CLINICAL CHARACTERISTICS, ETIOLOGIES, AND FACTORS ASSOCIATED WITH ETIOLOGIES OF HOARSENESS OF VOICE AMONG PATIENTS ATTENDING MUHIMBILI NATIONAL HOSPITAL

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By

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Dissertation Submitted in (Partial) Fulfilment of the Requirements for the Degree of Master of Medicine (Otorhinolaryngology) of Muhimbili University of Health and Allied Sciences

October, 2024

CERTIFICATION

The undersigned, certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation titled: **"Clinical characteristics, etiologies, and factors associated with etiologies of hoarseness of voice among patients attending Muhimbili national hospital",** in (partial) fulfillment of the requirements for degree of the Master of Medicine (Otorhinolaryngology) of Muhimbili University of Health and Allied Sciences.

_____

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Date:_____

DECLARATION AND COPYRIGHT

I, **Fatuma Yusuph Msuya**, declare that this **dissertation** is my original work and has not been presented and will not be presented to any other Higher Learning Institution for a similar or any other degree award.

Signature: …….. **Date:** …….

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To my fellow postgraduates.

With heartfelt gratitude

DEDICATION

I am dedicated to my pillar of strength, my beloved mother whose unwavering support with guiding light throughout this journey. To my cherished son, friends whose laughter and presence have brought joy to even the most challenging days. To my ever-inspiring brothers and sister, whose wisdom and encouragement have been constant sources of motivation, your trust and contribution have been invaluable in advancing our understanding. This dissertation is a tribute to the love, sacrifice, and encouragement of my dear family, and the collaborative spirit of those who make progress possible."

ABSTRACT

Background: Worldwide, hoarseness can affect people of various ages and genders. Identifying hoarseness causes involves gathering a comprehensive medical history of events leading to its onset and conducting a meticulous physical assessment. The latter could entail visualizing the vocal cords, potentially using techniques such as indirect laryngoscopy or flexible nasopharyngolaryngoscopy.

Objectives: This study aims was to assess the clinical characteristics, etiologies, and factors associated with etiologies of hoarseness of voice among patients attending Muhimbili National Hospital.

Materials and Methods: A cross-sectional study was conducted at MNH from September 2023 to April 2024. After obtaining ethical clearance from IRB under Muhimbili University of Health and Allied Science. The data were collected and analyzed using SPSS version 27. Patients' demography, clinical characteristics, and etiologies were reported using descriptive statistics. Chi-square ($\chi 2$) tests were used to examine associations between risk factors and etiologies as a factor associated with hoarseness of voice.

Results: The study involved 171 patients at the ENT clinic, with a median age of 50 years (IQR;3,80). The male-to-female ratio was 1.14:1, smoking was reported in 40.9% while 31.6% consumed alcohol. Clinically, patients commonly experienced chronic cough (38.6%) and Globus sensation (64.3%). Laryngeal examination revealed fungating masses in 49.1% of cases and vocal cord papilloma in 17.5%. Significant associations were found between smoking, alcohol consumption, and laryngeal malignancies, with 87.1% of smokers and 85.2% of alcohol users affected (p=0.001). Neck surgery and intubation were linked to vocal cord paralysis (p=0.001).

Conclusion: The study found that hoarseness of voice in patients was significantly associated with smoking, alcohol consumption, and certain medical histories like neck surgery and intubation. Most cases were linked to laryngeal malignancies, with notable laryngeal abnormalities observed. These findings highlight the importance of targeted interventions for high-risk groups.

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LIST OF ABBREVIATION

ENT	Ear, nose, and throat
MNH	Muhimbili national hospital
ORL	Otorhinolaryngology
MUHAS	Muhimbili university of health and allied science
LPR	Laryngopharyngeal reflux
GERD	Gastro-esophageal reflux
HOV	Hoarseness of voice
SPSS	Statistical program software for social sciences

DEFINITION OF KEY TERMS

Hoarseness of voice means a change in normal voice quality, roughness, voice breaks, or change in pitch of voice which can either be acute or chronic.

Acute laryngitis means inflammation of the larynx (voice box) from overuse, irritation, or due to infection which lasts for less than 2 weeks.

Chronic laryngitis is inflammation of the voice box (larynx) when the signs and symptoms persist for more than 2weeks.

Reinke's edema is the swelling of the vocal fold due to fluid collection in the superficial lamina propria of vocal folds.

Laryngoscopy is a medical procedure that is used for visualization of the larynx.

Dysphonia is used to describe any impairment of the voice, alteration in the sound, restriction of vocal performance, or strained vocalization.

Laryngeal pharyngeal reflux disease is symptoms, signs, and tissue abnormalities of the pharynx, larynx, and other associated respiratory organs resulting from damage caused by gastric/duodenal contents into the upper aerodigestive tract.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Study

Hoarseness of voice is not an independent condition but a symptom characterized by changes in vocal quality, often manifesting as a rough, rasping, or grating sound with a lower pitch and a dissonant tone (1,2). This altered vocal quality stems from a combination of unvoiced air and fricative sounds originating in the larynx. The underlying causes may include inadequate vocal cord closure, abnormal size, stiffness, or irregular vibrational patterns (3,4). Hoarseness of voice (HOV) can be classified as acute or chronic. Acute cases are common and often linked to inflammation (e.g., laryngitis), viral infections, smoking, vocal overuse, trauma, or thyroid surgery. Though viral infections are the primary cause, bacteria like *Moraxella catarrhalis*, *Hemophilus influenzae*, and *Streptococcus pneumoniae* have also been found in adults with acute laryngitis (5–7). Hoarseness from an upper respiratory infection often includes symptoms like rhinorrhea, cough, and mild throat discomfort. Persistent hoarseness, however, is typically linked to vocal cord nodules, cysts, polyps, laryngeal papillomatosis, malignancy, laryngopharyngeal reflux, thyroid and esophageal disorders, or chronic conditions like tuberculosis, syphilis, and systemic diseases such as diabetes (7,8). Prolonged hoarseness complaints could indicate a significant underlying condition, warranting careful attention and not to be disregarded (4).

Globally, HOV has the potential to impact individuals across all age groups and genders, exhibiting a prevalence of roughly 29.9%. Moreover, its occurrence is heightened within the realm of professional voice users, notably among vocations like singers and teachers (9,10). Progressive weakening of upper and/or lower motor neurons often affects the laryngopharyngeal complex, causing dysphagia, aspiration, dysphonia, and vocal fold paralysis. Around 25% of amyotrophic lateral sclerosis patients initially report voice or other ear, nose, and throat symptoms (11,12). Individuals afflicted by myasthenia gravis might experience variable hoarseness, occasionally accompanied by difficulties in swallowing and the presence of stridor (13). Though not fully definitive, diverse voice traits may link to the vocal issue's roots. The physical assessment should involve checking the ears, upper airway, oral cavity (including tongue motion), cranial nerves, and breathing (2).

Persistent irritation of the mucosal lining due to heavy smoking, excessive alcohol intake, and tobacco use significantly contributes to the origin of hoarseness in Asian nations (14). Within the African context, research conducted at the University of Benin highlighted a higher occurrence of hoarseness among males but affects individuals of all age groups (15). East African studies regarding HOV are scarce; however, a study at Muhimbili University indicated a total occurrence rate of 15.2%, with a higher proportion among males. (16). Precise hoarseness causes identification is vital for improved communication and quality of life. Limited Tanzanian studies hamper understanding of origins, risk factors, and exam outcomes, impeding prevention and treatment.

