CLINICAL CHARACTERIZATION OF TINNITUS AND ITS EFFECT ON QUALITY OF LIFE AMONG PATIENTS ATTENDING ENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL

Raymond Leiya, MD

MMed (Otorhinolaryngology) Dissertation
Muhimbili University of Health and Allied Sciences
October, 2014

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By

Raymond Leiya, MD

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

Muhimbili University of Health and Allied Sciences
October, 2014

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences, a dissertation entitled; **"Clinical characterization of Tinnitus and its effect on quality of life among Patients attending ENT Clinic at Muhimbili National Hospital"** 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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Dr. Enica Richard

Supervisor

_____

Date

_____

Prof. N. Moshi

Co-Supervisor

_____

Date

DECLARATION AND COPYRIGHT

I, **Raymond Leiya**, 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 similar or any other degree award.

Signature……..... **Date**……

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ACKNOWLEDGEMENT

It is not possible for a single individual to cover all the aspects that has made this dissertation into the way it is. I therefore sincerely thank all those who have, with such good grace, given their time and energy to supply valuable opinions, facts or even moral support.

Much appreciation should go to my supervisor Dr Enica Richard for her endless guidance and for her patience as she devoted her time to the supervision of this work. In her absence the dissertation would not have been completed. My heartfelt appreciation is directed to the Head of Department ORL, Prof. Ndesarua Moshi and all other members of the department for their contributions and constructive ideas which made this work possible

DEDICATION

To my dear and lovely wife, Matilda for her support, patience and care. My daughters Lina and Noela for the encouragement they gave me and for their patience while I was busy with studies. My dear Parents Mr. and Mrs. Angaufoon Alelungwa Nkya, who continuously pray and support me to become a great doctor, lastly Al mighty GOD for being there for me through out my studies.

ABSTRACT

Introduction

Tinnitus is a prevalent problem. It can cause significant levels of distress including anxiety, irritability, depression, sleep disturbances, obsessive compulsive disorders and somatisation to its sufferer thereby affecting their quality of life (QOL). These effects affect the response to treatment and can be measured using self reported questionnaires like the Tinnitus Handicap Inventory. This study will describe the characteristics of tinnitus and its impact on the QOL of adult sufferers in the Muhimbili Hospital ENT clinic.

Objective To determine clinical characteristics of tinnitus patients attending ENT clinic in Muhimbili and their effects on quality of life

Study Design: A Descriptive cross-sectional hospital based study.

Study Location; The study was conducted between august 2013 and January 2014 at the ENT outpatients' clinic, Muhimbili Hospital, Dar es Salaam Tanzania.

Subjects and Methods

A total of 1181 attended ENT clinic at Muhimbili National hospital and 92 patients had tinnitus. The instrument for the data collection was a close-ended questionnaire that elicited information on demographic, Tinnitus handicap inventory score to asses quality of life and history of tinnitus from the sample population.

Data analysis was done by using the statistical package for social science (SPSS version 11). The results presented using, descriptive statistics, cross-tabulation and test of associations

Results:

1181 patients were screened during the study period, 92 (7.8.%) were found to have tinnitus. 52(56.5%) were males and 40(43.5%) were females.The most affected age group being 39-48years(24%). Most patients had tinnitus for 4weeks to 1year(39.1%), most prevalent origin being the right ear(53.3%).Quality of life was affected slightly in 75% of patients with tinnitus and among the slightly affected group,age group 29-38year were more prevalent.(84%)p=0.12. Female had 83.5% in slightly affected group with p=0.21. Number of type of tinnitus heard had impact on quality of as those with more than one type of tinnitus heard had more moderate to catastrophic effects.(79%)p=0,002. Patients who had tinnitus for less than 4 weeks their quality of life was affected moderate to catastrophic with 63%. p=0.04.

Recommendation:

The study had limitations of short duration, small sample and lack of equipements that could match the tinnitus pitch.

Long duration studies incorporating adequate researchers to increase power of study and proper equipments are required to get sufficient data for analysis so as to establish proper treatment options of tinnitus among our settings.

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LIST OF ABBREVIATIONS

2AFC:		Two-alternative Forced Choice
ERA	:	Evoked Response Audiometry
dB	:	Decibel
dBHL	:	Decibel Hearing Level
ENT	:	Ear, Nose and Throat
GABA	:	Gamma Amino-butyric Acid
LDL	:	Loudness Discomfort Level
MML	:	Minimum Masking Level
OAE	:	Otoacoustic Emissions
PTA	:	Pure Tone Audiometry
QOL	:	Quality of Life
RI	:	Residual Inhibition
SL	:	Sensational Level
STSS	:	Subjective Tinnitus Severity Scale
TEQ	:	Tinnitus Effect Questionnaire
THI	:	Tinnitus Handicap Inventory
THQ	:	Tinnitus Handicap Questionnaire
TRQ	:	Tinnitus Reaction Questionnaire
TRT	:	Tinnitus Retraining Therapy
TSS	:	Tinnitus Severity Scale
WHO	:	World Health Organization
EAC	:	External Auditory Canal

OPERATIONAL DEFINITIONS

Conductive Hearing loss:	Hearing loss due to interference with the mechanical reception or amplification of sound to the cochlea due to either congenital and/or acquired abnormalities in the outer and middle ear.
Decibel:	The unit of sound intensity that is a ratio of two pressures or intensities that indicates how much larger one sound is than another, expressed in logarithmic units.
Decibels hearing level:	0 dB HL is the softest sound that can be heard by the average person with normal hearing.
Handicap:	A disadvantage for a given individual, resulting from impairment or a disability, that prevents the fulfillment of a role that is considered normal (depending on age, sex and social and cultural factors) for that individual.
Hearing impairment / loss:	Total loss or partial decrease in the ability to detect sounds.
Pitch:	Subjective perception of the frequency of a sound.
Pure Tone Audiometry:	A test to establish hearing threshold sensitivity across the range of audible frequencies important for human communication, usually over the range from 250-8000Hz determined at octave intervals.
Pure-tone average:	The average of hearing sensitivity at 500, 1000, and 2000 Hz.

