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Nutritional Status Among Head and Neck Cancer Patients, Tanzania

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Abstract

Background: Nutrition in cancer patients is a challenge as various mechanisms can lead to poor nutrition status, and this contributes to poor prognosis and quality of life. In developing countries, before one concludes that cancer is the culprit to malnutrition, one has to rule out access to food. The Head and Neck region is involved with the intake and initial processing of the food. Therefore, the presence of a tumor in any subsite directly affects nutritional status.

Aim: This study aimed to establish nutritional adequacy among Head and Neck Cancer patients accessing services at a tertiary hospital in Tanzania.

Method: The study was cross-sectional descriptive. Patients with head and neck cancer attended from 1st August 2022 to 31st January 2023 were recruited. Information about access to food and nutrition was collected through anthropometric measurements and biochemical tests (serum albumin levels). After data collection, the correctness was checked by running frequency tables and analyzed by Statistical Package for the Social Sciences (SPSS) version 26.

Results: The study involved a total of 113 participants aged from 15 to 93 years with a mean age of 51.81+/-17.439 years. There were 74 males and 39 females, making a ratio of 1.9:1. Most participants had laryngeal tumours (46%). 85.6% of patients had advanced disease, stage IV (52.2%).17% of patients had pre-existing dietary risk, and 36.3% had severe malnourishment at presentation. In this study,75% of patients with oropharyngeal tumours had malnutrition, followed by hypopharyngeal and nasopharyngeal tumours, each with 66.7%. Stage IV patients were severely malnourished (57.6%) which was statistically significant.

Conclusion and recommendation: Laryngeal tumours are common in men and are related to advanced age. Most of the patients with Head and Neck Cancer (HNC) had severe malnourishment. Management of head and neck cancer should also address malnutrition which contributes to poor prognosis and quality of life.

Keywords: Nutritional status; head and neck; cancer

Background

The subject of nutrition in cancer patients is essential as the findings from the study can add value to the management of this group of patients and improve the prognosis and quality of life. Some factors affecting patients' nutrition are related to socioeconomic status, which influences access to food. Therefore, now that the patient is battling with the disease, his/her nutritional status may also be affected by accessibility factors.

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The presence of cancer has been incriminated for potentiating cachexia in patients. This is attributed to factors grouped as either pro-inflammatory or pro-cachexia. Pro-inflammatory factors released by tumours include IL-1, IL-6, and TNF-α. TNF-α is a cell-signalling protein responsible for several metabolic derangements. Activated macrophages and many other types of cells, such as CD4+, neutrophils, mast cells, eosinophils, and neurons, release TNF-α. TNF-α has a direct catabolic effect on skeletal muscles and acts by induction of the Ubiquitin Proteasome System (UPS). UPS is the primary intracellular protein degradation system. TNF-α.has been shown to increase gluconeogenesis, proteolysis, and loss of adipose tissues, which decreases glycogen synthesis, protein, and lipid (Patel et al.,2016).

A study by Llovera showed that TNF-α doubles the expression of the ubiquitin gene, leading to increased activity of the Ubiquitin Proteasome system in skeletal muscles, which leads to protein degradation and wasting (Witte et al.,2006). Another perspective on nutrition for head and neck cancer is the anatomical location of the disease. The head and neck region is involved with food intake and initial processing. The presence of a tumor in any of its subsites significantly influences the patient's nutritional status.

Nutritional assessment in cancer patients poses a unique challenge, especially for those who are bedridden, as anthropometric measurements such as height and weight require a patient to be in a standing position. However, different alternatives to these measurements are available, as highlighted in the methodology section. This study employed biochemical measurement as an alternative parameter to nutritional assessment. This study used a combination of biochemical and anthropometric measurements as the minimum recommended for assessing nutrition.

Malnutrition in head and neck cancer patients has been shown to have undesired outcomes, such as poor immunity, which result in prolonged morbidity and mortality in these patients (Britton et al., 2012). The same study also revealed poor treatment responses in malnourished patients.

The nutritional status of cancer patients is a crucial parameter in influencing issues like length of hospital stay, prognosis, and the course of disease. Malnutrition in cancer patients is significant in some literature. It is reported to be present in 35-60% of all head and neck cancer patients at the time of presentation (Alshadwi et al.,2012). Malnutrition in head and neck cancer is a result of most cancers in the region impairing the ability of oral intake. Therefore, due to the debilitating effects of the disease, cancer patients often succumb to socioeconomic difficulties leading to poor access to food. This also affects the course of disease and overall nutrition of head and neck cancer patients.

There is an existing vacuum of knowledge on how malnutrition affects head and neck cancer patients at the time they present to health facilities regardless of its cause. There is also evidence of how nutritional assessment in head and neck cancer is often neglected, seen as inappropriate, or performed too late in the course of illness (Magnano et al.,2014). The relationship between HNC cancer stage, site, and how they affect the nutrition status of patients is scarcely mentioned not only in local but also global literature (Righini et al.,2012; Gosak et al.,2020; Capuano et al.,2010; Amaral et al.,2008; Kubrak et al.,2010; Takenaka et al.,2014). This study will help responsible authorities and the ENT

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fraternity at large to address the customized needs of head and neck cancer patients and, therefore, provide room for tailored therapies that address nutritional needs. It will also enlighten us about the influence of tumor stages on nutritional status. Furthermore, this study will shed light on the anatomical distribution of HNC, non-tumour factors, and their relationship with malnutrition in head and neck cancer patients.

Methods

Study setting, sampling, and population.

The study was a cross-sectional descriptive study. All head and neck cancer patients aged 15 years and above who attended a tertiary hospital in Tanzania from 1st August 2022 to 31st January 2023 were recruited. The sample size was obtained by estimations based on the computation proposed by the Fischer sampling formula, and the estimated sample size was 120. A convenient sampling technique was used.