1.2 Problem Statement

Hoarseness, a common symptom with diverse causes like vocal cord nodules, infections, and lifestyle factors, impacts communication and well-being. Various studies have discussed the clinicopathological profiles of HOV. However, understanding risk indicators and clinical traits of hoarseness in Tanzanian practice is limited, hindering tailored diagnostics and treatments. The current approaches based on previous studies from other countries may not suit Tanzania's unique factors based on our setting, and diverse hoarseness presentations at the hospital pose diagnostic and treatment challenges. Bridging these gaps requires an essential study of hoarseness within this hospital context. This study aims at assessing the clinical characteristics, etiologies, and factors associated with etiologies of HOV among patients attending Muhimbili National Hospital.

1.3 Conceptual framework

It is hypothesized that factors associated with HOV, such as smoking cigarettes, alcohol consumption, neck surgery, intubation, and voice user, such as singing or teaching, might show distinct hoarseness patterns, and may contribute to the development of hoarseness. All these falls under the factors associated with HOV. Etiologies like cancer of the larynx, vocal cord polyps, vocal cord nodules, laryngeal papilloma, and vocal cord paralysis may directly contribute to the development of hoarseness. These factors are interconnected, potentially influencing each other's effects on hoarseness.

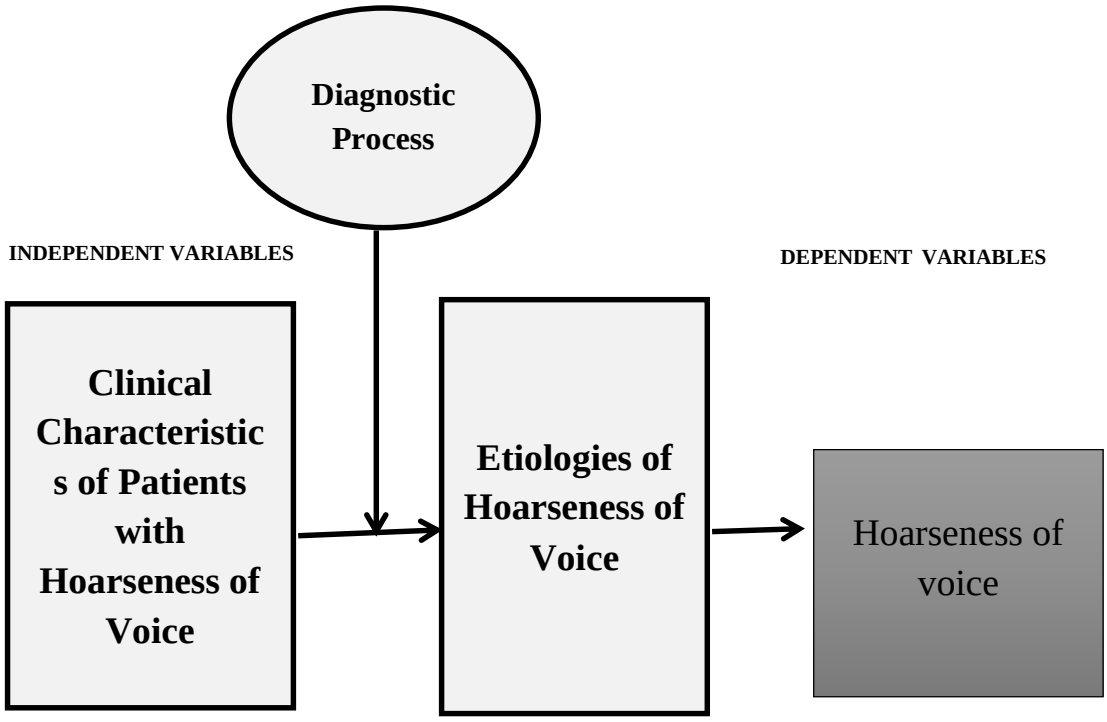


Figure 1: Conceptual framework

1.4 Rationale of the Study

The results of this study will lead to the creation of foundational information, encompassing risk factors, laryngoscopy findings, and etiologies for all HOV cases seen at the Otorhinolaryngology department. Scarce local studies specific to hoarseness in the Tanzanian population hinder the development of contextually relevant prevention strategies and treatment approaches.

By identifying risk factors and clinical characteristics associated with hoarseness, the study may have broader implications for public health initiatives, early detection, and improved referral systems, ultimately benefiting the community's health and well-being.

Furthermore, this academic research is a mandatory component for the partial fulfillment of a Master of Medicine degree in Otorhinolaryngology at Muhimbili University of Health and Allied Sciences (MUHAS).

1.5 Research Questions

1.5.1 Overall Research Question

What are the clinical characteristics, etiologies, and factors associated with etiologies of hoarseness of voice among patients attending Muhimbili National Hospital (MNH)?

1.5.2 Specific Research Questions

1. What are the clinical characteristics of patient with hoarseness of voice among patients attending MNH
2. What are the etiologies of hoarseness of voice among patients attending the MNH?
3. What are the factors associated with etiologies of hoarseness of voice among patients attending MNH?

1.6 Objectives of the Study

1.6.1 Broad Objective

To determine the clinical characteristics, etiologies, and factors associated with etiologies of hoarseness of voice among patients attending Muhimbili National Hospital (MNH).

1.6.2 Specific Objectives

1. To determine the clinical characteristics of patients with hoarseness of voice among patients attending MNH
2. To determine etiologies of hoarseness of voice among patients attending the MNH.
3. To determine the factors associated with etiologies of hoarseness of voice among patients attending MNH

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Clinical Characteristics of Patients with HOV

Several studies have explored the typical age at which HOV frequently appears in patients, considering various risk factors and causes. In Indian research conducted by Vaishnav et al., most instances were noted in the fourth decade, with the subsequent occurrence in the sixth decade. Conversely, Soni et al. discovered a higher prevalence of hoarseness in males compared to females. Most patients had been experiencing hoarseness for 3–6 months, while a smaller number had been afflicted for over a year (4). Similarly, Sheth et al., found that the majority of patients with hoarseness of voice were male. Hoarseness affects individuals of all age groups, which was demonstrated in their findings (15). Similarly, a Nigeria study demonstrated male predominance with the majority of patients attending hospital after more than 20 months since the presentation of symptoms (17). East African studies regarding HOV are scarce. However, a study at Muhimbili University indicated a total occurrence rate of 15.2%, with a higher proportion among males. The age group above 60 years exhibited the highest level of impact (16).

Deosthale et al., additional symptoms accompanying hoarseness of voice included cough, discomfort while swallowing, fever, loss of weight, challenges with swallowing, vocal exhaustion, swelling in the neck, and breathing difficulties (18). Consistent research in both Tanzania and Nigeria has indicated that the presence of edema, erythema/ hyperemia ventricular hypertrophy, vocal cord nodule, vocal cord polyp, laryngeal papilloma , formation of granulation tissue or granulomas, and the presence of thick mucus are indicative signs pointing toward laryngopharyngeal reflux (7,15).

