

**THE PREVALENCE AND RISK FACTORS OF OTITIS MEDIA AMONG OUT
PATIENTS IN MULAGO HOSPITAL**

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DECLARATION

I Chandiru Fiona declare that to the best of my knowledge, this work has never been submitted anywhere either partially or in total for the award of any degree or diploma in any university or institution of higher learning. This is originally my work and I therefore, present this work in partial fulfillment of requirements for the award of the Bachelor of Nursing Science Degree of International Health Science University, International Hospital Kampala.

CHANDIRU FIONA

Signature.....

Date.....

APPROVAL

This research paper entitled, The Prevalence and Risk Factors of Otitis Media among out Patients in Mulago Hospital Kampala District has been done under my supervision and has been submitted to the School of Nursing, International Health Sciences University for examination with approval as the candidate's supervisor.

MR. AFAYO ROBERT

Signature.....

Date.....

DEDICATION

This book is dedicated to my dear children Elizabeth, Malaika, Chante and Jayden; to my brother Francis and my dear husband Mr. Eguama William for their full support towards my education.

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I would like to extend my gratitude and thanks to my dear family for their tremendous support towards my education, and many other people who have assisted me during this course, more importantly, International Health Science University who led me to the knowledge of Nursing Course.

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OPERATIONAL DEFINITIONS OF KEY TERMS

Otitis media can mean an "inflammation of the middle ear". It is the medical term for middle ear infection. Although several subtypes of otitis media are distinguished, the term is often used synonymously with *acute otitis media*. It is very common in childhood.

A **risk factor** is a variable associated with an increased risk of disease or infection. Sometimes, **determinant** is also used, being a variable associated with either increased or decreased risks.

A **socio-demographic factor** is risk factors in which a word is used to describe an element of a group within a society that can give rise to some particular or group of diseases or illnesses. In this study, they include age group of a population, gender of a population, education level of a population, marital status of a population, occupation of a population, caregiver's educational level.

Co morbid illnesses are diseases or other pathological processes that occurs simultaneously with another. In other terms, the term "co morbid" can be either medical condition(s) existing simultaneously but independently with another condition, or it can indicate medical condition(s) in a patient that are related to another condition. In this study, co morbid illnesses include persistent rhinorrhoea, snoring, seasonal rhinitis or allergies, malnutrition and nasal obstruction.

Household risk factors involve all the home-based conditions, aspects, practices and activities that can give rise to prevalence of otitis media. In this study, they include household smoke, smoking, socio-economic status, and duration of breast-feeding.

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AOM	Acute Otitis Media
CAPAS	Corrective Action and Preventive Action
CSOM	Chronic Suppurative Otitis Media
ENT	Ear, Nose, and Throat
HIV	Human Immune Virus
HLA-A2	Human Leukocyte Antigen Serotype
OM	Otitis Media
OME	Otitis Media with Effusion
RAOM	Right Multi-Trip Annual <i>Medical</i>
SHO	Secondary Hypertrophic Osteoarthropathy
SPSS	Special Package for Social Scientists
URTI	Upper Respiratory Tract Infections

ABSTRACT

Otitis media is a common condition affecting children and adults worldwide requiring a considerable amount of clinic time and operating time to deal with either active otitis media or the sequelae of previous otitis media worldwide. Thus, this study determined the risk factors of otitis media among patients attending ENT clinic in Mulago hospital. In order to achieve the research purpose, the following research objectives were formulated and these included: to determine level of prevalence of otitis media among patient attending ENT clinic in Mulago Hospital; to establish socio-demographic factors responsible for otitis media among patient attending ENT clinic in Mulago Hospital; to determine comorbid illnesses that lead to otitis media in patients attending ENT clinic in Mulago Hospital; and to examine household factors responsible for otitis media among patients attending ENT clinic in Mulago hospital.

Cross-sectional descriptive study design employing quantitative approach was used in this study and the study using sample size determination by Kish and Leslie formula (1965), a sample size of 317 respondents was established. Stratified random and convenient sampling procedures were used to sample respondents. An interviewer questionnaires were used to collect data from respondents. Reliability for research instrument was attained through pretesting and re-pretesting with some 5 patients and 5 health workers in Kisugu Health Center while validity of the instruments was attained through expert judgment. The data was analyzed through SPSS software from which frequencies, multivariate analysis were done.

The research findings indicate that the level of prevalence of otitis media among patients attending ENT clinic in Mulago hospital is generally high as 82 % of the patients had the disease; gender as socio-demographic factor had significant relationship with otitis media (χ^2

6.564, p-value of 0.01). Thus, females are at higher risk of developing otitis media than men (OR= 25(132-476, p=0.005); it was found out that allergic rhinitis had significant relationship with otitis media ($\chi^2=6.574$, p=0.010) and those who have a history of allergic rhinitis are 2.3 times more likely to develop otitis media than their counterparts without allergic rhinitis (OR= 2.33, p=0.008); ear discharge had positive relationship with otitis media ($\chi^2=5.931$, p=0.015) and those with a history of ear discharge are 2.2 times more likely to develop otitis media than those without it (OR=2.18, p=0.02); URTI had positive relationship with otitis media ($\chi^2=12.429$, p=0.001) and those with history of URTI are 1.7 times more likely to develop otitis media than their counterparts (OR=1.69, p=0.001); a significant relationship was obtained between snoring while sleeping and otitis media ($\chi^2=5.678$, p=0.017); and finally, cooking in house of sleeping that had significant relationship with otitis media ($\chi^2=4.391$, p=0.036).

Study concludes that the level of prevalence of the disease among the patients is generally high; that the prevalence of otitis media was found to be associated with the female gender; those with a history of comorbid illnesses such as allergic rhinitis, ear discharge, URTI and snoring while sleeping were at higher risk of developing otitis media than those without these conditions; and finally, cooking in the same house of sleeping had a positive and significant relationship with otitis media.

It was therefore recommended that the ministry of health should establish a comprehensive campaign country wide to sensitize people about different factors, conditions, circumstances that lead to otitis media; it should also launch a campaign to educate women about the factors that expose them more to otitis media; people with comorbid illnesses such as allergic rhinitis, ear

discharge and URTI should be treated promptly; local community leaders such as local councilors should encourage people to establish kitchens with enough ventilation for cooking.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Otitis media is a common condition affecting children and adults worldwide requiring a considerable amount of clinic time and operating time to deal with either active otitis media or the sequelae of previous otitis media worldwide.

Otitis media can be conveniently divided into two main clinical types; the acute suppurative otitis media is a pyogenic bacterial infection of the middle ear and it is a common disorder occurring at all ages and particularly in children. The other type is the chronic suppurative otitis media, which is further divided into two; the first variety tends to follow a more benign clinical course, which is because of persistent perforation in the tympanic membrane. It is considered as the tubotympanic type because the infection tends to spread via the Eustachian tube to the tympanic cavity. The second variety is the tympano mastoid, which is more aggressive causing destruction of the middle ear, mastoid antrum and occasionally the inner ear.

Since the disease is becoming more common especially among most patients who are referred from, up country hospitals the diagnosis is hard and proper management is delayed. It's potential to cause diversetating complications make the disease an important public health problem and the risk factors must be identified to early detect and prevent these complications. The aim of this study was to investigate the association between persistent otitis media, environmental personal factors and prevalence of the disease in a population of patients attending ENT in Mulago.

1.1 Background of the Study

Mulago hospital is the national referral Hospital located 3 kilometers north of Kampala city in kyadondo Kawempe division.

The main objectives of Mulago hospital are to provide specialized tertiary healthcare services. Its current bed capacity is over 2000 beds and has both specialized and general health team of various cadres. It receives patients from both within and upcountry districts. by August 2012, about 54,753 patients had attended care at Mulago Hospital (Mulago Hospital Quarterly Report, 2012), and about 4000 of these patients attended care from Ear Nose Throat department, and 7,189 were new cases and passed through the accident and emergency unit. Further more of the 50,126 patients seen in Mulago Hospital by July 2012, 7,531 were new cases some of whom were ENT cases. Most of the top 10 killer diseases such as pneumonia, tuberculosis, HIV/AIDs, septicemia, meningitis, still continue to be registered children and adults continue to be prevalent in the hospital.