Inclusion Criteria

All patients with HNC attended with the identified primary site of malignancy and those who have been staged clinically and the diagnosis confirmed by histopathology.

Exclusion Criteria

Patients with Gastrostomy Feeding tube and Nasogastric tube Feeding were excluded from the study. Another excluded group was those patients with a history of treatment during the study period.

Data collection methods

Data collection was through clinical interviews, physical examination, and laboratory workup. In the clinical interview, a dietary screening tool (DST) was used, this tool is a simplified assessment tool that captures the main dietary components, and it has been assigned a score of 100 points; the weight of each food category was assigned by dietary principal components analysis done in previous studies by (Kang et al.,2016; Cotogni et al.,2021; Krejcie et al.,1970; Bailey et al.,2009).In each food category questions have been allotted scores based on factor load for each question. The total score for each patient was computed. The patients were categorized as having nutritional risk if they had a DST score of less than 60, possible risk if they had a DST score from 60-75, and those who scored above 75 were categorized as not having nutritional risk. This tool helped to distinguish the malnourishment attributed to poor access/dietary behaviour as contrasted to that due to disease process.

In the clinical interview reference, the patient's weight was sought by establishing a patient's weight six months before the diagnosis of cancer (Righini et al.,2012). For those who did not recall their weight, the expected usual weight of a person was used instead. This was compared to the current weight to get the percentage of weight drop. Later, the results of this assessment were subjected to the ***Nutritional Risk Screening tool***. This tool computed the overall nutritional risk to determine whether the patient was at low, medium, or high nutritional risk, and specific recommendations were made. Other information sought for completion of nutrition risk screening was illness status, which could cause the patient to be unable to eat for more than five days.

In physical examination, parameters that were assessed included anthropometric measurements. The latter included measurement of body weight and height which were used to compute Body Mass Index (BMI). BMI was computed by dividing body weight (in Kg) by the square of the

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height (in meters) and classified for adults: underweight if BMI ≤18.4 kg/m2; average weight if 18.5 ≤BMI ≤24.9 kg/m2; pre-obese if 25.0 ≤BMI ≤29.9 kg/m2 and obese if BMI ≥30.0 kg/m, for those patients who were unable to stand recumbent height was measured, backed by Lee & Nieman as cited in a study by (Amaral et al.,2008).

Laboratory workup involved assessment of serum albumin. This biochemical parameter was used to compute the nutritional risk Index using the formula Nutritional Risk Index= (1.519 X serum albumin, g/L) + 0.417 X (present weight/usual weight x 100). The nutritional risk index is a powerful screening tool validated in various clinical settings for screening malnutrition in cancer patients (Cotogni et al.,2021). A Nutritional Risk Index>100 indicates that the patient is not malnourished, 97.5–100 indicates mild malnourishment, 83.5-<97.5 indicates moderate malnourishment and <83.5 indicates severe malnourishment. Serum albumin was measured from fasting blood levels as the serum albumin test is affordable and accessible in the study area compared to other biomarkers.

Data validity and reliability

The validity of this study is drawn from the choice of instrument for measuring variables, which are BMI and NRI, which have been inferred to a patient with different nutritional disorders with high accuracy. The reliability of the data was tested by inter-tester variability as the data was collected by the principal investigator and an assistant who was trained on the study protocol using the same instruments. Again, reliability was tested by the Test-retests technique, in which variables such as the height of a patient were tested and retested on the same patient by the same investigator to monitor the consistency of the results.

Data management and analysis

The data collected was handled with confidentiality and was analyzed using computer software SPSS version 26. Cross tabulations were plotted for the Nutritional status of HNC versus the anatomical site of the tumor, tumor stage, status at presentation, and pre-existing nutritional risk. Chi-square tests tested the relationship of the variables.

Ethical Issues

Ethical clearance to conduct this study was sought from Muhimbili University of Health and Allied Sciences Institutional Review Board (IRB) and assigned the reference number MUHAS-09-2022-32.

Results

Table 1: Age and Sex distribution of participants (N=113)

Variable	n(%)
A. Age group(years)	
15-47Young adults	40(35.4)
48-63 Middle Aged	47(41.6)
>64 Elderly	26(23)
B.Sex	
Male	74(65.5)
Female	39(34.5)

