PROFILE AND TREATMENT OUTCOME OF LARYNGEAL CANCER PATIENTS ATTENDED AT ORCI FROM 2008 TO 2011.

Peter L. Muhoka, MD

MMed (Clinical Oncology) Dissertation
Muhimbili University of Health and Allied Sciences
October, 2015

PROFILE AND TREATMENT OUTCOME OF LARYNGEAL CANCER PATIENTS ATTENDED AT ORCI FROM 2008 TO 2011

By

Peter L. Muhoka

A dissertation submitted in (Partial) Fulfillment of the Requirements for the Degree of Masters of Medicine (Clinical Oncology) of Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences
October, 2015

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation named; ***Profile and treatment outcome of the patients with laryngeal cancer attended at Ocean Road Cancer Institute, Dar es Salaam, Tanzania from 2008 to 2011*** in (partial) fulfillment for the degree of Master of Medicine (MMed Clinical Oncology) of the Muhimbili University of Health and Allied Sciences.

_____

Dr. Khamza Maunda

(Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, **Dr. Peter L. Muhoka,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature…….. Date……

This dissertation is a copyright material protected under the Berne Convention, the Copyright Act 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means, in full or in part, except for short extracts in fair dealing, for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of the Directorate of Postgraduate Studies, on behalf of both the author and the Muhimbili University of Health.

ACKNOWLEDGEMENT

I acknowledge the Ministry of Health for her full sponsorship throughout my three years of Academic.

I wish to express my sincere gratitude and appreciation to my supervisor Dr. Khamza Maunda for his good supervision and encouragement during the development and writing of my dissertation.

Special thanks to Dr Julius Mwaiselege who spent most of his time in supervising and encouraging me from proposal development to data analysis and report writing.
I am also grateful to all staff members of from various Departments at MUHAS and ORCI for their support during the course of my studies.

My sincere appreciation goes to my colleague in this course for their full support and cooperation throughout the course.

To all that I have achieved in my life, the glory, honor and praise be to the Almighty God.

DEDICATION

To my parents, brothers and sisters, for the values they installed in me that continue to guide my life.

To my precious wife Juliet Mlaki for her love, hardworking and dedication to our family.
To our lovely child Frank, for the joy he bring into our life.

ABSTRACT

Laryngeal cancer is the cancer of the cells found in the larynx. The new cases diagnosed annually have significant geographical variation. Laryngeal cancer is more common to male compared female and more in low social economic class. It is more prevalent in elderly people and the glottis area is the most common site.

The high risk factors associated with laryngeal cancer include smoking cigarette, excessive alcohol consumption especially spirits, squamous cell carcinoma is by far the commonest histological type and the symptoms include hoarseness of voices, sore throat, painful swallowing and change in voice quality or enlarged neck nodes. In early stages, laryngeal cancer can be treated by surgery or radiotherapy and combination of radiotherapy and chemotherapy in late stages of the disease.

Objective of the study: The aimed to describe the disease profile of the patient with laryngeal cancer attended at ocean road cancer institute, Tanzania from 2008to 2011.

Methodology: The study was hospital based cross-sectional study and it was conducted at ocean road cancer institute targeting included all patients with laryngeal cancer from 2008 to 2011, whose baseline characteristics were determined before beginning of treatment and at least one follow up visit and excluded all subjects whose records were not available. sociodermographic characteristics, disease and treatment profiles were clearly documented.

Results: 72 patients were included in a study, 86.1% were males and 13.9% were females. The youngest patient was 35 years and the oldest patient had 84 years with mean age 58.1 years, where by 59.7% of the patients included in the study had primary education and below. 64.4% had history of both alcohol consumption and cigarette smoking prior to disease development and the glottis area was common disease site by 66.7% with squamous cell carcinoma the most histological type by 98.6%.

Majority had advanced disease stage III and IV with 73.6% of all patients included in the study where by the combination chemoradiation was common treatment modality.

Conclusion and recommendation: Most of the laryngeal cancer patients attended at ORCI was mid age males with low level of education, presented with late stage disease and they were treated by combination chemoradiation which offered symptomatic relief. The proportion of patients attaining complete remission following treatment was low and this is probably due to late disease presentation.

Health education, change of behavior campaigns towards cigarette smoking and alcohol consumption and improvement of health infrastructures are needed to reduce the disease development and improve its diagnosis and treatment.