2.2 Etiology of hoarseness of voice

The reviewed studies collectively provide insights into a diverse spectrum of vocal pathologies that cause hoarseness. Banjara et al.'s study encompassed a wide array of vocal pathologies, with nodules, paralysis, cancer, chronic laryngitis, cysts, edema, acute laryngitis, bowing, polyps, and abductor paralysis following in descending order of occurrence (19). Similarly, Vaishnav et al.'s research underscored vocal nodules as a

common laryngoscopy finding in hoarseness cases. Their study further highlighted occurrences of laryngeal carcinoma, vocal cord paralysis, acute laryngitis, hypothyroidism, and Reinke's edema(20). Adding to this, Kumar et al. identified laryngeal papillomatosis, muscle tension dysphonia, dysphonia plicae ventricular is, and intubation granuloma as notable findings(21). Furthermore, a study conducted by Amusathe et al. in Nigeria shed light on the temporal presentation of glottic tumors compared to supraglottic ones. Hoarseness, the initial symptom, was present in all patients about 9-10 months before respiratory obstruction, suggesting early vocal cord involvement. They proposed that the carcinoma could initially arise in the glottis, eventually spreading to a trans-glottic stage due to delayed intervention (22).

2.3 Factors Associated with etiologies of hoarseness of voice

In the study conducted by Pal et al., Cigarette smoking and upper respiratory infections (URIs) emerged as prevalent predisposing elements for hoarseness. Following in decreasing order were alcohol consumption, tobacco chewing, vocal strain, endotracheal tube intubation, thyroidectomy, and neck trauma. In certain cases, no discernible predisposing factor was identified, while a subset of patients exhibited multiple contributing factors (8). Similarly, in a study conducted by Banjara et al. (19), the most prevalent behaviors identified were smoking, succeeded by vocal strain, alcohol consumption, and tobacco mastication. In a different study, the occurrence of hoarseness was observed to be affected by smoking, the use of tobacco products, and alcohol consumption (23).

Persistent mucosal irritation due to smoking, alcohol, and tobacco in Asian countries is tied to hoarseness. In nations like India, factors such as low socio-economic status, poor nutrition, compromised health, distinct habits, and cultural practices affect hoarseness (24).

On the other hand, research carried out at the University of Benin brought to light the prevalence of tobacco consumption within the examined group. Interestingly, alcohol usage was slightly more pronounced, with a majority identifying as occasional or social alcohol consumers. Both alcohol and tobacco are acknowledged as contributing factors to laryngeal carcinoma. Studies have also revealed that laryngopharyngeal reflux disease frequently gives rise to hoarseness, although it frequently goes unnoticed (7,17). Overall, these studies collectively contribute to a deeper understanding of the multifaceted factors and contribution to the literature from Tanzanian studies is important.

A U.S. study found that dysphonia due to acute laryngitis is primarily linked to infections in the throat and/or larynx, including viruses, bacteria, and fungi. Foreign bodies in the larynx, and trachea, were also identified. Notably, symptoms associated with viral laryngitis commonly persist for a duration of 1 to 3 weeks before spontaneously resolving (25). Similarly, Vengala et al.'s study revealed that the prevalent causes of voice changes encompass acute laryngitis, chronic laryngitis, and vocal nodules (26).

Research conducted within the continent has consistently highlighted the under-recognized prevalence of laryngopharyngeal reflux disease and gastroesophageal reflux as a prominent contributor to hoarseness (17,22). Notably, Massawe and colleagues' study emphasized the significant occurrence of laryngopharyngeal reflux disease among individuals seeking Otorhinolaryngology services at MNH, shedding light on the substantial impact of this condition on the local population's vocal health (7).

Various neurological conditions like stroke, multiple sclerosis, and Parkinson's disease, along with other systemic disorders including diabetes, and hypertension, contribute to the spectrum of medical conditions associated with voice-related issues.

CHAPTER THREE
3.0 MATERIALS AND METHODS

3.1 Study and Design

A hospital-based cross-sectional study assessing clinical characteristics, etiologies and factors associated with etiologies of HOV among patients attending MNH from September 2023 to April 2024.

3.2 Study Area

The research took place within the Otorhinolaryngology Department of MNH. This department comprises three wards, each with a capacity of 50 beds, and operates a six-day outpatient clinic weekly, attending to an estimated 250 patients. Monthly admissions amount to around 129 patients, encompassing a variety of ear, nose, and throat ailments, including head and neck tumors. MNH was been selected as the study site due to its suitability in terms of participant availability, favorable scheduling, and the presence of adequate resources to ensure the timely completion of the study.

3.3 Target Population

Patients of diverse age ranges, genders, and backgrounds who arrive at ENT department at MNH to seek medical assistance exclusively for issues related to HOV.

3.4 Sample Size Estimation

Referring to a previous study at MNH by Dr. Ndasica et al., which found a hoarseness prevalence of 15.2% among patients receiving ORL care, this figure guided the calculation of our current study's sample size. (11)

The formula for calculating the sample size for a given population with a known prevalence is:

$$n = \frac{Z^2 P(100-P)}{E^2}$$

Where:

n = required sample size

Z = Z-score corresponding to the desired confidence level (for a 95% confidence level, Z-score is approximately 1.96)

P = estimated prevalence (as a decimal, so 15.2% becomes 0.152)

E = marginal error (as a decimal, so 5% becomes 0.05)

Substituting the values:

n =

n = 157.26 ≈157

Considering a non-response in this study, the adjusted sample size was calculated using the following formula:

$$N = \frac{n}{1-r}$$

Where:

N = adjusted sample size

N = calculated sample size without considering non-response

r = expected non-response rate

Since a non-response rate of 10% (0.10) was expected, then the adjusted sample size was 176 considering a non-response. (11)

3.5 Sampling Technique

The study employed a non-probability convenience sampling technique, whereby participants were consecutively selected until the predetermined sample size was reached. This approach was chosen due to constraints in time and resources for data collection. All patients presenting with hoarseness of voice during the data collection period at the clinics were invited to participate and provide informed consent.

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion Criteria

All patients experiencing HOV and attending ENT department at MNH with in the designated study period, and who willingly agreed to participate, were enrolled in the study.

3.6.2 Exclusion Criteria

i. Individuals with hoarseness of voice who were in a weakened state and unable to understand the questionnaire.

ii. Patients who have undergone laryngectomy, or have tumors in the oropharyngeal and hypopharyngeal regions that obstruct the larynx.

3.7 Study Variables

A: Independent variables

I. Patients' Demographic Profile: This includes age, sex, residence, symptom duration, and occupation.

II. Risk factors
   a) Smoking
   b) Alcohol
   c) Tobacco chewing
   d) Vocal abuse
   e) Neck surgery
   f) Intubation

III. Laryngoscopy Findings
   a) Erythema/hyperemia
   b) Vocal cord edema
   c) Posterior commissure hypertrophy
   d) Ventricular obstruction
   e) Cobblestone
   f) Papilloma
   g) Fungating mass
   h) Vocal Cord Nodules
   i) Vocal cord cyst
   j) Vocal Cord Polyps
   k) Granuloma

IV. Etiologies
   a) Vocal cord polyp

b) Vocal Cord Nodules
c) Vocal cord cyst
d) Granuloma
e) Papilloma
f) LPRD
g) Vocal cord paralysis
h) Laryngeal malignancy

B: Dependent variables: Hoarseness of voice

3.8 Data Collection Methods

Data were collected from patients presenting with HOV at the ENT OPD of MNH during the specified study. Approaching each eligible participant, the purpose of the study, potential risks, benefits, and confidentiality measures were thoroughly explained. Informed consent was obtained from those willing to participate. A structured questionnaire was administered to collect relevant data. The questionnaire covered demographic information and medical history. A thorough symptomatology assessment encompassed inquiries about symptoms such as globus sensation, chronic cough, sore throat, choking, painful swallowing, difficulty swallowing, bitter saliva, post-nasal drip, abdominal pain, and halitosis. Additionally, previous history of neck surgery, intubation, alcohol drinking, smoking cigarettes, and professional voice user. Detailed evaluations of the nose, oral cavity, nasopharynx, and ears were carried out. Additionally, indirect laryngoscopy examinations were conducted to directly observe the laryngeal structures, aiding in the identification of observable anomalies such as lesions, nodules, growths, or other abnormalities, laryngoscopy finding was used to identify the etiology like vocal cord poly, vocal cord cyst, vocal cord nodule, laryngeal papilloma, laryngeal malignant, vocal cord paralysis and LPRD and those shows to have laryngeal lesion biopsy was taken for diagnosis of laryngeal malignancy.

