

FACTORS INFLUENCING NUTRITIONAL STATUS AND FOOD CONSUMPTION PATTERNS OF CHILDREN WITH CANCER: A CASE OF KENYATTA NATIONAL HOSPITAL, KENYA

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Abstract

Observations at the Kenyatta National Hospital wards prior to the research period indicated a marked increase in cases of child cancer patients being admitted with various complications. These complications interfered with the children's food consumption patterns as there was increased morbidity and infections since the immunity of these children was weakened and they were not able to fight the disease effectively. The purpose of this study was to investigate the factors influencing nutritional status and food consumption patterns of children with cancer at Kenyatta National Hospital. A descriptive survey design was used. The study sample was made up of 60 children aged 6 months' to 14 years and 15 service providers. Purposive sampling was used. Data collection instruments included a self-administered questionnaire, an interview schedule, anthropometry, 24 hour dietary recall and an observation checklist. Data was analysed using the Statistical Package for Social Sciences Programme. Research findings revealed that 32% of the children were stunted, 26% were underweight while 12% were wasted. The findings confirmed that all the 18.3% children in the advanced stage of the disease were malnourished. A majority (88.5%) of the children's food intake was affected by the type of treatment received while the disease process affected 71.8% of the patient's food intake. Most of these interferences occurred in the middle (55%) and advanced stages (18.3%) of the disease. Therefore as treatment becomes more vigorous and as the disease advances the patients tend to develop more nutritional problems since their food intake is affected. From the findings of this study, it is concluded that food consumption patterns of children with cancer at Kenyatta National Hospital were influenced by the following factors: type of cancer a child suffered from, stage of the disease, duration of cancer disease and therapy used to manage their conditions. In view of these findings, the study recommends that nutritionists should emphasize the importance of adherence to the amounts of nutrients recommended for individual child cancer patients.

Key words: Nutritional status, food consumption patterns, stunting, wasting, underweight

1 Introduction

1.2 Background

According to Suskind and Suskind (1993), malnutrition occurs in up to 50% of children with cancer, including newly diagnosed patients (especially with disseminated disease), who have suffered a relapse and those undergoing intensive therapy. In children, the additional metabolic demands imposed by growth make it crucial to maintain adequate nutrition during therapy to prevent death either directly from starvation or from the increased susceptibility to infection. Although there is no clear evidence that nutritional support produces better outcome in children with cancer, studies indicate that some type of nutritional supplementation is important to maintain normal growth in the young patient (Suskind and Suskind, 1993).

The fact that health and nutrition are very much related could be an indicator that there are nutritional problems affecting these children. In the event of lack of proper nutrition, the cancer treatment given weakens their bodies. This could lead to a variety of nutritional deficiencies and could be a major cause of morbidity as well as mortality. In children, the additional metabolic demands imposed by growth make it crucial to maintain adequate nutrition during therapy to prevent death either directly from starvation or from the increased susceptibility to infection. Therefore some type of nutritional supplementation is important to maintain normal growth in the young patient (Suskind and Suskind, 1993). Statistics show that an average of 35% of all cancers is related to the food that feed cancer cells. (Honna and Keene, 1999). Thus a good portion of all human cancers may be potentially preventable. While no single food can prevent cancer, making better food choices can certainly reduce your risk from certain types of cancer (Honna and Keene, 1999).

In the past it was believed that undernourishment in the patient reduced the rate of tumour growth and therefore it was not unreasonable to conclude that a dietary restriction with increased physical activity was beneficial (Keys, 1980). Current research however suggests otherwise. The well-nourished patient tolerates treatment better and consequently tumour response to chemotherapy and radiation therapy improves. Furthermore, the interval between courses of treatment is reduced, as there is no need for protracted convalescence (Copeland and Dudrick, 1975). A positive correlation exists between the nutritional status of the patient and the chemotherapeutic tumour response suggesting an improved tumour response with adequate nutrition (Copeland and Dudrick, 1975). Cellular immunity generally improves as starvation states are corrected.

For the child with primary disease states, including cancer, diabetes and sickle cell anaemia, nutrition often makes the difference in prognosis and outcome. Awareness of this fact is an important factor in acknowledging nutrition's essential role in the management of children with these diseases states. Ignoring this fact often results in a state of severe malnutrition, which impacts significantly on ultimate morbidity as well as mortality.

1.2 Problem of Research

Although nutrition plays a key role in management of children with cancer more medical attention is adhered to than the nutritional management. This leads to 50% of children with cancer suffering from malnutrition as stated by Suskind and Suskind (1993). There is therefore need for studies to reaffirm the need for proper nutritional management in children with malignancies. This is because most of the children get malnourished due to chemotherapy and radiotherapy. Little is known about how nutritional care for child cancer patients is undertaken in Kenyan health institutions and homes/households. The study sought to find out the factors influencing nutritional status, care and food consumption patterns of children with cancer in Kenyatta National Hospital (KNH).

1.3 Research Focus

The specific objectives of the study were as follows:

- (a) Determine the nutritional status of children with cancer.
- (b) To determine the food consumption patterns of children with cancer.
- (c) Identify the complications that interfere with food consumption patterns of children with cancer.
- (d) Identify the types of cancers children suffer from.
- (e) Compare the nutritional status of child cancer patients at KNH against the type of cancer they suffer from.