TABLE OF CONTENTS

CERTIFICATION ii
DECLARATION AND COPYRIGHT iii
ACKNOWLEDGEMENT iv
DEDICATION v
ABSTRACT vi
TABLE OF CONTENTS viii
LIST OF TABLES x
LIST OF ACRONYMS xi
INTRODUCTION 1
LITERATURE REVIEW 4
PROBLEM STATEMENT 7
RATIONALE 8
RESEARCH QUESTION 8
BROAD OBJECTIVE 9
Specific Objectives 9
METHODOLOGY 10
Study design. 10
Study setting 10
Study participants 10
Eligibility criteria 11
Inclusion criteria 11
Exclusion criteria 11
Sampling procedure 11
Sample size 11
Data collection 12
Data Management and Statistical Analysis 12
Data Management 12
Statistical analysis 12
Quality control 12

ETHICAL CONSIDERATIONS 13
DISCUSSION 20
STRENGTH AND LIMITATION 23
STRENGTH 23
LIMITATIONS 23
CONCLUSION 24
RECOMMENDATIONS 24
REFERENCES 25
APPENDIX 29
Appendix I : Data Extraction Form 29

LIST OF TABLES

Table 1: Demographic characteristics of patients with Laryngeal cancer……..14

Table 2: Associated factors for Laryngeal cancer among the patients with laryngeal cancer attended at ORCI from 2008 to 2011.....15

Table 3: The common site of the disease among the patients with laryngeal cancer attended at ORCI……..…..…15

Table 4: The common histological type 16

Table 5: The common presentation among the patients of laryngeal cancer attended at ORCI from 2008 to 2011.....16

Table 6: Stage of the disease presented by laryngeal cancer patients attended at ORCI from 2008 to 201.....17

Table 8: The association between treatment outcome and the sociodermographic characteristics and disease profile of laryngeal cancer patients attended at ORCI from 2008 to 2011……..……18

Table 9: Logistic regression for outcome of treatment against disease stage and treatment modality to the laryngeal cancer patients attended at ORCI from 2008 to 2011…….....19

LIST OF ACRONYMS

CRT	Chemoradiation therapy
HNC	Head and Neck Cancer
HPV	Human Papilloma Virus
IARC	International Agency for Research on Cancer
ORCI	Ocean Road Cancer Institute

INTRODUCTION

Laryngeal cancer is uncommon head and neck malignancy which develops inside the tissue of the larynx (1).It is 18th most common cancer in the world representing approximately 2% of new cases diagnosed annually with significant geographical variation in incidence (2). According to United Kingdom cancer research center it was estimated that there were over 150,000 new cases of laryngeal cancer in 2008 worldwide (3). Countries with the highest incidence of laryngeal cancer includes Hungary were the incidence is 181.9; Belgium 152.4 and USA were the incidence is 142.6 per 100,000 according to data obtained from IARC (4).

In Tanzania, figures from Global cancer statistic center of 2008 give the estimated incidence of 5.3 per 100,000 in men and 0.3 per 100,000 in women, with estimated age standardized mortality rates of 3.5 per 100,000 and 0.2 per 100,000 in men and women respectively (5).

Laryngeal cancer is more common in male compared to female with a ratio of almost 5:1 (6) and it is more prevalent in among lower socio-economic class in which it is diagnosed at more advanced stages and the frequency of the disease increased along with age in both sexes (7)

In most recent studies shows glottic tumors forms the majority and subglottic tumors comprising only a few per cent of all laryngeal malignancies while some earlier studies indicate supraglottic dominance (9, 10). Tumors arising from different regions of the larynx probably have different risk factors and show considerable difference in clinical behavior and prognosis (8, 9).Usually supraglottic cancers present with sore throat, painful swallowing, referred ear pain, change in voice quality or enlarged neck nodes. Early vocal cord cancers are usually detected because of hoarseness of voice. Cancers arising in the subglottic area commonly involve the vocal cords and symptoms usually relate to contiguous spread.

Squamous cell carcinoma is by far the most common histological type, comprising 95% of laryngeal cancers. Other rare type of cancer arises from the other types of cells within the larynx including adenocarcinoma. The exact reason why a cell becomes cancerous is unclear. It is thought that something damages or alters certain genes in the cell, which make these cells abnormal and multiply out of control.

There are certain risk factors that increases the chances of laryngeal cancer development including: age – more common in older people over 60 years, smoking habit, excessive alcohol consumption, poor diet especially a diet lacking certain vitamins and minerals, long term exposure to certain chemicals, fumes or pollutant may irritate the larynx and Human Papilloma Virus (HPV) has been shown in some studies to be associated with cancer of the larynx.

For smokers, the risk of the developing laryngeal cancer decreases after the cessation of smoking but remains elevated even years later when compared to that of nonsmokers. The risk of second tumor is enhanced in a patient who has had a single cancer and continues to smoke and drink alcoholic beverages and the likelihood of a cure for the initial cancer, by any modality, is highly diminished.

The treatment advised for each case depends on various factors such as the exact site of the primary tumor in the larynx, the stage of the cancer, the grade of the cancerous cells and the general health of the patient. Although most early lesions can be cured by either radiation therapy or surgery, radiation therapy may be reasonable to preserve the voice, leaving surgery for salvage. Locally advanced lesions, especially those with large clinically involved lymph nodes, are poorly controlled with surgery, radiation therapy, or combined modality treatment. Distant metastases are also common, even if the primary tumor is controlled.