Quality of Life:	An individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns
Sensorineural HearingLoss:	A hearing loss whose cause is insensitivity of the inner ear (the cochlea) or impairment of the function of the auditory nervous system.
Tinnitus:	A conscious experience of a sound that originates in the head or neck, and without voluntary origin obvious to that person

CHAPTER ONE

1.0 INTRODUCTION

Various definitions of tinnitus have been proposed by several researchers. One of the earliest definitions was coined by Itard (1774–1838), who described tinnitus as "an extremely irksome discomfort, which leads to a profound sadness in affected individuals (1). Shulman defined tinnitus as "the aberrant perception of sound reported by a patient that is unrelated to an external source of stimulation," whereas Jastreboff mainly referred to the most recent neurophysiological acquisitions regarding the auditory function and described tinnitus as "the perception of sound that results exclusively from activity within the nervous system without any corresponding mechanical or vibratory activity within the cochlea and it's not related to external stimulation of any kind" (2,3). McFadden defined tinnitus as "the conscious experience of a sound that originates in the head or neck and without voluntary origin obvious to that person" (4). There is however no universally acceptable definition of tinnitus.McFadden definition of tinnitus is applied in our study.

Tinnitus is a prevalent problem that remains poorly understood by healthcare professionals today. The working group 89 reported that about 32% of all US adults had suffered from tinnitus at one time or another in their lives and that 6.4% characterized the tinnitus as severe or debilitating (4). In England, Coles found that 16% to 19% of people over the age of 17 had experienced tinnitus (5). Of these individuals, at least 8% experienced tinnitus as a moderate to severe annoyance or causing interference with sleep. In 1991 Turitwenka found that 41.9% of factory workers in Uganda had experienced tinnitus although only 1.3% was bothered by it (6). From our search we couldn't find any published literature on tinnitus prevalence from Tanzania.

Tinnitus should be considered a symptom rather than a disease (7, 8). Among the various pathologies that may cause or accompany tinnitus are otitis media, otosclerosis, Ménière's disease, presbycusis, exposure to noise and ototoxic drugs, sudden sensorineural hearing loss,

head trauma, acoustic neuroma, meningitis, and temporomandibular joint disorders (9-12). Hypotheses regarding the mechanism of tinnitus generation are numerous. They include peripheral disorders like inner hair cell and glutamate excitotoxicity. Middle central nervous system involvement, such as dorsal nucleus hyperactivity and GABA (gamma amino-butyric acid) receptor and inferior colliculus dysfunction or poor reactivity has also been noted. Complex pathogenetic or holistic hypotheses in the higher central nervous system involving stress mechanisms and interactions among hair cells, inferior colliculus, amygdala, and limbic and cortical projections have also been proposed (13-17).

Patients of tinnitus use different words to describe their tinnitus depending on the characteristics of the tinnitus. Such words may include ‘hum’, ‘buzz’, ‘ring’, ‘pulse’, ‘whistle’, ‘high-pitched’ or ‘low-pitched sound’. Some tinnitus sufferers report perceiving more than one type of tinnitus sound. These patients experience greater levels of distress including more concentration difficulties, irritability and sleep disturbances than those that perceive only one type of sound (18, 19). The tinnitus may seem to emanate from one ear, both ears or from somewhere in the head.

Although tinnitus is not a life threatening condition, it can cause significant levels of distress to its sufferer thereby affecting their quality of life. Tinnitus has been associated with substantial modifications of behavior, including anxiety, irritability, depression, sleep disturbances, obsessive compulsive disorders and somatization (20). Patients who are troubled by their tinnitus report considerable distress with negative effects on mood, sleep, concentration, and daily functioning (1). One study by Lim J et al found that 29.4% of patients with tinnitus reported feeling frustrated because of their tinnitus. They also reported getting upset because of the tinnitus and having trouble falling asleep. About 53% of them reported feeling like they had no control over their tinnitus (19). In the United Kingdom, Lewis et al noted that tinnitus was a risk factor for suicide especially in patients with other risk factors such as mental illness, old age and social isolation (21).

Severe tinnitus can be distinguished by subjective reports of the sound as being intrusive and irritating, but there are no objective ways to measure the level of distress. For example, it has not been possible to differentiate severity levels of tinnitus by looking at features of the sound itself (e.g. loudness, pitch, character, maskability). This lack of correlation between physical intensity of tinnitus, its acoustic characteristics and reported discomfort led to the use of questionnaire-based assessment methods. Such questionnaires include the Tinnitus Severity Scale (TSS) (22), Tinnitus Handicap Questionnaire (THQ) (23), Subjective Tinnitus Severity Scale (STSS) (24), Tinnitus Reaction Questionnaire (TRQ) (25), Tinnitus Questionnaire (TQ) (26) and the Tinnitus Handicap Inventory (THI) (27). Among these questionnaires, the THI appears to be widely endorsed in many clinical and research settings and is gaining recognition as a useful tool for quantifying the impact of tinnitus on daily life (28). It is the questionnaire of choice for this study (**Appendix I**).

On the other hand, specialized audiometric tests like pitch and loudness matching, residual inhibition (RI) and minimum masking level (MML) are used to find out the subjective qualities of tinnitus. Pitch and loudness matching may be used to characterize tinnitus frequency and intensity. MML is the difference between the threshold of tinnitus and the lowest intensity that masks the tinnitus. RI is measured as partial or full inhibition of tinnitus after 60 seconds of application of MML + 10 dB. These psychophysical measurements have a limited value due to the variability of tinnitus loudness and the poor correlation between tinnitus loudness and tinnitus distress but are useful in counseling and monitoring outcomes. Audiological tests like audiometry for pure tones and speech, impedance testing, evoked response audiometry (ERA) and otoacoustic emissions (OAE) may be used to asses etiology of tinnitus.(28)

Various different treatment modalities have been proposed for tinnitus therapy with unsuccessful or unproven results. These treatments range from medical therapy with glutamate antagonist and tricyclic antidepressants to physiological treatments like trans-cranial magnetic stimulation depending on cause of tinnitus (29, 30). Newer treatment modalities like the

Tinnitus Retraining Therapy (TRT) based on recent neurophysiologic understanding of the auditory pathway are now widely used (3). TRT involves directive counseling and the use of sound generators to facilitate habituation. Wearable low-level broadband noise generators are used to generate sound to counteract the tinnitus. The counseling is aimed at actively changing the way the patient thinks about their tinnitus thereby reversing the distress produced by the tinnitus by removing the negative association given to the tinnitus signal (habituation of the reaction).. TRT has been shown to reduce the negative impact of tinnitus by 60-80% (3).