2 Methodology of Research

2.1 Sample of Research

A cross-sectional descriptive survey design was used to undertake this study. The study was undertaken at KNH, situated in Nairobi, the capital city of Kenya. It is situated on the South Western part of Nairobi and is approximately 5 kilometres from the city centre. It is the national referral and teaching hospital in Kenya and has specialized human and non-human resources. The target population was children aged 6 months to 14 years suffering from cancer who, were admitted in the oncology ward or the general paediatric wards as well as those child cancer patients attending the out-patient clinic of KNH. The accessible patients' population during the research period of 2 months was 130 patients. The sample was made up of 60 children because some of the patients were out-patients and only came on specified clinic day. To qualify for the study the child needed to have been admitted for at least 2 months or attending clinic 2 months prior to the study. A list of patients registered at the various wards was used as the sampling frame. The patients were selected purposively from the lists.

2.2 Instrument and Procedures

Three interview schedules were used. One was used to obtain information from the children (Appendix II), the other from their guardians (Appendix I) and the final one from the service providers (Appendix VI). Anthropometric measurements, observations and a 24 hour dietary recall were also used. Respondents were informed of the purpose of the study and promised confidentiality of information provided before the study commenced.

2.3 Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS). It was done for all data entry, cleaning and analysis except the anthropometric data. In this study, descriptive statistics namely means, percentages and frequencies were used to describe the characteristics of the patients, organize, describe and summarize the data on socio-economic and anthropometric measurements of the respondents.

3 Results of Research

3.1 Demographic and Socio-Economic Characteristics of Respondents

The data presented in this section was obtained from 36 (60%) male and 24 (40%) female child cancer patients. The ratio of male to female was thus 1.5:1. This implies that gender influenced the prevalence of cancer. The youngest child was 6 months while the oldest was 14 years. Most age groups were fairly well represented apart from twelve years of age. The highest number of cases was between the ages 9-11 years. 70% of the child patients were either first, second or third borns. The position of birth of the child cancer patients was important since it indicated whether most patients were born to young or older parents.

3.2 Ethnic Distribution

The ethnic community a patient belongs to affects their diet. The way in which food is cooked, combined and consumed is usually ethnic based. Therefore children will prefer foods mainly consumed by their ethnic group even while in hospitals. The results of child cancer patients' ethnic distribution during period of study were reported in Table 1. From the results the largest numbers of children with cancer were Kikuyu at 25% followed by 15% each of Meru, Luo and Luhya, then Kamba with 11.7%. The least affected tribes were Giriama and Maasai with 3.3% cases each. The high percentage of Kikuyus, Luo, Luhya and Kamba in this study may be because they are amongst the five largest ethnic groups in Kenya.

Table 1: Ethnic distribution of patients at kenyatta national hospital

Tribe	Frequency (n)	Percentage (%)
Kikuyu	15	25
Meru	9	15
Luo	9	15
Luhya	9	15
Kamba	7	11.7
Kisii	4	6.7
Kalenjin	3	5
Masaai	2	3.3
Giriama	2	3.3
Total	60	100

3.3 Education of Parents

Education is believed to play a major role in influencing one's values and beliefs. Close to half of the parents had attained "O" level secondary education while 20% of the fathers and 15% of the mothers had gone to middle level colleges while 11.7% of the fathers and 5% of the mothers had attained university education. This shows that the sample was composed of fairly well educated parents. These findings could therefore explain the findings from nutritionists at the clinic that they did not experience difficulties in counselling the parents.

3.4 Parent's Occupation

The information provided was categorized into three groups; (i) employed, (ii) self-employed and (iii) unemployed. Those employed were either working for the government or private employers. Those self-employed were running their own businesses or farming. Approximately one-third of the fathers and a quarter of the mothers were reported as employed. About 5% of the fathers and 43.4% of the mothers were unemployed and were hampered financially. Approximately half of the mothers were unemployed so they had to rely on their husbands who may be overwhelmed with responsibility therefore making it impossible to cater for the sick children. Parents also have to dig deeper into their meagre resources to treat their children meaning most of them are financially unstable. Parents reported that several conditions had led to their current financial difficulties. This included unemployment, uncontrolled food prices, needs exceeding their income, being in debt, lack of savings and the high cost of cancer drugs.

3.5 Nutritional Status of Children

Nutritional status of children is a sensitive indicator of changes in the health status and food availability. In this study it was a useful tool as an early warning of distress and ill health within the child cancer patients. It gave the current status of the child in terms of immediate (acute) factors such as inadequate intake of food and the cancer disease process leading to wasting, while the accumulated impact of chronic deprivation lead to stunting. The corresponding standard deviation scores, (Z-scores) were calculated with reference to NCHS population using Epi-info-Package. This was done for 50 of the children who were aged 6 months to 10 years. Of these children 23 (46%) were out-patients, 11 children (22%) were admitted in the child cancer ward and were staying there without a parent while 16 children (32%) were admitted in the other wards and were staying with the guardians. Mid Upper Arm Circumference (MUAC) and Body Mass Index (BMI) were used for the 10 children who were aged 11 to 14 years.

