OTORHINOLARYGOLOGICAL TRAUMA AMONG PATIENTS WITH HEAD AND NECK INJURY ADMITTED AT MUHIMBILI NATIONAL HOSPITAL DAR ES SALAAM, TANZANIA.

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MMed (Otorhinolaryngology) Dissertation

Muhimbili University of Health and Allied Sciences.

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By

Victor Stanslaus Mashamba

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of medicine (Otorhinolaryngology) of Muhimbili University of Health and Allied Sciences.

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November, 2012.

CERTIFICATION.

The undersigned certifies that he has read and hereby recommends for acceptance of the dissertation entitled **Otorhinolarygological trauma among patients with head and neck injury admitted at Muhimbili National Hospital in Dar es salaam, Tanzania**, in fulfillment of the requirements for the degree of Master of Medicine (Otorhinolaryngology) of the Muhimbili University of Health and Allied Sciences.

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Dr. E. Liyombo
(Supervisor)

Date:_____

_____

Prof. N. Moshi
(Supervisor)

Date:_____

DECLARATION AND COPYRIGHT

I, **Victor Stanislaus Mashamba**, 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:……

ACKNOWLEDGEMENT

It is not possible for a single person to cover all aspects that made this dissertation into being and therefore, at the accomplishment of this dissertation, I would like to express my sincere gratitude to all those who helped me to reach this stage.

Much of any merit this dissertation may have is due to the generosity of my supervisor Dr. Edwin Liyombo for his guidance and patience as he devoted his spare time so as to offer and contribute towards this dissertation.

Principally I am grateful to Prof. N. Moshi, the head of department ORL (MUHAS), Dr J. Kimario and Dr.Enica Richard for their guidance and corrections.

Thanks to Dr. Benjamin Kamala for helping me with the expert data analysis during the report writing of this dissertation.

Finally I would like to take this opportunity to thanks all other people whose names do not appear here for the contribution they made towards the study.

DEDICATION.

I dedicate this work to my wife Lightness Mlaki and my son Nathan for their love, understanding and encouragement.

ABSTRACT

Introduction:

The Ear, Throat and face region is the area in the body that is commonly involved in head and neck injury. Trauma to this region is often associated with mortality and morbidity and varying degree of physical and functional damage.

In Muhimbili National Hospital more than 1200 patients with head and neck injury are admitted annually and ORL region is likely to be ignored. Fractures of the facial bones can result in complications, such as sinusitis, facial deformity, and injury to the eye. Conditions like chronic otitis media can lead into various intracranial complications and hearing loss.

Aim: The study aimed at determining the prevalence Otorhinolaryngological trauma among patients with head and Neck injury admitted at Muhimbili National Hospital, Dar es Salaam, Tanzania from May 2011 to February 2012.

Materials and methods: This study was conducted at Muhimbili National Hospital in four departments: Oral surgery department, Emergence medicine Department, Neural surgery department and Otorhinolaryngology department, It was a prospective cross-sectional descriptive hospital based study. 235 patients who were diagnosed of having head and neck injuries in the respective departments were recruited. Information on age, sex and cause of injury was taken from the case notes .Each patient was then examined for the presence of ear, face and throat injuries, using the available bed side instruments. Data was analysed using the SPSS program.

Results: Out of 235 patients, 121 (51.5%) were males and 114 (48.5%) were females, where, majority, 176 (74.9%) were of age group 21-40. Out of 235 patients,116(49.4%) had trauma in the ORL region whereby majority(56.8%) were in the age group 21-40 and males had higher proportion 70(57.9%) as compared to females 46(40.4%).
Among patients who had trauma in the ORL region, majority had facial injuries 86 (74.1%) and occurred commonly on the age group 21-40 and majority were males 52

(75.3%). Among patients who had trauma in the ORL region, majority involved in road traffic accidents 75 (64.7%) and most of them were in the age group 21-40 (65.1%) and majority were males 47 (67.1%).

Conclusion: The overall prevalence of Otorhinolaryngological trauma among head and neck injured patients attended at Muhimbili National hospital Dar es Salaam was noted to be high. It was higher among 20-41 years and in males.

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ABBREVIATIONS

MNH - Muhimbili National Hospital

MUHAS Muhimbili University of Health and Allied Sciences

ORL - Otorhinolaryngology

ENT - Ear, Nose and Throat

SPSS - Statistical Package for Social Sciences

RTA - Road Traffic Accident.

CHAPTER ONE

1.1 INTRODUCTION AND BACK GROUND

Trauma is a type of injury which affects the body by external force being applied in a violent and sudden manner. Head injury refers to trauma to the head. This may or may not include injury to the brain [1] .

A head injury is any trauma that leads to injury of the scalp, skull, or brain. The injuries can range from a minor bump on the skull to serious brain injury.[2]

Head injury is classified as either closed or open (penetrating).

A closed head injury means a hard blow to the head from striking an object, but the object does not break the skull.

An open, or penetrating, head injury means a hit with an object that broke the skull and entered the brain.

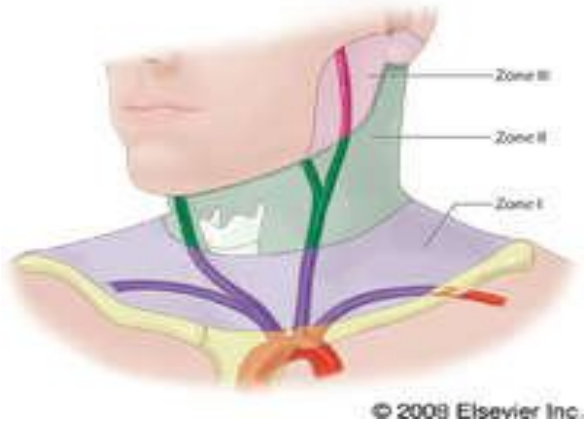
Common causes of head injury include road traffic accidents, falls, physical assault, and accidents at home, work, outdoors, or at sports.

Some head injuries result in prolonged or irrreversible brain damage. This can occur as a result of bleeding inside the brain or forces that damage the brain directly.

Neck injury

Is the damage to a structure within the neck. Common neck injuries include a neck contusion, neck strain, neck sprain, cut wounds and neck fracture[3]

Dividing the neck into anatomic zones or regions assists in the evaluation of injury. For clinical purposes, the neck is partitioned into 3 zones.



(Courtesy of Nunez DB Jr, Torres-Leon M, Munera F)

Zone I, the base of the neck, is demarcated by the thoracic inlet inferiorly and the cricoid cartilage superiorly. Structures at greatest risk in this zone are the great vessels (subclavian vessels, brachiocephalic veins, common carotid arteries, aortic arch, and jugular veins, trachea, esophagus, lung apices, cervical spine, spinal cord, and cervical nerve roots. Signs of a significant injury in the zone I region may be hidden from inspection of the chest or the mediastinum.

Zone II encompasses the midportion of the neck and the region from the cricoid cartilage to the angle of the mandible. Important structures in this region include the carotid and vertebral arteries, jugular veins, pharynx, larynx, trachea, esophagus, and cervical spine and spinal cord. Zone II injuries are likely to be the most apparent on inspection and tend not to be occult. Additionally, most carotid artery injuries are associated with zone II injuries.