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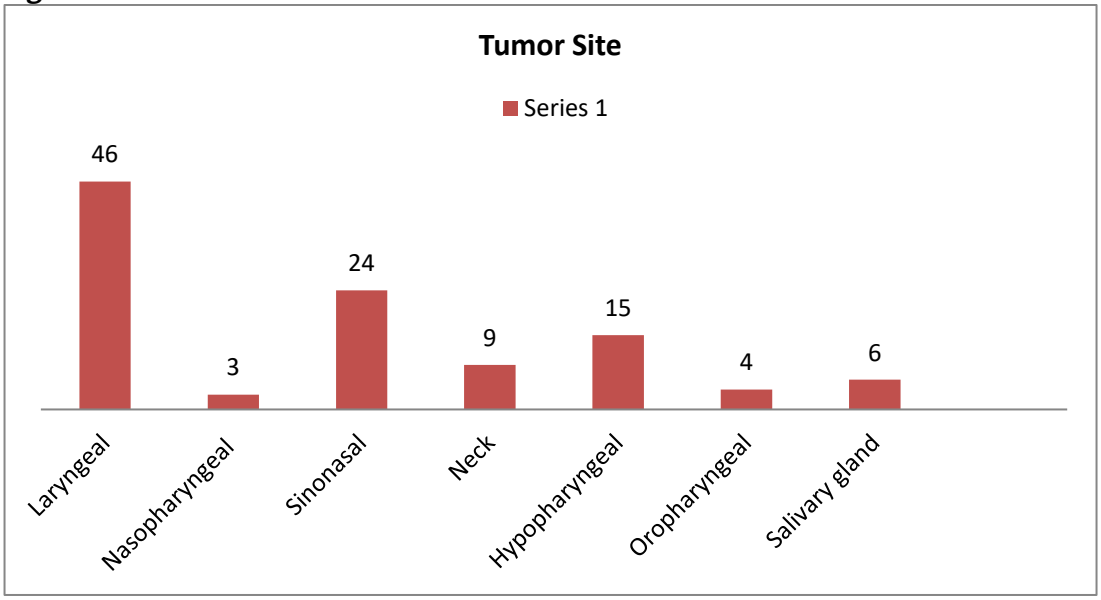
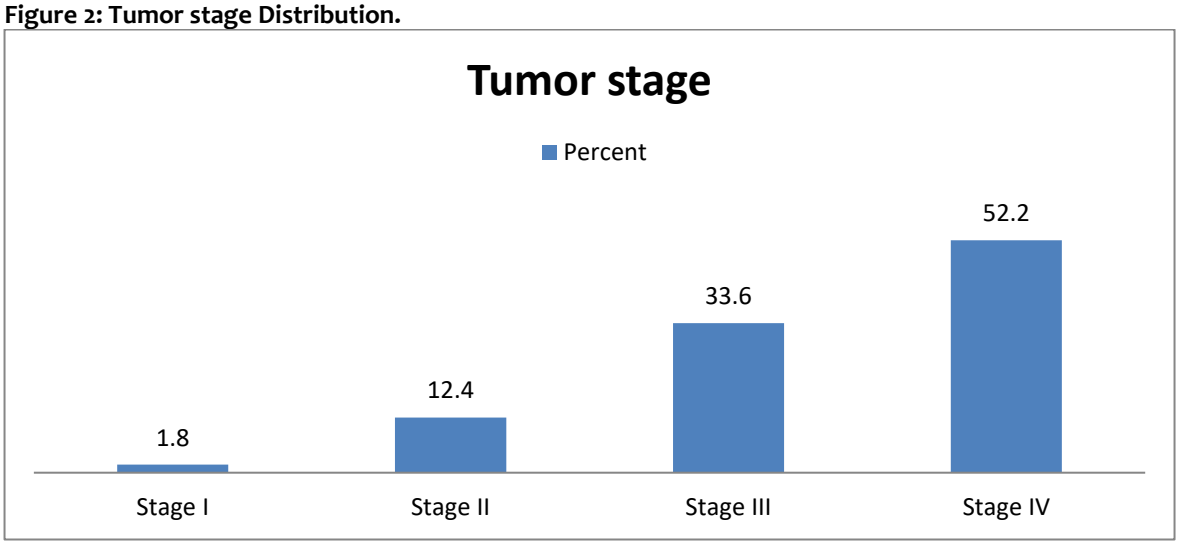
The study categorized patients into three age groups based on WHO stratification i.e. 15-47 years (young adults), 48-63years (middle-aged), and above 64 (elderly people). The study involved a total of 113 participants. Age ranged from 15 to 93 years old with a mean age of 51.81+/-17.439 years. Most participants were in the age group 48-63 years, making up 41.6% of all participants. There were 74 males and 39 females making a ratio of 1.9:1.

Figure 1: Tumor site distribution.



The majority of participants had laryngeal tumors (46%), followed by sino-nasal and hypopharyngeal tumors which made up 24% and 15% respectively. Nasopharyngeal tumors were composed of the least participants (3%).

Figure 2: Tumor stage Distribution.