Table 2: Nutritional status of children with cancer

	Above -2SD Normal n (%)	Between -2SD to -3SD Moderate n (%)	Below -3SD Severe n(%)
Height/Age (Stunted)	34(68)	13(26)	3(6)
Weight/Height (Wasting)	44(88)	3(6)	3(6)
Weight/age (Underweight)	40(80)	7(14)	3(6)

(a) Height-For-Age Index (Stunting)

Table 2 shows the children who were severely and moderately malnourishment in terms of stunting, wasting and underweight for their ages. Stunting is a measure of linear growth. More than two-thirds of the children were above the cut off point of -2SD and were therefore considered normal. One-quarter were moderately stunted while 6% were severely stunted. This is a condition that reflects the cumulative effect of chronic malnutrition.

(b) Weight-For-Height Index (Wasting)

Weight-for-height measures current nutritional status or wasting. Wasting is a nutritional deficiency of recent onset of usually a few weeks to few months, and is directly related to seasonal changes of low weight for height as a result of inadequate food intake, incorrect feeding practises and ill health. More than three quarters of the children (88%) had their Z scores above -2SD and were therefore considered normal as seen in (Table 2). In the study 6% of the children were moderately wasted and a similar proportion was severely wasted or too thin for their height. A possible explanation is the children may be affected by the cancer disease process or have an inadequate intake of food due to the side effects of treatment which include chemotherapy, radiotherapy or surgery.

(c) Weight-For-Age Index (Underweight)

Weight-for-age is a good overall indicator of a population's nutritional status. It is a composite of height-for-age and weight-for-height and thus does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). More than three quarters of the children had their Z

scores above $-2SD$ and were therefore considered normal. A total of 20% of the children were underweight, with 14% and 6% being moderately and severely underweight respectively.

In a healthy, well fed population of children, it is expected that only 2% to 3% of children would fall below minus $-2SD$ from the median of the reference population for each of the three indices (Central Bureau of Statistics (CBS), 1996). Less than 1% of the children are expected to be below $-3SD$ (CBS, 1996). The Z scores for the target cancer children in the study of all the three indicators were outside the acceptable limits for a nutritionally sound population as seen in Table 2. That implies that children with cancer had a poor nutritional status which was due to the effects of the disease process or the therapy given or the dietary intake.

3.6 Comparisons of Nutritional Status to National Levels

In Table 3 the 3 indicators of nutritional status of the child cancer patients during the research period were compared with national levels obtained from the 1993, 1998 and 2003 National Council for Population and Development (NCPD) Health Survey Data. They closely parallel those from the 1993, 1998 and 2003 NCPD, Kenya Demographic and Health Survey data, suggesting no improvement in the nutritional status of children over the last 10 years. This implies that the children were not receiving adequate nutrition in the period immediately before the study or may be as a result of the therapy or the disease process. The estimates of wasting for the child cancer patients during the research period were double those of the National levels. This implies that these children with cancer were poorly

Table 3: Comparison of percentages of nutritional status of child cancer patients against national levels

Factor	Cancer Patient 2001	2003	1998	1993
Stunting	32%	31%	33%	29%
Underweight	20%	20%	22%	20%
Wasting	12%	6%	6%	5%

Source: National Council for Population and Development (1993, 1998 and 2003)

The cancer patients' nutritional status was also compared to those of the Republic of Kenya (2002), National Development Plan. Table 4 shows that the stunting and underweight levels of child cancer patients during research period were approximately equal to those of the national level. This implies the child cancer patients' have a poor nutrition status.

Table 4: Comparison of child nutritional status to national development plan

YEAR		Cancer Patient	
	2002 (2001)	1998	
Underweight	20%	23%	22%
Stunting	32%	35%	33%

Source: Republic of Kenya (2002) National Development Plan

3.7 Nutritional Status of Cancer Patients Aged 11-14 Years

BMI and MUAC were calculated for children between the ages 11 and 14 years. There were 10 patients in this age category.

Table 5: Proportion of malnourished children based on BMI

BMI Results	Male (n.)	Female (n.)	Total (n.)
<16.0	1 (10%)	2 (20%)	3 (30%)
Borderline 16-18.5	1 (10%)	2(20%)	3 (30%)
Normal 18.5-24.5	1(10%)	2 (20%)	3 (30%)
Obese I: 24.5-29.5	0 (0%)	1 (20%)	1(10%)
Total (n)	3 (30%)	7 (70%)	10 (100%)

As depicted from Table 5, 60% of the children had protein energy malnutrition since they were either on the borderline or severely wasted. The mean BMI of the male patients was 17.6 while for female patients was 18.5. The female child who was obese was a newly diagnosed case, who had not been put on cytotoxic drugs.

In the case of MUAC, 3 children were severely wasted, 3 were moderately wasted and 4 were normal. Of the 10 children, 6 were wasted meaning the effect of the cytotoxic drugs lead to nausea, vomiting and loss of appetite that consequently lead to weight loss and finally protein energy malnutrition. This implies that 60% of the children were malnourished. This is attributed to the effect of the cytotoxic drugs.