3.8.1 Recruitment and Training of Research Assistants

To streamline data collection, the study enlisted the services of two research assistants possessing medical expertise, a solid command of spoken and written English and Swahili languages, exceptional communication proficiencies, and adept research capabilities. A day's session regarding the project was conducted. Research assistants received a detailed orientation to the study, its objectives, rationale, and expected outcomes. They understood

the significance of the research in the context of HOV and its implications for patient care. A thorough understanding of ethical principles, patient confidentiality, and informed consent procedures were provided. Research assistants were trained to ensure that all interactions with patients were conducted with the highest ethical standards. They received intensive training on the data collection instruments, including the questionnaire and examination protocols, however, we residents and specialists did laryngoscopy and researchers relied on documented findings.

3.8.2 Investigation Tools, validity, and Reliability

To evaluate the credibility and consistency of the research instrument, a subset of patients from the ENT department participated. A preliminary testing stage entailed administering the survey to 10 individuals. The feedback received during the trial run was analyzed to assess the precision and internal coherence of the queries. Any discrepancies were identified and prompted necessary modifications to the tool.

3.9 Data Processing and Analysis

3.9.1 Data Management

Unique codes were assigned to each patient to ensure data confidentiality. Variables will be consistently and accurately encoded to enhance the efficiency of data analysis. Thorough data cleaning was carried out to identify and correct any errors, missing values, outliers, or inconsistencies present in the dataset. A dedicated spreadsheet was created to serve as the repository for the collected data, followed by a comprehensive data cleansing process. Following this, the data was subjected to analysis using SPSS version 27.

3.9.2 Data Analysis Plan

Categorical variables including age group, gender, symptoms, signs, etiology, and occupation were analyzed to determine frequency. For continuous variables like age and symptom duration, measures of central tendency and variability were computed to summarize the statistics. The findings were visually depicted using cross-tabulations to represent the results.

Objective I:

The social demographic findings and laryngoscopy findings using descriptive statistics were summarized.

Objective II:

Descriptive statistics were employed to summarize the etiologies of HOV among the study population.

Objective III:

Potential risk factors associated with the etiology of HOV were explored using the Chi-square ($\chi 2$) test.

3.10 Ethical Clearance

Before commencing this study, ethical approval was sought from the Institutional Review Board (IRB) of MUHAS. Additionally, the researcher secured authorization from the relevant authorities at MNH to gather data. To ensure data privacy, no patient names were recorded in the data collection tool. The collected data was treated with utmost confidentiality by the principal investigator, and participants were not be subjected to any harm. The research was conducted with utmost integrity, honesty, and transparency. Participants received verbal information about the study and were invited to take part voluntarily. Only participants who provided written consent were included in the study. All information and findings were securely stored in a safe place during the data collection process.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics of hoarseness of voice

A total of one hundred and seventy-one (171) patients attending otorhinolaryngology clinic at Muhimbili National Hospital were involved in the study. The median age was 50 (3-80) years, with majority of the study participants were older than 56 years of age. Also, this study revealed a Male: Female ratio of (1.4:1).

Table 1: Demographic profile of patients with hoarseness of Voice, N = 171

Variable	Value(s)	Percent
Age, median (range)	50 (3-80) years	
Age groups (years)		
< 16	22	12.9
16 – 25	11	6.4
26 – 35	22	12.9
36 – 45	19	11.1
46 – 55	28	16.4
56+	69	40.4
Gender		
Male	101	59.1
Female	70	40.9

Approximately 40.9% of participants reported cigarette smoking, while tobacco chewing was rare (1.2%). Alcohol consumption was reported by 31.6% of participants. Small percentages report a history of neck surgery (4.1%) as shown in table 2.

Table 2: Risk factors among patients with hoarseness of Voice, N = 171

Variable	Value	Percent
Cigarette smoking		
Yes	70	40.9
No	101	59.1
Tobacco chewing		
Yes	2	1.2
No	169	98.8
Alcohol consumption		
Yes	54	31.6
No	117	68.4
History of neck surgery		
Yes	7	4.1
No	164	95.9
History of intubation		
Yes	13	7.6
No	158	92.4

4.2 Clinical characteristics of patients with hoarseness of voice

This study found out that; Symptom duration ranges from 2 to 43 days with majority complaining of Globus sensation, chronic cough and sore throat 64.3% 38.6% and 31.6% respectively while difficult swallowing (11.7%), and heartburn (5.3%) were the least reported complaints.

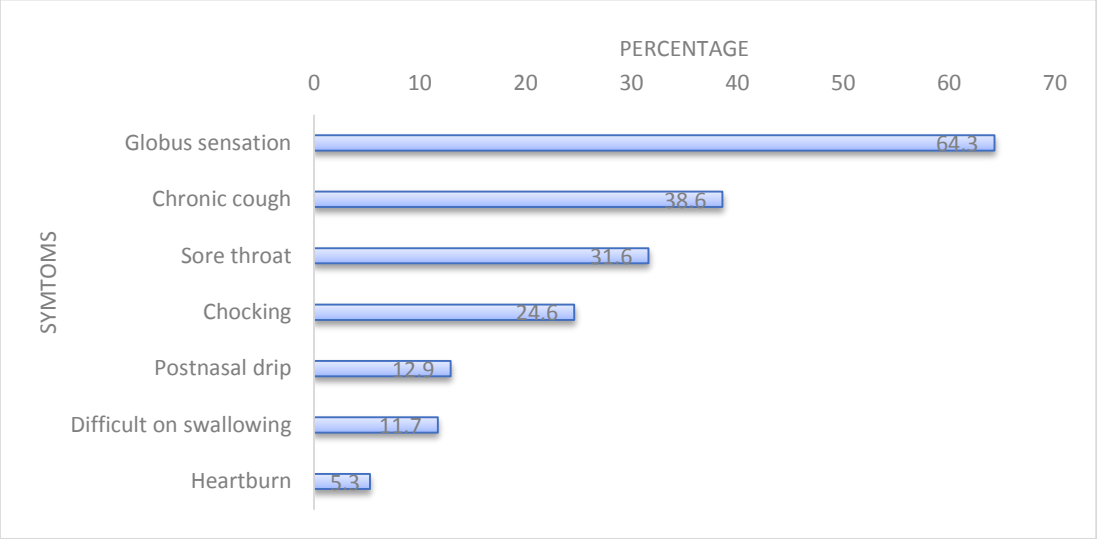


Figure 2: Symptoms accompanying hoarseness of voice

4.3 Endoscopic findings among patients with hoarseness of voice

The most observed endoscopic finding was fungating mass in approximately 49.1 % of participants followed by erythema/hyperemia 19.9% and the least posterior commissure hypertrophy 4.7%

