

Nutritional Knowledge, Attitude and Practices and Nutritional Status of School-Going Children in Machakos District, Kenya

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Abstract. The aim of this study was to determine the level of nutrition knowledge, attitude and practices and nutritional status of school-going children in a semi arid food insecure Machakos District, Kenya. A cross-sectional study was conducted in 15 randomly selected primary schools. A sample size of 350 pupils was used. Stratified sampling method was used to select pupils by class and gender. Structured questionnaires, focus-group discussion guide, observation checklist and anthropometry were used to collect data. Data was analysed by SPSS version 11 and Nutri-Survey computer packages. The WHO 2006 growth standards were used to interpret nutrition data. A P-value of ($P < 0.05$) was considered significant. Significantly ($P < 0.05$) more females (83.1%) than males (64.3%) formed the bulk of those without secondary education. About 56.1% of pupils' parents were involved in casual labour. About 39.1% of the pupils' households had pit latrines made of banana/grass walls, earthen floor and no roof while 16.4% of the households disposed household refuse in open fields. Aspects of nutrition knowledge, attitude and practices measured included; nutritive value of food, hygiene and safety, cooking methods, food selection for different groups, food production and food preservation. Researcher administered validated performance tests on nutrition knowledge and attitude levels showed that 4.6%, 37.6% and 57.8% of pupils scored average, poor and very poor respectively indicating lack of adequate nutrition knowledge. Cultural beliefs, taboos and attitudes negatively affected nutrition practices. About 8.8%, 22.9% and 64.3% of pupils made food related decisions, prepared meals and washed up at home respectively. About 14.5%, 28.9% and 3.9% of the pupils were underweight (Weight-for-Age), stunted (Height-for-Age) and wasted (Weight-for-Height) respectively. Nutrition education in primary schools has to be strengthened if any country has to effectively address malnutrition.

Key Words: Nutritional Knowledge, Attitude, Practices, Nutritional Status

1. Introduction

Although food shortage may be a leading cause of malnutrition, nutrition education intervention programmes have also proved to be equally important in addressing malnutrition [1]. Despite the importance of nutrition education interventions in addressing malnutrition, these interventions have not been given much emphasis in Kenya, a country with high cases of malnutrition, stunting at 35%, household food insecurity and a high school dropout. The teaching of nutrition in formal schools has been taking a downward trend since independence. Each school syllabus revision has seen the omission of essential nutrition education topics or content reduction [2]. Although some selected nutrition topics are included in the syllabus the content is quite reduced from the previous syllabi. School dropout rate is at its peak in class 5 and 6 meaning these pupils leave school without adequate nutrition knowledge [2]. Further not all pupils who complete primary education proceed with secondary education with more girls than boys not continuing with education [3].

Nutrition has to be taught in an enabling environment using available resources. The school offers a proper setting for nutrition education because the child and the school are inseparable. The child spends most

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of its time (9 months in a year) in school [4]. Knowledge and skill learnt in childhood are more likely to be retained and practiced in future life because the young mind is still receptive to new information [5]. Children are also change agent; new food technologies, nutritional practices learnt in school are likely to be transferred to the community [6]. In any community setting also, the child represents more than 80% of households and thus providing an opportunity for school-community interaction. The school is a protected environment, which instils confidence and builds self-esteem to a child [4]. Some children also influence making decisions about food and health at home. Pupils who drop out of school due to hunger, early marriages, teenage pregnancies and search for teenage employment are disadvantaged [3]. This study sought to establish nutrition knowledge, attitude and practices and nutritional status of school going children in a resource poor district in Kenya.