There are about 15 specialist ENT doctors, 10 SHO in ENT at different levels of training, 7 clinical officers and 23 ENT nurses. All these provide specialized care to patients with ENT conditions in the department including the clinics that run daily from Monday to Friday. Many patients turn up for specialized attention with majority being referral cases from either the neighboring health units or from upcountry hospitals.

1.2 Problem Statement

Many patients attending ENT clinic in Mulago present with different ENT conditions. Otitis media is one of the commonest conditions observed among children and adults presenting in acute and chronic states. However, their distribution among children and adults is not clearly

known. It is not also clear how many of the current patients attending ENT care actually have otitis media yet their distresses coupled with complications such as effusion, severe damage, hearing loss need a lot of time for treatment and evaluation. Therefore the problem of otitis media appears to be very huge in this department and there is hence need to know the associated risk factors among the patients moreover there seems to be limited published literature on their prevalence.

By carrying out this study, it would be important to understand the distribution of otitis media condition among various age groups, ascertain and establish its risk factors among patients in Mulago Hospital.

1.3 Study Objectives

1.3.1 General Objective

To determine the prevalence and risk factors of otitis media among patients in Mulago hospital.

1.3.2 Specific Objectives

1. To determine level of prevalence of otitis media among patient attending ENT clinic in Mulago Hospital.
2. To establish socio-demographic factors responsible for otitis media among patient attending ENT clinic in Mulago Hospital.
3. To determine co morbid illnesses that lead to otitis media in patients attending ENT clinic in Mulago Hospital.

4. To examine household factors responsible for otitis media among patients attending ENT clinic in Mulago hospital.

1.4 Research Questions

1. What is the level of prevalence of otitis media among patient attending ENT clinic in Mulago Hospital.
2. What socio-demographic factors are responsible for otitis media among patients attending ENT clinic in Mulago Hospital?
3. What co morbid illnesses lead to otitis media among patients attending ENT clinic in Mulago Hospital?
4. What household factors are responsible for otitis media among patient attending ENT clinic in Mulago Hospital.

1.5 Significance of the Study

A lot has been done concerning various ENT disease conditions in Mulago Hospital ENT department that is, occurrence of Chronic Suppurative Otitis Media and its management, prevalence and types of CSOM in children, prevalence of CSOM among HIV/AIDS and prevalence of otitis media with effusion in children. However, little has been done concerning risk factors associated with otitis media among out patients' department patients in Mulago.

This study focused on the risk factors of otitis media and the findings can be significant in the following ways:

The findings can help the clinicians and other health workers in Mulago and upcountry hospital who manage Ear, Nose and Throat conditions in creating awareness especially for efficient management.

The findings of this study will help the hospital management team especially on policy making as regards to this disease condition to allocate funds for out reaches so that the community is empowered on the risk factors of the disease and how to prevent it.

The findings of the study will reinforce the database of IHSU for future references and students teaching. Therefore, the aim of this study is to determine the risk factors of otitis media among outpatient department patients in Mulago hospital.

1.6 Conceptual Framework

Figure 1: Conceptual Framework

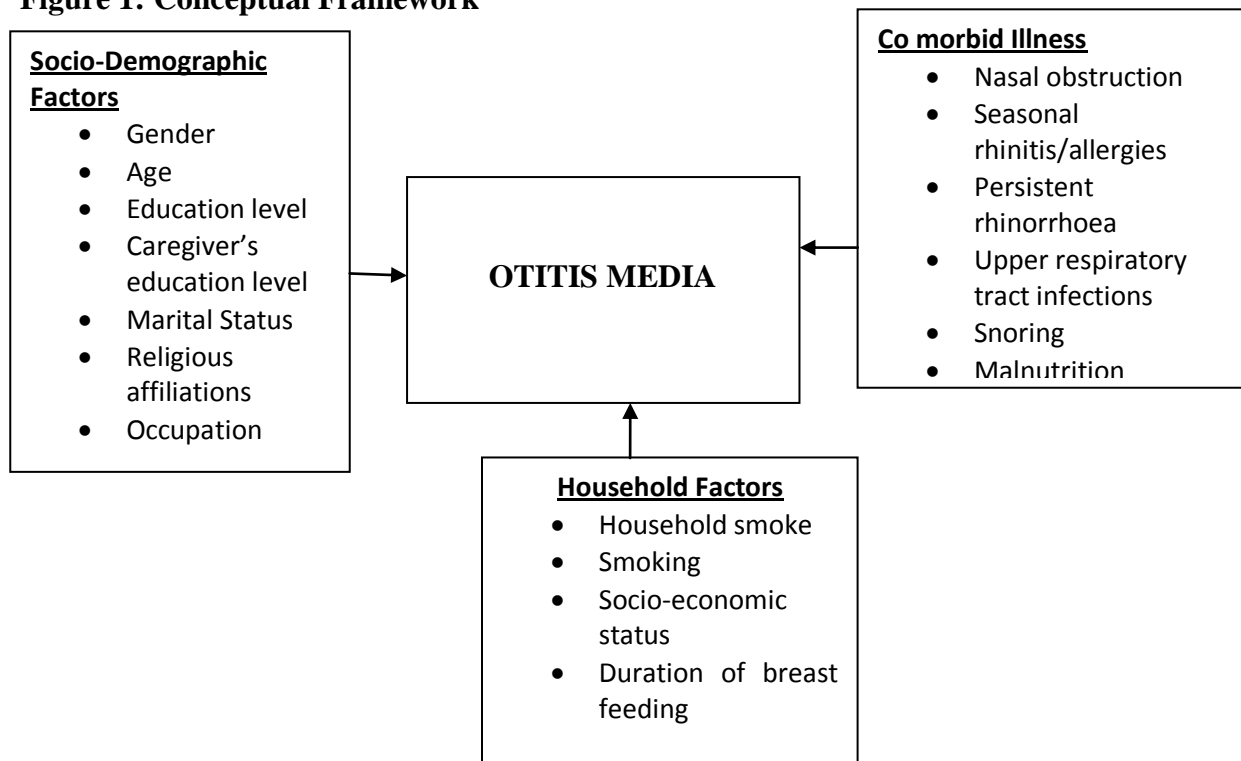


Figure 1 shows that different factors are responsible for otitis media among patients. Socio-demographic factors such as age, gender, education level, occupation, marital status and parental education level are responsible for otitis media; co morbid illnesses such as persistent rhinorrhoea, snoring, seasonal rhinitis/allergies, malnutrition and nasal obstruction in one way or another also lead to otitis media; and lastly, household factors such as household smoking, socio-economic status, duration of breast feeding also lead to otitis media.

CHAPTER TWO

LITERAURE REVIEW

2.0 Introduction

This chapter looks at what other authors and scholars have said about otitis media. It first determines ,articulates prevalence of otitis media among patients; and then establishes socio-demographic factors responsible for otitis media; next are the co morbid illnesses that lead to otitis media; and lastly, household factors that are responsible for otitis media.

2.1 Prevalence of Otitis Media

In establishing the prevalence of otitis media, the research carried out by Brouwer et al. (2005) in Northern part of Ghana demonstrates that out of 478 youth and children in the region, perforation was present in 0.4% to 33.3% of children and youth; otorrhea occurred in 0.4% to 6.1%; and mastoiditis occurred in 0.19% to 0.74%. Same trends of prevalence were also observed in Malawian school surveys with 1340 students where perforation was identified in 1.3% to 6.24% of students, and otorrhea was found in 0.6% to 4.4% (Lok *et al.*, 2009).

In showing the level of prevalence of otitis among children and youth in Uganda, Rovers *et al.*, (2006) also observed that mastoiditis were diagnosed in 18% of children and youth who presented to a hospital ear, nose, and throat (ENT) clinic in Uganda. The proportion of patients presenting to ENT clinics with mastoiditis regardless of their initial symptoms were noted to have varied from 1.7% to 5%. In Further still, studies by Rovers *et al.*, (2008) also showed that patients presenting to these ENT clinics with mastoiditis often experience severe complications, including subperiosteal abscess, labyrinthitis, facial palsy, meningitis, and brain abscess. The

study also showed that hearing impairment was a major public health problem compromising the quality of life in approximately one third of the population of developing countries. These findings demonstrate that the rate of otitis in Uganda is relatively high.

