meat and meat products were rarely consumed by school children. Similar findings were observed by Omwami *et al.* [21] whose study indicated poor meats and meat products consumption among the food groups eaten by pupils. Findings of these studies could be attributed to the study areas which are all in developing countries. Limited consumption of animal source proteins increases the chances of the school going children having micronutrient deficiencies, thus contributing to the triple burden of malnutrition and hidden hunger [22].

### **Relationship Between Household characteristics and Food Security indicators among School Going Children 6-14 Years in Turkana West Sub-County, Turkana County**

The relationship between household demographic characteristics and food security was determined using Pearson's Chi-square test. The relationship between household head level of education and the amount of food produced showed that there was no significant association between education level of the household head and food security with  $X^2(12, N = 386) = 12.588$ ,  $p$  value 2.147. However, another Chi-square test showed that there was significant relationship between household head level of education and the number of seasons the food lasted with  $X^2(9, N = 386) = 23.488$ ,  $p$  value of 0.061. This concurs with FAO (2018), that the level of education of household heads to a great extent affects food and nutrition security of the household as it results in improved food production by adopting modern techniques. In relation to nutrition security, Pearson's chi square test indicated a significant relationship between household head level of education and nutrition status of school going children,  $X^2(18, N = 386) = 17.181$ ,  $p$  value 0.003. Educated household heads are able to recognize the signs and symptoms of malnutrition and seek necessary nutrition interventions from relevant sources.

### **CONCLUSION**

The researcher found that the level of household food and nutritional security was key among other factors such as the level of education in relation to the nutrition status of the school going children 6-14 years. Most respondents were able to access food through purchasing power and farm produce. From study findings, household food security status for school going children aged 6-14 years was moderate while nutritional security was inadequate. The researcher recommends Agri-nutrition interventions and implementation of community resilient programs to improve food and nutrition security.

### **Data availability**

The data is available and can be obtained from the corresponding author upon request.

### **Conflict of interest**

There was no conflict of interest in conducting this study.

### **Author's contributions**

All the authors designed the study, first author conducted the data collection process, analysis and preparation of draft manuscript while second and third authors participated in technical writing and review of manuscript before publication. All authors approved the manuscript for publication.

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**Table 1: Socio-demographic characteristics of the household heads**

Characteristics	Response	n	%
<b>Gender</b>	Male	228	59.1
	Female	158	40.9
<b>Age</b>	20-30 years	240	62.2
	31-40 years	103	26.7
	41-50 years	31	8.0
	>50 years	12	3.1
<b>Level of education</b>	No formal education	84	21.8
	Primary	227	58.8
	Tertiary	18	4.7
<b>Occupation</b>	Selling Charcoal	99	25.6
	Agricultural labour	51	13.2
	Formal employment	8	2.1

**Table 2: Number of seasons farm produce lasts and utilization of farm produce**

Variable	Factors	n	%
<b>Number of seasons farm produce lasts</b>	Less than one season	147	38.1
	One season	211	54.7
	Two seasons	19	4.9
	Don't know	9	2.3
<b>Utilization of farm produce by the household</b>	Own consumption	229	59.3
	Sale	13	3.4
	Share	1	0.3
	Own consumption & sale	29	7.5
	Not clear	114	29.5

**Table 3: Types of food consumed by the households for the School Going Children 6-14 years on a normal occasion**

Food item	Yes (%)	No (%)	Don't Know (%)
Eggs	23.8	70.7	0.8
Porridge made from CSB, unimix, millet, sorghum, maize flour	76.9	21.0	2.1
Flesh meats (beef, mutton, liver, fish, camel, donkey, blood, wild meat)	40.4	57.0	0.3
Legumes and nuts	75.9	21.8	0.3
Dairy Products	56.7	40.9	2.3
Vitamin A rich fruits and vegetables (melon, carrots, spinach)	51.6	41.6	0.3
Other fruits and vegetables (tomatoes, okra)	60.6	37.0	0.3
Grains, roots and tubers (Ugali, Cassava, potatoes)	72.5	25.4	2.1
Oil & fats (camel fat, goats fat)	79.0	18.7	2.6

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