2. Methods

A cross-sectional study was conducted in 15 randomly selected primary schools in Machakos district, Kenya with a study sample of 350 pupils. The district was purposively selected because of long standing food insecurity, famine and high school dropout [7]. Stratified sampling was used to select pupils by class and gender. Structured questionnaire, focus-group discussion guide, anthropometry and existing records were used to collect data from pupils, teachers and parents. Nutrition knowledge aspects measured included nutritive value of food, hygiene and safety, cooking methods, food selection for different groups, food production and preservation. Responses were ranked using the Likert scale of performance [8] as 1=very good, 2=good, 3=average, 4=poor and 5=very poor or don't know. Anthropometric measurements included weight and height controlled for age and sex [9]. Pupils were asked to remove foot wear and excess clothing. Weight was taken with a bathroom scale that was calibrated every morning using a 1kg stone and recorded to the nearest 0.1 kg. A well calibrated height board with a sliding headrest was used to take pupils' heights. The pupil was well positioned on the height board with knees and chin held straight and height readings done to the nearest 0.1cm. Two readings for weight and height were done and average calculated. Pupils' growth monitoring cards were used to verify date of birth/age. Secondary data such as school records; school admission register and class attendance registers were used to validate this information.

Forms of malnutrition discussed in this paper included stunting, wasting and underweight. Stunting (Height/Age) also referred to as chronic malnutrition is a measure of linear growth. It reflects failure to receive adequate nutrition over a long time. It represents a measure of long term effects of malnutrition in a population. Wasting (Weight/Height) also referred as acute malnutrition measures body mass in relation to body length and describes current nutritional status. It represents failure to receive adequate nutrition in the period immediately preceding the survey and/or recent illness. Underweight (Weight/Age) is a composite index of stunting and wasting and thus does not distinguish between acute and chronic malnutrition (stunting). Using the WHO 2006 growth standards, a pupil was considered malnourished if he/she fell below minus 2 SD of the reference child. If a pupil was below minus 3 SD, the pupil was considered as severely malnourished. Data was analysed by SPSS and Nutri-Survey computer packages using both descriptive and inferential statistics. A P-value of less than 0.05 ($P < 0.05$) was considered significant at 95% Confidence Interval.

3. Results

3.1. Demographic and Socio-economic Characteristics of Pupils' Households

The household size was 7.1. Majority of the people in the study area had some education. (Table 1). Those not proceeding to secondary school however formed more than three quarters of the population (78.2%). Significantly ($P < 0.05$) more females (83.1%) than males (64.3%) had no secondary school education (Table 1).

Slightly more than half (56.1%) of the household members were involved in casual labour. Results also showed that 17.4% and 2.6% of them were unpaid family workers and unskilled public workers respectively. Only 9.6% and 4.3% were involved in skilled private work and skilled public work respectively. Ten percent of them were involved in business. Those involved in skilled work and/or businesses were households in or near urban centres.

About 1.5% to 2% of pupils per class in upper primary (class 4 to 8) were reported to drop out of school every year. The main reason cited for school dropout was search for jobs (50.4%) with more boys (29.4%) than girls (21.2%) citing search for employment as the main reason for drop out. Early marriages were reported as the second main reason with 27.5%.

Table 1: Distribution of Pupils Households by Education and Occupation Levels

Variable	Variable description	% n=350
Education Level	No secondary Education	78.2
	No secondary education (males)	64.3
	No secondary education (females)	83.1
	Not Completed Primary	42.3
	Completed Primary	35.9
	Post secondary	5.7
Occupation Levels	Casual labor	56.1
	Unpaid family worker	17.4
	Private worker	9.6
	Public worker	6.9
	Business	10

3.2. Water, Sanitation and Disease Frequency

More than three-quarters of the pupils (80%) reported that their households obtained water from rivers or streams while 19.1% had tap water with 5.1% having taps inside the house and 14% from a communal tap. Only 0.9% of the pupils reported to obtain their water from a tank throughout the year. Only 18.9% of the pupils reported to have water tanks at home. Nearly all the pupils (92%) drank untreated water, while the rest reported that the water they consumed was treated at source. All the pupils reported to have a latrine at home. More than a quarter of the pupils (39.1%) reported to have traditional pit latrines, walls made of banana fibers or grass, earthen floor and no roof while 60.9% reported to have VIP pit latrines. Further, 83.6% of the pupils reported to have composite or refuse pits at home while 13.4% and 3% of them disposed household refuse in the cows shed and garden respectively. Class teachers who knew the pupils' homes verified this information. A Focus Group Discussion with teachers and with parents indicated that the most common diseases among school children were malaria, headaches, nose bleeding, fainting, stomachache and diseases of the Upper Respiratory Infections (URI). Others were skin infections, worm infestations, pneumonia and wounds that took long to heal.