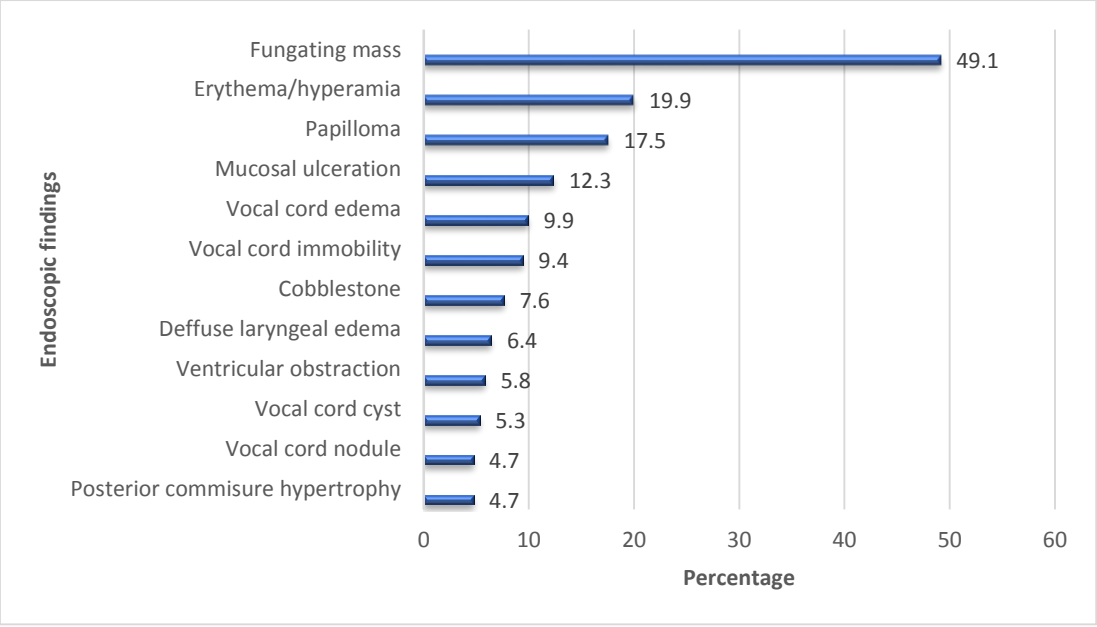


Figure 3: Endoscopy findings among patients with hoarseness of voice

4.4 Causes of hoarseness among patients attending otorhinolaryngology clinic

This study found majority of patients with hoarseness of voice had laryngeal cancer 52.0% followed by laryngeal papilloma and laryngeal pharyngeal reflux disease with 18.1% and 15.8% respectively while the least cause of hoarseness was vocal cord polyps and cyst accounting for 2.3% and 2.9% respectively (figure 3)

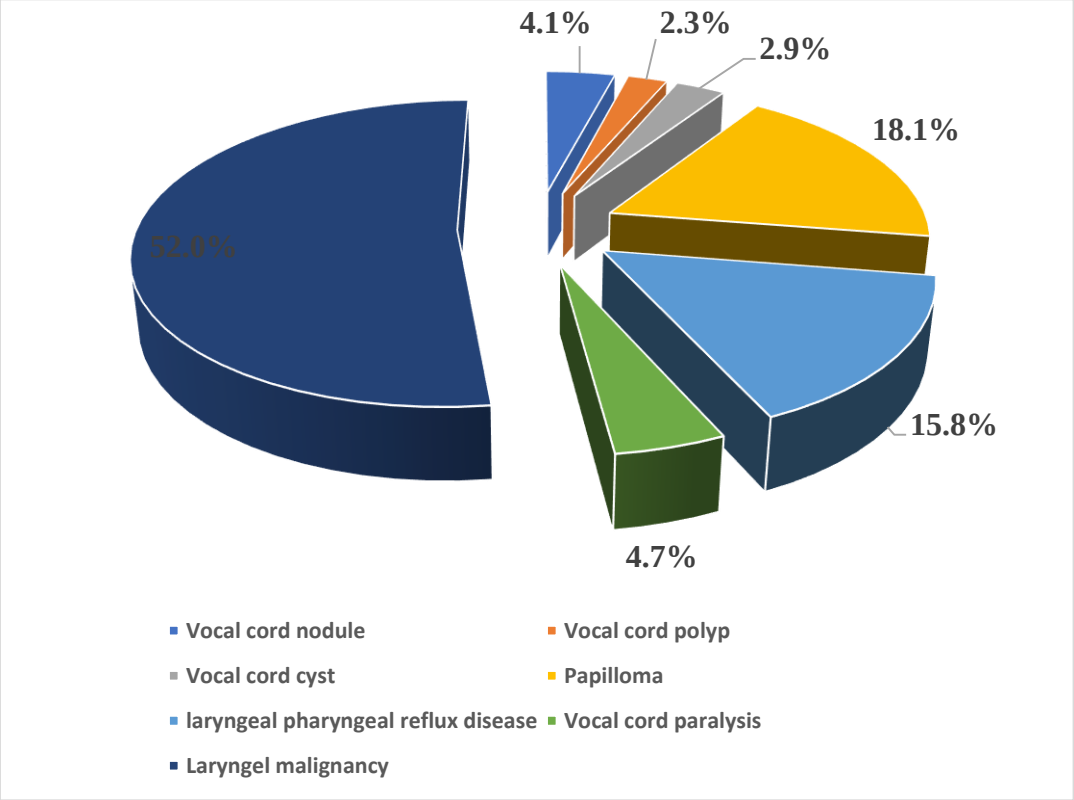


Figure 4: Demonstration of causes of hoarseness

4.5 Factors associated with the etiology of hoarseness of voice

The data reveals significant associations between various risk factors and the etiology of hoarseness of voice. Cigarette smoking and alcohol consumption are strongly linked to laryngeal malignancy, with 87.1% of smokers and 85.2% of alcohol consumers affected (p=0.001 for both). At the same time, they are inversely associated with benign conditions (p=0.001) and laryngopharyngeal reflux disease (LPRD) (p=0.010 and p=0.013, respectively). No smokers had vocal cord paralysis (p=0.022). Neck surgery and intubation show significant associations with vocal cord paralysis (p=0.001 for both), highlighting these medical histories as risk factors. On the other hand, being a professional voice user is

not significantly associated with any of the examined etiologies, suggesting that vocal strain alone does not predominantly influence these conditions.