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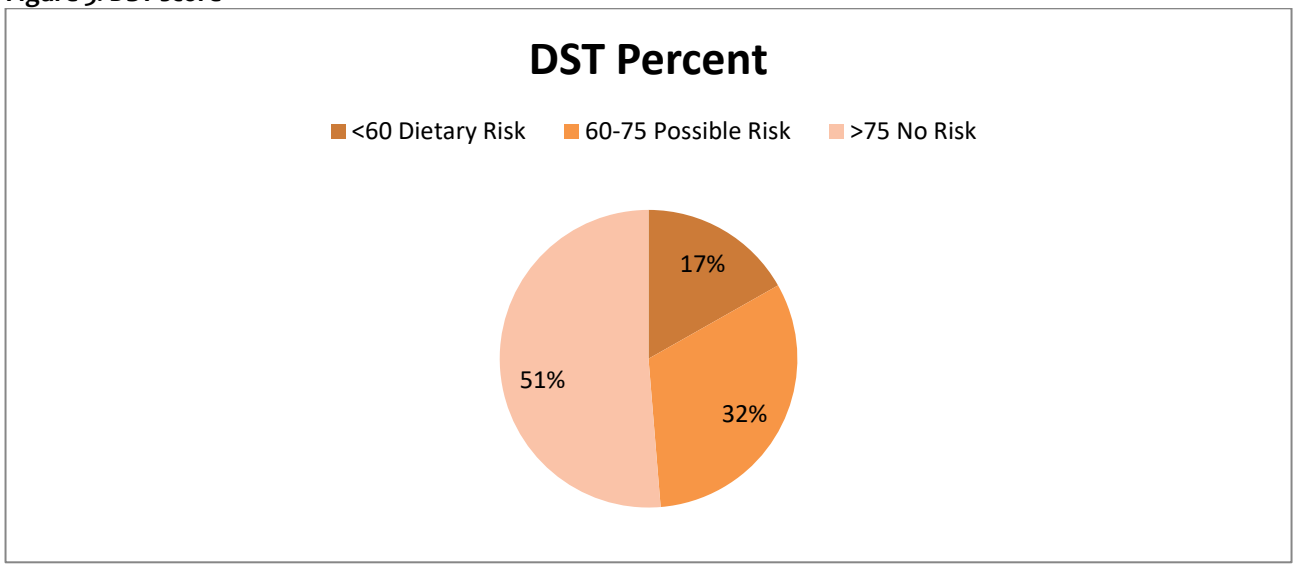
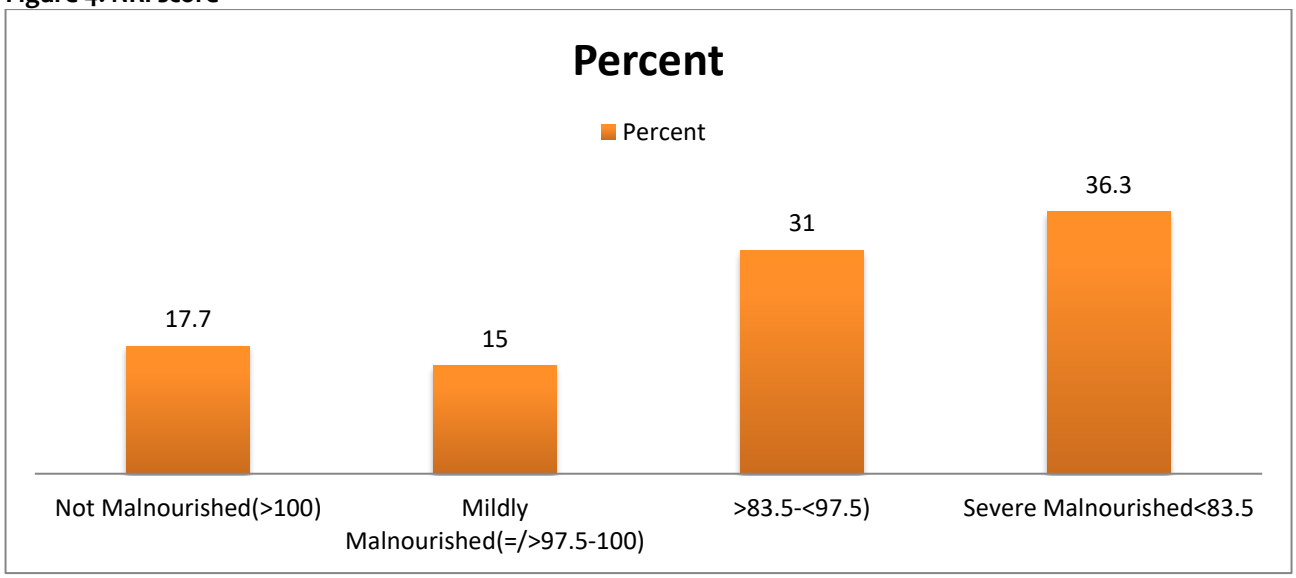
Advanced stages (III and IV) composed most of the patients in the study,85.6%, with stage IV revealed in half of the participants (52.2%). Stage I disease was revealed in 1.8% of participants.

Figure 3: DST score



Seventeen per cent of patients were presented with a pre-existing dietary risk, i.e., a DST score of fewer than 60 points. A good proportion of patients presented with no nutritional risk based on their diet i.e.51%.

Figure 4: NRI score



This study found that 36.3% of patients were presented with severe malnourishment as they scored less than 83.5 points based on NRI ratings, moderately malnourished patients made 31%of participants. Well-nourished patients were 17.7%.

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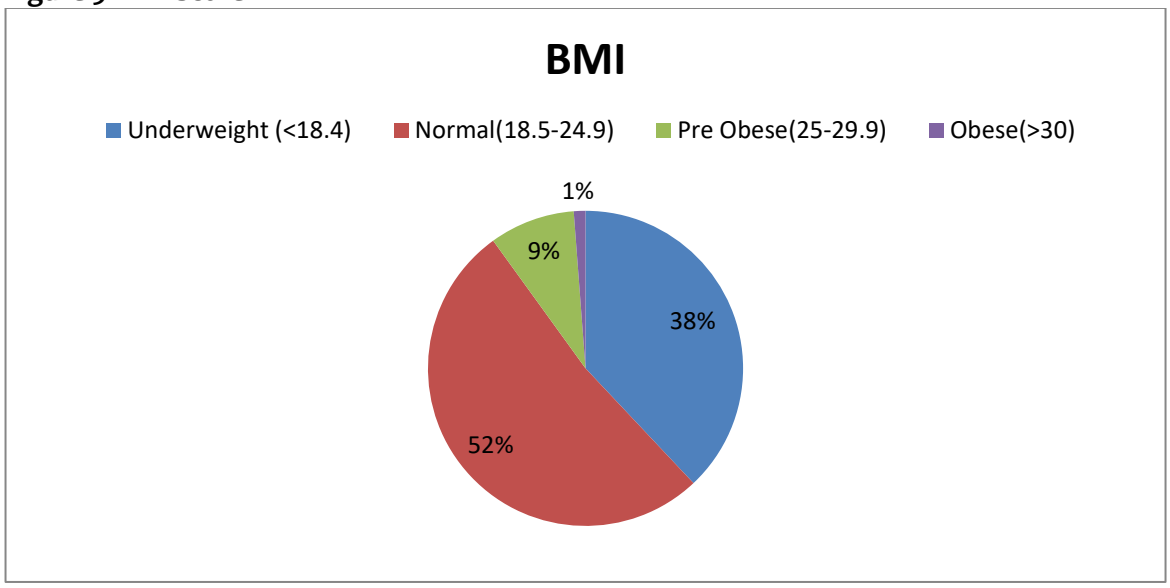
Figure 5: BMI score



Based on the BMI scale 38% of participants were underweight (BMI score of equal or less than 18.4 points). In this scale, it was noted that 1% of patients had obesity.