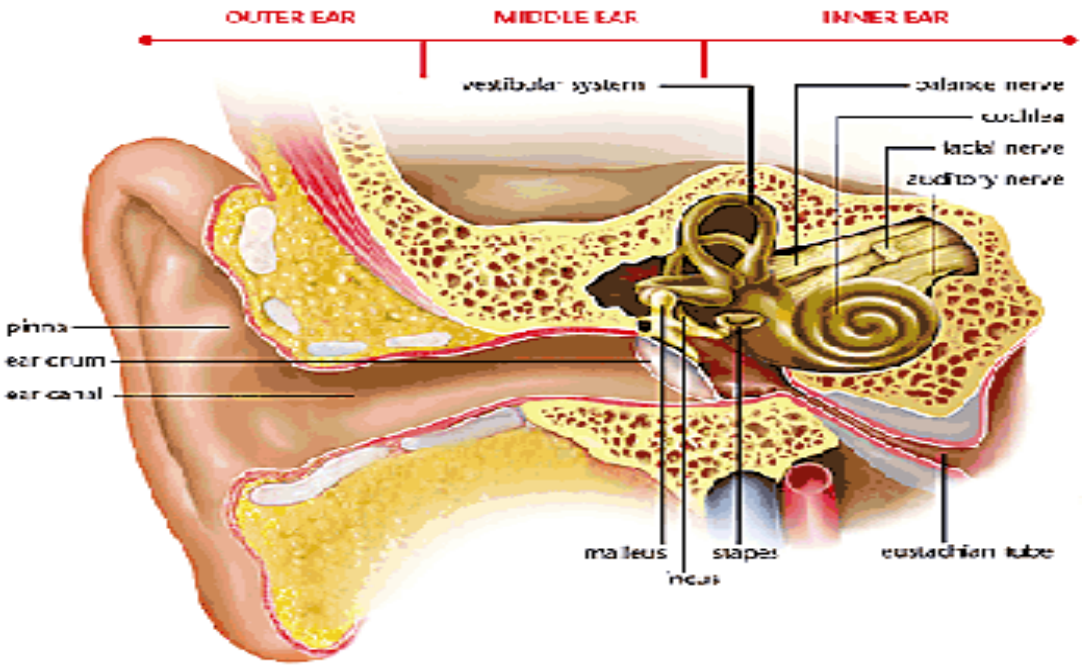
Zone III characterizes the superior aspect of the neck and is bounded by the angle of the mandible and the base of the skull. Diverse structures, such as the salivary and parotid glands, esophagus, trachea, vertebral bodies, carotid arteries, jugular veins, and major nerves (including cranial nerves IX-XII), traverse this zone. Injuries in zone III can prove difficult to access surgically. Few emergencies pose as great a challenge as neck trauma. Because a multitude of organ systems (e.g., airway, vascular, neurological, gastrointestinal) are compressed into a compact conduit.

More than 95% of penetrating neck wounds result from guns and knives, with the remainder resulting from motor vehicle accidents, household injuries, industrial accidents, and sporting events [4]

Head and neck injuries most commonly associated with trauma to the otorhinolaryngology region. Soft tissue injuries include abrasions, lacerations, avulsions, bruises, burns and cold injuries others are epistaxis and ear discharge. Hard tissue injuries include maxillofacial bones fracture and laryngeal-tracheal factures.[5]

Ear trauma

Middle and external ear damage has recently been documented as occurring in 10% of head, face and neck injuries The most common causes of blunt trauma to the ear and surrounding area are motor vehicle accidents, violent encounters, and sports-related accidents [6]



(Image courtesy of Hearing World)

Outer ear trauma.

The outer ear consists of the auricle or pinna, external auditory meatus and tympanic membrane.

The auricle is composed mainly of a cartilaginous framework covered with thin skin; and moderately firmly attached to the cartilage.

Injuries and wounds of the cartilage are slow to heal, and if inflamed the cartilage becomes exceedingly sensitive. Swelling of the ear readily occurs from injury or erysipelas, and the tension is quite painful

The auricle can be easily damaged. Because it is skin-covered cartilage.

The entire cartilage framework is fed by a thin covering membrane called the perichondrium. Acute auricular hematoma is common after blunt trauma to the side of the head.

A network of vessels provides a rich blood supply to the ear, and the ear cartilage receives its nutrients from the overlying perichondrium. Prompt management of hematoma includes drainage and prevention of reaccumulation.

If left untreated, an auricular hematoma can result in complications such as perichondritis, infection, and necrosis.

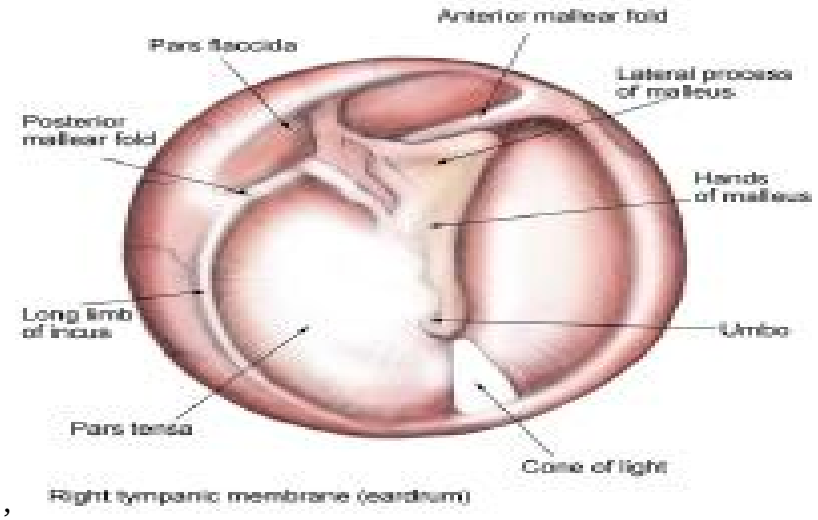
Cauliflower ear may result from long-standing loss of blood supply to the ear cartilage and formation of neocartilage from disrupted perichondrium.

The external auditory meatus extends from the concha to the drumhead, and is about 2.5 cm. in length. A little less than one-half of it is cartilaginous and a little over one-half bony

The cartilaginous portion of the meatus contains sweat-glands, sebaceous glands, and hair-follicles. There are only a few glands in the upper posterior portion of the bony meatus.

The tympanic membrane is inclined downward and inward at an angle of about 1400 to the upper wall (Troltsch) and 270 to the lower wall (Bezold) of the meatus; it does not lie directly transverse, therefore in introducing instruments into the ear the upper posterior part will be first encountered. The membrane is located 2.5 cm. (1 in.) from the surface; this is to be borne in mind in puncturing the membrane or other operations. It consists of three layers except in the upper part. Outer cuticular or epithelial layer, continous with the skin of the external ear. Middle fibrous layer, missing in the upper part. Inner mucosal layer, continue with the middle ear mucosa.

The tympanic membrane consists of two parts. Pars tensa ,larger part below the malleolar folds, it has all the three layers and is tense,the inner surface at the centre is attached to the handle of the malleus (umbo),when light is reflected on the TM ,the antero inferior part is the most illuminated part of the pars tensa.Pars flacida (attic),It is thin and devoid of fibrous tissue and annulus,the flaccid part forms the lateral wall of the superior recess of the tympanic cavity



(Courtesy of F Carl van Wyk)

Tympanic membrane rupture is common and is often associated with more serious injuries elsewhere .Some of the more common type of injuries to the external ear include, laceration from glass, knives, and bite injuries, avulsion injuries, frostbite, and burns[7].Ear canal injuries can come from firecrackers and other explosives[8]

Middle ear trauma

Middle ear consists of the tympanic cavity. The tympanic cavity is flat and narrow and is situated directly behind and also above the tympanic membrane. It has a floor and roof, and external (lateral) and internal (medial) walls. It is divided into the portion behind the membrane and the portion above the membrane called the attic.

The floor of the tympanic cavity is narrower than the roof and is formed by the tympanic plate, which separates it from the jugular fossa containing the commencement of the internal jugular vein. The roof is comparatively thin and formed of cancellous tissue with a thin and weak outside compact layer.

The external (lateral) wall is formed below by the tympanic membrane and above by the bone. Immediately behind the membrane are the lower portions of the ossicles, and above is the chorda tympani nerve.

The internal (medial) wall is formed of bone and is from 2 to 4 mm behind the membrane. It is so close that in trauma to the outer ear can also damage the middle ear. In it are the oval and round windows

There is no well-defined anterior or posterior wall. The anterior portion of the cavity is continued forward into the Eustachian tube; Posteriorly the cavity of the attic is continuous through the aditus with the mastoid antrum and the cells beyond. Posterior to the opening of the Eustachian tube is an elevation on the internal wall called the promontory, formed by one of the semicircular canals.