1.1 PROBLEM STATEMENT

Tinnitus is a chronic condition that can have a debilitating effect on the quality of life of its sufferers. Several investigators have shown that people with self-reported moderate to severe tinnitus experience excessive stress, irritability, poor concentration, sleep disorders and depression which affects their emotional balance and their ability to cope (19, 31-33). These distressing effects of tinnitus should be addressed in the management of these patients.

In Muhimbili, unpublished records from the ENT clinic show that averagely 54 patients with self-reported are seen per year. These records do not however reflect the effects of the tinnitus of their quality of life. Moreover, no published studies on the effects of tinnitus on the quality of life of sufferers in our setting exist.

Tinnitus being a chronic condition, many of the tinnitus sufferers attends the ENT clinic seeking for a cure to their tinnitus. They are however treated depending on the cause of tinnitus, for with little or no improvement occurs and counseling is given to all patients. Tinnitus retraining therapy (TRT) which is now widely recommended in management of tinnitus focuses on directive counseling to aid the patients' coping mechanisms. It has shown to reduce the negative impact of tinnitus by 60-80% (3). The scarce of literature on locally presentation of tinnitus patients leads to little evidence of areas of focus on designing effective counseling programs that suites type of patients we have in our country.

1.2 JUSTIFICATION OF THE STUDY

This study investigated the characteristics and effect of tinnitus on the quality of life of adult patients in our setting, thereby filling a knowledge gap that currently exists. The study also described the characteristics of tinnitus experienced by these patients. Studying the distress caused by tinnitus to patients in our community helped to provide knowledge that will form a basis for further research on tinnitus in this country.

- To establish tailored counseling programs to our patients.
- As a partial fulfillment of Degree of Master of medicine in ENT.

1.3 OBJECTIVES

1.3.1 General objective

To determine clinical characteristics of tinnitus among patients attending ENT clinic in Muhimbili and their effects on quality of life

1.3.1 Specific objectives

- To determine the prevalence of tinnitus among the ENT clinic patients.
- To Describe clinical characteristics of tinnitus among patients attending ENT clinic in Muhimbili
- To determine the effects of tinnitus on the quality of life of adult patients attending ENT clinic.

1.4 LITERATURE REVIEW

1.4.1 Tinnitus and Quality of Life

Tinnitus is defined as "the conscious experience of a sound that originates in the head or neck and without voluntary origin obvious to that person" (4). Quality of life (QOL) on the other hand is defined as 'an individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns' (34). Several researchers have observed that people with self-reported severe tinnitus experience excessive stress which affects their emotional balance and their ability to cope (31-33). It also seems plausible that tinnitus sufferers experience stresses from a number of other sources not directly related to the presence of tinnitus. Life stresses such as career or domestic pressures, and emotional states such as anxiety or depression may compound the reaction to tinnitus (18). These stresses may then be compounded by the tinnitus making a seemingly mild tinnitus very distressing to the patient.

The effects of tinnitus on the quality of life can be assessed using standardized subjective questionnaires like the Tinnitus Handicap Inventory (THI) (**Appendix** I). In a study carried out in London, Lucy Handscomb used the THI to evaluate 247 patients with tinnitus as the primary complaint. She found that 11.3% had no handicap, 27% were mildly handicapped while 21.9% and 39.8% were moderately and severely handicapped respectively. Item C19 ("Do you feel that you have no control over your tinnitus?") had the most number of 'yes' responses across the no handicap (25.8%), mild handicap (56.7%), moderate handicap (71.6%) and severe handicap (83.4%) categories. Other questions that had high mean scores included C8 ("Do you feel as though you cannot escape your tinnitus?") and E24 ("Does your tinnitus get worse when you are under stress?") Many patients reported feeling frustrated, inability to concentrate, failure to fall asleep at night and feeling upset by their tinnitus. The author agreed that experiencing a lack of control was a particularly severe response, which was significant enough to prompt people to seek help, even when their tinnitus did not have a particularly large impact on their overall life (35).

On the other hand, a study carried out on 327 tinnitus sufferers by Lim J et al in Singapore in 2010 found that 33% had no handicap, 31% had a mild handicap, 18% had a moderate handicap and only 19% had a severe handicap (19). This difference may be attributed to the differences in the cultural and socio-economic aspects of the two study populations. The study by Lim J et al was carried out in predominantly Chinese population (80.7%) while the study by Lucy Handscomb was done in a more affluent English speaking society of London. It's worth noting that in the London study, the THI questionnaires were posted to the respondents while with the study in Singapore the questionnaire was answered in the hospital.

Similar to the study by Lucy Handscomb however, Lim J et al found that item C19 in the THI had the highest percentage of positive responses at 53.2% (19). Questions concerning feeling frustrated, irritability, difficulty falling asleep and anxiety also had higher positive responses in this study. Two other studies using the THI reported similar results. In the first study, conducted by Newman et al, 63% of the 66 subjects had a positive response to this question, and the authors cited lack of control as a common feeling and one of "the most severe reactions to the tinnitus sensation" (27). In the second study, 65% of the 80 consecutive tinnitus clinic patients had a positive response to this question (36).

1.4.2 Determinants of degree of Handicap

The number of tinnitus sounds perceived by a sufferer has a bearing on the severity of the handicap. Tinnitus sufferers often report perceiving more than one type of tinnitus sound. An online Tinnitus Archive, comprising data for 1,630 adult patients who presented at a tinnitus clinic in the United States of America, found that 46.1% of the patients reported experiencing more than one sound (37). Some studies have demonstrated an association between the severity and impact of tinnitus and the number of different sounds heard by the patient. In a study carried out in a Swedish audiology clinic, it was found that 35 (40.1%) of the 87 patients with tinnitus reported hearing 'combined' sounds (a combination of tonal and buzzing tinnitus).

Similar findings were demonstrated in a recent study by Lim J and his colleagues in Singapore. They found that patients who perceived more than one type of sound were more likely to suffer a more severe tinnitus handicap compared with those that perceived only one type of sound (19).

The severity of handicap caused by tinnitus does not appear to be related to gender or to hearing loss. This was illustrated by Ferreira LM et al who studied 100 elderly (> 60 years old) tinnitus patients who presented at an ear, nose and throat (ENT) clinic in Brazil. Although 42% expressed emotional distress and 80% had symmetrical hearing loss, the authors did not find a correlation between hearing impairment and the degree of disturbance that these patients felt with regard to their tinnitus using a visual analog scale (38). Similarly, Lim J et al found no statistically significant difference in the handicap scores between those with hearing loss and those with normal hearing in their study (19). They also found no statistically significant differences in the mean total and subscale scores of the THI between the male and female patients. Epidemiological studies of tinnitus have also not been able to demonstrate any gender differences (1).