Patients treated for laryngeal cancers are at the highest risk of recurrence in the first 2 to 3 years. Recurrences after 5 years are rare and usually represent new primary malignancies. Close, regular follow-up is crucial to maximize the chance for salvage. Careful clinical examination and repetition of any abnormal staging study are included in follow-up, along with attention to any treatment-related toxic effect or complication

The survival rates for laryngeal cancer depends on the stage that the condition is diagnosed. Around 1 in 4 people with stage four laryngeal cancer will live at least five years after diagnosis (7). The prognostic factors for laryngeal cancers include increasing T stage and N stage. Other prognostic factors may include sex, age, performance status, and a variety of pathologic features of the tumor, including grade and depth of invasion. (11)

LITERATURE REVIEW

Populations having lower socioeconomic status, as well as ethnic minorities, have demonstrated lower utilization of preventive screening, including tests for early detection of laryngeal cancer.The study done by Arsenijevic S et al to define demographic characteristic of patients with laryngeal cancer and their socioeconomic status where by 100 patient (cases) with histologically verified laryngeal cancer were investigated and the control group consisted 100 patients (control) having no cancer. The comparison between the groups was carried out by individuals matching of demographic characteristic and socioeconomic status. It was observed that people of lower education level and poor socioeconomic status had increased risk of getting laryngeal cancer (12)
Various factors have been associated with laryngeal cancer development. A hospital based group matched case control study which was done by Mousavi MR et al on association between opium and risk of laryngeal cancer shows that the crude odds ratio of laryngeal cancer were 15.07 (95% CI, 6.92- 32I, 6.92- 32.8 ($p<0001$)) for cigarette smoking, 21.55 (95% CI, 10.54-44 ($p<0001$)) for opium depending and 1.84 (95% CI, 1.008-3.38 ($p<048$)) for male gender. They conclude that opium dependency was not only an independent possible risk factor for laryngeal cancer but also significantly increases the likelihood of developing the disease at young age (16)

Also a case control study to determine the association between salted meat and the risk of laryngeal cancer done by De Stefani E et al found that cigarette smoking and consumption of salted meat appeared to increase the risk of laryngeal cancer in a multiplicative fashion and fresh meat consumption (beef) was also associated with an increased risk of laryngeal cancer (OR 2.0) (15)

A study on the role of GERD in laryngeal cancer done by Vaezi MF et al found that on univariable analysis the significant risk factors current smoking OR 5.46(95% CI,2.59-11.50); alcohol OR 1.97 (CI, 1.19-3.26) and GERD OR 1.79 (CI, 1.03-3.11). On multivariable analysis only smoking and GERD continued to be significantly associated

with laryngeal cancer OR 6.08 (CI,2.82-13.10) and OR 2.11 (CI,1.16-3.85) respectively (17)

A case control study conducted by Edefonti V et al to determine the relation between nutrient based dietary patterns and laryngeal cancer and they found that the vitamins and fiber dietary pattern was inversely associated with laryngeal cancer (OR, 0.35, 95% CI, 0.24-0.52 for the highest versus the lowest quartile) where animal products (OR 2.34, 95% CI, 1.59- 3.45) and the animal unsaturated fatty acid (OR, 2.07, 95% CI, 1.42-3.01) patterns were directly associated with it. There was no significant association between the vegetable unsaturated fatty acid and the starch – rich patterns and laryngeal cancer risk. They conclude that diet rich in animal products and animal fats are directly related and those rich in fruit and vegetables were inversely related to laryngeal cancer (20)

In a case control study done by Kapil U et al on assessment of risk factors in laryngeal cancer in India they found that years of use of alcohol, smoking, chewing of betel leaf with tobacco in the model, low green leafy vegetables and preferences for spicy foods were found to be positively related to the risk of laryngeal cancer (13)

A study done by Hassan Latifi et al on squamous cell carcinoma of larynx in Northwest Iran for the period of five years totally 0.1% of the cases had laryngeal cancer which was confirmed by pathological studies. All of the cases were pathologically detected as squamous cell carcinoma. 35 of detected 42 patients (83.3%) had a least a smoking history of daily 20 cigarettes for ten years. The location involved by the tumor included a 16 cases (38%) supraglottis, 18 cases (42%) glottic and 8 cases (19%) were reported with unknown location. The main clinical manifestation of the patient was dysphonia, dysphagia, weight loss, dyspnea, laryngalgia, cervical lymphadenitis, stridor, hemoptysis and coughing (21)

In a case-control study by R. Pacella- Norman from 1995 to 1999 in Johannesburg to determine the risk factors for esophageal, lung, oral and laryngeal cancer in black South Africans they found that tobacco smoking was the major risk factor for all these cancers with OR 23.6 (95% CI, 4.6-121.2) for laryngeal cancer in men who smoked 15 or more grams of tobacco a day (18)

A study on four year trend of head and neck cancer at Nairobi Cancer Registry in Kenya from 2000 to 2003 they found that laryngeal cancer was at 18.3% and the commonest histology type was squamous cell carcinoma from 70% to over 90% (19).