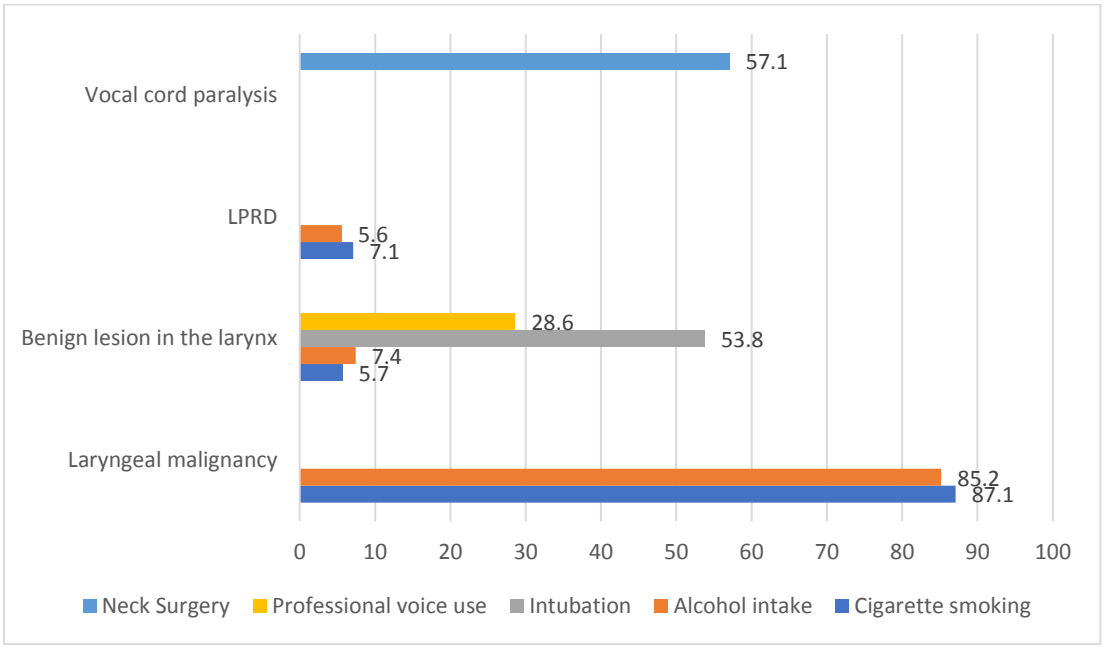


Figure 5: Factors associated with the etiology of hoarseness of voice

CHAPTER FIVE

5.0 DISCUSSION AND LIMITATIONS

5.1 Discussion

The findings from this study indicate that the majority of the participants were older than 56 years, reflecting an older patient population in this clinical setting. The Male ratio of 1.4:1 suggests a slight predominance of males, which is consistent with some epidemiological patterns seen in conditions associated with hoarseness or ENT pathologies as demonstrated by studies conducted in India, Benin, Nigeria, and Tanzania (4,15,16,18) Lifestyle factors such as cigarette smoking and alcohol consumption were prevalent in the study participants, with 40.9% of participants reporting cigarette smoking. This is a significant proportion and could point to a potential risk factor for voice disorders and other otorhinolaryngological issues, given the known adverse effects of smoking on the respiratory and vocal systems. However, tobacco chewing was rare (1.2%), suggesting that other forms of tobacco use are not as common in this population. Additionally, alcohol consumption was reported by 31.6% of the participants, which might also contribute to otorhinolaryngological symptoms or disorders. A history of neck surgery was less common, noted in only 4.1% of participants, which may imply that post-surgical complications affecting the voice are not widespread within this group. These demographic and lifestyle characteristics help to contextualize the clinical patterns and potential etiological factors related to the patients' complaints of hoarseness of voice, as outlined in the broader scope of your study.

Similar findings have been shown in the survey by Vivek et al, India (27). However, dissimilar findings have been demonstrated in a study by Sheth et al in India which showed majority of participants were in the fourth decade (1). The observed differences may be due to differences in culture of the study participants. Indians prefer spicy foods and have voice-overuse habits (3,14,20). This may contribute to the earlier presentation of hoarseness of voice than in our study population.

Furthermore, the study found that symptom duration ranged from 2 to 43 days, with the most common complaints being globus sensation (64.3%), chronic cough (38.6%), and sore throat (31.6%). Less frequently reported were difficulty swallowing (11.7%) and heartburn (5.3%).

These findings highlight that globus sensation, cough, and sore throat are the primary presenting symptoms, while swallowing issues and heartburn are less common, suggesting that while GERD may contribute to voice disorders, it is not a predominant factor in this patient group. In contrast, Vaishnav et al (20). reported a hoarseness duration spanning from 7 days to more than 3 years, while Soni et al (4). observed durations of 3-6 months, with some cases exceeding a year. The longer symptom duration in these studies might suggest delayed medical consultation or chronic conditions among their participants (4,20).

The majority of patients with hoarseness of voice had laryngeal cancer 52.0% followed by laryngeal papilloma and laryngeal pharyngeal reflux disease at 18.1% and 15.8% respectively. In comparison, the least cause of hoarseness was vocal cord polyps and cysts accounting for 2.3% and 2.9% respectively, similar findings have been reported by Vivek et al in their study on changing trends of hoarseness of voice (27) however Vaishnav et al. and Banjara et al. (India) are reported dissimilar findings with vocal nodules and polyps being the most common (19,20). The observed differences may be due to excluding patients with laryngeal and malignancy in the previous studies.

Notably, the findings from this study reveal a diverse range of etiologies for hoarseness of voice, with laryngeal malignancy being the predominant cause, accounting for 52.0% of cases. This emphasizes the critical role of hoarseness in the early diagnosis and treatment of laryngeal cancer, especially in patients with risk factors like cigarette smoking and alcohol consumption. The study also highlights a strong association ($p = 0.001$) between smoking (87.1%) and alcohol use (85.2%) with hoarseness of voice, reinforcing the need for targeted screening and prevention efforts in high-risk populations. These findings are similar to the study by Pal et al (25). and Banjara et al (19), who also identified smoking, alcohol consumption, and vocal strain as key risk factors for hoarseness of voice. Other studies from Asian countries linked persistent mucosal irritation due to smoking, alcohol, and tobacco use to the development of hoarseness, often compounded by socio-economic and cultural factors (1,4,18,23). Neck surgery is significantly associated with vocal cord paralysis, indicating that surgical, trauma, or procedural interventions in the neck area may increase the risk of this condition. However, this has not been well explored by other studies.

5.2 Limitations

The use of a cross-sectional design limits the ability to establish causality between risk factors and hoarseness. Additionally, the non-probability convenience sampling technique may introduce selection bias, affecting the generalizability of the findings. The study relies on self-reported data for risk factors such as smoking and alcohol consumption, which may be subject to recall bias or social desirability bias. Furthermore, the study's focus on patients attending a single hospital may not reflect the broader population's characteristics or risk factors associated with hoarseness.

CHAPTER SIX

6.0 CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

6.1 6.1 Conclusion

The clinical characteristics of hoarseness among patients at MNH showed a higher prevalence in males (59.1%) and older individuals, particularly those aged 56 and above. The leading cause of hoarseness was laryngeal cancer, affecting 52% of patients, with smoking and alcohol consumption being significantly associated with malignant etiologies. Non-malignant causes included laryngeal papilloma and laryngopharyngeal reflux disease. Factors such as cigarette smoking and alcohol consumption were linked to malignancy, while a history of neck surgery and intubation were significant risk factors for vocal cord paralysis.

6.2 Recommendations

Based on the study's findings, several recommendations can be made. Screening programs should be introduced, especially for high-risk groups such as older males, smokers, and alcohol consumers, to ensure early detection of conditions like laryngeal cancer. Future research should adopt longitudinal designs to better establish causal relationships between risk factors and hoarseness. To enhance the generalizability of the findings, studies should use probability-based sampling methods and include multiple hospitals to capture a more representative sample. Finally, incorporating objective methods to assess risk factors, such as biochemical verification for smoking and alcohol use, could help mitigate biases associated with self-reported data and improve the accuracy of risk factor evaluation.