1.4.3 Characteristic of tinnitus

Tinnitus may be described in different words depending on the acoustic experience of the sufferer. Heller and Bergman supplied a list of 39 words used by 80 normal- hearing and 100 hearing-impaired subjects to describe their tinnitus. For those with normal hearing, "hum," "buzz," "ring," and "pulse" were used by 18 percent, 15 percent, 12 percent, and 8 percent, respectively. For the hearing- impaired, "ring," "buzz," "hum," and "whistle" were used by 30 percent, 11 percent, 10 percent, and 9 percent, respectively (39).

Perceived tinnitus may have both temporal and spectral characteristics. The sound may be continuous, fluctuating or interrupted. It may be spectrally simple that is, tonal or narrowband, or spectrally complex (wideband, multiple but relatively discrete frequency regions). It may seem to emanate from one ear, both ears or somewhere inside the head. Bilateral tinnitus is generally perceived as more intense in the left ear. Unilateral tinnitus occurs in the left ear (5, 19). The tinnitus quality however, is rarely an accurate guide to the site of origin. Some exceptions are the pulsatile tinnitus of objective vascular origin and the low-frequency roaring tinnitus of Meniere's disease and otosclerosis (2).

One of the characteristics used in describing tinnitus is tinnitus pitch. Audiometers are used to determine the tinnitus pitch by use of pure tones or broadband noise. No single tone however, characterizes the sound perceived (or its representation within the auditory system) (40). It is known from psychoacoustics on normal listeners, that people can match the pitch of a pure tone to the edge or to the center frequency of a band of noise. Several investigators have observed that the stimulus (pure tone) employed in audiometry might change the tinnitus, and that some individuals report their tinnitus pitch changes. Stouffer and Tyler reported that 50% of the 528 tinnitus patients studied reported that the pitch of their tinnitus varied either within a day or from day to day (41). Henry and Meikle suggested that many patients reported that their tinnitus contains many different pitches; therefore it may be difficult to match the tinnitus to a single pitch (42). The concept of ‘the most prominent pitch’ has therefore been advocated for (43).

Most patients will describe their tinnitus as being high pitched. This was demonstrated by Tao Pan and his colleagues in a study conducted at the University of Iowa in 2009. They found an average pitch of 4968 Hz in the 195 patients recruited in their study. Nearly half of these patients had their tinnitus matched at 8000 Hz or above (40). Reed (1960) and Vernon (1987) found that most of the patients had their pitch match frequency around and above 3000 Hz (44, 45). Stouffer and Tyler (1990) observed that patients typically rated their tinnitus as being

high-pitched (over 7 on a scale from 0 to 10) (41). Meikle (1995) reported that the pitch match frequency in 33% patients was between 3500 and 6499 Hz (46).

The intensity of tinnitus is measurable in sensational levels (SL). Reports of the measurement of the loudness of tinnitus in the literature indicate that the majority of the tinnitus patients experience tinnitus at a level of within 5 to 10 dB of their thresholds and that almost all tinnitus patients experience tinnitus within 30 to 40 dB of their thresholds (47, 48, 49). Vernon (1978) reported that in 513 tinnitus patients with severe tinnitus, the loudness of tinnitus was usually measured at 5-10 dB SL; however, he had recorded it at 40 dB SL in some patients and at 70 dB SL in one patient (48). The older individuals appear to perceive greater sensation of tinnitus intensities than their younger counterparts. This was shown by Raquel Prestes and Daniela Gil in a study in Brazil. They investigated tinnitus sufferers between 17 and 60 years and found a mean loudness of 31.86 dB SL among patients up to 28 years of age and 56.84 dB SL in those older than 28 years (49). The authors used the age of 28 years to arbitrarily divide the study population. In this same study, the authors also found that hearing impaired patients experienced double the loudness of tinnitus compared with the patients with normal hearing. They attributed this to the increase in hearing threshold in this group. The degree of discomfort, intolerance or incapacity caused by tinnitus to the individual was however, not related to the loudness (sensation of intensity) of the tinnitus (19, 38, 47, 49).

CHAPTER TWO

2.0. METHODOLOGY

2.1. Study design

The study was a descriptive Prospective Hospital based cross sectional study.

2.2. Study population

The study population included all patients aged 18 years or above presenting with tinnitus to the ENT outpatients' clinic during the study period.

2.3. Selection criteria

2.3.1. Inclusion criteria

- Patients who presented with tinnitus during the study period who were eighteen years and above.
- Patients who agreed to consent for participation in the study.

2.3.2. Exclusion criteria

- Patients who were previously diagnosed with psychiatric illnesses including mood disorders or other obvious stressful situations.
- Patients who refused to consent for participation.

2.4. Sample size

Sample size determination

The sample size was calculated as follows;

Using the **Kish Leslie formula (1965);**

$$n = \frac{(Z_{0.025})^2 \times P(1-P)}{D^2}$$

Where;

- $Z_{0.025}$ = standard critical value at 95% confidence= 1.96
- P = the expected proportion of patients seen with tinnitus at the ENT outpatients' clinic. The value of P, was set at 0.06 from previous study.( )
- N = the estimated sample size
- D = level of significance; for the study we have selected a significance of 5% because of the resources available, including time.

Substituting;

$$n = \frac{1.96^2 \times 0.06(1-0.06)}{0.05 \times 0.05}$$

$$= \frac{0.216667}{0.0025}$$

$$= 86.7 \approx 87$$

A total of 87 patients was a minimum number to be recruited in the study.

2.5. Sampling procedure

The study comprised a prospective analysis of 1181 adult patients who attended ENT clinic between Augost 2013 and January 2014 at Muhimbili National Hospital. All patients who fulfilled the criteria were studied by research assistant and principle research officer.A close-ended questionnaires were given to them to elicit information on demographic, quality of life (Tinnitus handcap inventory), history of tinnitus and otoscopic findings.

Manual analysis was carried out through sorting out all the questionnaires. Data were filled into and analysed by SPSS program version 20, using "t" test and "chi-square" statistical analytical tests and statistical significance was set as a P value < 0.05**.**

2.6 Ethical Clearance

Ethical clearance was sought from MUHAS ethical committee which provided a letter of introduction with request to conduct the study at Muhimbili National Hospital.