3.3. Nutrition Knowledge, Attitude and Practice

Nutrition knowledge test results show that all the pupils scored poorly in nutrition knowledge aspects. About 4.6%, 37.6% and 57.8% of pupils scored average, poor and very poor. There was no significant difference ($P < 0.05$) in performance in Class 5 and 6 implying that higher classes were not at any advantage in nutritional knowledge than lower classes.

Nutrition attitudes were negative. Boys considered nutrition as a female domain and instead preferred masculine activities. Attitudes towards consumption of certain foods were influenced by school set up; rural or urban. When pupils were asked to state the food cultures/taboo they knew, significantly ($P < 0.05$), more rural pupils (65.1%) than urban pupils (34.9%) reported taboos and/or beliefs that negatively affected food consumption. Some of the taboos reported were; abstinence from consumption of certain foods. Girls were prohibited from consuming animals' head because it was presumed they would dominate their husbands when married. Consuming these meats therefore made it difficult for girls to get husbands. Further, girls were not supposed to consume legs or feet of animals because they would allegedly not settle in their husbands' homes once married. Females were also not supposed to consume eggs otherwise they would become thieves. They were also not supposed to consume animal organs such as the liver as they would lose sight. Significantly more boys (76%) than girls (24%) reported these taboo. 81% of rural and 19% of urban pupils reported that fish was related to the snake and eating fruits with snake patterns made one become like a snake, a clear indication that nutrition knowledge was lacking. Half (57%) of the pupils reported that boys were not supposed to enter the kitchen lest they will never get wives.

Nutrition practices were similarly poor since the learners could not practice what they did not know or appreciate. About 61.2% of the pupils reported that their mothers made decisions on what to be cooked while 8.8% of them reported that they did. Slightly more than a quarter (22.9%) of the pupils reported that they were responsible for food preparation at home (Table 2). There was a significant difference ($p < 0.05$) in the number of pupils washing up dishes after meals (64.3%) as compared to other household members (35.7%). Although not significantly ($P > 0.05$) more girls (13.45%) than boys (9.5%) reported to be responsible for food preparation and clean up at home. More boys (22.1%) than girls (14.1%) were responsible for fetching water, going to the market to purchase food than its preparation. About 33.4% of the pupils reported that raw food at home is stored in sacks while 6.9% and 23.4% of them reported that raw food is stored in granaries and stores respectively. More than three quarters of pupils (79%) reported to cover leftover food but they could not clearly justify the practice.

Table 2: Distribution of pupils by responses on food and nutrition related practices

Household members (Pupils N=350)	Makes decision on What is to be cooked	Prepares food At home	Washes dishes at home
Self (pupil)	31 (8.8%)	73 (22.9%)	225 (64.3%)
Mother	214 (61.2%)	139 (39.1%)	22 (6.8%)
Father	93 (26.6%)	18 (5.1%)	0
Sister/grandparents/Other	12 (3.4%)	115 (32.9%)	100 (28.9%)
N =pupils = 350	350 (100%)	350 (100%)	350 (100%)

3.4. Pupil's Food Consumption Patterns and Nutritional Status

Sifted maize flour *Ugali* (Stiff pulp) which is less nutritious than whole grain *Ugali* was the mostly consumed cereal. *Chapati* (flat pan-fried wheat cake) was only consumed on special occasions such as Christmas. Consumption of *muthokoi* (dehusked maize bean mixture); a delicacy in the study area was also frequently consumed by majority of households (Table 3).