Studies carried out in Southern Saharan Africa especially with young children with otitis media showed that the level of prevalence of otitis media was very high as in 11.6 % to 41.4 % of children. The study also showed that out of 3720 respondents sampled, 38.9 % of the children were irritable, 29.5 % of the children were fussy and 34.2 % of the children had problems with feeding or sleeping (Sattout and Jenner, 2008). The study also found out that older children (36.8 %) complained about pain and fullness in the ear (earache). Fever may be present in a child of any age. The authors further cited that these symptoms are often associated with signs of upper respiratory infection such as a runny or stuffy nose, or a cough. The buildup of pus within the middle ear causes pain and dampens the vibrations of the eardrum (so there is usually temporary hearing loss during the infection).

Studies carried out by Rosenfeld et al. (2004) with 26 South African hospitals demonstrated that otitis media is an extremely common diagnosis among children. In their studies entitled "*Otitis media with effusion clinical practice guideline*," Resenfeld et al. (2004) showed that in South Africa, 75% of all children experience at least one episode before the age of three. Ear infections are not contagious; however, 66.2 % of the children develop ear infections following a cold or other viral infection, and those infections are contagious.

Spremo and Udovicic (2007) also carried out studies on prevalence of otitis media especially between first grades and second grade students in Mauritius. Their study on "Acute Mastoiditis in children: Susceptibility factors and management" with 2042 first grade and 1633 second grade students indicated that OME was diagnosed in 64 out of 2042 (3.1%) first grade and in 25 out of

1633 (1.5%) second grade students. The difference between the percentages of OME in first and second grade students was statistically significant ($P < 0.05$). The frequency of other ear-nose and throat pathologies accompanying OME was similar to those in children without OME. However, there was no statistically significant difference between the academic performances of children with and without OME ($P > 0.05$).

2. 2 Socio-Demographic Factors Responsible for Otitis Media

Leach and Morris (2006) carried out studies with 1428 Tanzanian aboriginal infants on "*Antibiotics for the prevention of acute and chronic suppurative otitis media in children.*" Their findings demonstrated that as children grow, however, the structures in their ears enlarge and their immune systems become stronger thus cases of otitis media are low in them. Leach and Morris (2006) also indicated that by 16 months, the risk for recurrent infections is rapidly declining. After age five, 73% of children have outgrown their susceptibility to any ear infections. This finding means that young children are vulnerable to otitis media than the older ones under normal circumstances.

Further research by Lieberthal *et al.* (2013) on "*The Diagnosis and Management of Acute Otitis Media*" in Nigeria with 350 children also indicated that 78 % of the children from 36 to 47 months of age were more likely to carry multiple types of *H. influenzae* than children ≥ 23 months of age. However, the reasons for this association are unclear. Eighty seven (87 %) of the children in the 36 to 47 months of age group were not significantly more likely to have specific otitis media risk factors than younger children. However, the study found out that 63.3 % of the children of 36 to 47 month-old might have more contacts than younger children, which could contribute to increased exposure to multiple genetic types of *H. influenzae*.

According to the studies carried out by Uhari et al. (2006) with 426 twin pairs in South Africa, it was concluded that heritability of otitis media susceptibility was 74% among girls and 45% among boys. This study showed that the HLA-A2 gene has been noted to be associated with RAOM but not OME.

McDonald et al, (2008) carried a study on *Grommets (Ventilation Tubes) For Recurrent Acute Otitis Media In Children* in Central Province of Zambia also showed that a marginal trend (OR = 1.5; $p = 0.055$) and another reported an increased risk without specifying significance. Thus, in overall, boys are at raised risk for OM.

Laine et al. (2010) also carried out a study with Nigerian children aged six months to 4 years. In their studies entitled *"Symptoms or Symptom-Based Scores Cannot Predict Acute Otitis Media At Otitis-Prone Age"* in some kindergartens in Nigeria showed that OME is very common in children aged six months to 4 years with approximately 90% of children having OME at some point. More than 50 % of the children experience OME before the age of one, and more than 60% by age two.

Yilmaz et al. (2006) on *"Otoacoustic Emissions Involving Gender And Age In Ghana"* showed that about two thirds of children will have a least one attack of AOM by age three, and a third of these children will have at least three episodes. Considering the gender as an associated risk factor, Yilmaz et al. (2006) in their study with 2194 Ghanaian children sampled indicated out of the children sampled, 71.3 % of the boys were more apt to have infections than 43.5 % of the girls are.

Klossek (2009) also demonstrated similar findings in his study with 2082 Malian children. According to his research entitled *"Diagnosis and Management of ENT Conditions Responsible for Acute Community Acquired Bacterial Meningitis"*, Klossek (2009) showed that otitis media

generally affects children between the ages of six and 18 months. The earlier a child has a first ear infection the more susceptible he or she is to recurrent episodes (that is to say, three or more episodes within a six-month period).

According to the studies carried out by Alho et al (2006) with Mozambican children on the “*Public Health Impact Of Various Risk Factors For Acute Otitis Media*”, the researchers found out that out of 673 children sampled, fifty-four (43%) throat cultures contained two or more genetically distinct H. influenza isolates, and children in day-care center 1 carried more genetically distinct isolates at a single time than children in day-care center 2 ($p = .028$). The children carried an average of 1.4 genetically distinct H. influenza isolates per throat culture (range 0-5) and 2.9 (range 0-8) genetically distinct isolates during the study period.

Basing themselves on parents’ working status, Gouma *et al.* (2011) in their studies entitled “*Behavioral Trends In Young Children With Conductive Hearing Loss*” in West African countries indicated that out of 786 parents sampled, ‘Father working part time’ had significantly higher odds ($OR = 2.0$; $p = 0.007$), while mother’s working status appeared to be unrelated to referral. There were no studies for comparison. These findings also show that there is a positive correlation between parents working conditions status and otitis media.

From the information analyzed in the literature about the socio-demographic factors and otitis media, it can be seen that most of the scholars focused on age, working status of parents, gender while some other socio-demographic factors such as parental educational level, marital status have been neglected. It will therefore be the duty of this study to attempt to establish whether these factors are also responsible for increasing cases of otitis media in Mulago Hospital outpatient department or not.

2.3 Co morbid Illnesses that Lead to Otitis Media

Teele et al (2009) on their study on “*Epidemiology of Otitis Media During The First Seven Years of Life In Children In Greater Boston*” found out that six (5%) throat cultures contained two genetically distinct *S. pneumoniae* isolates, and none contained more than two. On average, the study showed that out of 468 children, 71.4 % of them carried fewer genetically distinct *S. pneumoniae* isolates per culture than the average number of *H. influenzae* isolates per culture (0.5 *S. pneumoniae* isolates vs. 1.4 *H. influenzae* isolates per culture); this difference was statistically significant ($p < .001$, t test).

Teele et al (2009) further explained that one child carried three genetically distinct *S. pneumoniae* isolates during the study period; no other child carried more than two isolates during the study period. Ten (10 %) of the children who carried more than genetically distinct *S. pneumoniae* isolate simultaneously carried more than one genetically distinct *H. influenzae* isolate. Overall, 82% of the children carried multiple isolates at some point during the study.

Paradise et al. (2007) in their study “*Otitis Media in 2253 Pittsburgh-Area Infants*” in South Africa obtained 126 throat cultures from 38 children at two day-care centers. In their findings, they discovered that one hundred two (81%) of the cultures were positive for at least one *H. influenzae* isolate and 60 (48%) for at least one *S. pneumoniae* isolate. The study also obtained 418 *H. influenzae* isolates (average of 4.1/positive culture) and 184 *S. pneumoniae* isolates (average of 3.0/positive culture) from the 126 throat cultures.

Studies by Alho et al (2006) in the “*Public Health Impact Of Various Risk Factors For Acute Otitis Media*” with 673 Mozambican children also showed that children who were 36 to 47 months old, had allergies, or were exposed to smoking were more than twice as likely to carry two or more genetically distinct *H. influenzae* isolates at a time. Children who had a history of

frequent otitis media episodes were half as likely to carry two or more genetically distinct H. influenza isolates. Children who used a pacifier were one-fifth as likely to carry two or more genetically distinct H. influenza isolates as children who did not use a pacifier. However, no exposure variables were associated with carriage of multiple distinct S. pneumonia isolates.