3.8 Nutritional Status of Children According to Category of Patients

The child cancer patients consisted of three categories. There were 23 children attending clinic as out-patients, 11 children were admitted in the child cancer ward and were staying in the ward without a parent while 16 children were admitted in the other wards and were staying with their guardians. These children took different diets and lived under different conditions so there was need to find out their nutritional status.

Table 6: Nutritional status of study children by ward/out-patient

	Height/Age Stunting		Weight/Height Wasting		Weight/Age Underweight	
	Below -3SD Severe %	Between -2SD—3SD Moderate %	Below -3SD Severe %	Between -2SD- -3SD Moderate %	Below -3SD Severe %	Between -2SD—3SD Moderate %
Out-Patient (n=23)	0	17.4	0	0	0	17.4
Child+ Guardian (n=16)	0	25	0	0	0	0
Child Patient (n=11)	27.3	45.5	27.3	27.3	27.3	27.3
Total	6	26	6	6	6	14

(a) Height for Age (Stunting)

It is observed from Table 6 that 32% of the children were stunted. These included 72.8% of the children in the oncology ward, 25% of children staying with guardians in the wards and 17.4% of children attending clinics. All 27.3% children who were severely stunted came from the child cancer ward. A possible explanation is they may have been in the advanced stage of the disease or their food intake was affected by the disease process or treatment received.

(b) Weight for Height (Wasting)

It is observed from Table 6 that 54.6% of the children in the oncology ward were wasted. Of these children 27.3% were all in the advanced stages of cancer so were severely wasted. The out-patients and children with guardian in hospital were not wasted.

(c) Weight for Age (Underweight)

The 17.4% of the children who were attending clinic and 54.6% of the children in the child cancer ward were found to be underweight. That implies 27.3% of the children in the cancer ward were stunted, wasted and underweight. These children may be given food and refuse to eat, particularly if the nurses are busy with the seriously ill children. Some of these children then end up skipping meals especially those who have anorexia or lack of appetite. The children attending clinic may also refuse to eat or skip a meal when the parents are at their places of work. The children who have a guardian/parent while in hospital get a lot of care, moral support and encouragement from their parents/guardians so their eating habits are much better compared to the out-patients or child in-patients in the cancer ward. The parents/guardians ensure they have eaten the food given by the hospital and may give them additional foods when they have the appetite. Therefore this category of patients had a higher chance of being well nourished as compared to the other two.

3.9 Nutritional Status by Sex of Children with Cancer

Figure 1 shows the nutritional status of the study children by sex. A slight difference in stunting was noted within the sexes; boys had higher stunting levels as compared to girls. No girl was reported to be wasted while 10% of the boys were reported to be wasted. As for underweight: 10% of the girls and 16.7% of the boys were respectively underweight. This reflects wasting, stunting or both. Overall more boys were wasted, stunted and underweight as compared to the girls. A possible explanation may be attributed to girls having a stronger immunity and being able to fight the disease much longer than their male counterparts.