PROBLEM STATEMENT

Laryngeal cancers usually develop in the sixth and seventh decades of life and it is more common in male compared to female and people with low socioeconomic status but nowadays the trend has changed and there is an increase in number of young and female patients who develop laryngeal cancer compared to previous years. The changes observed is highly attributed by change in lifestyle toward western, lack of awareness on disease risk factors that increase the chances of disease development.

Despite the advancement in the treatment of laryngeal cancer, the disease presents a challenge in its management due to the occurrence near vital structures. Diagnosis and screening is difficult in the early stages due to hidden nature of the lesions often resulting in late clinical presentation making the treatment outcome to be poor. Unfortunately, in Tanzania there is no any scientific study that has assessed disease profile and the outcome after treatment of laryngeal cancer in a population.

RATIONALE

It has been found that in less developed countries like Tanzania the total number of laryngeal cancer patients increases yearly while their survival rate of the after one year decreases, this is much contributed by poor knowledge of the disease, poor lifestyle, lack of skilled medical personnel to diagnose the disease at early stages and lack of proper facilities in diagnosis and treatment of the disease properly.

There is no scientific research which has been done at ORCI to show how sociodemographic characteristics is related to disease, the profile of the disease and the treatment outcome in diagnosed patients for the past 3 years and this study is expected to find the relation between sociodemographic characteristics and the disease, disease profile and treatment outcome of the patients attended and treated at ORCI for the past 3 years , so that proper arrangement of treatment, diagnostic tools and in improvement of disease knowledge and proper delivery of treatment and therefore improve the outcome after treatment.

RESEARCH QUESTION

What is the profile of Laryngeal cancer patients attending at ORCI from 2008 to 2011 and their outcome after treatment?

BROAD OBJECTIVE

To describe the disease profile and treatment outcome of the patients with laryngeal cancer attended at Ocean Road Cancer Institute, Tanzania from 2008 to 2011.

Specific Objectives

1. To describe the socio-demographic characteristics of patients with laryngeal Cancer presenting at the Ocean Road Cancer Institute, Tanzania from 2008 to 2011.
2. To determine the associated factors for laryngeal cancer among laryngeal cancer patients attending at Ocean Road Cancer Institute, Tanzania.
3. To determine the clinical pathological presentation of laryngeal cancer patients attending at Ocean Road Cancer Institute, Tanzania.
4. To describe the treatment modalities of laryngeal cancer patients attending at Ocean Road Institute, Tanzania.
5. To describe the treatment outcome and the association with sociodermographic and disease profile of laryngeal cancer patient treated at Ocean Road Cancer Institute, Tanzania.

METHODOLOGY

Study design.

This was a hospital based cross-sectional retrospective study.

Study setting

This study was conducted at Ocean Road Cancer Institute in Dar Es Salaam, Tanzania.

Ocean Road Cancer institute is located along Indian Ocean in Dar Es Salaam, Tanzania. The facility is one of the oldest health in Tanzania founded in 1895 by German colonial government.

The Institute works in partnership with the Tanzania community so as to create and maintain an integrated, accessible and affordable cancer health care system with quality services to improve health and well-being.

Ocean Road Cancer Institute offers numerous patients services including laboratory services, diagnostic imaging, chemotherapy, radiotherapy, palliative care services, cervical and breast cancer screening and HIV/AIDS care and treatment clinic.

Also Ocean Road Cancer Institute offers programs for undergraduate and postgraduate student as well as other health care workers, further more ORCI runs research projects in various aspects of cancer.

Laryngeal cancer patients brought to ORCI are treated either by radiotherapy and chemotherapy and most of them are brought in advanced stages.

Study participants

Target population: All patients with diagnosis of laryngeal cancer in Tanzania.

Accessible population: All patients referred to ORCI for treatment with diagnosis of laryngeal cancer.

Study population: All patients with laryngeal cancer who fulfill the eligibility criteria.

Eligibility criteria

Inclusion criteria

The study included all patients referred to ORCI with diagnosis of laryngeal cancer from January 2008 to December 2011, and whose baseline characteristics were determined before beginning of the therapy and had at least 1 follow-up visit.

Exclusion criteria

The study excluded subjects whose records were not available.

Sampling procedure

All patients who attended ORCI between 1st January 2008 and 31st December 2011 with a diagnosis of laryngeal cancer were identified from the central hospital register. Hospital case-notes were retrieved for each patient. Details pertinent to patient demographics, diagnosis, disease severity and laterality, treatment, and outcome, were recorded.

Sample size

The sample size for laryngeal cancer was calculated using a single proportion formula:

$n= z2\ p\ (100- P)/\varepsilon 2$

Where: n = Minimum sample size designed,

z = the point on standard normal deviation corresponding to 95% Confidence Interval which is 1.96, (Zx of 1.96 approximated to 2)

p = The proportion of laryngeal cancer patients seen at ORCI (5%),

ε = Margin of error set at 5%

n = (2)2x5x95/(5)2

n = 76

From the formula the minimum number of patients with laryngeal cancer to be recruited in the study was found to be 76 Study variables

The outcome variables were:

- Complete remission
- Persistent disease
- Relapse
- Death

Data collection

Research assistants under the supervision of the principal investigator use data extraction forms to retrieve data from patient's records stored in manual files and or files on computer. The data extraction forms were capture demographic characteristics, severity of disease, treatment modalities and outcome of treatment and other variables of interest.