Daly *et al.* (2005) carried a study with Tonawanda/Williamsville Pediatrics on “*Recent Advances In Otitis Media. 1. Epidemiology, Natural History, And Risk Factors*” and this study found out that mouth breathing, snoring and nasal congestion can all be symptoms of URTI and can be related to adenoid hypertrophy. They also showed that these factors could therefore impose a risk for developing OM and OM-related hearing loss. Neither ‘severe mouth breathing’ nor ‘severe snoring’ appeared to be risks here or in another study.

Similar findings were also found by Lieberthal *et al.* (2013) carried a study with 350 Nigerian children on “*The Diagnosis and Management of Acute Otitis Media*” and their finding indicates that severe nasal congestion’ appeared as a risk here (OR = 1.8; $p = 0.006$), and in one reference study which showed that the risk increased with growing number of days with nasal congestion.

Studies on “*Bacterial Colonization Of The Nasopharynx Predicts Very Early Onset And Persistence Of Otitis Media In Tanzanian Aboriginal Infants*” by Leach *et al.* (2004) observed fifty-six distinct H. influenza patterns in day-care center 1. Eight (14%) of those patterns were observed in more than one child during the study period. Thirty-one distinct H. influenza patterns were observed in day-care center 2. Four (13%) patterns were observed in more than one child. Thirteen distinct S. pneumonia genetic patterns were observed in day-care center 1. Four (31%) patterns were observed in more than one child during the 3-week study period. Sixteen genetic patterns were observed in day-care center 2. Three (19%) of those patterns were observed in more than one child.

More still, studies by Yilmaz *et al.* (2006) on “*Otoacoustic Emissions Involving Gender And Age In Ghana*” indicated that sharing of specific isolates varied from week to week and room to room within the day-care centers. Out of the 2194 Ghanaian children, most shared isolates (68%) appeared in no more than two children during the study period. For example, in day-care center 1, the H. influenza fingerprint pattern #7 appeared in children from five classrooms on three sampling occasions.

The current weight of expert opinion is that the presence of infected adenoids or tissue, with biofilm and intracellular bacteria identified in the tissue, is a greater contributor to AOM and OME than the physical bulk or size of the adenoids. A large Western Liberia study of 50000 children who underwent ventilation tube insertion showed a 50% reduction in subsequent grommet insertion following adenoidectomy (Jansen *et al.*, 2009). Jansen *et al.* (2009) also shows obesity as one of the comorbid illnesses that leads otitis media. Thus, the authors in their Western Australian study found a link between ear infections and childhood obesity. The impression that can be got from this finding is that eardrum abnormalities increased the more the child weighed, which might explain the association.

In a multivariate GEE logistic regression model, exposure to smoking, having allergies, and being 36 to 47 months old were significantly associated with at least a twofold increase in carriage of two or more genetically distinct H. influenza at a time (Martikainen *et al.*, 2007). In their studies with 720 Nigerian children, they scholars noted that using a pacifier and having a history of frequent otitis media episodes were highly correlated with antibiotic use; therefore, only antibiotic use was included in the multivariate model. Even after the data were adjusted, children who had taken an antibiotic during the study were almost four times less likely to carry

two or more genetically distinct *H. influenza* isolates than children who had not taken an antibiotic.

Rovers *et al.* (2004) in their study "*Is pacifier use a risk factor for acute otitis media? A dynamic cohort study in Central African Children*" with 758 children also showed that certain medical disorders, including Down's syndrome, cleft palate, Kartagener's syndrome, and immunosuppressive disorders, such as HIV, increase the risk for ear infections. Although the scholars could not clearly establish the association between such diseases and otitis media, their findings could be true since such illnesses can affect the general wellbeing of a person and lead to otitis media.

Allergies are also cited as one of the aspects leading to otitis media. Studies by Leach and Morris (2006) on the "*Antibiotics for the prevention of acute and chronic suppurative otitis media in children*" with 1428 Tanzanian aboriginal infants showed that that an increase in allergies is also partially responsible for the higher number of ear infections. Allergies can cause inflammation in the airways, which may contribute to ear infections. Further still, allergies are also associated with asthma and sinusitis, which can therefore lead to otitis media. However, a causal relationship between allergies and ear infections was not definitively established in this study.

Similar findings on "*Delayed prescription may reduce the use of antibiotics for acute otitis media: a prospective observational study in primary care*" carried out by Marchetti *et al.* (2005) with 892 children from Ivory Coast indicated that children with allergies were more likely to carry multiple *H. influenza* isolates than children without allergies. They asserted that allergies in young children have also been described as a risk factor for otitis media, because upper respiratory mucosal swelling during an allergic episode may cause Eustachian tube dysfunction, similar to that observed during an upper respiratory viral infection. Alternatively, allergic

responses in 56 % of the 1243 infants in Kenya resulted in impaired mucociliary activity, which permitted increased bacterial colonization of the upper respiratory tract thus leading to otitis media (Flacking *et al.* 2007).

The common cause of all forms of otitis media is blockage of the Eustachian tube. According to studies on the “*Does survey non-response bias the association between occupational social class and health?*” with 720 Nigerian infants, Martikainen *et al.*, (2007) showed that Eustachian tube is usually due to swelling of the mucous membranes in the nasopharynx, which in turn can be caused by a viral upper respiratory infection or by allergies. Because of the blockage of the Eustachian tube, the air volume in the middle ear is trapped and the surrounding tissues, leading to a mild vacuum in the middle ear, slowly absorb parts of it. Eventually the vacuum can reach a point where fluid from the surrounding tissues is sucked in to the middle ear's cavity (also called tympanic cavity), causing middle ear effusion. This is seen as a progression from a Type A tympanogram to a Type C to a Type B tympanogram.

Accordingly, studies by Butler *et al.* (2003) with screening children in the first four years of life to undergo early treatment for otitis media with effusion in Pretoria in South Africa showed that damage or skin irritations of the external auditory canal are closely linked to otitis media. Thus, scratching the ear canal or removing wax with makeshift items such as barrettes or clips, can damage skin, thus providing the bacteria a gateway. Efforts to clean the ear canal with wool sticks, is not recommended, contrary to expectations, due to excess wax and dirt that is forced deeper into the ear canal.

The impression from the literature on the influence of comorbid illnesses on otitis media is that such illnesses significantly contribute to otitis media among many patients. However, the rate at

which this occurs among patients attending ENT clinic in Mulago hospital is yet to be established.

2.4 Household Factors Responsible for Otitis Media

Rosenfeld *et al.* (2004) in their studies entitled "*Otitis media with effusion clinical practice guideline*" with Malawian children cited that babies who are bottle-fed may have a higher risk for otitis media than do breastfed babies. It is through such risks among others that the Malawian Academy of Pediatrics recommends breastfeeding for at least six months. Studies by Spremo and Udovčić (2007) in their study with 1633 Mauritian children also found out that breastfeeding for at least 3 months' had a paradoxical 1.5 higher odds ($p = 0.01$), rather than being protective for referral. 'Season of CAPAS' being January–March or July–September had increased odds for referral with a $p = 0.05$. However, the CAPAS screen is no longer in use and therefore this factor will be irrelevant in the future.

Alho *et al.* (2006) in their 2-year population-based study of 2512 Mozambican children, the scholars found out that 825 of whom experienced otitis media, estimated that one in five children could have avoided otitis media, and two in five affected could have avoided RAOM, if they had been moved from full-time daycare to home care. The scholars concluded that about 14% of all episodes of otitis media could have been avoided if all of these children had been cared for at home. The other modifiable risk factors of significance are cessation of dummy use after the age of 11 months and reduction in passive cigarette exposure.

Marchetti *et al.* (2005) in their study entitled "*Delayed prescription may reduce the use of antibiotics for acute otitis media: a prospective observational study in primary care*" with 892 children from Ivory Coast also indicated that passive cigarette smoking increases the risk of otitis media among Aboriginal and non-Aboriginal children. In the Kalgoorlie Otitis Media Research

Project, 64% of Aboriginal children and 40% of non-Aboriginal children were exposed to environmental tobacco smoke. A meta-analysis demonstrated a significant increase in risk (66%) of RAOM and chronic OME in the presence of parental smoking (risk ratio [RR], 1.66; 95% CI, and 1.33–2.06).