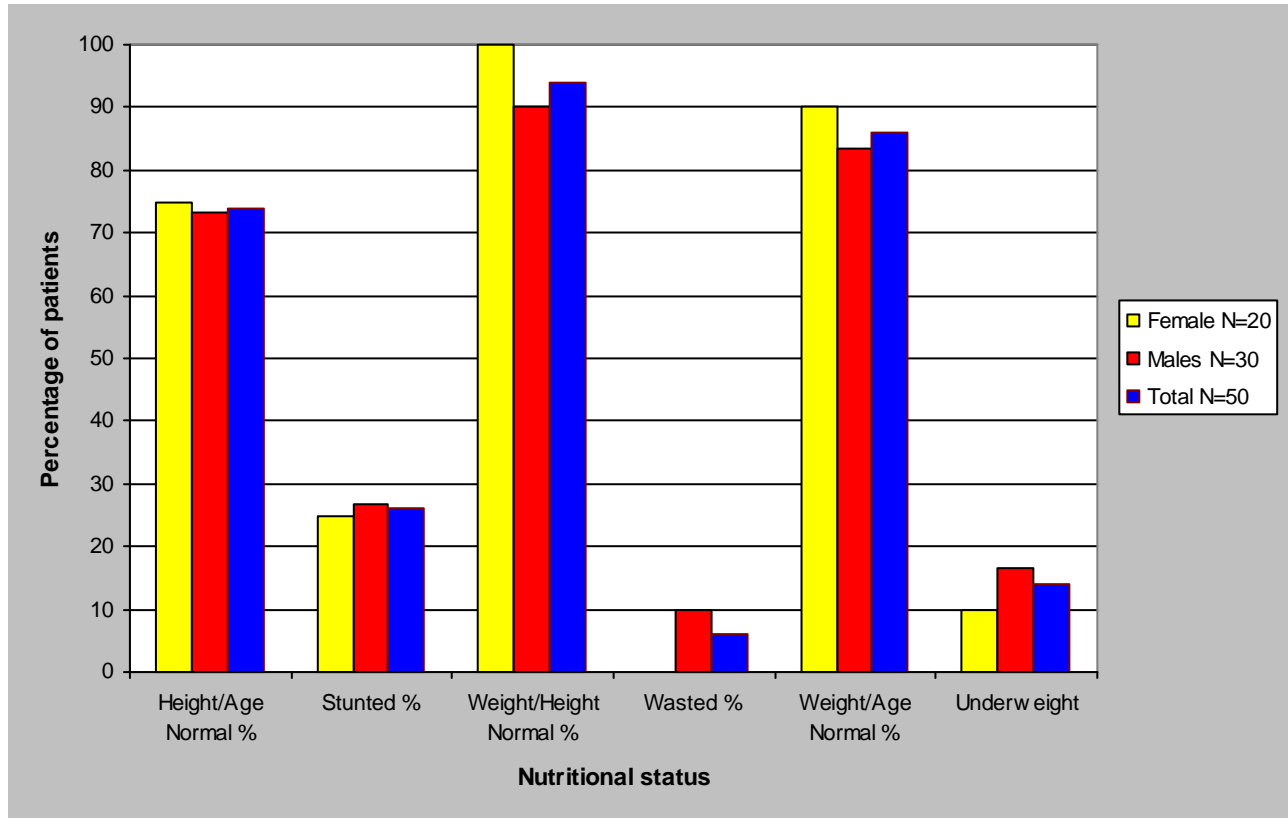


Figure 1: Nutritional status according to category of sex

3.10 Nutritional Status by Type of Cancer

Approximately half of the children were found to suffer from Burkitt's lymphoma and Acute Lymphoblastic Leukemia as seen in Table 7. These are 2 of the most common cancers in East Africa particularly in the highlands and Coast region (Mwanda, 1999).

Table 7: Distribution of patients by types of cancer

Type of Cancer	Frequency (n)	Percentage (%)
Burkitt's lymphoma	18	30
Acute lymphoblastic leukemia	13	21.7
Hodgkin's sarcoma	8	13.3
Acute myeloid leukemia	7	11.7
Wilm's tumour (Kidney)	6	10
Rhabdymyosarcoma	4	6.7
Osteogenic sarcoma	2	3.3
Stomach cancers	2	3.3
Total	60	100

According to the study Burkitts Lymphoma, Acute Lymphoblastic Leukemia, Hodgkins Lymphoma and Wilm's Tumour constituted 75% of all cancers found at KNH. This finding agrees with the findings of Macharia (1996) who reported that approximately 70% of all the cancers seen at KNH paediatric wards over a period of 6 years were of 4 types, namely Acute Lymphoblastic Leukemia, Burkitts Lymphoma, Hodgkins Lymphoma, and Kidney Cancer.

It was noted that all the children who had stomach cancers as well as 1.7% of the children with Wilms tumour were wasted, stunted and underweight. This was mainly due to the fact that they were in the advanced stage of the disease as they were receiving intensive therapy. Therefore the use of cytotoxic drugs led to vomiting, nausea, diarrhoea and anaemia. There was also improper absorption or utilization of nutrients. Of the 60 child cancer patients, 20% of them were underweight. These included all the children with stomach cancers and osteogenic sarcoma, 3.3% of the children with Wilms tumour and 5% each of the children with acute lymphoblastic leukaemia and hodgkin's sarcoma. This was also as a result of intensive chemotherapy and/or radiotherapy and surgery.

32% of the 60 children were stunted as seen in Table 8. This included 5% each of the children suffering from acute lymphoblastic leukaemia, acute myeloid leukaemia and Hodgkin's sarcoma. All the children suffering from osteogenic sarcoma, stomach cancers and Wilm's tumour were also stunted. A possible explanation is these children had poor absorption and utilization of nutrients due to their disease states leading to poor nutrition status.

Table 8: Stunting levels by type of cancer

Type of Cancer	n	Stunted %
Wilm's tumour	6	10
Acute lymphoblastic leukaemia	13	5
Acute myeloid leukaemia	7	5
Hodgkins sarcoma	8	5
Osteogenic sarcoma	2	3.3
Stomach cancer	2	3.3
Burkitts lymphoma	18	0
Rhabdomyosarcoma	4	0
Total	60	32

All the children suffering from Burkitts lymphoma and Rhabdomyosarcoma were neither wasted, stunted or underweight. This may be attributed to the fact that none of them were in the advanced stage of the disease so they could easily take in the foods given.

Kasili (1994) stated that generally speaking childhood cancers are more curable than adult cancers. Again when considering the different types of cancers in children, acute lymphoblastic leukaemia, kidney cancer, Hodgkin's sarcoma and Burkitt's lymphoma are the most treatable cancers worldwide. These are the same cancers estimated to constitute two thirds of the cancers seen at KNH and the provincial hospitals in Kenya. They formed 75% of the cancers seen at KNH during the study period as seen in Table 7.

3.11 Food Consumption Patterns of Children with Cancer

Nutrition is important in the treatment of children with cancer. This is because it can make a significant difference in cancer patient management if careful attention is given to the patient's nutritional needs with due consideration to the effects of the disease and its treatment (Woods, 1989). The researcher intended to find out the food consumption patterns of children with cancer at KNH and whether the disease and treatment process affects food consumption.