Data Management and Statistical Analysis

Data Management

The data extraction forms were carefully reviewed for completeness and consistency. In case of missing or inconsistent data was checked the patient periodical records or medical registers while ensuring utmost confidentiality of patient records and identity.

Statistical analysis

The data analysis was done using the SPSS version 21 for windows.

Quality control

The data obtained was coded, edited and cleaned before any statistical analysis was carried out on the data. Additional internal documentations such as variable and value labels were added and any necessary additional variables were created through algebraic or logical expressions. Study research assistants were trained before the start of the study. Data capture sheet will be pre-tested to improve consistency. Data was double entered to control for errors.

ETHICAL CONSIDERATIONS

Ethical clearance to conduct the study was obtained from MUHAS Ethical Committee. In addition ORCI was asked to allow a researcher to access the medical sites and files of patients with laryngeal cancer between Jan 2008 and Dec 2011.

RESULTS

Information required was obtained from hospital registry and patients files. After excluding the patients whose information didn't fulfil the selection criteria, only 72 patients were included in the study and data extraction and analysis was performed and the results of socio-demographic characteristics and disease profile are presented below.

Table 1: Demographic characteristics of patients with Laryngeal cancer.

Variable	Number (N=72)	%
Sex		
Male	62	86.1
Female	10	13.9
Age of the patient		
<30	0	0
31-60	41	56.9
>60	31	43.1
Formal education level		
Non	1	1.4
Primary school	42	58.3
Secondary school	22	30.6
Post-secondary school	7	9.7

There were more male than female, with ratio of 6.2:1, with majority of the patients, 56.9% at the age of less than 60 years which is the most economic and active group with the mean age of 58.71 years. 58.3% of the patients had primary school education, 30.6% attends secondary school and only 9.7% had post-secondary school education.

Table 2: Associated factors for Laryngeal cancer among the patients with laryngeal cancer attended at ORCI from 2008 to 2011.

VARIABLE	FREQUENCY	%
SMOKING CIGARATTE ALONE	9	12.5
ALCOHOL CONSUMPTION ALONE	13	18.1
ALCOHOL AND CIGARETTE SMOKING	50	69.4
TOTAL	**72**	**100**

Majority of Laryngeal cancer patient had history of both alcohol consumption and cigarette smoking 69.4% prior to disease progression, history of alcohol consumption alone was 18.1% and cigarette smoking alone were 12.5% among the laryngeal cancer patients presented at ORCI from 2008 to 2011.

Table 3: the common site of the disease among the patients with laryngeal cancer attended at ORCI.

Variable	frequency	%
SUPRAGLOTTIS	24	33.3
GLOTTIC	48	66.7
SUBGLOTTIS	0	0
	72	100

The common site for the laryngeal cancer among the patients attended at ORCI from 2008 to 2011 was glottis area with 66.7% followed by supraglottic area with 33.3%. There was no any patient presented with disease at subglottic area.

Table 4: The common histological type

Variable	Frequency	%
Squamous cell carcinoma	71	98.6
Adenocarcinoma	1	1.4
	72	100

The squamous cell carcinoma was found to be the common histological presentation 98.6% compared to adenocarcinoma which was in about 1.4 % of all patients with laryngeal carcinoma attended at ORCI from 2008 to 2011.

Table 5: The common presentation among the patients of laryngeal cancer attended at ORCI from 2008 to 2011

Variable	Frequency
Hoarse voice (93%)	67
Sore throat (23%)	17
Lump in the neck 13(18%)	
Trouble in swallowing	34(47%)

Majority of the patients attended at ORCI with laryngeal cancer from 2008 to 2011 had hoarse voice, 93%. Trouble in swallowing had 47%, sore throat 23% and lump in the neck had least number of the patients 17%.

Table 6: Stage of the disease presented by laryngeal cancer patients attended at ORCI from 2008 to 2011

Variable	Frequency	%
Stage I	7	9.7
Stage II	12	16.7
Stage III	27	37.5
Stage IV	26	36.1

From the figure above , it shows that majority of the patients present at ORCI at stage three , 37.5% and stage four 36.1% which are late stages. Small proportion of the patients present with stages one and two, 9.7% and 16.7% which are early stages.

Table 7: The treatment modalities provided to the patients with laryngeal cancer attended at ORCI from 2008 to 2011.

Variable	Frequency	%
Chemotherapy and EBRT	64	88.9
Surgery followed by chemotherapy and EBRT	5	6.9
Surgery followed by EBRT	1	1.4
Radiotherapy alone	2	2.8
Total	**72**	**100**

Combination of chemotherapy and radiotherapy was the most common treatment modality, 88.9% combination of surgery followed by chemotherapy and radiotherapy was 6.9%, surgery followed by radiotherapy was 1.4% and radiotherapy alone was 2.8%.