A written informed consent was obtained from the participants. The informed consent included a clear explanation of the purpose of the study and the possible benefits and risks. Participants were free to self discontinue if they did not continue participating in the study. Such patients were still attending regular clinic.

Data collected was handled with confidentiality. The names of the participants was be coded. The information that was entered into the computer was only accessed using a password known only by the researcher and the supervisors.

Patients received treatment including counseling as part of the tinnitus retraining therapy (TRT). They were also educated and given appointments for follow-up as part of the management of their tinnitus.

2.7 Study Limitations

Short duration of the study hampered collection of sufficient data.

This study represents data only from Muhimbili National Hospital at ENT clinic, therefore may not reflect a true National image of the magnitude of Tinnitus.

CHAPTER THREE

3.0 RESULTS

1181 patients were screened during the study period, 92 (7.8.%) were found to have tinnitus. 52(56.5%) were males and 40(43.5%) were females.The most affected age group being 39-48years(24%). Most patients had tinnitus for 4weeks to 1year(39.1%), most prevalent origin being the right ear(53.3%).Quality of life was affected slightly in 75% of patients with tinnitus and among the slightly affected group,age group 29-38year were more prevalent.(84%)p=0.12. Female had 83.5% in slightly affected group with p=0.21 however number of type of tinnitus heard had impact on quality of as those with more than one type of tinnitus heard had more moderate to catastrophic effects.(79%)p=0,002. Patients who had tinnitus for less than 4 weeks their quality of life was affected moderate to catastrophic with 63%. p=0.04.

Table 1: Age and Sex distribution of patients

Age group	**sex**				**Total**	**%**
	M	**%**	**F**	%		
19-28	111	56	86	44	197	17
29-38	110	47	125	53	235	19
39-48	150	58	108	42	258	22
49-58	122	48	133	52	255	22
>59	112	47	124	53	236	19
Total	605	51	576	49	1181	100

Males were 51% and females were 49%, majority belongs to age group between 39-48 and 49-58

Table 2: Distribution of patients by tinnitus and Sex.

Sex	**Tinnitus**				**Total**	**%**
	Yes	**%**	**No**	**%**		
M	52	9	553	91	605	51
F	40	7	536	93	576	49
Total	92	**7.8**	1089	92.2	1181	100

Patients with tinnitus were 7.8% among total screened patients.

Table 3: Age and Sex distribution of patients with tinnitus

Age group	**sex**				Total	
	Male		Female		N	%
	n	%	n	%		
19-28 years	8	53.3	7	46.7	15	16.3
29-38 years	8	42.1	11	57.9	19	20.6
39-48 years	15	68.2	7	31.8	**22**	**24.**
49-58 years	9	47.4	10	52.6	19	20.6
59 > years	12	70.5	5	31.3	17	18.5
Total	52	**56.5**	40	**43.5**	92	100

Among patients with tinnitus, Males were 56.5% and females were 43.5%, majority belongs to age group between 39-48 years.

Table 4: Distribution of patients with tinnitus by origin of tinnitus

Origin of the tinnitus	n	%
Right ear	**48**	**53.3**
Left ear	28	31.1
Both ears	13	14.4
Not from the ear but somewhere in the head	3	1.1
Total	92	100

Majority 53.3% located right ear as the origin of tinnitus. Few 1.1% had located the origin of tinnitus not from the ear but somewhere in the head.

Table 5: Distribution of patients with tinnitus by the number of sound they heard.

No of sounds heard	**n**	**%**
One type	77	**83.7**
More than one type	15	16.3
Total	92	100

Among patients with tinnitus, majority heard one type of tinnitus (83.7%)

Table 6: Distribution of patients with tinnitus by the number of types of sound heard.

The type of sound	**n**	**%**
Bee like	**60**	**65.9**
Ocean waves	14	15.4
Bell like	11	12.9
Harmer sounds	5	5.5
Car horn	2	1.1
Total	92	100

The most common type of sound heard was bee like (high pitched)-65.9%

Table 7: Distribution of patients with tinnitus by age group and the quality of life.

	Slight/mild	**%**	**Moderate-catastrophic**	**%**	**Total**	**%**
19-28	12	80	3	20	15	16.3
29-38	16	84	3	16	19	20.6
39-48	17	77	5	23	22	24
49-58	12	63	7	37	19	20.6
59>	12	71	5	29	17	18.5
Total	**69**	75	19	21	92	100

Majority of patients quality of life was affected slightly/mildly **75%,** among those age group 29 **to 38yrs** was mostly affected. **(84%) p=0.12**

N.B: Slightly-tinnitus is perceived only in silence and is easily masked. It does not interfere with sleep or with daily activities)

Table 8: Distribution of the patients with tinnitus by sex and the quality of life.

Sex	Slight/mild	%	Moderately-catastrofic	%	Total	%
Male	36	69	16	31	52	56.5
Female	33	83	7	17	40	43.5
Total	69	75	23	25	92	100

Majority of patients whose quality of life was affected slightly/mildly were females **(83.5%) p=0.21**

Table 9: Distribution of patients with tinnitus by number of sounds and quality of life

How many sounds do you hear	Slight/mild	%	Moderately-Catastrophic	%	Total	%
One type	64	94	4	6	68	74
More than one type of sound	5	20	19	79	24	26
Total	69	75	23	25	92	100

Majority of patients who heard more than one sound of tinnitus, quality of life was affected moderately to catastrophic-**79%**, **p=0.002**

Table 10; Distribution of patients with tinnitus by duration of tinnitus and quality of life

Duration of tinnitus	**Slight/mild**	**%**	**Moderately-Catastrophic**	**%**	**Total**	**%**
Less than four weeks	3	37	5	63	8	8.7
4 weeks to 1 year	33	92	3	8	36	39.1
1 year to 5 years	23	70	10	30	33	35.9
Over 5 years	10	67	5	33	15	16.3
Total	69	75	23	25	92	100

Majority of patients who had tinnitus for less than 4 weeks, their quality of life was affected moderate to catastrophic with **63%. p=0.04** though patients with tinnitus for 4weeks to 1 year had 39.1% off all patients with tinnitus.