Like external ear trauma, most often, the middle ear trauma comes from blast injuries and penetrating trauma.. Displacement of the ossicles will cause a conductive hearing loss. Forcible displacement of the stapes into the inner ear can cause a sensory neural hearing loss[9]

Inner ear trauma

(Courtesy of Draper Laboratory)

The inner is situated in the petrous part of the temporal bone, medial to the middle ear.

It consists of two parts the bony Labyrinth and the membranous Labyrinth.

Bony Labyrinth is a series of cavities contained within the otic capsule of the petrous part of the temporal bone, the otic capsule is made of bone that is denser than the remainder of the petrous temporal bone. It contain a clear fluid, the perilymph, in which is suspended the membranous labyrinth. It is divided into three parts, semicircular canals,Vestibule and the cochlea. The semicircular canals are three in number, the Superior, Posterior (vertical) and lateral and they are concerned with balance. The cochlea resembles a snail shell. It is the hollow tube having 2 and 3 or 4 turns.

The membranous Labyrinth contains the endolymph and is foating in the perilymph in the bony labyrinth. Broadly divided into three parts, membranous vestibular labyrinth, membranous semi circular canal and membranous cochlear labyrinth.

Membranous cochlear labyrinth,is a spiral, blind tube consisting of a receptor of auditory stimuli called the organ of Corti, situated on the basilar membrane overlaid by the gelatinous tectorial membrane.

Trauma to the inner Ear can result into sensory neural hearing loss alone or accompanied with vertigo, temporal bone fracture following motor traffic accident and blast injuries were the observed causes [10]

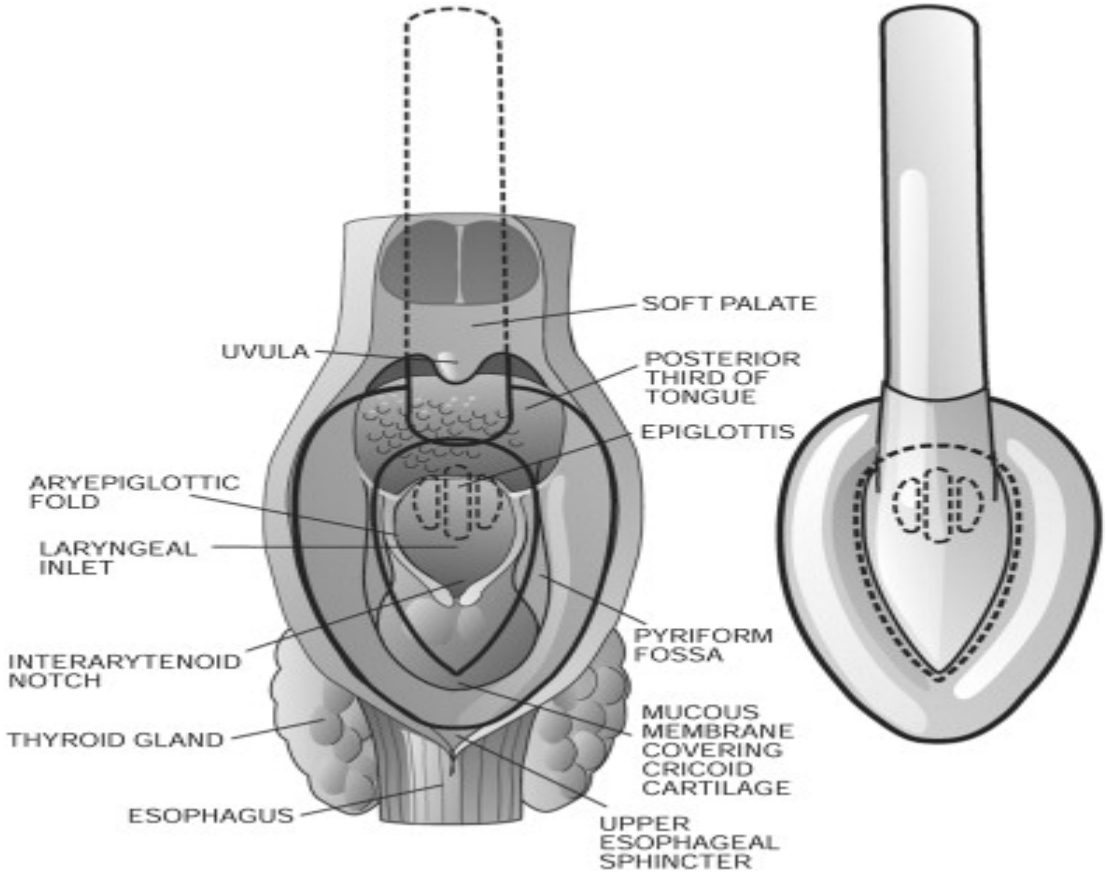
Throat trauma

The throat comprises of the pharynx and the larynx

The pharynx is the common air and food tract that lies behind the nose, mouth, and larynx. It extends from the base of the skull above to the oesophagus below. Its lower end is at the cricoid cartilage, which is opposite the sixth cervical vertebra. The pharynx has seven openings into it, viz.: the two posterior nares, the two Eustachian tubes, the mouth, the larynx, and the oesophagus

The larynx lies in front of the hypopharynx opposite the third to sixth cervical vertebrae. It moves vertically and in anteroposterior direction during swallowing and phonation. It can also be passively moved from side to side producing a characteristic grating sensation called *larngeal crepitus.* In an adult, the larynx ends at the lower border of C6 vertebra.

Collectively, the hyoid bone, the thyroid and cricoid cartilages, and the cricothyroid and thyrohyoid membranes form the laryngeal architecture. The arytenoid, corniculate, and cuneiform cartilages also contribute to the laryngeal structure. Membranes, ligaments, and muscles connect the entire framework



(Courtesy of LMA North America, Inc., San Diego, CA; with permission.)

Laryngeal trauma is a rare condition .The rarity of this condition is likely due to the protected location of the larynx, with the rigid cervical spine posterior and the mandible hanging in a superior and anterior position.

Most commonly, trauma to the larynx occurs as a result of a motor vehicle accident (MVA) . A small percentage of causes include direct blows sustained during assaults, sport injuries, hanging, manual strangulation, and iatrogenic causes.

Laryngeal fractures can be categorized as either penetrating or blunt injuries, which can be further categorized as either high or low velocity [11] .

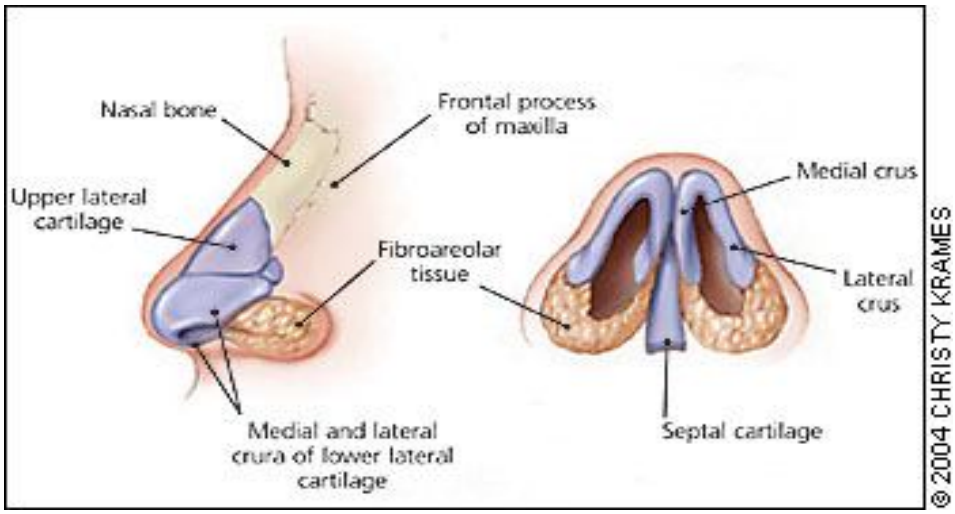
Facial trauma

Nasal and Septal trauma

Nasal and Septal trauma are the most common types of facial trauma; however, they are often unrecognized and untreated at the time of injury.