Table 2: Age/Sex and Tumor Site

	Laryngeal	Nasopharyngeal	Sinonasal	Neck	Hypopharyngeal	Oropharyngeal	Salivary gland	Total
A: Age group								
15-47	14(35)	2(5)	14(35)	5(12.5)	3(7.5)	1(2.5)	1(2.5)	40(100)
48-63	**21(44.7)**	1(2.1)	7(14.9)	3(6.4)	7(14.9)	3(6.4)	5(10.6)	47(100)
=/>64	**17(65.4)**	0(0)	3(11.5)	1(3.8)	5(19.2)	0(0)	0(0)	26(100)
B: Sex Distribution								
Male	**44(59.5)**	3(4.1)	16(21.6)	3(4.1)	6(8.1)	1(1.4)	1(1.4)	74(100)
Female	8(20.5)	0(0.0)	8(20.5)	6(15.4)	**9(23.1)**	3(7.7)	5(12.8)	39 (100)
Total	**52(46)**	3(2.7)	24(21.2)	9(8)	15(13.3)	4(3.5)	6(5.3)	113 (100)

Laryngeal tumours were more common than any other HNC in the elderly and middle-aged groups, with 65.4% and 44.1%, respectively. However, this difference was not significant (χ^2=20.5 P= .058). It was noted that the laryngeal tumour was more common in men than all other HNC, and the difference was significant (χ2=27.67 P= .000). In females; the hypopharyngeal tumour was much more common than the rest of the HN tumours with the same level of significance (23.1%).

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Table 3: Age/Sex and Tumor Stage

	I	II	III	IV	Total
Age groups	**n(%)**				
15-47Young adults	1(2.5)	7(17.5)	14(35)	18(45)	40(100)
48-63 Middle Aged	1(2.1)	4(8.5)	17(36.2)	25(53.2)	47(100)
=/>64 Elderly	0(0)	3(11.5)	7(26.9)	16(**61.5**)	26(100)
Sex Distribution					
Male	2(2.7)	8(10.8)	24(32.4)	40(54.1)	74(100)
Female	0(0)	6(15.4)	14(35.9)	19(48.7)	39(100)

Elderly patients presented late to health care, with 88.4% of them presenting with stage III and IV disease, though the difference was not significant (χ^2=3.34 P= .765). Among male patients, the majority presented at an advanced disease stage (86.5%) χ^2=1.716 P= .633.

Table 4: Tumor site/stage and Nutritional status

	Not malnourished(>100)	Mild malnourished(=/>97.5-100)	Moderately malnourished(=/>83.5-<97.5)	Severe malnourished<83.5	Total
A: Tumor site					
Laryngeal	13(25)	10(19.2)	14(26.9)	15(28.8)	52(100)
Nasopharyngeal	1(33)	0(0)	0(0)	2(66.7)	3(100)
Sinonasal	4(16.7)	6(25)	10(41.7)	4(16.7)	24(100)
Neck	1(14.3)	0(0)	3(42.9)	5(55.6)	7(100)
Hypopharyngeal	0(0)	0(0)	5(33.3)	10(66.7)	15(100)
Oropharyngeal	**0(0)**	**1(25)**	**0(0)**	**3(75)**	**4(100)**
Salivary gland	1(16.7)	0(0)	3(50)	2(33.3)	6(100)
B: Tumor Stage					
I	1(50)	0(0)	1(50)	0(0)	2(100)
II	11(78.6)	0(0)	1(7.1)	2(14.3)	14(100)
III	6(15.8)	10(26.3)	17(44.7)	5(13.2)	38(100)
IV	**2(3.4)**	**7(11.9)**	**16(27.1)**	**34(57.6)**	**59(100)**
Total	**20(17.7)**	**17(15)**	**35(31)**	**41(36.3)**	**113(100)**

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The highest percentage of malnutrition was found in oropharyngeal tumours (75%), followed closely by hypopharyngeal and nasopharyngeal tumours, each with 66.7%. The difference was, however, not significant (χ^2 =27.577 P=.069). Stage IV patients were severely malnourished in most excellent percentages and this finding was significant (57.6%) χ^2 =64.414 P=.000.

Table 5: DST score and NRI score

	Not malnourished(>100)	Mild malnourished(=/>97.5-100)	Moderately malnourished(=/>83.5-<97.5)	Severe malnourished<83.5	Total
DST score					
<60	1(5.3)	1(5.3)	7(36.8)	10(52.6)	19(100)
60-75	8(22.2)	6(16.7)	6(16.7)	16(44.4)	36(100)
>75	11(19)	10(17.2)	22(37.9)	15(25.9)	58(100)
Total	**20(17.7)**	**17(15)**	**35(31)**	**41(36.3)**	**113(100)**

Patients with the highest dietary risk had the highest proportion of severe malnourishment at presentation (52.6) χ^2=10.879 P=0.092.

Discussion

This study found that most head and neck cancers were in patients aged 48-63years, classified as middle-aged, with a mean of 51.8 years; this finding is close to that by (Righini et al.,2012), who found that the mean age in head and neck cancer patients to be 59 years. (Amaral et al.2008) found a similar pattern of head and neck cancer patients with a mean age of 57.1 years. A local study done at a cancer institute in Tanzania by Nundu found a similar age distribution for head and neck cancer with a mean age of 51 years (Britton et al.,2012). The sex distribution of participants showed male predominance with 65.5%. This finding is in congruence with the study by Nundu et al.,2020) in a cancer institute in which 58.7% of HNC patients were male.