NB: **Moderate**; Tinnitus is perceived even in the presence of environmental sound; however, daily activities are not impaired. It is perceived less under concentration. Interference with sleep and relaxing activities is not infrequent.

catastrophic -All side effects caused by tinnitus are present at a very severe level. The subject requires medical assistance very frequently, including neuropsychiatric help.

CHAPTER FOUR

4.0 DISCUSSION

Tinnitus is a symptom and not a disease, in most cases no specific cause is found, it can be flustrating problem for both the patient and the clinician. (7)
This study was done to establish the clinical characteristics of tinnitus among patients attending ENT clinic in muhimbili national hospital.

The prevalence of tinnitus among adult patients was found to be 7.8%. This is relatively high when you compare with the study done in Nigeria assessing the prevalence of tinnitus among Nigeria living in Ife central local government area of osum state.(45)
In America, the prevalence of tinnitus is about 15% in study done by American tinnitus Association. (12).

Generally the prevalence of tinnitus is much higher than the number of patients who seeks treatment thus indicating that many individuals who experience tinnitus do not find it to be a significant or debilitating problem.

Among 92 patients with tinnitus, males were 56.7%, mostly affected age group was 39-48yrs with 24%. In the study majority of patients had tinnitus for 4weeks to 1 year(39.1%) and about 53.3% had located right ear as origin of tinnitus, no explanation other than by chance could be given to this finding, further research shuld be done.

Bee like tinnitus was most prevalent type of tinnitus heard (65.9%).
In the study done in Nigeria, the most common type of tinnitus heard was a whistling sound. (45)
Type of sound tinnitus rarely can be correlated with the underlying medical desease as ocean waves tinnitus is associated with meniers desease, more studies are needed to evaluate on this as it was beyond the scope of this study.

Severe tinnitus that could interefere with work, sleep, concentration and social interaction occurred in the study by only 4%. Severity of tinnitus was observed with advancing age of the patients in this study, this is constintent with findings in United States and Europe where age has been identified as an independent risk factor for tinnitus.(35) Other studies have shown a close association of tinnitus with ear disease in the elderly.

It was also observed that Males were having more severe tinnitus grades when compared with females though the p value was not significant. In other studies, severity of tinnitus does not relate to gender as the study done in America by ferreire lm et al.(38)
Psychological factors may play a significant role in determining individuals reaction to tinnitus.(eg some people are accustomed to solving their own problems where others need a great deal of support(49) and women were more likely to report emotional reaction to tinnitus than men.(35)

Number of types of tinnitus heard had an effect on quality of life in this study as those who heard more than one type of tinnitus had severe THI score tinnitus grades with p value of 0.002.This is in accordance with the study done in Swedish audiological clinic where 40.1% of the patients who heard more than one type of tinnitus had more concentration, irritability and sleep disturbances.(35)

Duration of tinnitus play a significant role in quality of life among its patient, as its clear from this study those who had tinnitus for less than four weeks had moderate to catastrophic effects.(63%) p=0.04
It is unknown that 80% of chronic tinnitus patients suffer little or have no treatment seeking effects from their tinnitus and about 20% manifest a clinically significant condition.( )
Hallam et all surmised that an adaptation effect seems to take place that causes tinnitus to become less of a problem over time:” habituation model of tinnitus”(45)

The trigger for adverse or intrusive effect of tinnitus to quality of life is sometimes unrelated to the associated medical condition. Stress, psychological factors, bereavement, unemployment or various physical and mental illnesses can trigger intrusive tinnitus.

CHAPTER FIVE

5.0 CONCLUSION

Tinnitus may be a symptom rather than a disease but it bares a significant effect in quality of life among it patients.

Advanced age group represents an important risk for severity of tinnitus as do the number of sounds heard among its patients.

Treatment option remains counseling (Tinnitus retraing therapy), masking and medical (anxiolytics, antipsychotics, sedatives, antidepressants, antihistamines, anticonvulsants and even anesthetics) for those with un curable causes of tinnitus.

5.1 RECOMMANDATION

The study had imitations of short duration, small sample and lack of equipements that could match the tinnitus pitch.

Long duration studies incorporating adequate researchers to increase power of study and proper equipments are required to get sufficient data for analysis so as to establish proper treatment options of tinnitus among our settings.

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APPENDICES

Appendix I. Tinnitus Handicap Inventory

SERIAL NO.……..……

DATE……..…….……..…….

The purpose of the scale is to identify the problems your tinnitus may be causing you.

Circle "Yes," "Sometimes," or "No" for each question. Do not skip a question.

1	Because of your tinnitus is it difficult to concentrate?	Yes	Sometimes	No
2	Does the loudness of your tinnitus make it difficult for you to hear people?	Yes	Sometimes	No
3	Does your tinnitus make you angry?	Yes	Sometimes	No
4	Does your tinnitus make you feel confused?	Yes	Sometimes	No
5	Because of your tinnitus do you feel desperate?	Yes	Sometimes	No
6	Do you complain a great deal about your tinnitus?	Yes	Sometimes	No
7	Because of your tinnitus do you have trouble falling to sleep at night?	Yes	Sometimes	No
8	Do you feel that you cannot escape your tinnitus?	Yes	Sometimes	No
9	Does your tinnitus interfere with your ability to enjoy social activities (such as going out to dinner, to the movies)?	Yes	Sometimes	No

10	Because of your tinnitus do you feel frustrated?	Yes	Sometimes	No
11	Because of your tinnitus do you feel that you have a terrible disease?	Yes	Sometimes	No
12	Does your tinnitus make it difficult for you to enjoy life?	Yes	Sometimes	No
13	Does your tinnitus interfere with your job or household duties?	Yes	Sometimes	No
14	Because of your tinnitus do you find that you are often irritable?	Yes	Sometimes	No
15	Because of your tinnitus is it difficult for you to read?	Yes	Sometimes	No
16	Does your tinnitus make you upset?	Yes	Sometimes	No
17	Do you feel that your tinnitus problem has placed stress on your relationship with members of your family and friends?	Yes	Sometimes	No
18	Do you find it difficult to focus your attention away from your tinnitus and on other things?	Yes	Sometimes	No
19	Do you feel that you have no control over your tinnitus?	Yes	Sometimes	No
20	Because of your tinnitus do you often feel tired?	Yes	Sometimes	No
21	Because of your tinnitus do you feel depressed?	Yes	Sometimes	No
22	Does your tinnitus make you feel anxious?	Yes	Sometimes	No
23	Do you feel that you can no longer cope with your tinnitus?	Yes	Sometimes	No
24	Does your tinnitus get worse when you are under stress?	Yes	Sometimes	No
25	Does your tinnitus make you feel insecure?	Yes	Sometimes	No

Appendix II: Grading of Tinnitus severity

Guidelines for the grading of tinnitus severity: the results of a working group commissioned by the British Association of Otolaryngologists, Head and Neck Surgeons, 1999. (36)

• **Grade 1: slight (THI score 0–16).**
Tinnitus is perceived only in silence and is easily masked. It does not interfere with sleep or with daily activities.