More still, Paradise et al. (2007) in their studies on “*Otitis media in 2253 Pittsburgh-area infants: prevalence and risk factors during the first two years of life*” with Central African children noted that breastfeeding has a protective effect on the development of middle ear disease related to the immunological properties of breast milk; a meta-analysis showed that breastfeeding for at least 3 months reduced the risk of AOM by 13% (RR, 0.87; 95% CI, 0.79–0.95).

Leach et al. (2004) on their research on “*Bacterial colonization of the nasopharynx predicts very early onset and persistence of otitis media in Tanzanian aboriginal Infants*” showed that low socioeconomic status with limited access to health care might be a factor affecting the association with otitis media. The researcher concluded that there is great variability, however, in the association between otitis media and low socioeconomic status. The use of a dummy after the age of 11 months is significantly associated with otitis media. In a meta-analysis, the use of a dummy increased the risk of AOM by 24%.

Lous *et al.* (2005) carried a study with the poor communities in Burkina Faso and found out that children who were exposed to smoking were more likely to carry multiple *H. influenza* isolates than children who were not. The authors also described smoking as a risk factor for otitis media but the exact mechanism by which it contributes to otitis media had not been described.

Browning et al. (2010) also found similar findings on the relationship between smoking and otitis media in the study with 3012 Egyptian kindergarten children. This study found out that

mucociliary clearance is damaged in adult smokers, and *H. influenza* is more likely to adhere to pharyngeal cells of middle-aged smokers than nonsmokers with bronchitis.

Research by Rosenfeld *et al.* (2004) on "*Otitis media with effusion clinical practice guideline*" with Tanzanian children had also suggested that secondhand smoke may also damage the upper respiratory environment in young children, leading to increased bacterial colonization. Thus, increased carriage of diverse *H. influenza* types may partially account for the increased episodes of otitis media observed in children exposed to smoking. However, the association of smoking with both increased carriage of *H. influenza* and episodes of otitis media does not establish a causal relationship (Butler *et al.*, 2003).

Rovers *et al.* (2004) in their study "*Is pacifier use a risk factor for acute otitis media? A dynamic cohort study in central African Children*" also showed that parents who smoke pose a significant risk for both otitis media with effusion (OME) and recurrent acute otitis media (AOM) in their children. In this regard, the behavior of parents can increase a child's risk for otitis media. Another study by Leach and Morris (2006) in Tanzanian children found that the number of smokers around the child did increase the risk of persistent OM.

Studies by Browning *et al.* (2010) with 5012 South African kindergarten children on the other hand showed that pregnant women who drink alcohol put their babies at risk for birth defects that can cause a number of problems, among them hearing loss and OME. Much as studies by Browning *et al.* (2010) did not provide details concerning the relationship between alcohol drinking by pregnant women and otitis media of their babies, they at least have showed that the two are somewhat related.

Sleeping in the prone position has been reported as an increased risk for coughing, earache and hearing problems in the young infant or for 'having ear infections' and developing a 'stuffy nose

at 6 months of age' (Pettigrew *et al.*, 2004). In their study on “*Infant otitis media and the use of secondary heating sources*” however, it may not have emerged as a risk, as the number of children sleeping prone was too few to detect a difference at statistical significance.

Several studies have found that the use of pacifiers place children at higher risk for ear infections. Sucking increases production of saliva, which helps bacteria travel up the Eustachian tubes to the middle ear (Vos, 2012; Spremo and Udovčić, 2007; Lous *et al.*, 2005).

The analysis of literature on household factors indeed reveals that household factors in form of sleeping position, length of time for breastfeeding, socio-economic status and level of smoke are also responsible for increased cases of otitis media among patients. Since none of these studies was carried out in Outpatient Department of Mulago, it becomes important to try to determine the influence of household factors on otitis media among patients attending ENT clinics in Mulago Hospital.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter represents the methods, which were used in the process of data collections. Therefore, it covers the study design, study area, study population, sample size, sampling procedures, study variables, data collection, data management and data analysis techniques, quality control, ethical considerations, timeframe, limitations of the study and dissemination of results.

3.1 Study Design

The research design that was employed in this study is cross-sectional descriptive study design. This design was chosen because the researcher intends to determine the prevalence of otitis media and risk factors simultaneously at a point in time of otitis media among patient attending ENT clinic in Mulago Hospital.

3.2 Study Area

This study was carried out in Mulago Hospital in Kampala. This hospital was taken as a case study because it is the national referral hospitals thus, a number of patients with otitis media come for treatment there and many are referred here. This therefore made sampling of respondents for data collection on the study variables much easier.

3.3 Population

The target population for this study was all the patients with otitis media in Kampala district. However, the accessible population was those patients attending ENT clinic in Mulago Hospital Referral Hospital. Since all the patients attending ENT clinic could not consent to participate in this study, the study population involved only those who consent or ascent and meet the inclusive criteria.

3.4 Scope of the Study

Geographical Scope

This study was carried out in Mulago Hospital in Kampala. It specifically focused on the prevalence of otitis media and its associated risk factors among out patients in Mulago Hospital

Content Scope

The study first established the prevalence of Otitis media among patients in Out Patient department in Mulago and then establish risk factors related to socio-economic factors, co morbid factors and household factors of otitis media among out patients in Mulago.

3.5 Eligibility Criteria

1. Both children and adults suffering from otitis media were included in this study.
2. Patients attending ENT clinic in Mulago hospital were given chance to participate in this study as respondents.
3. Patients who consented to participate in the study were the only ones considered as respondents.
4. Patients who were very sick and unable to talk were left out or excluded.

3.6 Sample Size Determination

To obtain the overall sample, the formula (fisher's) was used (Fisher, 1999).

$$N = Z^2Pq/d^2$$

Where:

N = the required sample size,

Z = the confidence level at 95% (standard value of 1.96)

d = precision 0.05

P = prevalence of otitis media

P = 75% (Resenfeld et al, 2004)

P = 5% the prevalence of otitis media in Mulago Hospital

q= 1-p (1-0.05) = 0.95

D = degree of accuracy required

$$n = \frac{(1.96)^2 \times 0.75 (1-0.75)}{(0.05)^2}$$

$$n = 288$$

10% added to the calculated sample size to cater for non-response or incomplete questionnaires.

$$10\% = 10/100 \times 288 = 29$$

Therefore, the sample size for this study was **317** patients attending ENT clinic at Mulago.

3.7 Sampling Procedure

Consecutive sampling method was used to sample participants. Through consecutive sampling, all the patients who come for treatment and consultation at ENT clinic in Mulago Hospital during data collection were considered as participants unless they did not consent. The study used this technique of sampling because it gives a chance to all subjects that are available thus, making the sample a better representation of the entire population.

3.8 Study Variables

3.8.1 Dependent variables

- Prevalence of otitis media

3.8.2 Independent variables

- Socio-demographic factors
- Co morbid Illness
- Household Factors

3.9 Data Collection Method

An interviewer administered and structured questionnaires was used to collect data in this research. This type of questionnaire was preferred for this study because the researcher considered both literate and illiterate patients with clear consent as respondents. It mostly consisted of closed-ended questions such that patients' valuable time was not wasted. The questionnaire focused on respondents profile; prevalence of otitis media in Mulago Hospital; socio-demographic factors as risk factors; co morbid illnesses as risk factors; and household factors as risk factors of otitis media.

3.10 Reliability and Validity of Research Instrument

Reliability for research instrument was determined through pretesting with some 12 patients in Kisugu Health Center. As for the validity of the instrument, an expert judgment was done. In this regard, the research supervisor was used to determine the content of instrument and after which some corrections were made so that both the reliability and validity was ensured.

3.11 Data Collection Procedures

Before data gathering, an introductory letter was secured from the International Health Science University. This letter helped to introduce the researcher in Mulago Hospital where this study was carried out. The introduction letter also helped to give details about the purpose of the research hence acting as a stepping-stone for various forthcoming research activities such as sampling and data collection.

During data collection process, questionnaires were self/ administered to respondents. Respondents were asked to fill in the questionnaires that same day they receive them since some could go back home that same day. Data collection took about 7 days so that all the respondents sampled could be met.