This study revealed that 36.3% of patients presented for the first time with severe malnourishment according to NRI score (<83.5 points). Based on BMI score 38.1% of HNC presented at the ENT department as underweight. However, it should be noted that some patients had pre-existing nutritional risk based on their dietary intake, which was assessed using the Dietary Screening Tool pioneered initially by (Bailey et al.,2009). According to DST categorization, this study found that 16.8% of patients had prior nutritional risk which could explain the high proportion of malnutrition at presentation. Critical Weight Loss (CWL) is a common phenomenon in HNC, defined as involuntary weight loss of ≥5% in one month or ≥10% in six months, which is present in around (30-55%) of HNC patients (Jager-Wittenaar et al.,2007). CWL phenomenon can explain the presentation of severe malnourishment at a high rate in this study.

A study by (Jager-Wittenaar et al.,2007) found that 19% of patients with HNC had CWL at presentation which is a slightly

lower rate than ours. The difference with our study could be explained by late presentation as most patients had advanced stage (II&IV) i.e. 88.6%.

Oropharyngeal tumour patients were presented with severe malnourishment at the highest rate of all HNC tumours assessed (75%) χ^2 =30.079 P=.090. This finding differed from the study of CWL by (Jager-Wittenaar et al.,2007), which showed that the highest proportion of weight loss in patients with HNC was seen in hypopharyngeal tumours (43%). This difference can be explained by the different tools used to assess nutritional status; our study used NRI while Jager's used CWL. A study in Japan by (Takenaka et al.,2014) had findings that were like the study by (Jager-Wittenaar et al.,2007), showing the highest proportion of malnutrition in head and neck cancer linked to hypopharyngeal tumours; however, this finding was not statistically significant.

Oropharyngeal cancer is incriminated in severe malnutrition due to two mechanisms which are systemic effect which occurs due to the involvement of CNS by the regulation of satiety and sense of taste by the action of cytokines produced by host monocytes and tumour cells (Van Cutsem et al.,2005). The second mechanism is that the local effects of the oropharyngeal tumour may impinge food intake and predispose a patient to severe malnourishment. These effects include odynophagia and dysphagia.

It was also noted that nasopharyngeal tumours had a higher malnutrition rate than laryngeal tumours (66.7% vs 28.8 respectively). This finding is explained by the fact that the majority of nasopharyngeal tumour patients presented with a relatively higher proportion of advanced disease (66.7% vs 44.2% had stage IV disease, χ2=16.39, P=.565), which contributed to their poor nutritional state at presentation.

A different finding was in a study by (Jager-Wittenaar et al.,2007), who found overall malnutrition to be 16%; however, his study was limited to cancer in the oral cavity and oropharynx, which may explain the lower incidence as compared to this study.

Severe malnourishment was present in stage IV patients for about (57.6%) χ^2 =64.414 P=.000. The advanced stage of the tumour was associated with a large size tumour, which has a mechanical effect of obstructing the food passage, e.g. and hypopharyngeal tumour. Another feature of the advanced-stage disease is the involvement of multiple anatomical sites, e.g., an advanced sinonasal tumour may present with an oral involvement by palatal extension, which may end up causing dysphagia. This finding agreed with the study by (Takenaka et al.,2014), which found that advanced tumour staging in HNC had a significant association with severe malnourishment (56%).

In our study, it was noted that 16.8% of patients with HNC had nutritional risk which could have predisposed them to malnutrition regardless of disease. These findings were comparable to the study by (Esfahani et al.,2017) in Iran, who studied the nutritional risk in inoperable gastric adenocarcinoma; however, in his study, he found 87% of patients had moderate to severe nutritional risk. The cancer type might explain this large discrepancy. Their study included gastric tumours, which directly affect food uptake.

On the contrary, our study assessed multiple upper aerodigestive tumours. Some are not directly involved with dietary intake, like sinonasal tumours. Furthermore, the study by (Esfahani et al.,2017) used a different methodological approach by employing the Patient-Generated Subjective Global Assessment (PG-SGA) tool, and they clustered patients into moderate and severe malnutrition risk.

In this study, the majority had laryngeal tumours, which were followed by sinonasal and hypopharyngeal tumours with 46%, 19.5%, and 13 respectively; our study differed from the study by (Magnano et al.,2014) oropharyngeal and oral tumours predominated over laryngeal and hypopharyngeal tumour with 56.5% vs 46.5% respectively. The discrepancy might be explained by the methodological difference in which Magnano's study followed patients over four years (2009-2013). A similar pattern of HNC was found in (Righini et al.,2012) study in which oropharyngeal tumours were high on the list. This study also had a similar methodological approach to ours, i.e., they used NRI and BMI as nutritional criteria. However, they added an extra criterion of Weight Loss (WL) of more than/less than 10% to categorize malnutrition.

The finding in our study corresponded to a local study by (Abdulshakoor et al.,2020) in a cancer institute in Tanzania, which found that laryngeal tumours were high on the list with 19.7% of all HNC tumours. The lower percentage in his study is explained by the lower sample size, which was 66, compared to our study, which involved 113 participants. Another local study by (Nundu et al.,2020), which studied the effect of chemo-radiotherapy in HNC, also found laryngeal tumour as a leading pathology with 17.3%. The lower percentage in his study is explained by the source of patients who were not just from the ENT department but also from Oro-maxillofacial surgery (OMFS) and General surgery departments, which consisted of other tumours like oral cavity tumours, facial, maxillary and mandibular tumours.