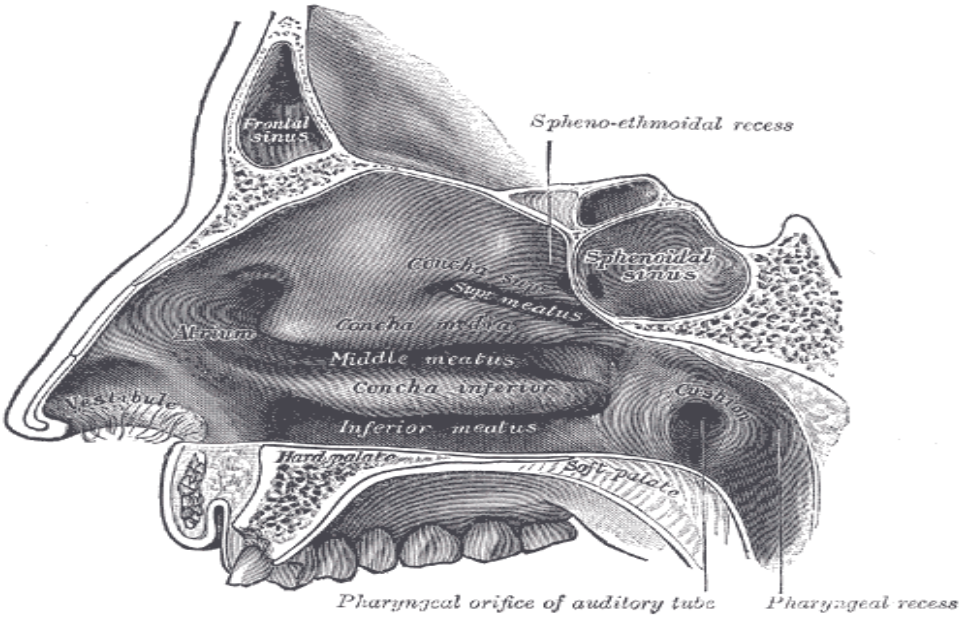
Nose proper consists of a bony and a cartilaginous portion. The bony portion is formed by the two nasal bones articulating with the frontal bone above, with each other in the median line, and with the nasal process of the superior maxilla on the side. They are supported on the inside by the upper anterior portion of the perpendicular plate of the ethmoid. This articulation does not extend the whole length of the nasal bones to their tip, but only about half their length.The cartilaginous portion consists of four lateral cartilages, two on each side, upper and lower, and the triangular cartilage, or cartilaginous septum on the inside.

The external shape of the nose viewed in profile is composed of three portions: an upper of bone, a middle of cartilage - the upper lateral cartilages - and a lower, or tip, formed by the lower lateral cartilages. The bridge of the nose is formed by bone; it slopes downward and forward and where it joins the upper lateral cartilage the line changes and slopes more downward, until the tip is reached, here the lower lateral cartilages bulge forward, forming a rounded and more or less projecting tip.



(Courtesy of American family physician)

In looking into the nose from in front, if the speculum is directed downward, the floor of the nose and the inferior meatus can be seen. On the inner side is the septum; still higher is the middle meatus and the anterior end of the middle turbinated bone. The superior turbinated bone is not visible from the front, being in the upper posterior corner and hidden from sight by the middle turbinate.



(Image Courtesy of Gray's Anatomy on Bartleby.com)

The nasal fossa are separated from each other by the septum. This septum is formed by the triangular cartilage in front, forming the cartilaginous septum, and the perpendicular plate of the ethmoid and vomer behind, forming the bony septum. The posterior edge of the septum is formed solely by the edge of the vomer; it can readily be seen with the rhinoscopic mirror.

The affections of the septum are haematoma, ulcer and abscess, deviation to one side, spurs or outgrowths, and it may be the site of nasal hemorrhages. Haematomas affect the cartilage of the septum are usually due to traumatism and may become infected, forming a pus-like detritus or abscess..

Deviations of the septum can cause serious obstruction to breathing. They are probably traumatic in origin and involve the cartilaginous portion.

Fractures of these sites can be classified as open or closed, depending on the integrity of the mucosa. The direction of force to the nose during injury determines the pattern of the fracture [12]

Trauma of the maxillary bone,is potentially life-threatening as well as disfiguring[13]. Maxillary bone trauma often results from high-energy blunt force injury to the facial skeleton. Typical mechanisms of trauma include motor vehicle accidents, altercations, and fall [14]

1.2. LITERATURE REVIEW

Otorhinolaryngological injuries following head and neck injury are the most common cause of morbidity and mortality in most developed and developing countries.

Head injury causes hospitalization of 200-300 people per 100 000 population per year worldwide[15]

Globally, a review of 'head and neck' injuries between 1914 and 1986 found the average incidence to be 16% of total injuries[16], ranging from 4% in World War II to 31% in some armies during World War I.

Separate reviews from US forces in Iraq and Afghanistan describe incidences of 'head, face and neck' injuries ranging from 21%, 28% and 29% [17, 18, and 19].

The first review of Head, Face and Neck injuries sustained by British servicemen found these injuries accounted for 18% of battle injuries in 2006, 28% in 2007 and 23% in 2008[20]

In UK, 900,000 people are hospitalized in a year because of the head and neck injury. The major cause was found to be motor traffic accident. Of all people getting involved in a motor traffic accident, 70% of them manifest with head and neck injury[21].

In a retrospective study that was done in UK, motor traffic accident was found to be responsible for 52.5% of all patients who were admitted because of head and neck injury, followed by assault which was found to be 34%[22]

Motor traffic accidents was found to be the common cause, occurring in 195 (59.8%) patients, in a study done in Atlanta USA [23].

A study in Korea showed that, among all causes of head and neck injury to children, fall from heights contributed to 35.2% [24].

Facial injuries are caused by automobile and motorcycle accidents, sport related accidents, work related accidents, altercations (bar fights, assaults, spouse abuse and other causes) [25]

In France, a study was done to determine the types of facial injuries; 25.4% of the injured were aged between 21 and 30 years. Sex-ratio was 2.7 M/1 F .The most frequent

cause was sports injuries (25.8%) followed, in decreasing order, by traffic injuries (23.1%), home injuries (17.6%), fight injuries (3.4%), work injuries (3.4%) and dog bites (3.2%).[26]

In New Zealand, the study was done, to review patients admitted with head injuries and features of associated maxillofacial trauma. 2307 patients were admitted .5% of those patients had an associated maxillofacial injury.[27]

A study done in Malaysia, showed that, the majority of patients were Malaysian men between 20 years of age .The main cause of injury was motorcycle accident (53.6%).[28]

In Pakistan, a study was carried out to determine types and mechanisms of injuries encountered in Ear, Nose and Throat (ENT) regions of children. Most of the injuries were in the nasal region (50%) and nasal bone fracture was the commonest (26%) [29]

A study done in India on Epidemiological Profile of Otorhinolaryngological Emergencies at a Medical College, in Rural Area of Gujarat showed that the Major section was ENT trauma and facio-maxillary trauma constituted 84.0% of all the cases.[30]

A study done in Birmingham, United Kingdom, showed that tissue injuries accounted for 70% of injuries and 14% presented with a maxillofacial fracture. The types of these soft tissue injuries vary considerably. They may be a clean sharp laceration, a laceration with a contusion, an abraded wound, a contused wound, an avulsed wound, a puncture wound.[31]

Throat trauma can occur in association with facial injuries and may lead to life-threatening airway obstruction. External laryngeal trauma, blunt or penetrating, is a rare but potentially life-threatening injury. This is frequently seen in multiple-trauma patients and can go unrecognized in the absence of astute clinical awareness. Injuries may range from small endolaryngeal hematomas or lacerations to complete laryngotracheal separation[32]

In a study done in USA on laryngo-tracheal injuries. Most patients sustained injuries as the result of blunt trauma (n = 23; 85.1%)[33]

In another study in USA, Among fifty-seven patients with penetrating laryngotracheal injury 32 patients sustained gunshot wounds and 25 had stab wounds. The injuries were to the larynx in 24 (42%) and trachea in 33 (58%). Forty-six (81%) had isolated airway injuries[34]

Another study was done in USA, on tracheobronchial injuries following blunt and penetrating trauma. Mechanism of injuries involved gunshot wound (50%), stab wound (13%), blunt trauma (19%), hanging injury from suicide attempt (6%) [35]

In Taipei, Taiwan, a Clinical analysis of external laryngeal trauma was conducted.. Injuries were mostly caused by motor vehicle accidents (car = 36.7 per cent; motorcycle = 23.3 per cent) [36]

A study was done in Helsinki, Finland on Laryngeal trauma. Thirty-three consecutive patients, aged 14-84 years, presented with various types of laryngeal trauma. : In all, 32 of 33 laryngeal trauma patients had blunt trauma and the main causative factors were sport injuries (39%) and physical assault (33%) [37].