Once data was collection from the field, the researcher began organizing data and analyzing as well as interpreting them. The system to used in data analysis and interpretations was Special Package for Social Scientists (SPSS). This was done with the help of an expert.

3.12 Data Management

After data collection, a quantitative data was first tallied manually into a well-designed Microsoft excel sheet. A database adapted from the excel sheet was created according to the way the pre-coded questionnaire appeared on the hard copy. Codes were assigned to each response to the

question and the corresponding numbers were used to develop a coding sheet. The sheets with codes corresponding to different questions in the questionnaire were referred to when feeding data into the database. The information already entered in computer was consistently saved so that it could not be lost in anyway. The same information was also saved on a flash disk and email for proper safety purposes.

3.13 Analysis Plan

Using the clean data file produced from database, final analysis of the data was done using SPSS, a computer software package. The quantitative data was analyzed through descriptive and inferential techniques and presented in table and figures. The researcher organized the labeled data into categories.

3.14 Quality Control Measurement

Data collection was done through interviewer questionnaires. The instrument was pre-tested with some 12 patients from Kisugu Health Center in Makindye Division to ensure reliability. The validity of the instrument was also ensured through expert judgment where content validity index was computed at alpha coefficient of 0.7. After data collection, researcher ensured completeness and correctness of the information. Different corrections and any other gaps were filled in. The following formula was used to determine the validity of the research instruments.

$$CVI = \frac{\text{Items rated relevant (or valid)}}{\text{Total items to be judged}}$$
$$CVI = \frac{23}{25} = 0.92$$

From the above calculation, it can be seen that the CVI was computed and the result was 0.92, greater than 0.70. Thus, the questionnaire was considered valid because the items in the instruments were relevant and sufficient to cover the sampled population in question.

3.15 Ethical Consideration

An introduction letter was obtained from the principal of International Health Sciences University, which was person in charge of Mulago Hospital. This letter granted permission for data collection in the hospital and introduced the researcher to the respondents.

All the authors and scholars whose views, findings and ideas had been used in this study were also acknowledged through citation and referencing.

Confidentiality of respondents was ensured during and after data collection. Informed consent was also ensured as an ethical measure.

CHAPTER FOUR

DATA PRESENTATION

4.0 Introduction

This chapter presents the data that was collected from the field. It first presents demographic characters of respondents; and then determines level of prevalence of otitis media among patient attending ENT clinic in Mulago Hospital; followed by establishment of socio-demographic factors responsible for otitis media among patient attending ENT clinic in Mulago Hospital; next is determination of comorbid illnesses that lead to otitis media in patients attending ENT clinic in Mulago Hospital; and lastly, it examines household factors responsible for otitis media among patients attending ENT clinic in Mulago hospital.

4.1 The socio-demographic characteristics of patients attending ENT clinic in Mulago hospital

The aspects that were determined under the demographic characteristics of patients' attending ENT clinic in Mulago Hospital included the gender of the patients; their age groups, education level, marital status, religion, occupation and education level of their care givers. The findings regarding these are presented in Table 1 in the next page.

Table 1: The socio-demographic characteristics of 317 patients attending ENT clinic in Mulago hospital

Variable	Category	N	%
Sex	Male	152	47.9
	Female	165	52.1
Age	10-19	58	18.3
	20-39	113	35.6
	40-59	110	34.7
	≥60	36	11.4
Educational level	None	61	19.3
	Primary	78	24.7
	Secondary	103	32.6
	Tertiary	74	23.4
Marital status	Single	129	40.7
	Married	136	42.9
	Separated/divorced	34	10.7
	Widower	18	5.7
Religion	Catholic	120	37.9
	Anglican	105	33.1
	Moslem	65	20.5
	Others	27	8.5
Occupation	Pupil/student	81	25.6
	Employed	80	25.2
	Self-employed	95	30.0
	Unemployed	61	19.2
Education level of Caregivers	None	30	27.3
	Primary	26	23.6
	Secondary	35	31.8
	Tertiary	19	17.3

Of the 317 respondents interviewed, 165 (52.1 %) of the patients who participated in this study were female while 152 (47.9 %) of them were males.

Based on the age group of the respondents, 113 (35.6 %) of the patients were in the age group of 20-39 years while 36 (11.4 %) of them were from 60 years and above.

Regarding the educational level of respondents, of the 317 respondents interviewed, 103 (32.6 %) of the patients had secondary school level while 61 (19.3 %) of them had no formal education at all.

Of the 317 respondents interviewed, 136 (42.9 %) of them were married while 18 (5.7 %) of the patients were widowed.

Concerning the religious affiliation of the patients, 120 (37.9 %) of the respondents were Catholics and they were closely followed by Anglicans who were 105 (33.1 %).

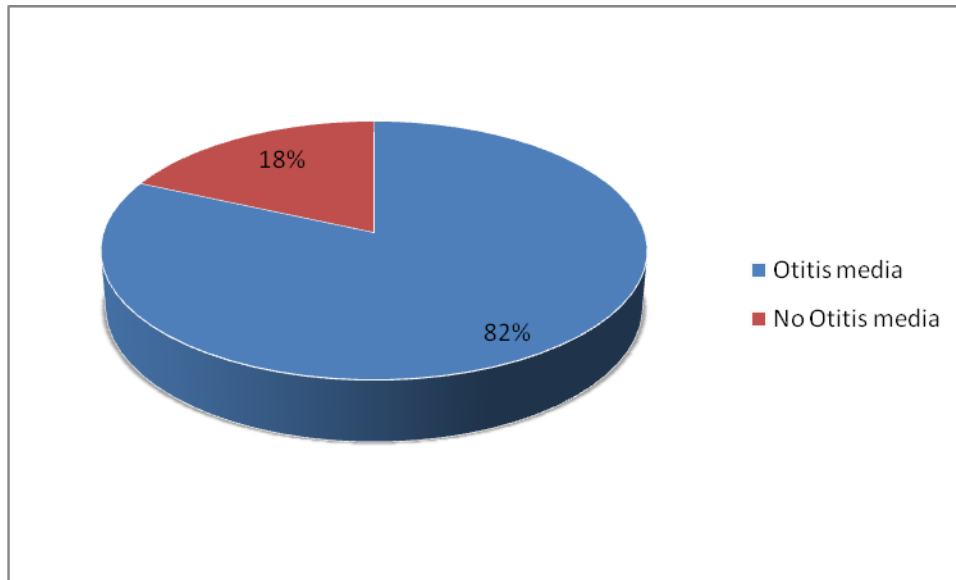
Based on the occupation of the patients who participated in this study, of the 317 the patients who participated in this study, 95 (30 %) of them were self-employed while 61 (19.2 %) of them were the unemployed.

Of 317 respondents, 35 (31.8 %) of the caretakers of the patients had secondary school education level and they were closely followed by those with no formal education as they were 30 (37.3 %) as shown in Table 1.

4.2 The prevalence of otitis media among patient attending ENT clinic in Mulago Hospital

The first research objective determined the prevalence of otitis media among patients attending ENT clinic in Mulago Hospital. The findings regarding these are presented in Figure 1.

Figure 2: The Prevalence of Otitis media among patients attending ENT clinic in Mulago hospital



The prevalence of otitis media among patients attending ENT clinic in Mulago hospital was found to be 260 (82 %) as indicated in Figure 1.

4.3 Socio-demographic factors Influencing the Prevalence of otitis media among patient attending ENT clinic in Mulago Hospital

The second research objective examined the socio-demographic factors responsible for otitis media among patients attending ENT clinic in Mulago hospital. The findings regarding these are presented in Table 2 in the next page.