• **Grade 2: mild (THI score 18–36).**
Tinnitus is easily masked by environmental sounds and forgotten during daily activities. It can occasionally interfere with sleep but not with daily activities.

• **Grade 3: moderate (THI score 38–56**).
Tinnitus is perceived even in the presence of environmental sound; however, daily activities are not impaired. It is perceived less under concentration. Interference with sleep and relaxing activities is not infrequent.

• **Grade 4: severe (THI score 58–76).**
Tinnitus is continuously perceived and hardly masked by external noise. It alters the sleep cycle and can interfere with the subject's daily activities. Relaxing activities are compromised. Subjects with this level of tinnitus often require medical consultations.

• **Grade 5: catastrophic (THI 78–100).**
All side effects caused by tinnitus are present at a very severe level. The subject requires medical assistance very frequently, including neuropsychiatric help.

Appendix III: Questionnaire – English Version

Data collection form. Serial No…….Date……..

I. Demographic data

Age……..... Sex……

Occupation…….Marital Status……

II. Clinical data

(a). About the tinnitus;

i. How long have you had it?

- Less than 4 weeks ☐
- 4weeks to 1 year ☐
- 1 year to 5 years ☐
- Over 5 years ☐

ii. Where do you think it is originating from?

- Right Ear ☐
- Left Ear ☐
- Both Ears ☐
- Not from the ear but somewhere in the head ☐
- Not sure if it is from the head ☐

iii. How many sounds do you hear?

- One type ☐
- More than one type ☐

iv. Describe the type of sound you hear?

Appendix IV: Questionnaire – Swahili Version

NAMBA YA ORODHA..…… ……

TAREHE……..…….……..…….

Makusudi ya dodoso hili ni kutambua matatizo yanayosababishwa na tinitasi uliyonayo.

Tinitasi(tinnitus) ni tatizo la sauti ya mvumo katika sikio moja au yote mawili,

Zungushia " NDIYO", "NYAKATI FULANI" au "HAPANA" kwa kila swali. Usiruke swali lolote tafadhali.

1	Kutokana na tatizo la tinitusi ulilonalo,je inakuwia vigumu kutafakari?	Ndiyo	Nyakati fulani	Hapana
2	Kutokana na sauti za mvumo wa tinitusi, Je inakuwia vigumu kusikiliza watu?	Ndiyo	Nyakati fulani	Hapana
3	Je tinitusi uliyonayo inakufanya uwe mwenye hasira?	Ndiyo	Nyakati fulani	Hapana
4	Je tinitusi uliyonayo inakufanya ujihisi kuchanganikiwa?	Ndiyo	Nyakati fulani	Hapana
5	Kwasababu ya tinitusi uliyonayo, Je unahisi kukata tama?	Ndiyo	Nyakati fulani	Hapana
6	Je, unalalamika sana kuhusu tinitasi uliyonayo?	Ndiyo	Nyakati fulani	Hapana
7	Kwasababu ya tinitasi uliyonayo, Je inakuwia vigumu kulala?	Ndiyo	Nyakati fulani	Hapana
8	Je,unajihisi kwamba huwezi kuepuka tatizo la tinitasi ulilonalo?	Ndiyo	Nyakati fulani	Hapana
9	Je, tinitasi uliyonayo inapunguza uwezo wako wa kufurahia shughuli za kijamii?	Ndiyo	Nyakati fulani	Hapana
10	Kwasababu ya tinitusi uliyonayo,je unahisi kuzuiwa kusonga mbele	Ndiyo	Nyakati fulani	Hapana
11	Kwasababu ya tinitasi uliyonayo,je unahisi una ugonjwa wa kutisha?	Ndiyo	Nyakati fulani	Hapana
12	Je tinitasi uliyonayo inakufanya usifurahie maisha?	Ndiyo	Nyakati	Hapana

			fulani	
13	Je tinitasi uliyonayo inaingiliana na utendaji wako wa kazi?	Ndiyo	Nyakati fulani	Hapana
14	Kwasababu ya tinitasi uliyonayo, Je mara nyingi unajiona kuchukizwa?	Ndiyo	Nyakati fulani	Hapana
15	Kutokana na tinitasi uliyonayo,unakuwia vigumu kusoma?	Ndiyo	Nyakati fulani	Hapana
16	Kwasababu ya tinitasi uliyonayo, Je inakufanya kukosa utulivu wa kimawazo?	Ndiyo	Nyakati fulani	Hapana
17	Je unahisi kuwa tatizo la tinitasi ulilonalo limeleta mbinyo katika mahusiano yako na familia/ marafiki zako?	Ndiyo	Nyakati fulani	Hapana
18	Je inakuwia vigumu kuelekeza fahamu zako kutoka tinitusi uliyonayo?	Ndiyo	Nyakati fulani	Hapana
19	Je unahisi huwezi kudhibiti tinitasi uliyonayo?	Ndiyo	Nyakati fulani	Hapana
20	Kwasababu ya tinitasi uliyonayo,Je unahisi kuchoka?	Ndiyo	Nyakati fulani	Hapana
21	Kwasababu ya tinitasi uliyonayo,Je unahisi kupata msongo?	Ndiyo	Nyakati fulani	Hapana
22	Je, tatizo la tinitasi ulilonalo linakufanya kujihisi mwenye wasiwasi?	Ndiyo	Nyakati fulani	Hapana
23	Je unahisi kushindwa kukubaliana na hali ya tinitasi uliyonayo?	Ndiyo	Nyakati fulani	Hapana
24	Je,tinitasi uliyonayo huwa inazidi unapokuwa katika mbinyo wa kimawazo?	Ndiyo	Nyakati fulani	Hapana
25	Je, tatizo la tinitasi ulilonalo linakufanya usijiamini?	Ndiyo	Nyakati fulani	Hapana

Namba ya Orodha……. Tarehe……..