3.11.1 Food Consumption Frequency

Each of the 5 wards had their own preferred menu for the week which varied slightly from ward to ward and for the out-patients it depended on what they had eaten at home. These menus depended on the types of cancer patients generally suffered from in a ward. The menus were recommended by the nutritionists with advice from the doctors. Table 9 shows the frequency of foods consumed. The child oncology ward had a varied menu as compared to the other wards. This is because the oncology ward usually received donations from well-wishers in form of food or money. They then use these donations to improve the variety of foods served in their ward so as to entice the children to eat. Foods such as pilau, meat, chicken, liver, chips and fish were given to the patients occasionally or once a week or on special order or if a firm volunteered to make a donation to the patients particularly in the child cancer ward.

Table 9: food consumption frequency

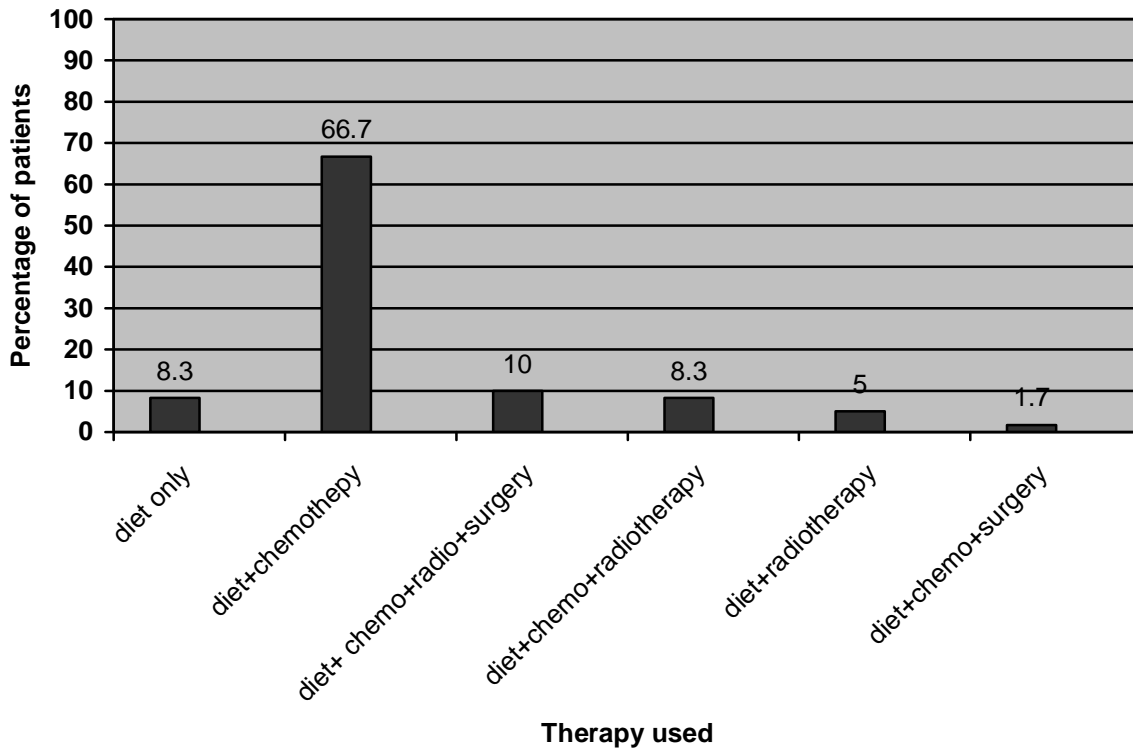
Food	Daily	>3 Times a Week	Weekly	Occasionally	Rarely
Cereals and cereal products					
Bread	•				
Rice		•			
Ugali	•				
Porridge	•				
Mixed Dishes					
Maize and beans (githeri)					•
Pilau				•	
Chips and sausage				•	
Meat and meat products					
Chicken			•		
Fish					•
Liver				•	
Meat (beef)			•		
Legumes					
Beans		•			
Green grams					•
Soya beans					•
Fruits and vegetables					
Carrots					•
Sukuma wiki					•
White cabbage	•				
Fruits		•			
Dairy					
Eggs		•			
Milk	•				

NB: Black dot • means number of times a particular food item was consumed

The food items consumed daily included bread, porridge, ugali, milk and white cabbage. Food items consumed 3 or more times a week included beans, eggs, carrots and rice while the food items consumed once a week included meat and chicken. The food items that were seldom or never eaten by the child cancer patients while in hospital included lemons, dark green leafy vegetables like sukuma wiki, githeri, soya beans and green grams. Some food items were eaten mainly while in season and this was true particularly for the fruits. This was because they were cheap and readily available at such times. The proteins mainly consumed were of low biological value and particularly from plants. Most of the high biological value proteins such as meat and chicken were limited to once a week. This is because they tend to increase the spread of cancerous cells in the body as they feed the cancer cells.