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8.0 APPENDICES

8.1 Appendix I: Consent Form-English Version

MUHIMBILI UNIVERSITY HEALTH AND ALLIED SCIENCES

To be read and questions answered in a language in which the study subject is conversant (English or Kiswahili).

I am Dr. Fatuma Y. Msuya, currently pursuing a Master's degree in Otorhinolaryngology at Muhimbili University of Health and Allied Sciences. As part of my degree requirements, I am conducting a study focused on investigating clinical characteristics, etiologies, and risk factors associated with etiologies of individuals experiencing hoarseness of voice. The research will take place at the ENT department of Muhimbili National Hospital in Dar-es-Salaam. I would like to invite you to take part in this study. Before your involvement, I will provide you with a thorough explanation of the study's purpose and procedures. Feel free to ask any questions you may have. The primary objective of this research is to examine the various clinical characteristics and potential etiologies and factors associated with etiologies of hoarseness of voice among patients seeking care at the Otorhinolaryngology department of Muhimbili National Hospital in Dar-es-Salaam.

Declining to take part in the study will have no impact whatsoever on the healthcare services or benefits that you are entitled to receive. Once you have reviewed the provided information, please feel free to reach out if you have any queries or require further clarification. The assessment process, which will involve the use of a tool, is expected to take approximately 10 to 20 minutes of your time. It's important to note that there will be no intrusive procedures, such as blood drawing, involved in this assessment. Rest assured that all information gathered during this study will be treated as strictly confidential. To ensure anonymity, code numbers will be utilized for identification purposes instead of using your actual name. Your privacy and well-being are of utmost importance throughout this research.

Risks and benefits

Participation in this study poses no potential harm or adverse risks to the participants. While there won't be immediate personal benefits for you, it's important to highlight that the collective outcomes of the study will contribute to a broader understanding of the risk factors, laryngoscopy findings observations, and underlying causes of hoarseness of voice among patients who are seeking medical attention.

If you have, any questions related to this study or your health you can call me on my telephone number 0655675454 or my lead supervisors Dr. Kassim B. Mapodella and Dr. Wilybroad Massawe at the Department of Otorhinolaryngology, Muhimbili University Health, and Allied Sciences or you can also contact the chairperson of the Research Senate and Publication committee, Dr. Nahya Salim, telephone number 0713250074. P.O. Box 65001 Dar es Salaam.

I the undersigned do hereby volunteer to participate in this study. Nature and purpose have been fully explained to me. I understand that all the information obtained will be used for this study only.

Signed: _____ Date: _____

Witness Signature_____ Date_____

8.2 Appendix II: Consent form-Swahili version

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

Kusomwa na maswali kujibiwa kwa lugha ambayo mshiriki wa utafiti anaweza kuelewa (Kiingereza au Kiswahili)

Utangulizi:

Jina langu ni Dkt. Fatuma Y. Msuya, nafanya shahada ya uzamili ya udktari bingwa wa magonjwa ya Masikio, Pua na Koo katika Chuo cha Sayansi Shirikishi cha Muhimbili.

Tunafanyautafiti kuhusu kuchunguza viashiria hatarishi, visababishi na matokeo ya uchunguzi katika mfumo wa koo baina ya wa gonjwa wenye uchakato wa sauti wanaotibiwa katika hospitali ya taifa ya Muhimbili, Dar es salaam. Nitakupa maelezo na kukualika kushiriki katika utafiti huu, kabla ya kushiriki tutakupatia maelezo ya kutosha na iwapo kuna maneno hujaelewa vizuri unaweza kumwuliza daktari au muuguzi yeyote anayehusika na utafiti huu.

Lengo la utafiti huu: kutambua Dalili nyingine anazokuwa nazo mgonjwa,visababishi na kuangalia uhusiano kati vitu vinavyo hatarisha kubalika kwa sauti na visababishi kwa wagonjwa wenye uchakacho wa sauti kama sababu ya kutafuta tiba katika hospitali ya taifa ya Muhimbili, Dar es salaam.

Kushiriki kutahusisha nini: Iwapo utakubali kushiriki katika utafiti huu, tutakuuliza maswali binafsi na kuhusu uchakacho wa sauti na taarifa zingine tutatoa kwenye faili lako la hapa hospitali.

Kushiriki kwako ni kwa hiari na utapata huduma zote stahiki hata kama hutashiriki kwenye utafiti, pia iwapo utaamua kujitoa kwenye utafiti wewe/mwanao ataendelea kuhudumiwa vile vile.

Usiri wa taarifa: Taarifa zote zitakazopatikana katika utafiti huu zitabaki kuwa siri. Tutatumia namba ya hospitali nanamba ya utambulisho ya utafiti kwa ajili ya kuwatambua washiriki wa utafiti, hakuna majina ya takayotumika katika utafiti huu au katika machapisho yoyote ya kiutafiti yatakayotokana na utafiti huu hapo baadaye.

Madhara ya kushiriki: Kwa kushiriki kwenye utafiti huu hutapata madhara yeyote.

Je, nitalipwa kwa ushiriki?: Kushiriki kwenye utafiti ni hiari. Hakutakuwa na malipo kwa kushiriki kwako kwenye utafiti. Pia hautahitajika kulipia chochote ili uweze kushiriki katika utafiti.

Kama una maswali zaidi ambayo ungependa kuuliza kuhusiana na utafiti huu, tafadhali wasiliana na

MtafitiMkuu

FatumaY.Msuya-0655675454

Idara ya tiba ya Kinywa, pua na maskio

Chuo kikuucha afya Muhimbili,
Dr Nahya Salim,
Telephone number 0713250074.
P.O. Box 65001 Dar es Salaam.
Mwenyekiti wakamati ya utafiti na machapisho ya chuo
S.L.P. 65001 Dar es salaam, Tanzania
Tamko la ridhaa

Nimesoma yaliyomo kwenye fomu hii ya ridhaa, au nimesomewa yaliyomo kwenye fomu ya ridhaa. Maswali yangu yote yamejibiwa nanimepewa nakala ya fomu ya ridhaa. Ninakubali kwa hiari yangu mwenyewe shiriki katika utafiti huu

Sainiya mgonjwa/mlezi …….

Tarehe: …….