The incidence of ear trauma has increased in recent decades together with the increasing traffic and population. In Britain,a study was done to describe the pattern of ear injuries sustained by all British servicemen serving in Iraq and Afghanistan ; Ear damage was present in 5 per cent of all British servicemen sustaining battle injuries. Tympanic membrane rupture occurred in 8 per cent of personnel evacuated with blast injuries.[38]

In Germany, the case notes of 141 from 197 patients with ear injuries have been reviewed retrospectively according to trauma cause and to the distribution of age and gender. Two thirds of the documented cases occurred between the age of 11 and 40 years. Men outnumbered women at a ratio of 2 to 1. The most frequent causes for ear trauma were traffic accidents (43 %), accidents at home (33 %), and fights (14 %) [39]

In Japan a clinical study of traumatic tympanic membrane perforation was done they reviewed 165 cases of traumatic tympanic membrane perforation .Of these, 103 sustained direct injury and 62 indirect injury.[40]

Head and neck trauma is also a major problem in developing countries.

In Africa, trauma is also important with road-traffic injuries (RTIs) represent 25% of all trauma deaths [41]

In a study done in Nigeria, three hundred and sixty-three patients were studied. There was a male/female ratio of 3.4:1, with the modal age being 25 years. The head and neck region was the commonest injury site (41.1%) [42]

A prospective descriptive study on head and neck trauma was carried out from August 2007 to January 2008 in the emergency surgery department of Gabriel Touré Hospital in Bamako, Mali .Most of the patients included in this series were young single city-dwelling males (mean, age, 27 years; M/F sex ratio, 4.3). Most injuries were sustained in road traffic accidents (93%) [43].

In Africa, facial injuries are fairly common and they are usually found in association with multiple injuries. In Tunisia, a total of 1100 patient files were analyzed. The average age was 29 years and the sex-ratio was 6:1 in favor of men. The most common etiologies were: car crashes (39%), fights (28%) and domestic trauma (19%) [44].

In Sub-Saharan Africa, males sustain more facial injuries than females; five to one in Zimbabwe, 4.5 to one in Senegal and 5.4 to one in Nigeria. The male predominance is related to violence and falls and also partly by the traditional role of male as businessman in Africa society where the man may be more exposed to road traffic accidents than woman who stays at home [45]

The incidence of throat injuries irrespective of the cause is on increase worldwide but they are underreported in sub- Saharan Africa, however there are some studies which have been done. In Nigeria a study was done to determine the pattern of cut throat injuries, among head and neck injured patients. All the patients were males; age range was 26-45 years. The commonest age group affected was 31-35 years, suicide accounted for 60% of cases [46].

In Cape Town, South Africa, a study was done to assess the outcome of the neck trauma. Seventy of the 116 patients sustained a direct hit to the neck, 61 with an injury to the airway, 32 with an injury to the pharynx or esophagus, and 12 with sustained neurological damage [47]

A clinical study was done on traumatic perforation of the tympanic membrane in Nigeria; Fifty- eight (8.6%) patients with traumatic perforation were seen among 676 patients with aural diseases. Average age was 27.56 years. Causes of traumatic perforation were, fights with spouse 27.6%, street fights 19%, instrumentation 17.2% [48]

In East Africa facial injuries are also common. In one study done in Kenya; it was found that of the 290 bomb-blast survivors in Kenya 1998, 78% had sustained one or more maxillofacial injuries [49]

In a study done in Kenyatta National Hospital, Nairobi, Kenya, to describe the characteristics and pattern of maxillofacial and associated injuries sustained in road traffic accidents, Males in the 21-30-year age group were the most affected. Most accidents occurred during weekends with pedestrians being the leading casualties in 59.5% and 71.4% of non-fatal and fatal cases respectively [50]

1.3. STATEMENT OF THE PROBLEM AND RATIONALE

1.3.1 STATEMENT OF THE PROBLEM

The Ear, face and Throat region is one of the areas in the body that is commonly involved in head and neck injury.

Trauma to this region is often associated with mortality and morbidity and varying degree of physical and functional damage.

In Muhimbili National Hospital, more than 1200 patients with head injury are admitted annually. The manifestations of head injury and its numerous other systemic complications are so compelling that the ORL region is likely to be ignored. Some injuries in the ORL region are left undiagnosed when proper ORL examination is not done. ORL examination needs special instruments and skills and therefore needs to be done by otolaryngologist.

Conditions like chronic otitis media with intracranial complications and hearing loss could be prevented if tympanic membrane rupture would have been noted and managed earlier.

Fractures of the facial bones can result in complications, such as sequestrum formation, sinusitis, nasolacrimal duct injury, facial deformity, and injury to or entrapment of the globe. An awareness of the treatment methods available can help to diminish the complication rate.

This study aims at establishing the magnitude of otorhinolaryngological trauma associated with head and neck injury. This will provide a focus on importance of thorough otorhinolaryngological examination to patients with head and neck trauma and therefore early ear, face and throat care for patients with head injury.

1.3.2 RATIONALE

The presence of differences in frequencies of otorhinolaryngological manifestations of head and neck injury in different setting in the previous studies necessitates establishing the magnitude at our setting.

There is no such study which has been done in Tanzania, therefore the magnitude of the problem is not known in our setting.

Muhimbili being a national hospital where consultancy in different specialties is offered, a question of associated otorhinolaryngological trauma in head and neck injury need to be addressed.

The results of this study will help to alert doctors of the possible associated ORL trauma when managing patients with head and neck injury thus providing required attention in holistic management of head injury.

Results from this study will also help the policy makers in planning for having more allocation of resources to the management of these injuries; it will also strengthen interdepartmental multidisplinary approach which includes an otorhinolaryngologist, neurosurgeon and oral & maxillofacial surgeon in the management of head and neck injury patients.

This study is also a partial fulfillment of my training for a master's degree in otorhinolaryngology.

1.4. OBJECTIVES

1.4.1 Broad Objective

To determine the prevalence Otorhinolaryngological trauma among patients with head and Neck injury admitted at Muhimbili National Hospital, Dar es Salaam, Tanzania.

1.4.2 Specific Objectives

1. To determine the prevalence of otorhinolaryngological trauma among head and neck injured patients by age and sex.

2. To determine the prevalence of otorhinolaryngological trauma among head and neck injured patients by site of injury.

3. To determine the prevalence of otorhinolaryngological trauma among head and neck injured patients by cause of injury.

CHAPTER TWO

2. METHODOLOGY

2.1 Study Area.

This study was conducted at Muhimbili National Hospital in four departments: Oral surgery department, Emergence medicine Department, Neural surgery department and Otorhinolaryngology department.

2.2 Study design

It was a prospective cross-sectional descriptive hospital based study.

2.3 Study duration

The study duration was eight month, from May 2011 to February 2012 inclusive

2.4 Study population

The study population was all patients who were diagnosed of having head and neck injuries in the respective departments. Patients of all ages and sex who diagnosed of having head and neck injuries were recruited in the study.

2.5 Sample size calculation

The sample size was calculated from the formula

$n = \frac{Z^2 P(1-P)}{E^2}$ where:

n= Sample size

Z= 95% Confidence Interval (1.96)

P= 18%, Previous prevalence of head, face and neck injuries.