It was noted that most of the foods given went to waste if the children were left alone. Therefore nurses had to sit with the children and even feed some especially in the oncology ward. Doll (1996) and

Ames *et al.*, (2001) argue that good nutrition helps to maintain immunity and combat malignancy. The food we eat contains components that may either help cause or help prevent cancer. Proper nutritional support for cancer may help provide recovery and improve the patient's response to therapies such as chemotherapy, radiotherapy or surgery. Diet therapy was the nutritional treatment given to the cancer patients in form of meals to cater for their energy and protein needs. These nutrient needs varied depending on the type and severity of the cancer, its treatment, and the patient's nutrition status. At KNH there was a combination of methods used to treat the child cancer patients as seen in Figure 2. Two thirds of the patients (66.7%) were on diet and chemotherapy. Diet was emphasized in all forms of therapy. A total of 10% of the patients were treated with a combination of diet, chemotherapy, radiotherapy and surgery while 8.3% were treated with normal drugs and diet or a combination of diet, chemotherapy and radiotherapy.



Note: chemo= chemotherapy, radio= radiotherapy

Figure 2: Nutritional Management of the Disease

Most of these children's food intake was affected when they were receiving treatment especially chemotherapy leading to loss of appetite, vomiting, nausea and mouth sores meaning their nutritional status is affected whenever they are receiving treatment. Therefore when the children are on chemotherapy, radiotherapy, surgery or a combination of these treatment types their food intake must be keenly monitored and any complications that arise dealt with. Most of the children who had food intake problems were mainly put on intravenous fluids. This is because they were vomiting continuously, had diarrhoea and so could not get the necessary nutrients. Most wards had specific menus for different days. This diet did not cater for some of the patients' needs. There is need therefore to encourage the nutritionists to give more child specific diets that are related to their type

and severity of cancer and treatment being received in order to improve on the nutritional status of these child cancer patients. The vitamin and mineral needs should also vary depending on the specific treatment and the presence and severity of complications such as vomiting and malabsorption. Any early signs of nutrient deficiencies should be monitored to prevent them from becoming severe.

3.12 Adequacy of Food Consumption Patterns of Children with Different Types of Cancer

The nutritional management practices of children with different types of cancer at KNH were found to be wanting. This is because of the 60 children investigated for nutritional statuses 12% were wasted, 20% were underweight and 32% were stunted. All the 18.3% of children in the advanced stage of the disease were malnourished. This was mainly attributed to the fact that they were in the advanced or terminal stage of the disease so the effects of the disease like nausea and vomiting affected their food intake. Any child who could not feed normally due to vomiting, nausea and so on was put on parenteral feeds till they could return to normal feeding. There was an attempt to give children balanced diets for all meals but the children were not eating most food because of the cytotoxic effects of the drugs. For those children who did not want to eat due to vomiting, nausea, lack of appetite and so on the children were enticed by parents/guardians or the nurses to at least eat some little food. In all forms of management of the disease, diet was emphasized. In cases where the patients had certain complications or nutritional needs the child’s diet would be changed in order to cater for the various needs as depicted in Table 10.

Results in Table 10 show that about a third of the children were unable to eat and had reasons for diet change from the normal hospital diet to special diets. Unfortunately only 5% of the patients in the study were given special diets. That implies that some of the patients who had need for specialized diets were deprived of the necessary diets. This led to poor nutritional status due to lack of child specific diets.

Table 10: Reasons for diet change

Reason		Child Attending Clinic n (%)	Child in-Patient n (%)	Child in-Patient + Guardian n (%)	Total n (%)
Mouth Sores	Yes	5 (20%)	1 (6.7%)	2 (10%)	8 (13.3%)
Vomiting Continuously	Yes	10 (40%)	0 (0%)	16 (30%)	16 (32.1%)
Unable to Swallow	Yes	6 (24%)	0 (0%)	1 (5%)	7 (11.7%)
Unable to Eat	Yes	12 (48%)	1 (6.7%)	7 (35%)	20 (33.3%)
Unable to Chew	Yes	0 (0%)	1 (6.7%)	2 (10%)	3 (5%)

3.13 Complications that Interfere with Food Consumption Patterns of Children with Cancer

Most children had complications. About three quarters (74.3%) of the complications occurred as a result of treatment received and sometimes occurred in 14.2% of the children. This implies that 88.5% of the children's food intake was affected by the treatment received. This finding agrees with the findings of Woods (1989) that the child cancer patient may present with nutritional problems as a result of their tumour or will develop a problem as a result of treatment. This concurred with results which depicted that most child cancer complications occurred as a result of treatment received (88.5%) or the disease process (71.7%). Most of these interferences occurred in the middle (55%) and advanced stages (18.3%) of the disease. A possible explanation may be that as treatment becomes more vigorous and as the disease advances the patients tend to develop more nutritional problems since their food intake is affected. Results in Table 11 show that vomiting was the most prevalent health problem as a result of treatment received while mouth sores were the least prevalent. Most of these children were receiving chemotherapy as a form of treatment. More than three quarters of these children's food intake was affected when they were receiving chemotherapy as a form of treatment.

Table 11: Types of treatment interference among child cancer patients

	Yes Frequency (%)	No Frequency (%)
Vomiting	55 (92.3%)	5 (7.7%)
Nausea	44 (67.9%)	16 (32.1%)
No appetite	39 (57.9%)	21 (42.1%)
Mouth sores	9 (14.1%)	51 (85.9%)

Chemotherapy can inflame the lining of the mouth and sometimes cause mouth ulcers, making chewing and swallowing painful. This cancer therapy can lead to anorexia by causing nausea, vomiting, mouth ulcers, diarrhoea, malabsorption and dislike for certain food.