8.3 Appendix III: Questionnaire-English version.

PARTICIPANT ID……

1. Age ……..
2. Registration no……..
3. Gander of the study participant
    1. Male
    2. Female
4. Occupation
    1. Teacher
    2. Preacher
    3. Singers
    4. Bus conductor
    5. Industrial workers
    6. Salespersons
    7. Others

5.Other accompanied symptoms of hoarseness of voice

1.Globus sensation
2.Post nasal drip
3. Chronic cough
4.Difficult on breathing
5.Pain on swallowing
6.Sore throat
7.Chocking
8.Heartburn
9.Bitter saliva

6.History of smoking

1. Yes
2. No

7.History of tobacco chewing

1.Yes
2.No

8.History of drinking alohol

1. Yes `
2. No

9. History of neck surgery

1. Yes
2. No

10. History of intubation

1. Yes
2. No

11.Laryngoscopic examination findings

1. Erythema/Hyperemia …
2. Vocal cord edema
3. Mucosal ulceration
4. Diffuse laryngeal edema
5. Cobblestone
6. Posterior commissure hypertrophy
7. Vocal cord nodule
8. Vocal cord cyst
9. Fungeting mass
10. Papilloma
11. Vocal cord mobility
12. Others

12.Biopsy result;

1.Malignancy

2.Benign

3.Not applicable

13. Etiology of hoarseness of voice.

1. Vocal cord nodule
2. Vocal cord polyp
3. Papilloma
4. Laryngeal pharyngeal reflux disease
5. Vocal cord paralysis
6. Laryngeal malignancy
7. Others

8.4 Appendix IV: Questionnaire-Swahili version

1. Umri ……..
2. Registration no……..
3. Jinsia ya mshiriki
    1. Kiume
    2. Kike
4. Kazi ya mshiriki
    1. Mwalimu
    2. Muhubiri (Mchungaji/Shehe)
    3. Mwimbaji
    4. Kondactor wa bus
    5. Mfanyakazi wa viwandani.
    6.Muuzaji wa biashara
    7. Zinginezo

5.Uwepo wa dalili nyinginezo;

1. Hisia za kuwepo kitu kwenye koo
2. 2.Hisia za kuwepo makohozi mazito kwenye koo au makohozi kudondoka nyuma ya pua
3. Kikohozi sugu
4. Kupata shida ya kumeza chakula
5. Maumivu wakati wa kumeza chakula
6. Vidonda kwenye koo
7. Kupaliwa wakati wa kumeza chakula
8. Kiungulia
9. Mate kuwa machungu
10. Harufu mbaya mdomoni
11. Koo kuwasha
12. Maumivu ya tumbo.
13. Nyinginezo

5. Historia ya kuvuta sigara
    1. Ndio
    2. Hapana
6. Historia ya kutumia tumbaku
    1. Ndio
    2. Hapana
7.Historia ya unywaji wa pombe
    1. Ndiyo
    2. Hapana
8.Historia ya upasuaji shingoni.
    1. Ndio
    2.Hapana
9.Historia ya kupata matibabu ya mionzi kichwani au shingoni
    1. Ndio
    2. Hapana
10.Historia ya kufanyiwa upasuaji na kuwekewa mpira kooni kupitia mdomoni kwa ajili ya kusaidia upumuaji
    1. Ndio
    2. Hapana
11.Majibu ya kipimo cha laringoskopi
    1. Erythema/Hyperemia
    2. Vocal cord edema
    3. Mucosal ulceration
    4. Diffuse laryngeal edema
    5. Cobblestone
    6. Posterior commissure hypertrophy
    7. Vocal cord nodule
    8. Vocal cord cyst
    9. Fungeting mass
    10. Papilloma
    11. Vocal cord mobility
    12. 12.Others

12.Je umefanya kipimo cha histogia.

1. Ndio
2. Hapana

(i)Majibu ya kipimo cha histologia

1. Saratani
2. Si saratani

13. Visababishi vya uchakacho wa sauti.

1. Vocal cord nodule
2. Vocal cord polyp
3. Papilloma
4. Laryngeal pharyngeal reflux disease
5. Vocal cord paralysis
6. Laryngeal malignancy
7. Others

8.5 Appendix V: Approval for ethical clearance

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATION

Ref. No.DA.282/298/01.C/1899 Date: 08/09/2023

MUHAS-REC-09-2023-1899
FATUMA YUSUPH MSUYA
School of Medicine
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: CLINICAL CHARACTERISTICS AND FACTORS ASSOCIATED WITH HOARSENESS OF VOICE AMONG PATIENTS ATTENDING AT MUHIMBILI NATIONAL HOSPITAL

Reference is made to the above heading,

I am pleased to inform you that the Chairman has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 08/09/2023
EXPIRATION DATE OF APPROVAL: 08/09/2024

STUDY DESCRIPTION:

Purpose:

The purpose of this cross sectional study is to assess risk indicators and clinical characteristics of hoarseness of voice among patients at Muhimbili National Hospital.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:
https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2014844.pdf and in the MUHAS archives.

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country,
8. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Nahya Salim Masoud,
Chairperson, MUHAS Research and Ethics Committee

Muhimbili University of Health and Allied Sciences
DIRECTOR
Research, Publications & Innovations
Box 65001

8.6 Appendix VI: Introduction Letter

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL

In reply please quote;

Ref. No.: MNH/CRTCU/Perm/2023/512 Date: 29th September, 2023

Head Department,
Otorhinolaryngology
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH.

Name of Student	**Fatuma Yusuph Msuya**
Title	**"Clinical Characteristics and Factors Associated with Hoarseness of Voice Among Patients Attending at MNH".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Dr. Kassim Mapondella (MUHAS)
Co - Supervisor	Dr. Wilybroad Massawe (MNH)
Period	29th September, 2023 to 30th November, 2023

Approval has been granted to the above mentioned student to collect data at MNH. **A final study report should be lodged with Clinical Research, Training and Consultancy Unit.** Dissemination of study findings to MNH stakeholders shall be overseen by Dr. Wilybroad Massawe (MNH) Co – supervisor.

Kindly ensure that the student abide to the ethical principles and other conditions of the research approval.

Yours Sincerely,

Dr. Deus Buma
For: Head of Clinical Research, Training and Consultancy Unit

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT * P.O. Box 65000 DAR-ES-SALAAM * MUHIMBILI NATIONAL HOSPITAL

c.c DSS
c.c Dr. Wilybroad Massawe
c.c **Fatuma Yusuph Msuya**

Upanga West, Kalenga Street, Plot No. 10480/3, P.O. BOX 65000, Dar es Salaam, Tanzania.
Telephone: +255-22-2151367-9, Telephone: +255-22-2151351-2
Email: info@mnh.or.tz, Website: www.mnh.or.tz

8.7 Appendix VII: Permission letter data at MNH

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL

In reply please quote;

Ref. No.: MNH/CRTCU/Perm/2023/512 Date: 29th September, 2023

Head Department,
Otorhinolaryngology
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH.

Name of Student	**Fatuma Yusuph Msuya**
Title	**"Clinical Characteristics and Factors Associated with Hoarseness of Voice Among Patients Attending at MNH".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Dr. Kassim Mapondella (MUHAS)
Co - Supervisor	Dr. Wilybroad Massawe (MNH)
Period	29th September, 2023 to 30th November, 2023

Approval has been granted to the above mentioned student to collect data at MNH. **A final study report should be lodged with Clinical Research, Training and Consultancy Unit.** Dissemination of study findings to MNH stakeholders shall be overseen by Dr. Wilybroad Massawe (MNH) Co – supervisor.

Kindly ensure that the student abide to the ethical principles and other conditions of the research approval.

Yours Sincerely,

Dr. Deus Buma
For: Head of Clinical Research, Training and Consultancy Unit

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT * MUHIMBILI NATIONAL HOSPITAL * P. O. Box 65000 DAR-ES-SALAAM

c.c DSS
c.c Dr. Wilybroad Massawe
c.c **Fatuma Yusuph Msuya**

Upanga West, Kalenga Street, Plot No. 10480/3, P.O. BOX 65000, Dar es Salaam, Tanzania.
Telephone: +255-22-2151367-9, Telephone: +255-22-2151351-2
Email: info@mnh.or.tz, Website: www.mnh.or.tz