E= Error margin (5%)

Using the above formula the maximum sample size was 235 head and neck injured patients**.**

2.6 Inclusion and exclusion criteria

Inclusion criteria-

All patients presented with head and neck injuries and seen in the oral surgery, emergency medicine, neural surgery and otorhinolaryngology departments and who consented for the study. Unconscious patients were included in the study whereby the relative was requested to consent for the study.

Exclusion criteria

The following cadre of patients were excluded from the study

1) Patients who gave history of previous head and neck trauma.
2) Patients or relative (in case the patient is unconscious) who did not consent.

2.7 Data collection and Data management

2.7.1 Data collection

Patients were seen within three days of admission, from Oral surgery, Emergency medicine, neurosurgery and otorhinolaryngology departments, so that the patient who were to be discharged within three days should not be missed but also to be able to evaluate the patient signs before they disappear. Patients who gave the history of previous head and neck trauma were not included in this study, this aimed at avoiding some ambiguity during examination as to whether the encountered trauma was the result of the recent head and neck injury or previous underlying trauma.

Information on age, sex and cause of injury was taken from the case notes as recorded by the attending doctor in the respective department.

Each patient was then examined for the presence of ear, face and throat injuries, using the following bed side instruments:

1) Wooden tongue depressor, for throat examination
2) Head light, for illumination
3) Nasal speculum and packing forceps for nose examination
4) Otoscope, for ear examination.
5) Cotton applicator, for mopping the external ear canal (Aural toilet)
6) Cerumen hooks, for removing wax, debris and clotted blood from external ear canal.

Data sheets were used for collecting information. Every patient was having his/her own data sheet. Information recorded in the data sheet included case note report on the name of the patient, age, sex, residency, cause of head and neck injury and otorhinolaryngological examination findings. Information was then transferred to the master data sheet by the principle investigator.

2.7.2 Data management and Analysis

The obtained data was checked for completeness and clarity then entered into the computer and analysis will be done using Statistical package for social sciences programme (SPSS). Chi –square test (X^2) will be carried out and significant level $p<0.05$ will be used to draw out conclusion by the help of the statistician.

2.8 Consent for the study

All patients or relatives were given a necessary explanation about the study before they asked to participate.

For those patients who were unconscious, consents were obtained from their relatives. For children, informed consents were obtained from their parents/ guardians

2.9 Ethical issues

2.91 Ethical consideration

1) Information obtained were used only for the study and kept confidentially.
2) During examination any encountered trauma in the ORL region which needed, assistance by the otolaryngologist was managed accordingly.
3) Those who declined participation in the same study were not discriminated against during management.
4) The results of the study will be published in medical journal for the benefit of patients, public and medical fraternity.

2.9.2 Ethical clearance

This study was channeled through the Research and Publication Ethical committees of the Muhimbili University of Health and Allied Sciences (MUHAS) and the Muhimbili National Hospital (MNH) for clearance.

CHAPTER THREE

3. RESULTS

A Total of 235 patients with head and neck trauma were included in the study. The gender and age distribution of the study population is as shown in Table 1 below.

Table1. Distribution of patients with head and neck trauma attended at MNH from May to February 2011.

	Frequency	Percentage
Gender		
Male	121	51.5
Female	114	48.5
Age Group		
0-20	40	17
21-40	146	62.1
41+	49	20.9

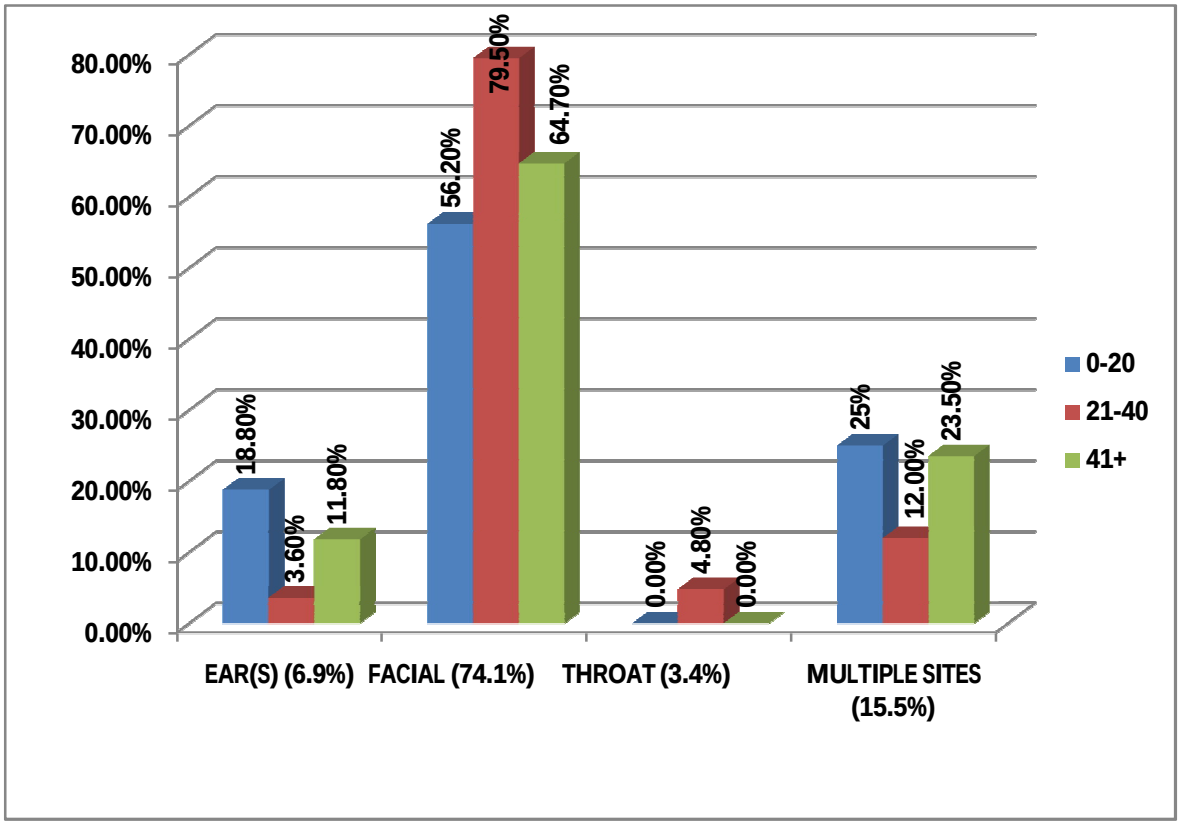
Out of 235 patients, 121 (51.5%) were males and 114 (48.5%) were females, where, majority146 (62.1%) were of age group 21-40 followed by other groups as shown in table 1 above.

Table 2: Socio-Demographic distribution of ORL trauma among patients with head and neck injury attended at MNH, 2011

	Presence of ORL trauma		Total	P-Value
	Yes- n (%)	No-n (%)		
Age Group				
0-20	17 (42.5)	23 (57.5)	40 (17.0)	0.009
21-40	83 (56.8)	63 (43.2)	146 (62.1)	
41+	16 (32.7)	33 (67.3)	49 (20.8)	
Total	116 (49.4)	119 (50.6)	235	
Gender				
Male	70 (57.9)	51 (42.1)	121 (51.5)	0.007
Female	46 (40.4)	68 (59.6)	114 (48.5)	
Total	116 (49.4)	119 (50.6)	235	

Out of 235 patients, 116 (49.4%) had trauma in the ORL region where by majority (56.8%) were in the age group 21-40 followed by other age groups. Males had higher proportion 70 (57.9%) as compared to females 46 (40.4%**).** (Table 2)