Table 8: The association between treatment outcome and the sociodermographic characteristics and disease profile of laryngeal cancer patients attended at ORCI from 2008 to 2011.

Variables	Treatment outcome				
	Complete remission	**Persistent disease**	**relapse**	**death**	**p-value**
Sex					
Male	4	6	0	0	
Female	14	45	1	2	**0.632**
Patients age					
< 30 yrs	0	1	0	0	
31-60 yrs	11	31	0	0	
> 61 yrs	7	19	1	2	**0.541**
Disease stage					
I	7	0	0	0	
II	10	2	0	0	
III	0	24	1	2	
IV	0	26	0	0	**< 0.0001**
Education achieved					
Illiterate	0	1	0	0	
Primary	12	28	1	1	
Secondary	2	19	1	0	
Post-secondary	4	3	0	0	**0.481**
Treatment modalities					
Chemo + EBRT	11	50	1	2	
Only EBRT Surger	1	1	0	0	
+ EBRT	1	0	0	0	
Surgery + chem+ EBRT	5	0	0	0	**0.014**

Disease stage and treatment modality shows association with treatment outcome with p <0.0001 and 0.014 respectively, but there were no any association between treatment outcome and sex, age or level of education of the patient.

Table 9: Logistic regression for outcome of treatment against disease stage and treatment modality to the laryngeal cancer patients attended at ORCI from 2008 to 2011.

Variable	**treatment outcome**		
	p-value	**OR**	**95% CI**
Treatment modality	0.817	1.125	0.414 – 3.054
Disease stage	< .001	18.342	4.192 - 80.244

Disease stage was highly associated with treatment outcome with p< 0.001, OR 18.342 with 95%CI of 4.192- 80.244. But treatment modality was not associated directly to the treatment outcome.

DISCUSSION

Laryngeal cancer is the second most common respiratory cancer after lung cancer and it is fourteenth in all malignancies. Despite the advance in investigation and treatment of laryngeal cancer it remains one of the deadly diseases.

In this study 72 laryngeal cancer patients were studied and it was found that 86.1% were male compared to female which was 13.9% this corresponds to the study done by Owen Pyeko Menach et al on demographic and histology pattern of laryngeal squamous cell carcinoma in Kenya, which demonstrate that only 4% were female and male was 96% of all patients (25). The results obtained are largely contributed by the fact that male experience more risks behaviors like excessive alcohol consumption and cigarette smoking which lead to laryngeal cancer development compared to females.

In this study the youngest patient was 35 years old while the oldest patient was 84 years with mean age of 58.1 years. 56.9% of the patients had age between 31 and 60, 43.1% had age above 60 years while there was no patient with the age below 30 years. These results were consistency to the result of study done by Owen Pyeko Menach et al which shows that the mean age of the patient in his study was 63 years old (25). This shows that laryngeal cancer is more common in elderly people compared to other age groups in a population and this can be explained by the fact that at that age the immune system and genetic repair mechanism is poor.

According to the study done by Arsenijevic S et al to define demographic characteristic of patients with laryngeal cancer and their socioeconomic status it was observed that people of lower education level and poor socioeconomic status had increased risk of getting laryngeal cancer (12). This correlate with our study which shows that the majority of laryngeal cancer patients had primary education and below, 58.3% with only primary education and those with no formal education were 1.4% %. This may be due to the fact that these patients have got poor knowledge on risk factors and development of laryngeal cancer and also this group with low level of education does not have a

tendency to seek for right medical treatment when they start to experience early symptoms of disease.

In our study, 69.4% had history of both alcohol consumption and cigarette smoking prior to disease development, 18.1% had history of alcohol consumption alone and 12.5% cigarette smoking alone, this shows that patients who previously had both habit of cigarette smoking and alcohol consumption had higher chance of developing laryngeal cancer compared to those patients who smoke cigarette or consume alcohol alone. These results were consistent with the results of the study done by Hashibe M et al in 2009 in determination of interaction between tobacco and alcohol use and the risk of head and neck cancer which shows that the effects between tobacco and alcohol use is greater than multiplicative on head and neck cancer risk(23). Also the study done by Pelucchi C et al, 2008 on alcohol and tobacco use and cancer risk for upper aerodigestive tract and liver shows that the combined exposure to alcohol and tobacco has multiplicative effects on carcinogenesis of this tract (24).