The results in Tables 10 and 11 agree with the findings of Berge (1976), Waldman et al., (1974) and Schein *et al.*, (1975). They state that frequently cancer patients display abnormalities in the state of their nutrition, their nutritional process and metabolism. Such abnormalities frequently correlate with the stage of malignant disease in the patient and may decrease with appropriate local or systemic anti-cancer therapy. Many different mechanisms contribute to the decreased intake of foods, improper absorption or utilization of nutrients, weight loss and a cachectic state. First, the anxiety associated with the knowledge of their diagnosis and the toxic side effects of various forms of therapy may singly or in combination alter taste or desire for food, produce anorexia or cause nausea, vomiting or diarrhoea. Secondly, certain tumours of the alimentary tract, such as those of the oropharynx, esophagus, stomach or small intestines may mechanically affect the intake or absorption of nutrients because of dysphagia or obstruction. Thirdly, various gastro-intestinal tract tumours may interfere with alimentation and absorption functionally. Thus certain gastro-intestinal tract tumours may be associated with malabsorption or protein losing enteropathy. Functional pancreatic islet cell tumours and carcinoid tumours of the gastro-intestinal tract may be associated with malabsorption, diarrhoea, ulcer diseases or hypoglycaemia.

4 Conclusions

From the findings of this study, it is concluded that food consumption patterns of children with cancer is affected by type of cancer a child patient suffers from, stage of the disease, therapy they used in management of their condition, duration they have suffered from cancer and their diets.

References

- Ames, B. N., Gold, L. S., and Willet, W. C. (2001) The Causes and Prevention of cancer. **92**: pp 5258-5265. Washington DC, U.S.A.
- Berge, J. W. (1976). Nutritional Status and Cancer. *Seminar of Oncology*, 3:17-23. New York: Academic Press.
- Central Bureau of Statistics (CBS) (1996). Office of the Vice-President and Ministry of Planning and National Development, Republic of Kenya. Fifth Nutrition Survey- 1994). Unicef Kenya Country Office.
- Copeland, E. M., III, and Dudrick, S. J. (1975) Cancer: Nutritional Concepts. *Seminar of Oncology*, **2**: pp 329-335. New York: Crown Publishers.
- v
- Doll, R. (1996). Nature and Nurture: Possibilities for Cancer Control. *Carcinogenesis*, **17**: pp 177-184. New Jersey: Avery.
- Honna, J. H. and Keene, N. (1999) Nutrition in Childhood Cancer: A Parent's Guide to Solid Tumour Cancers [on-line]. Available [www.http://www Oreilly.com/Medical/child cancer/news/nutrition.htm](http://www.Oreilly.com/Medical/child_cancer/news/nutrition.htm). [2003, 14 March]. London: Chapman and Hall Medical.
- Kasili, E. G. (1994). Proceedings of the First Africa SIOP meeting, Nairobi, Kenya.
- Keys, A. (1980). The Biology of Human Starvation. Vols. I & II. 8:1020-1050 St. Paul Minneapolis: North Central Publishing Company.
- Macharia, W. M. (1996). Childhood Cancers in a Referral Hospital in Kenya. *A Review East African Medical Journal*, **73**: pp 647-650. Nairobi, Kenya.
- Mwanda, O. W. (1999). Cancer in Children Younger Than Age Sixteen Years in Kenya. *East African Medical Journal*, **76**: pp 3-9. Nairobi, Kenya.
- National Council for Population and Development (NCPD), Central Bureau of Statistics (CBS), and Macro International (MI) (1993). The Kenya Demographic and Health Survey (KDHS). Calverton, Maryland: NCPD; CBS and MI.
- National Council for Population and Development (NCPD), Central Bureau of Statistics (CBS), and Macro International (MI) (1998). The Kenya Demographic and Health Survey (KDHS). Calverton, Maryland: NCPD, CBS and MI
- National Council for Population and Development (NCPD), Central Bureau of Statistics (CBS), and Macro International (MI) (2003). The Kenya Demographic and Health Survey (KDHS). Calverton, Maryland: NCPD; CBS and MI.
- Republic of Kenya (2002). The National Development Plan 2002-2008: Effective Management for Sustainable Economic Growth and Poverty Reduction. Nairobi: Government Printers.

Schein, P. S., Macdonald, J. S., Waters, C., and Haidak, D. (1975). Nutritional Complications of Cancer and its Treatment. *Seminar of Oncology*, **2**: pp337-347.

Suskind, M.R., and Suskind, L.L. (1993). Textbook of Pediatric Nutrition. (2nd ed). Pp 400-425. New York: Raven Press.

Waldman, T.A., Broder, S., and Strober, W. (1974). Protein-losing Enteropathies in Malignancy. *Annual NY academic science*, **230**: pp 306-317. New York: Raven Press.

Woods, M. (1989). Tumour Takes All. *Nursing Times* **3**: pp 46-47. London: Thorsons