Figure 1. Prevalence of ORL trauma by age according to site of injury



P-Value 0. 043

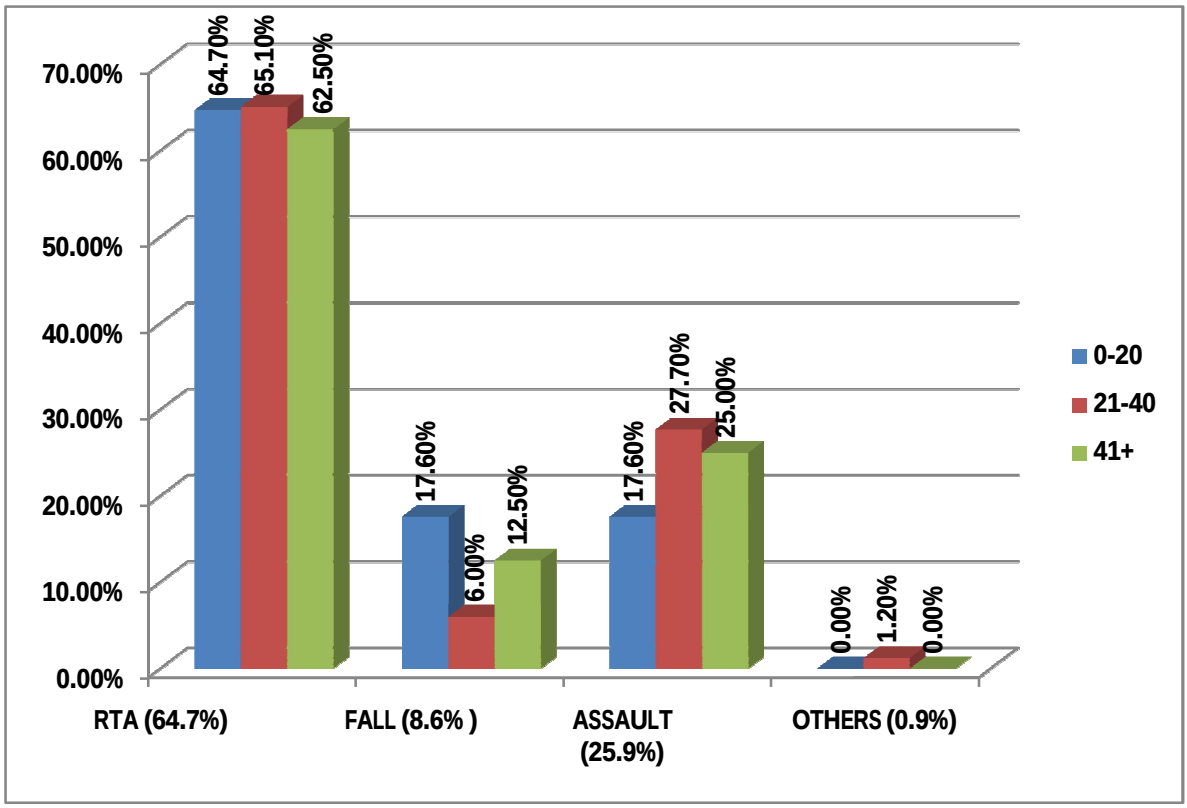
Among 116 patients who had trauma in the ORL region, majority had facial injuries 86 (74.1%) followed by multiple sites. Ear injuries occurred more among 0-20 years, facial among 21-40 and throat injuries occurred almost exclusively among 21-40 years. Other details are as shown in Figure 1 above.

Table 3. Prevalence of ORL trauma by sex according to site of injury.

Gender	Site – n (%)				Total	p-value
	Ear(s)	Facial	Throat	Multiple		
Male	5(7.2)	52(75.3)	4(5.8)	8(11.5)	69 (59.5)	0.199
Female	3(6.4)	34(72.3)	0(0.0)	10(21.3)	47(40.5)	
Total	8(6.9)	86(74.1)	4(3.4)	8(15.5)	116	

Among 86 (74.1%), patients who had facial trauma (as described in figure 1 above), majority were males 52 (75.3%).

Figure 2. Prevalence of ORL trauma by age according to cause of injury.



P-Value 0.743

Among 116 patients who had trauma in the ORL region, majority involved in road traffic accidents (RTA),75 (64.7%) and most of them were in the age group 21-40 (65.1%) followed by other age groups as shown in figure 2 above.

NOTE: Other causes e.g. Fire burns, blasts, and bullet

Table 4. Prevalence of ORL trauma by sex according to cause of injury.

Gender	Cause – n (%)				Total	P-Value
	RTA	Fall	Assault	Others		
Male	47(67.1)	6(8.6)	16(22.9)	1(1.4)	70(100)	
Female	28(60.9)	4(8.7)	14(30.4)	0(0.0)	46(100)	0 .696
Total	75(64.7)	10(8.6)	30(25.9)	1(0.9)	116(100)	

Among patients who had trauma due to road traffic accidents 75 (64.7%), (as described in figure 2 above), majority were males 47 (67.1%).

CHAPTER FOUR

4. DISCUSSION

4.1 PREVALENCE OF OTOLARYNGOLOGICAL TRAUMA BY AGE AND SEX.

The overall prevalence of ORL trauma and its complications in not known in Tanzania. This study revealed the overall prevalence of ORL trauma to be 49.4%.This finding is slightly higher than that found in the study done in Nigeria in 2010 by Mandubueze and others where by the prevalence of ORL trauma was 41.1%[41].

The increase of this prevalence can be related to an increase in economic human activities which predispose them to different kinds of accidents, example road traffic accidents and falls.

A study was done in Afghanistan in the review of head, face and neck injuries sustained by British service men in the battle, found the prevalence of these injuries accounted for 18% in 2006, 28% in 2007 and 23% in 2008 [20].These prevalence are different from this study, the reason could be difference in the study area, injuries occurred in the battle area could be related only to bullet injuries and blasts, while this study considered more other causes as mentioned above.

The findings from this study also revealed, the most common involved age group was 21-40 which constituted 56.8% as compared to other age groups. This finding is the same as that done in Nigeria by Mandubueze and others in 2010, where the modal age was 25 years, which is included in the 21-40 age group[42].

Another study was done in Bamako, Mali, by Keita M and others in 2010, found the mean age to be 27 years, which is also included in the age group 21-40 [43].

The reason for high prevalence of ENT trauma to this age group (21-40) as compared to other age groups could be related to activeness of this age group in economic and social activities which lead to the increase in accidents and urban violence.

In this study it was also found that, men are slightly more involved in ENT trauma as compared to females whereby 58% were male patients and 40.4 % were females. Male

to female ratio was 1.5 to 1. This finding is different from other studies done in different parts of the world.

A study done in Nigeria by Mandubueze and others in 2010, found a male/female ratio of 3.4/1 [42]

A study done in Bamako, Mali by Keita M and others found Male/ Female ratio of 4.3/1.

A study done in Malaysia by Hashim H and others in 2011, showed that, the majority of the patients were Malaysians men between 20years of age [28]

The difference seen between this study and other studies in terms of sex ratio could be related to the increase of involvement of woman in the social-economic activities especially in urban areas which were formerly done by men, which predisposing them to different injuries. ..

4.2 PREVALENCE OF ENT TRAUMA BY SITE.

This study also aimed at identifying sites involved in the ENT region during injury.

In this study it was found that ,the most involved site in the ENT region was the maxillofacial area, which constituted to about 74.1% of all sites and most patients were in the age group 21-40 (79.5%).There were 52(75.3%) males and 34(72.3%) females, Male/Female ratio was 1.5/1.

A study done in India by Shama Y and others in 2011 found maxillofacial area constituted to about 84% of the patients[30]. This finding is slightly higher as compared to the findings in this study. The difference observed could be related to sample size, study area and duration of study.

In Pakistan a study by Khan A and others found 50% of patients had trauma to the facial area (nose) [29], however this study was done in children then comparison may be difficult.

In one study done in Kenya by Odhiambo W, published in 2002, it was found that 78% of the patients sustained maxillofacial injury. This finding is slightly high as compared to the finding in this study(74%).The difference could be explained by the fact that, the study was done to bomb blast survivors in one area and in a short period.

In newzealand a study was done by Goddison and others in 2004, revealed 5% of the patients had associated maxillofacial trauma[27]. These findings are different from the

findings in this study, the difference could be related to study setting or well organized infrastructure in the developed world where people are not more exposed to accidents like road traffic accidents which is the common cause of injuries.

In this study the most common involved age group among patients with facial trauma was 21-40 (79.5%). and males (75.3%) were more affected than females (72.3%).