Table 2: Socio-demographic factors associated with the prevalence of otitis media 317 among patients attending ENT clinic in Mulago Hospital

Variable	N	Otitis media	No Otitis media	χ^2	p-value
Sex					
Male	152(47.9)	133(51.4)	19(32.8)	6.564	0.01
Female	165(52.1)	126(48.6)	39(67.2)		
Age				2.955	0.399
10-19	58(18.3)	51(19.7)	7(12.1)		
20-39	113(35.6)	94(36.3)	19(32.8)		
40-59	110(34.7)	86(33.2)	24(41.4)		
≥ 60	36(11.4)	28(10.8)	8(13.8)		
Educational level				3.831	0.280
None	61(19.3)	45(17.4)	16(27.6)		
Primary	78(24.7)	65(25.2)	13(22.4)		
Secondary	103(32.6)	84(32.6)	19(32.8)		
Tertiary	74(23.4)	64(24.8)	10(17.2)		
Marital status				1.881	0.597
Single	129(40.7)	129(40.7)	110(42.5)		
Married	136(42.9)	136(42.9)	108(41.7)		
Divorced	34(10.7)	34(10.7)	27(10.4)		
Widower	18(5.7)	18(5.7)	14(5.4)		
Religion				2.536	0.469
Catholic	120(37.9)	100(38.6)	20(34.5)		
Anglican	105(33.1)	81(33.1)	24(41.4)		
Moslem	65(20.5)	56(21.6)	9(15.5)		
Others	27(8.5)	22(8.5)	5(8.6)		
Occupation				1.772	0.621
Pupil/student	81(25.6)	70(27.0)	11(19.0)		
Employed	80(25.2)	65(25.1)	15(25.9)		
Self-employed	95(30.0)	76(29.3)	19(32.8)		
Unemployed	61(19.2)	48(18.5)	13(22.4)		
Education level of Caregivers				3.886	0.274
None	30(27.3)	22(25.6)	8(33.3)		
Primary	26(23.6)	19(22.1)	7(29.2)		
Secondary	35(31.8)	27(31.4)	8(33.3)		
Tertiary	19(17.3)	18(20.9)	1(4.2)		

According to the findings presented in Table 2, there is no statistical evidence that age, education level, marital status, occupation and education level of caretakers associate with the prevalence of otitis media among patients attending ENT clinic in Mulago Hospital as their overall p-values

are more than 0.05. The only socio-demographic factor that has an association with the prevalence of otitis media among patients attending ENT clinic in Mulago Hospital is sex (χ^2 6.564, $p=0.01$).

4.4 The comorbid illnesses associated with the prevalence of otitis media in patients attending ENT clinic in Mulago Hospital

The second research objective determined the comorbid illness that lead to otitis media in patients attending ENT clinic in Mulago Hospital. The findings regarding these are presented in Table 3.

Table 3: Co-morbid factors associated with prevalence Otitis media 317 among patients attending ENT clinic in Mulago Hospital

Variable	N	Otitis media	No Otitis media	χ^2	p-value
Nasal obstruction					
Yes	157(50)	131(50.6)	26(47.3)	0.198	0.656
No	157(50)	128(49.4)	29(52.7)		
Rhinitis					
Yes	138(43.5)	104(40.2)	34(58.6)	6.574	0.010
No	179(56.5)	155(59.8)	24(41.4)		
Ear discharge					
Yes	144(45.4)	126(48.6)	18(31.0)	5.931	0.015
No	173(54.6)	133(51.4)	40(69.0)		
URTI					
Yes	215(67.8)	187(72.2)	28(48.3)	12.429	<0.001
No	102(32.2)	72(27.8)	30(51.7)		
Snore while sleeping					
Yes	120(37.9)	106(40.9)	14(24.1)	5.678	0.017
No	197(62.1)	153(59.1)	44(75.9)		
Nutritional status					
Malnutrition	15(4.7)	10(3.9)	5(8.6)	2.381	0.123
No malnutrition	302(95.5)	249(96.1)	53(91.4)		

Results in Table 3 also indicate that of the 317 respondents interviewed, 179 (56.5 %) of the patients had no rhinitis. Nevertheless, rhinitis had statistic significant relationship with otitis media ($\chi^2=6.574$, $p=0.010$).

Further still, of the 317 patients interviewed, 173 (54.6 %) of them had no ear discharge although there was a statistic evidence that ear discharge had positive relationship with otitis media ($\chi^2=5.931$, $p=0.015$).

Similarly, of the 317 patients interviewed, 215 (67.8 %) of them had URTI and statistically, URTI had positive relationship with otitis media ($\chi^2=12.429$, $p=0.001$).

More still, Table 4.3 shows that of the 317 patients interviewed, 197 (62.1 %) of the patients could not snore while sleeping. However, there was statistic relationship between snoring while sleeping and otitis media ($\chi^2=5.678$, $p=0.017$).

The findings of comorbid illnesses associated with prevalence of otitis media are summarized and presented in Table 3.

4.5 The household factors responsible for otitis media among patients attending ENT clinic in Mulago hospital

The research objective four established the household factors responsible for otitis media among patients attending ENT clinic in Mulago Hospital. The results regarding these are presented in Table 4.

Table 4: Household factors associated with Prevalence of otitis media 317 among patients attending ENT clinic in Mulago hospital

Variable	N	Otitis media	No Otitis media	χ^2	p-value
Cooking in house for sleeping					
Yes	217(68.5)	184(71.0)	33(56.9)	4.391	0.036
No	100(31.5)	75(29.0)	25(43.1)		
Type of fuel used for cooking				3.610	0.307
Solid	287(90.5)	238(91.9)	49(84.9)		
Dung	2(0.6)	1(0.4)	1(1.7)		
Gas	21(6.6)	15(5.8)	6(10.3)		
Others	7(2.2)	5(1.9)	2(3.4)		
Smoking status				1.428	0.232
Yes	84(26.5)	65(25.1)	19(32.8)		
No	233(73.5)	194(74.9)	39(67.2)		
Socio-economic status				3.753	0.153
High	51(16.1)	43(16.6)	8(13.8)		
Moderate	139(43.8)	107(41.3)	32(55.2)		
Low	127(40.1)	109(42.1)	18(31.0)		
Daily expenditure(UGX)				1.469	0.480
<3000	104(32.8)	87(33.6)	17(29.3)		
3000-5000	120(37.9)	94(36.3)	26(44.8)		
>5000	93(29.3)	78(30.1)	15(25.9)		
Exclusive breastfeeding for six months				2.075	0.150
Yes	78(24.6)	68(26.3)	10(17.2)		
No	239(75.4)	191(73.7)	48(82.8)		

Of the 317 patients interviewed, 217 (68.5 %) of them were cooking in house of sleeping and yet cooking in house for sleeping.

Based on the type of fuel used for cooking, of the 317 patients interviewed 287 (90.5 %) of them use solid fuel for cooking.

Regarding the smoking status of the patients, out of 317 respondents interviewed, 233 (73.5 %) of the patients were nonsmokers.

Considering the socio-economic status of the patients interviewed, of the 317 patients interviewed, 139 (43.8 %) of them fell under the level of moderate.

Most, 120 (37.9 %) of the patients would spend from 3000-5000 Ugandan shillings per day. Regarding exclusive breastfeeding for six months, it was found out that of the 239 (75.4 %) of them disagreed ever breastfeeding exclusively for six months.

The only household factor found to be associated with prevalence of otitis media was cooking in the house for sleeping ($\chi^2=4.391$, $p=0.036$) as indicated in Table 4.

4.6 Factors Associated with Prevalence of Otitis Media among Patients Attending ENT Clinic in Mulago Hospital

Summary of the findings regarding factors associated with prevalence of otitis media among patients attending ENT Clinic in Mulago Hospital was also established through multivariate analysis. The findings regarding these are presented in Table 5.

Table 5: Factor associated with prevalence of Otitis media among patients attending ENT clinic in Mulago hospital at multivariate analysis

Variable	N	OR(95%CI)	p-value
Gender			
Male	152(47.9)	1	
Female	165(52.1)	2.5 (1.32-4.76)	0.005
History of allergic rhinitis			
Yes	138(43.5)	2.33(1.25-4.35)	0.008
No	179(56.5)	1	
History of ear discharge			
Yes	144(45.4)	2.18(1.13-4.21)	0.02
No	173(54.6)	1	
History of URTI			
Yes	215(67.8)	1.69(0.91-3.16)	<0.001
No	102(23.2)	1	

Results in Table 5 indicate that males are less likely to develop otitis media than females. Patients who have a history of allergic rhinitis are 2.3 times more likely to develop otitis media than their counterparts without allergic rhinitis. Similarly, patients with a history of ear discharge are 2.2 times more likely to develop otitis media than those without its history and those with history of URTI are 1.7 times more likely to develop otitis media than their counterparts.