This study found that 85.6% of patients were presented with advanced disease i.e. Stages III and IV, stage IV alone involving more than half of participants (52.2%). The finding in our study differed from an Italian study (Magnano et al.,2014) which found a slightly lower proportion of advanced disease. (Righini et al.,2012) in France had a finding corresponding to (Magnano et al.,2014), but his study categorized patients into two groups based on weight loss of >/= 10%. For those who were less malnourished (WL<10%), the advanced disease was found in 35%, and for those who were severely malnourished, 60% of patients had an advanced disease. Geographical differences explain the differences seen as the two studies were done in Europe and it is documented that cancers in Africa are diagnosed at an advanced stage and with relatively higher levels of malnutrition (Kaduka et al.,2017).

Based on this scale it was noted that 38% of patients were underweight at presentation. It also revealed that 1% had obesity. The finding of obesity in these patients is supported by literature, which shows that obesity alone is an independent risk factor for about 20% of all cancers (Hurria et al.,2012). In the head and neck region obesity has been linked to Thyroid tumours and non-Hodgkin lymphomas. The mechanism for this relationship is the presence of low-grade inflammation (esp.IL-6 cytokine) in obese people which promotes malignant cell growth and progression (Hurria et al.,2012). These findings were contrary to those by (Kaduka et al.,2017) in Kenya who found malnutrition at presentation was present in only 13.4% of participants, with male dominance. The difference is explained by the later study, which involved tumours other than HNC, such as digestive system tumours, breast, hematopoietic, etc.

It was found in this study that among middle-aged and the elderly, the laryngeal tumour was the most familiar pathology, with 44.1% and 65.4%, respectively. This finding concurred with most of the literature on HNC, where tumors commence in the 6^{th} to 7^{th}

decades. The finding that most laryngeal tumours occur in males cannot be overemphasized as most literature links it to the use of alcohol and smoking, which have synergistic effects of carcinogenesis. The two risk factors are common in men (Ellis et al.,2012).

It was revealed that 88.4% of elderly patients were presented with stage III and IV disease though the difference was not significant. This finding is explained by the fact that the majority of HNC patients who show up in health facilities are aged >/= 50yrs (Takenaka et al.,2014) and they present with advanced disease (Kaduka et al.,2017)

This study evidenced an alarming rate of malnutrition in HNC. The highest proportion of malnutrition was found in oropharyngeal tumours, followed by hypopharyngeal and nasopharyngeal tumours, each with 66.7%. A whole body of evidence supports the high rates, (Kaduka et al.,2017) in Kenya found the prevalence of malnutrition in HNC was 17.6% in lip oral cavity and pharyngeal tumour combined, however in their study, they used BMI as a sole criterion for nutritional assessment which some authors incriminate it for its poor sensitivity in overweight and obese patients (Magnano et al.,2014). In the study by (Nundu et al.,2020) in ORCI found that the majority of patients with hypopharyngeal cancer had malnutrition at 85.7% followed by oropharyngeal cancer at 60%, however in his study, he just used BMI as a nutritional assessment tool, and he assessed nutrition after the use of radiotherapy

This study found that patients with the highest dietary risk had the highest proportion of severe malnourishment at presentation (52.6%) χ^2=10.879 P=0.092. It is evidenced that malnutrition is a common feature associated with predisposing patients with HNC to poor prognostic outcomes (Takenaka et al.,2014).

Conclusion and recommendations

The laryngeal tumour is more common in men and strongly related to advanced age. Most of the patients with HNC had severe malnourishment at presentation. The oropharyngeal tumour had the highest rate of severe malnourishment compared to other anatomical sites in the head and neck. Hypopharyngeal and nasopharyngeal tumours ranked second in causing severe malnourishment.

There should be a paradigm shift towards health-seeking behaviour in the Tanzanian community. The latter should be educated more on avoiding risky practices related to cancer aetiology. Healthcare practitioners should address patients with hypopharyngeal tumours with care by providing adequate nutritional support as required.

References

Patel HJ, Patel BM. PT. Life Sci [Internet]. 2016; Available from: http://dx.doi.org/10.1016/j.lfs.2016.11.033

Witte, M., Anderson, M., Robinson, D. (2006). Anti-TNF-α Antibody and Cancer Cachexia. In: Mantovani, G., *et al.* Cachexia and Wasting: A Modern Approach. Springer, Milano. https://doi.org/10.1007/978-88-470-0552-5_66

Britton B, Clover K, Bateman L, Odelli C, Wenham K, Zeman A, Carter GL. Baseline depression predicts malnutrition in head and neck cancer patients undergoing radiotherapy. Support Care Cancer. 2012 Feb;20(2):335-42. doi: 10.1007/s00520-011-1087-y. Epub 2011 Jan 14. PMID: 21234608.

Alshadwi A, Nadershah M, Carlson ER, Young LS, Burke PA, Daley BJ. Nutritional Considerations for

Head and Neck Cancer Patients : A Review of the Literature. J Oral Maxillofac Surg [Internet].2012;71(11):1853–60.Available fromhttp://dx.doi.org/10.1016/j.joms.2013.04.028

Magnano M, Mola P, Machetta G, Maffeis P, Forestiero I, Cavagna R, et al. The nutritional assessment of head and neck cancer patients. Eur Arch Oto-Rhino-Laryngology. 2014;272(12):3793–9.

Righini CA, Timi N, Junet P, Bertolo A, Reyt E, Atallah I. Assessment of nutritional status at diagnosis in patients treated for head and neck cancer. Eur Ann Otorhinolaryngol Head Neck Dis [Internet]. 2013;130(1):8–14. Available from: http://dx.doi.org/10.1016/j.anorl.2012.10.001

Gosak M, Gradišar K, Rotovnik Kozjek N, Strojan P. Psychological distress and nutritional status in head and neck cancer patients: a pilot study. Eur Arch Otorhinolaryngology. 2020 Apr;277(4):1211-1217. doi: 10.1007/s00405-020-05798-y. Epub 2020 Feb 5. PMID: 32025788; PMCID: PMC7072056.