From this study the majority of the patients with laryngeal cancer attended at ORCI and treated had glottic tumor with 66.7%, while 33.3% had supraglottic tumor envolvement and there was no any patient who presented with subglottic tumor. These findings are consistent to some literature which label glottis as the common site of cancer of the larynx by 65%, supraglottis by 35% and subglottis by less than 1% (21). Also the study done by Hassan Latifi et al in 2012 on 42 patients with squamous cell carcinoma of larynx in northwestern Iran shows that the locations involved by the tumor included as 16 cases (38%) supraglottic, 18 cases (42.8%) glottic, and 8 cases (19%) were reported with unknown location (20)

ED Kitcher et al in a retrospective study on Laryngeal Cancer at the Korle Bu Teaching Hospital Accra Ghana in 2003, shows that squamous cell carcinoma was more common histopathology by 88.7%, followed by adenocarcinoma, 1.7% and other types comprises about 9.6% .These findings collerate with the findings from this study which shows that

squamous cell carcinoma was 98.6% of all cell types compared to adenocarcinoma which was 1.4% (22).

88.9% of patients in our study were treated with combination of chemotherapy and radiotherapy, combination of surgery and chemoradiation was delivered to 6.9% of our patients,2% received radiotherapy alone while combination of surgery and radiotherapy was delivered to 1.4% of all patients under the study.

The majority of laryngeal cancer patients attended at ORCI from 2008 to 2011 present hoarseness of voice, 93%. Difficult in swallowing had 47% of all patients while sore throat had 23% and neck lump alone had 17% of all patients. These results were consistent with the result of the study done by Hassan Latifi, Peyman Mikaili et al in 2012 on 42 with squamous cell carcinoma, the main clinical manifestations of the patients were dysphonia, dysphagia, weight loss, dyspnea, laryngalgia ,cervical lymphadenitis, stridor, hemoptisis, coughing (20).

In this study, the treatment outcome for the patients with laryngeal cancer was highly associated with disease stage. 17 patients with stage I and II had complete disease remission and 2 patients had persistent disease with no death at this stage, for those patients who attended one follow up visit. 26 patients with stage IV disease had persistent disease, 1 patient had disease relapse while 2 patients died after completing treatment for disease. The relationship between disease stage and the treatment outcome was highly significant (p- value < 0.001, OR=18.342 and 95% CI 4.192-80.244). These results were consistent with literature which shows that the early stage disease has got good outcome compared to late stage disease (21)

STRENGTH AND LIMITATION

STRENGTH

This was a hospital based cross-sectional study in which the author was involved in data collection and personally entered and analyzed the data in order to assure authenticity and completeness of data collected as well as the results obtained.

LIMITATIONS

Being a hospital based retrospective study, some important information's in a files was missing due to improper filling of patients particulars.

CONCLUSION

Most of the patients attended at ORCI are male with the age between 30 to 60 years and with low socioeconomic status. They present with late stage of the disease and squamous cell carcinoma is the most common histopathology where they receive chemoradiation treatment which offered symptomatic relief to our patients.

However the proportion of our patient attaining complete disease remission following treatment in our set up is very low. This may be due to late disease presentation observed in our patients which end up receiving palliative treatment.

RECOMMENDATIONS

1. More effort from the government and all other stakeholders are required in order to prevent/reduce the occurrence of laryngeal cancer, by reducing/stop cigarette smoking and alcohol consumption.

2. Health education, income capacity buildup and improvement of health infrastructures are necessary in order to overcome late disease presentation.

3. Further studies to assess incidence and prevalence of laryngeal cancer with respect to socio-demographic characteristics.

REFERENCES

1. Hannu S. Raitiola and Juhani S. Pukander; Acta Oncologica Vol. 36, No. 1. pp. 33-36, 1997

2. E. Jaworowiska,P. Serrano-Fernandez, C.Tarnowiska, J.Lubinski, A. Kram, B.Masojc et al (clinical and epidemiological features of familial laryngeal cancer in Poland.)

3. United Kingdom Cancer Research Centre - http://www.cancerresearchuk.org/cancer-info/cancerstats/keyfacts/laryngeal-cancer/uk-laryngeal-cancer-statistics

4. International Agency for Cancer Research http://www.aneki.com/larynx_cancer_countries.html

5. Global Cancer statistic Centre- http://globocan.iarc.fr/factsheet.asp

6. M.P Curado, B. Edwards, H.R .Shin, H.Storm, J.Ferlay, M. Heanue et al, Cancer incidence in five continents IARC scientific publication, Lyon. France (2008)

7. UK cancer charity Centre http://www.cancerresearchuk.org/cancer-info/cancerstats/types/larynx/incidence/uk-laryngeal-cancer-incidence-statistics

8. Barnes L, Gnepp DR. Diseases of the larynx, hypopharynx, and esophagus. In: Barnes L, ed. surgical pathology of the head and neck. New York: Marcel Dekker, Inc., 1985: 141-226.

9. Kleinsasser 0. Tumors of the larynx and hypopharynx. Stuttgart: Georg Thieme Verlag, 1988: 1-24.

10. Lauerma S. Treatment of laryngeal cancer. A study of 638 cases. Acta Otolaryngol Suppl (Stockh) 1967; 225.

11. Yilmaz T, Hoşal S, Gedikoglu G, et al.: Prognostic significance of depth of invasion in cancer of the larynx. Laryngoscope 108 (5): 764-8, 1998.