III. Demographic data

Umri……..... Jinsia……

Kazi……. Marital Status……

IV. Clinical data

(a). kuhusu Tinitasi;

v. Kwa mda gani umekuwa nayo?

- Chini ya wiki 4 ☐
- Wiki 4 - mwaka 1 ☐
- Mwaka1 – Miaka5 ☐
- Zaidi ya miaka 5 ☐

vi. Unafikiri Tinitasi inatokea sehemu gani ya mwili?

- Sikio la kulia ☐
- Sikio la kushoto ☐
- Masikio yote mawili ☐
- Sio sikioni lakini kichwani ☐
- Sina hakika ☐

vii. Milio mingapi unasikia?

- Aina moja ☐
- Zaidi ya aina moja ya sauti ☐

viii. Elezea Aina ya Sauti unayosikia?

Appendix V: Consent form – English Version

CONSENT FORM FOR A STUDY ON THE IMPACT OF TINNITUS ON THE QUALITY OF LIFE OF ADULT SUFFERERS ATTENDING THE ENT CLINIC IN MUHIMBILI HOSPITAL

Investigator - DR RAYMOND LEIYA

Muhimbili University of Health and Allied Sciences
Department of Ear, Nose and Throat
P.O. BOX 65001
Dar-es-salaam,
Tel.0718803958

Purpose and background

My name is Dr. Raymond leiya and I am a post graduate student in ENT Department. I am conducting a study to find out and document the effects of tinnitus on the quality of life of adult sufferers attending the ENT clinic in Muhimbili National hospital. This study will help to provide baseline knowledge of this form of disease in our setting. Such knowledge will help the doctors improve on the care for patients with tinnitus and hence improve on their quality of life. You have been identified as a potential participant in this study.

Procedure

Should you accept to participate in this study, the following will be done:
You will be expected to answer questions about your tinnitus and how it affects your daily living. A physical examination of your ear followed by testing your ear to determine the characteristics of the tinnitus will then be carried out. You will then be treated for tinnitus.

Risks

This study does not carry any risks.

Benefits

The sound your hearing in your ear and its effects on their daily life will thoroughly examined. It's hoped that the information from this study will help doctors treat people with a similar problem better in future.

Confidentiality

All information and findings from this study will be kept confidential. No names shall appear from any reports arising from this study.

Rights to refuse

Your participation in this study is entirely voluntary and you are free to refuse to participate or to withdraw from the study at any time without affecting your medical care.

Questions

Dr. Raymond will explain this study to you. If you have any questions you can ask them now or you contact speak him later on telephone number 0718803958.

Statement of consent/assent

I have read or been explained to and understood the information provided. I had time to discuss with the above doctor about this study. I agree to participate in this study.

Name of patient…… Signature/Thumbprint…….. Date……

Name of investigator…… Signature…… Date……

Name of witness/Caretaker……Signature/Thumbprint…….. Date……

Appendix VI: Consent Form – Swahili Version

FOMU YA RUHUSA KWA AJILI YA UTAFITI WA MATOKEO YA UGONJWA WA MVUMO WA KUDUMU NDANI YA SIKIO JUU YA UBORESHAJI WA MAISHA YA WATU WAZIMA WANAO HUDHURIA KLINIKI YA MASIKIO, PUA NA KOO KATIKA HOSPITAL YA TAIFA MUHIMBILI.

Mtafiti: Daktari Raymond Leiya,
Chuo cha Afya na Sayansi Shirikishi Muhimbili
Kitengo cha Masikio, Pua na Koo
S. L. P. 65001,
DAR ES SALAAM.
Simu: 0718 803 958

Jina langu naitwa Daktari Raymond Leiya, Mwanafunzi wa mafunzo ya Uzamili katika Kitengo cha Masikio, Pua na Koo. Nafanya utafiti kuangalia matokeo ya Ugonjwa wa kelele za huduma ndani ya Sikio na madhara yake juu ya ubora wa maisha wa watu wazima wanaohudhuria Kliniki ya Masikio, Pua na Koo katika Hospitali ya Taifa Muhimbili. Utafutu huu utatoa msingi wa maarifa juu ya ugonjwa huu. Maarifa haya yatawasaidia Madaktari kuboresha huduma za uangalizi wa wagonjwa wa ugonjwa wa kelele za kudumu ndani ya sikio na hatimae kuboresha ubora wa maisha yao.
Umetambulika kuwa mhusika muhimu sana katika utafiti huu.

Mwongozo:
Unatakiwa kukubali kushiiriki katika utafiti huu kwa kufanya yafuatayo;
Unatakiwa kujibu maswali kuhusu ugonjwa wako wa kelele za kudumu ndani sikio na namna ambavyo ugonjwa huu unavyokusumbua katika maisha yako ya kila siku. Uchunguzi wa sikio lako utafanyika na utashauriwa juu ya namna nzuri ya matibabu ya mvumo wa sauti masikioni.

Madhara

Utafiti huu hauna madhara yoyote.

Faida:

Sauti unayosikia ndani ya sikio lako itafanyiwa uchunguzi yakinifu.Ni matumaini yangu kuwa taarifa kutoka katika utafiti huu zitasaidia madaktari katika kuwatibu watu wenye matatizo kama haya kwa ripoti zitokanazo na tafiti hii.

Usiri:

Taarifa zote na matokeo ya utafiti huu vitatunzwa kwa siri.Hakuna majina yatakayotumika katika ripoti zitokanazo na utafiti huu.

Haki ya kukataa:

Uhusika wako katika utafiti huu ni wa hiari, hivyo unaruhusiwa kutokuhusika au kujitoa katika utafiti muda wowote pasipo kuathiri uangalizi wa afya yako.

Maswali:

Daktari ataelezea utafiti huu kwako. Na kama una swali lolote unaweza kuuliza sasa hivi au baadae kwa kupiga Simu namba 0718 803 958

Maelezo ya kukubali

Nimesoma au kuelezewa na nimeelewa taarifa zilizotolewa. Nimekuwa na muda wa kujadili na Daktari kuhusu utafiti huu. Nimekubali kushiriki juu ya utafiti huu.

Jina la Mgonjwa …….. Sahihi/dole gumba…….. tarehe……

Jina la Mtafiti…….. Sahihi …… tarehe……..

Jina la Shahidi/Mwangalizi…… Sahihi/dole gumba…….. tarehe ……