Capuano G, Gentile PC, Bianciardi F, Tosti M, Palladino A, Di Palma M. Prevalence, and influence of malnutrition on quality of life and performance status in patients with locally advanced head and neck cancer before treatment. Support Care Cancer. 2010 Apr;18(4):433-7. doi: 10.1007/s00520-009-0681-8. Epub 2009 Jun 29. PMID : 19562384.

Amaral TF, Antunes A, Cabral S, Alves P, Kent-Smith L. An evaluation of three nutritional screening tools in a Portuguese oncology centre. J Hum Nutr Diet. 2008 Dec;21(6):575-83. doi: 10.1111/j.1365-277X.2008.00917. x. PMID: 19017102.

Kubrak C, Olson K, Jha N, Jensen L, McCargar L, Seikaly H, Harris J, Scrimger R, Parliament M, Baracos VE. Nutrition impact symptoms: key determinants of reduced dietary intake, weight loss, and reduced functional capacity of patients with head and neck cancer before treatment. Head Neck. 2010 Mar;32(3):290-300. doi:10.1002/hed.21174. PMID: 19626639.

Takenaka Y, Yamamoto M, Nakahara S, Yamamoto Y, Yasui T, Hanamoto A, Takemoto N, Fukusumi T, Michiba T, Cho H, Inohara H. Factors associated with malnutrition in patients with head and neck cancer. Acta Otolaryngol. 2014 Oct;134(10):1079-85. doi: 10.3109/00016489.2014.906750. Epub 2014 Aug 18. PMID: 25131392.

Kaduka LU, Bukania ZN, Opanga Y, Mutisya R, Korir A, Thuita V, et al. Malnutrition and cachexia among cancer out-patients in Nairobi, Kenya. J Nutr Sci. 2017;1–10.

Kang WX, Li W, Huang SG, Dang Y, Gao H. Effects of nutritional intervention in head and neck cancer patients undergoing radiotherapy: A prospective randomized clinical trial. Mol Clin Oncol. 2016 Sep;5(3):279-282. doi: 10.3892/mco.2016.943. Epub 2016 Jun 30. PMID: 27588193; PMCID: PMC4998005.

Cotogni P, Stragliotto S, Ossola M, Collo A, Riso S, On Behalf of The Intersociety Italian Working Group For Nutritional Support In Cancer. The Role of Nutritional Support for Cancer Patients in Palliative Care. Nutrients. 2021 Jan 22;13(2):306. doi: 10.3390/nu13020306. PMID: 33498997; PMCID: PMC7911232.

Krejcie R V, Morgan DW. ACTIVITIES. 1970;38:607–10.

Bailey RL, Miller PE, Mitchell DC, Hartman TJ, Lawrence FR, Sempos CT, Smiciklas-Wright H. Dietary screening tool identifies nutritional risk in older adults. Am J Clin Nutr. 2009 Jul;90(1):177-83. doi: 10.3945/ajcn.2008.27268. Epub 2009 May 20. PMID: 19458013; PMCID: PMC2697000.

Jager-Wittenaar H, Dijkstra PU, Vissink A, van der Laan BF, van Oort RP, Roodenburg JL. Critical weight loss in head and neck cancer-prevalence and risk factors at diagnosis: an explorative study. Support Care Cancer. 2007 Sep;15(9):1045-50. doi: 10.1007/s00520-006-0212-9. Epub 2007 Feb 3. PMID:17277925.

Van Cutsem E, Arends J. The causes and consequences of cancer-associated malnutrition. Eur J Oncol Nurs. 2005;9(SUPPL. 2).

Jager-Wittenaar H, Dijkstra PU, Vissink A, van Oort RP, van der Laan BF, Roodenburg JL. Malnutrition in patients treated for oral or oropharyngeal cancer--prevalence and relationship with oral symptoms: an explorative study. Support Care Cancer. 2011 Oct;19(10):1675-83. doi: 10.1007/s00520-010-1001-z. Epub 2010 Sep 16. PMID: 20844902; PMCID: PMC3166597.

Esfahani A, Somi MH, Asghari Jafarabadi M, Ostadrahimi A, Ghayour Nahand M, Fathifar Z, Doostzadeh A, Ghoreishi Z. A new score for screening of malnutrition in patients with inoperable gastric adenocarcinoma. Jpn J Clin Oncol. 2017 Jun 1;47(6):475-479. doi: 10.1093/jjco/hyx034. PMID: 28334893.

Abdulshakoor AA, Sciences A. Quality of life among head and neck cancer patients receiving chemoradiotherapy at Ocean Road Cancer Institute in Tanzania. 2020/23/76;

Nundu report. National Cancer Treatment Guideline 2020 pg 191-211

Hurria A, Browner IS, Cohen HJ, Denlinger CS, deShazo M, Extermann M, Gant i AK, Holland JC, Holmes HM, Karlekar MB, Keating NL, McKoy J, Medeiros BC, Mrozek E, O'Connor T, Petersdorf SH, Rugo HS, Silliman RA, Tew WP, Walter LC, Weir AB 3rd, Wildes T. Senior adult oncology. J Natl Compr Canc Netw. 2012 Feb;10(2):162-209. doi: 10.6004/jnccn.2012.0019. PMID: 22308515; PMCID: PMC3656650.

Ellis L, Rachet B, Birchall M, Coleman MP. Trends and inequalities in laryngeal cancer survival in men and women: England and Wales 1991-2006. Oral Oncol [Internet]. 2012;48(3):284–9. Available from: http://dx.doi.org/10.1016/j.oraloncology.2011.10.012