12.Arsenijevic S, Pantovic V, Gledovic Z, Stojanovic J,Belic B. Demographic characteristics of patients with Laryngeal cancer and their socioeconomic status, JBUON 2010 Jan-Mar, 15 (1):131- 5

12. Kapil U, Singh P, Bahadur S, Dwivedi SN, Singh R, Shukla N. Assessment of risk factors in laryngeal cancer in India . Asian Pac cancer prev; 2005 Apri-Jun; 6 (2):202-7

13. Groorne PA, Schulze KM, Keller S, Mackillop WJ, O'Sullivan B, Irish JC et al. explaining socioeconomic status effects in laryngeal cancer. Clin Oncol (R coll Radiol), 2006 May, 13(4); 283-92

14. De Stefani E, Orregia F, Ruero S, Ronco A, Fierro L. Salted meat consumption and the risk of laryngeal cancer. Eur J. Epidemiol, 1995 April, 11(2): 177-80

15. Mousavi MR, Damghani MA, Haghdoust AA, Kharnesipour A. Opium and risk factors of laryngeal cancer. Laryngoscope .2003 Nov; 113(11):1939-43

16. Vaezi MF, Qadeer MA, Lopez R, Colabianchi N. Laryngeal cancer and gastroesophageal reflux disease. AM J Med 2006 Sep; 119 (9):768-76

17. R Pacella-Norman, M I Urban and V Beral. Risk factors for esophageal, lung, oral and laryngeal cancer in black South Africa. British Journal of Cancer 2002 June 5; 86(11): 1751-1756

18. Gathere S, Mutuma G,Kovir A and Musibi A. Head and neck cancer four year trend at Nairobi cancer registry 2000-2003.

19. Edefonti V, Brari F, Garavello W, La Vecchia et al. Nutrient based dietary patterns and laryngeal cancer incidence from an exploratory analysis. Cancer Epidemiol Biomarkers Prev, 2010 Jan; 19(1); 18-27

20. Hassani Latifi, Peyman Mikaili, Kaveh Latifi, Hassan Torbati. Squamous cell carcinoma of larynx in Northwest Iran. European Journal of Experimental Biology, 2012, 2 (1):242-246

21. Decision making in radiation Oncology by L.W.Brady,M. Molls, C.Nieder and H.P.Heilman.

22. ED Kitcher, J Yarney, RK Gyasi, and C Cheyuo. Laryngeal Cancer at the Korle Bu Teaching Hospital Accra Ghana.Ghana Med J. Jun 2006; 40(2): 45–49.

23. Hashibe M, Brennan P, Chuang SC. Interaction between tobacco and alcohol use and the risk of head and neck cancer: pooled analysis in the International Head and Neck Cancer Epidemiology Consortium. Cancer Epidemiol Biomarkers Prev. 2009 Feb; 18(2):541-50. doi: 10.1158/1055-9965.EPI-08-0347. Epub 2009 Feb 3

24. Pelucchi C, Gallus S, Garavello W, Bosetti C, La Vecchia C. Alcohol and tobacco use, and cancer risk for upper aerodigestive tract and liver. Eur J Cancer Prev. 2008 Aug; 17(4):340-4.

25. Owen Pyeko Menach,[1,2] Asmeeta Patel,[2] and Herbert Ouma Oburra. Demography and Histologic Pattern of Laryngeal Squamous Cell Carcinoma in Kenya. International Journal of Otolaryngology Volume 2014 (2014), Article ID 507189, 7 pages

26. Cancer: Principles and Practice of Oncology 6th edition (July 2001): by Vincent T. Devita (Editor), Samuel Hellman, Steven A. Rosenberg (Editor) By Lippincott Williams & Wilkins Publishers

APPENDIX

Appendix I : Data Extraction Form

1. Patients initials …….

2. Registration No……

3. Serial No……

4. Sex
   i. Male
   ii. Female

5. Age (years)…..

6. Highest formal education achieved.
   i. none
   ii. primary school
   iii. secondary school
   iv. post-secondary

7. Any history of
   i. smoking cigarette alone
   ii. Alcohol consumption alone
   iii. tobacco chewing
   iv. Alcohol and cigarette smoking

27. Any history of
   i. Hoarse voice
   ii. Sore throat for more than 6 weeks
   iii. Trouble in swallowing for more than 6 weeks
   iv. Lump in the neck

28. Diagnostic investigation done before treatment
   i. Biopsy
   ii. Laryngoscopy

29. Findings of diagnostic investigation done in question 9

…….....

11. Disease stage:

i. One
ii. Two
iii. Three
iv. Four

12. Site of the disease:

i. Supraglottis
ii. Glottis
iii. Subglottis

13. Histology type .....

14. Treatment Modalities:

i. Chemotherapy followed by Radiotherapy
ii. Surgery followed by Radiotherapy
iii. Surgery followed by Chemotherapy and Radiotherapy
iv. Only Radiotherapy
v. Only Chemotherapy.

15. Post-treatment outcome

i. Complete remission
ii. Persistent disease
iv. Relapse
v. Death