Table 3: Distribution of pupils by food consumption patterns

Food	Frequency			Food	Frequency		
	1	2	3		1	2	3
Maize Ugali ^a	91.7	8.3	-	<i>Sukuma wiki/Kale</i>	18	42	40
Chapati ^a	-	0.9	8.9	Cabbage	0.3	76.9	22.9
Rice	6	15.4	78.6	Spinach	0	12.6	14.3
<i>Muthokoi</i>	12.9	1.9	75.2	Carrots	6.6	10	19.4
Sweet Potatoes	-	8.9	5.1	Tomatoes in food	89	11	-
Irish Potatoes	14.8	0.9	74.3	Cowpea Leaves	0.3	5.1	-
Arrow Roots	1.4	0.9	33.4	Oranges	0.3	0.3	0.3
Cooked Bananas	-	32	11.4	Avacado pear	0.3	5.7	10.6
Beans(In <i>Githeri</i>)	93.4	2	4.6	Pawpaw	-	4.6	6.9
Beans	-	-	7.8	Ripe Banana	-	0.3	17.4
Green Grams	-	5.1	44.3	Passion Fruits	-	12.9	11.4
Meat (beef)	3.4	6	60.3	Mangoes	-	-	-
Fish	0	0.9	17.4	Margarine	-	2.3	17.4
Eggs	0.5	2.1	17.7	Oils	-	-	9.2
Milk (In Tea)	89.6	9.1	-	Fats	90.6	9.4	-

Frequency 1=more than 3 times a week, 2=once a week, 3= less than 3 times a month, ^a Sifted flour

More than three quarters of the pupils (89.6%) were reported to take milk more than three times a week (Table 3). This milk was however taken in tea. There was low consumption of high quality protein from meat, eggs, margarines, fish and oils and African leafy vegetables. The low consumption was associated with affordability than availability. About 14.5%, 28.9% and 3.9% of the study pupils were underweight, stunted and wasted respectively. Boys were at a higher risk of stunting than girls (Table 4).

According to the WHO, 2006, malnutrition exists in a population if more than 20% of that population is stunted hence, requiring intervention. Consequently the study population experienced chronic malnutrition (stunting), requiring a nutrition intervention in this case the need for nutrition education.

Table 4: Distribution of study pupils by forms and levels of malnutrition

Forms of Malnutrition	Severity of malnutrition		
	*Total/Global ($< -2SD$)	Moderate ($< -2 SD$ to $> -3SD$)	Severe ($< -3SD$)
Underweight (Weight/Age)	14.5%	14.5%	-
Stunting (Height/Age)	28.9%	25%	3.9%
Wasting (Weight/Height)	3.9%	3.9%	-
*Total/Global malnutrition is moderate and severe malnutrition combined			

3.5. Discussion

A high household size has negative implications on education levels, household food security and nutritional status. This may justify the high levels of school dropout and educational wastage. The education levels in the study area were generally low possibly because poverty is cyclic. This is confirmed by low ranking occupation status, casual labor livelihood among most households. Despite numerous girl-child campaigns, most parents preferred taking boys than girls to secondary school while the girls got married early or opted for lesser jobs such as housework. This also justifies the need for nutrition education. The study district experienced seasonal famine episodes justifying the school dropout in search of employment during such seasons. The poor status of nutritional knowledge, attitude and practices indicate the clear need to prioritise nutrition education. The disparities in knowledge and attitude among boys and girls and from rural and urban schools could be because of influence from other household members with dismal input from teachers.

Results on sanitation and disease prevalence further indicate the need for nutrition and health education. Results on pupils' food consumption depict poverty, unavailability, poor access and lack of nutritional knowledge. The low consumption of protein-rich foods, oils and nutritious vegetables was significantly associated to cost, availability and poor nutrition knowledge. However, the low consumption of fish could possibly be because the district is semi arid, lacking water masses and effect of negative taboos. Findings on nutritional status show that malnutrition levels are high among school going children and close to the national figure of 35% among children aged below five years. This also agrees with scientific evidence that show that forms of malnutrition such as stunting worsen with age. This paper also recognized that some nutrition practices that affect nutritional status such as dietary patterns are influenced by some household demographic and socio economic characteristics that are beyond the school going child control.

4. Conclusion

The importance of nutrition education in addressing malnutrition among school going children cannot be underestimated. Households where children have nutrition knowledge are likely to also have positive attitudes and practices and hence better nutritional status. Nutrition education should also be introduced in the early years of schooling to benefit those who drop out of school before completion of the primary school or who do not proceed to secondary school. Overall, nutrition education has to be strengthened to effectively address malnutrition in any nation.

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