These findings are similar to other findings in the studies done in different parts of the world.

In Tunisia a study done by Bonguila J and others in 2008. Found the average age for patients sustained facial trauma to be 29 years and sex Ratio was 6:1 in favor of Men[44].

In France, a study done by Lebeau .J in 2006,showed that, most of the facial injury were in the active age group 21-30 and sex ratio was 2.7Male/1Female[26].

A study done in Kenyatta Hospital in Kenya by Chindia Ml and others and published in 2007. Found similar patterns of age group involvement [21-30] and Males predominance as to this study[50]

Other studies in sub-Saharan Africa had similar finding to this study in facial injuries regarding male predominance than female,5:1 in Zimbabwe , 4.5:1 in Senegal and 5.4:1 in Nigeria . This male predominance is related to violence and falls and partly by the traditional role of male as business man in African society; where man may be more exposed to Road traffic accidents than women who stay at home. But from this study, the Ratio of Male to Female is 1.5:1; the gap of Male dominance is decreasing, this could be due to upcoming involvement of women in social-economic activities as Men and are now more exposed to injuries.

In this study, ear injuries occurred in 18.75% of patients and occurred more among age group 0-20.This finding is slightly different from other studies. High proportion to this age group could be related to involvement in physical assault, fight and self inflicted injuries in children.

A study done in Nigeria by Da lily and others on ear trauma (ruptured tympanic membrane) found to account about 8.6% of the patients and the average age was 27 years[48].

From this study, throat injury was least prevalent and occurred in only 3.4% of the patients. All patients were males and the commonest age group involved was 21-40.

This finding is similar to studies done in some other countries.

In the study done in Nigeria by Onotai I.O and others in 2011 found the commonest age group affected to be 31-35 and were all males[46]. High proportion of throat injuries to this age group is related to habits of suicide attempts and physical assaults at this age group.

4.3 PREVALENCE OF ENT TRAUMA BY CAUSE

This study found the commonest cause of trauma in the ENT region to be road traffic accidents, which included motor cycle and car accidents. Road traffic accidents accounted to about 65% of all cases.

The common age group involved in road traffic accidents was 21-40 and majority of the patients were males (67.1%).

The findings from this study look similar to the findings in other studies.

A study done in Tunisia by Bouguila J and others in 2008 found the most common etiologies of injury were car crashes(39%) followed by assaults (28%) and majority of the patients were males, with male to female ratio of 6 to 1 and the mean age was 29 years.[44]

In a study done in Bamako, Mali by Keita M and others in 2010 found that, most injuries in the head and neck region were related to road traffic accidents (93%) [43]

Another study done in Germany by steffen A in 2007 on pattern of ear injuries, found that the frequent causes of ear trauma were traffic accidents (43%),accidents at home (33%) and fight(14%) [39]

A study which was done in Malaysia by Khan A and others in 2005, showed that, the main cause of injury was motor traffic accidents (53.6%).[28]

In a retrospective study done in UK by Bilsk T and others in 2003, found road traffic accidents to be responsible for 52.5% of all patients admitted because of head and neck trauma, followed by assault (34%).[22]

Motor traffic accidents was found to be common cause, occurring in 59.8% patients in a study done in Atlanta, USA by Chan CC in 2005.[23]

From the studies which were done in different countries as shown above, it is observed that, motor traffic accident is a leading cause of otolaryngological trauma and each study has its specific proportion depending on the study area and design.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION.

5.1 CONCLUSION.

This study clearly shows that otorhinolaryngological trauma is prevalent in Tanzanian among head and neck injured patients where by the prevalence was 49.4%.

It was noted that the prevalence of ENT trauma was higher in the age group 21-40(56.8%) than other age groups.

The study showed that, the prevalence of ENT trauma is higher in males (57.9%) than females (40.4%).

In this study, the maxillo- facial area was the commonest involved site (74.1%).

The most common cause of trauma in the ENT region was road traffic accidents (64.7%) followed by physical assault (25.9%), this finding is similar to other studies.

5.2 RECOMMENDATION.

1. Screening of all patients with head and neck injury for the presence of trauma in the ENT region, should be introduced in our country to enable early detection and therefore prevention of complications such as meningitis, mastoiditis, permanent hearing loss and upper air way obstruction.
2. Clinicians and other health care providers should build a habit of evaluating head and neck injured patients for the presence of ear, face and throat injuries and seek consultation from otolaryngologist. ENT examination needs special instruments and skills and therefore needs to be done by otolaryngologist.
3. Further studies are important so as to address the magnitude of ENT trauma in other areas of Tanzania including rural areas.
4. A study to evaluate types of injuries and complications of ENT trauma is also recommended

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APPENDICES

1.1 CONSENT FORM (ENGLISH VERSION)

Consent to participate in a research on otolaryngological involvement in head and neck injury.

The purpose of this study is to find out, how often trauma in the otorhinolaryngology region occurs during head and neck injuries.

Participation needed

If you agree to join the study, you will be required to have examination to the ear, face and throat

Risks

There are no risks expected during examination. No pain or irritation is expected during examination.

Right to withdraw

Taking part in this study is completely voluntary. You will continue to receive all services

That you would normally get from this hospital.

Benefits

In the course of examination any ENT problem that may be found, treatment and advice will be given.

In case of any problem you may contact the following people

1. Dr. Victor Mashamba (Principle investigator).

P.O. Box 65001

Phone number: 0716826888

2. DR. Edwin lyombo (Supervisor),
P.O. Box 65001
phone number; 0715283569

3. Prof Ndesarua Moshi (Second Supervisor)
P.O .Box 65001,Dar es Salaam.
Phone number: 0754279738

Director of Research and Publication, MUHAS

P.O. Box 65001,
Dar es Salaam.
Tel 2152489, 2150302-6
Thank you for your cooperation

Signature_____
Iam informed about the study, benefits and risks.
I hereby agree/disagree to be enrolled in this study
Name…….signature……(patient)
Name…….signature……(care taker if a child or unconscious patient)

1.2 CONSET FORM (KISWAHILI VERSION)

Unaombwa idhini ya kushiriki katika utafiti wa watu wanao uumia eneo la uso,masikio na koo kunako ambatana na kuumia kichwa na shingo. Dhumuni la utafiti huu ni kuona ni kwa kiwango gani uso,masikio na koo huumia wakati mtu anapoumia kichwa na shingo.

Ushiriki wako

Ikiwa utakubali kushiriki,utahitaji kuchunguzwa eneo la uso, masikio na koo

Madhara

Hakuna madhara yoyote yanayo tarajiwa wakati wa kuchunguzwa

Faida

Katika uchunguzi huu,tatizo lolote la pua, koo na masikio litakalo gundulika, matibabu na ushauri vitatolewa.

Haki ya kutoshiriki

Una haki ya kujitoa kutoshiriki katika utafiti huu muda wowote utakapo amua.
Utaendelea kupata huduma zote katika hospitali hii hata baada ya kujitoa.
Kukiwa na shida yeyote wasiliana na wafuatao

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Nimesoma na kuelewa juu ya dhumuni la utafiti huu pamoja na hatari ambazo zinaweza kutokea.

Nimekubali/kutokukubali kushiriki

Jina……sahihi……..(mshiriki)

Jina……sahii…….(ndugu ikiwa ni mtoo au mgonjwa hajiwezi)

1.3 DATA COLLECTION SHEET

INDEX NUMBER……

PART I

1. Name……

2. Age…….

3. Residency …….

4. Gender

A) Male

B) Female

5. Cause of injury

A) RTA

B) Fall from height

C) Assaults

D) Others (e.g. animal/human bite, burn, bullet injuries)

PART II

ORL EXAMINATION FINDINGS

6. Presence of trauma in the ORL region?

a) Yes

b) No

7. SITE involved during trauma in the ORL region

A) Ear(s)

B) Facial

C) Throat

8. Presence of multiple injuries in the ORL region?

A) Yes

B) No

9. Sites involved in multiple injuries in the ORL region.

A) Maxillofacial and Ear B) Maxillofacial and Throat C) Throat and Ear

D) Maxillofacial, Throat and Ear.