CHAPTER FIVE

DISCUSSIONS OF THE FINDINGS

5.0 Introduction

This study determined the risk factors of otitis media among patients attending ENT clinic in Mulago hospital. Before establishing these factors, the study determined the level of prevalence of otitis media among patient attending ENT clinic in Mulago Hospital and then established socio-demographic factors, comorbid illnesses and household factors responsible for otitis media among patients attending ENT clinic in Mulago hospital. This chapter therefore discusses the issues identified in relation to these key objectives.

5.1 Level of prevalence of otitis media among patient attending ENT clinic in Mulago Hospital

This study found out that the level of prevalence of otitis media among patients attending ENT clinic in Mulago hospital is generally high with eight in every ten patients having the disease. This is probably because that Mulago ENT clinic handles all referrals from around.

Comparing the research finding on the level of prevalence of otitis media among patients attending ENT clinic in Mulago with those of other authors whose studies have been reviewed in the literature, it can be noted that the research finding is in line with the one by Sattout and Jenner (2008) in Southern Saharan Africa as they showed in their study that the level of prevalence of otitis media was very high as many of the children sampled were irritable, fussy, or had problems with feeding or sleeping. Studies by Coleman and Moore (2008) in USA is also in agreement with the one carried out with patients attending ENT clinic in Mulago Hospital as they indicated in their study that otitis media is an extremely common diagnosis. The authors

also showed that 75% of all children experience at least one episode of otitis media before the age of three.

These studies are in agreement with the one carried out among patients attending ENT clinic in Mulago because all of them were carried out in similar geographical setting with few clinics or hospitals that can handle such conditions.

The prevalence of otitis media could also be high among patient attending ENT clinic in Mulago because of low level of awareness about the disease. Thus, this makes many people to come to hospitals when their conditions have worsened. In other terms, low level of awareness about the disease among communities is likely to lead to high prevalence of the disease. Thus, the ministry of health and its partners should make efforts to sensitize people about different ways of preventing the disease.

However, study findings on the prevalence of otitis media among patients attending ENT clinic in Mulago hospital is somewhat in disagreement with the one carried out by Abba *et al*, (2010) with first grades and second grade children in United States as their studies showed that OME was diagnosed in 64 out of 2042 (3.1%) first grade and in 25 out of 1633 (1.5%) second grade students. These studies could be in disagreement because it only considers children as case study while this study considers all sorts of patients.

The implication of having high prevalence of otitis media among patients attending ENT clinic is that many people are likely to lose their hearing and treating hearing problems will be costly to individuals as well as the government as they will have to spent a lot of money on financing

drugs. Having many people with hearing problems is also likely to affect the quality of human resource and their out of those affected with such diseases.

5.2 Socio-demographic factors responsible for otitis media among patients attending ENT clinic in Mulago hospital

Females were found to be at higher risk of developing otitis media than men. Among other reasons, females could be at higher risk of developing otitis media than men because of their good health seeking behavior and perhaps women's involvement in different household activities in Uganda could have played a greater role in making them at a higher risk of developing otitis media than men.

Comparing this research finding with those of other authors whose studies have been reviewed in the literature, it can be noted that this study finding is in disagreement with the one carried out by Gulani et al, (2010) who in their studies entitled "*Efficacy of Short Course of Antibiotics For Treatment of Acute Otitis Media In Children*" in India pointed out that males have almost twice the odds for developing OM-related hearing loss (OR = 1.9; $p < 0.001$). Studies carried out by McDonald et al, (2008) on "*Grommets (Ventilation Tubes) For Recurrent Acute Otitis Media In Children*" in United States is not also in agreement with the one carried out among patients attending ENT in Mulago Hospital as they showed that a marginal trend (OR = 1.5; $p = 0.055$) and another reported an increased risk without specifying significance. Thus, in overall, boys are at raised risk for OM. Yilmaz *et al.* (2006) also noted that boys are more likely to have infections than girls are and yet in this study, the female gender was at a higher risk. Uhari et al. (2006) in a Norwegian study of 2750 twin pairs concluded that heritability of otitis media

susceptibility was 74% among girls and 45% among boys. This study showed that the HLA-A2 gene has been noted to be associated with RAOM but not OME.

The study carried out among the patients attending ENT in Mulago could be in agreement with the ones by the above mentioned authors because none of them was carried out in Uganda and Africa as a whole. This could also suggest that the trend of developing otitis media between gender differs from one country by another or one continent to another. In other terms, geographical differences could have influenced the development of otitis media between gender.

Thus, efforts should be put in place to help women identify and control risk factors that are likely to make them at higher risk of developing otitis media otherwise the prevalence of the disease is likely to remain higher among them.

Nevertheless, the study with patients attending ENT clinic in Mulago is in disagreement with the ones by Yilmaz *et al.* (2006); Klossek (2009); Laine *et al.* (2010); and Leach and Morris (2006) as their study in Canada found out that age is closely associated with prevalence of otitis media among children and this was not for the case of this study as age was not found to be associating with otitis media. These findings could be in disagreement because these authors carried out their studies in other countries rather than Uganda. Perhaps the prevalence of otitis media in different countries could be influenced by different factors and this is why age was not significantly related to otitis media in this study.

5.3 Comorbid illnesses responsible for otitis media among patients attending ENT clinic in Mulago hospital

Under comorbid illness, this study found out that those with history of allergic rhinitis had significant relationship with otitis media. This is probably because allergic rhinitis can cause inflammation that increases chances for otitis media.

This finding is consistent with the one done by Alho et al (2006) as they showed in their “*Public Health Impact Of Various Risk Factors For Acute Otitis Media*” in northern Finland that children who were 36 to 47 months old, had allergies and were more than twice as likely to carry two or more genetically distinct H. influenzae isolates at a time. In a multivariate GEE logistic regression model, exposure to smoking, having allergies, and being 36 to 47 months old were significantly associated with at least a two fold increase in carriage of two or more genetically distinct H. influenzae at a time (Martikainen *et al.*, 2007). Using a pacifier and having a history of frequent otitis media episodes were highly correlated with antibiotic use; therefore, only antibiotic use was included in the multivariate model.

These studies are in agreement because allergic rhinitis could be a general condition leading to otitis media. Further still, studies by Alho et al (2006) and this carried out among patients attending ENT clinic in Mulago all employed adults, thus, this could have influenced such similar findings.

This study also revealed that patients with history of ear discharge were associated with prevalence of otitis media. Many of the patients being of low education level were not knowledgeable about procedures to effectively care for their ears. This could have contributed to the development of their ear discharge.

What this study found is in line with what other studies found elsewhere. For instance Lieberthal *et al.* (2013) found that severe ear discharge appeared as a risk factor for otitis media (OR = 1.8; $p = 0.006$), and the same study showed that the risk increased with growing number of days with ear discharge. The ear discharge is as a result of inflammation, thus, making it easier for otitis media to develop.

The implication of this condition is that patients especially in their early ages are likely to have slow language development and reading skills. Further still, failing to treat ear discharge can also have a bad implication on the patients as many of them are likely to have problems with vertigo. Thus, efforts should be put in place by the ministry of health such that people are sensitized about these conditions and can be treated at earlier stages.

Similarly, history of URTI was found to be associated with otitis media. This could be so because there is a connection between the nose, throats and the ear thus infections spread easily and this can lead to otitis media.

This study finding with patients attending ENT clinic at Mulago is also consistent with the one by Daly *et al.* (2005) whose study showed that URTI is related to adenoid hypertrophy.

These studies are in agreement because URTI is a common condition that encourages development of otitis media if not managed earlier.

The implication of this is that failure to thrive especially among under-fives and poor health among adults. Thus, disease control measures should be put in place by the ministry of health in collaboration with other partners such that URTI can be treated at its earlier stage.

This study did not find any relationship between snoring while sleeping and otitis media. This study finding is inconsistent with the one done by Daly *et al.* (2005) whose study pointed out that

snoring and nasal congestion lead to development of otitis media. According to the authors, severe snoring appeared to be risks here or in another study.

These study findings are disagreement because the focus of studies by Daly *et al.* (2005) was children under five while this study captured both children and adults and this explains differences in the findings.

As comorbid illness appeared to be the main causes of otitis media among patients attending ENT clinic in Mulago, all efforts should be done by the ministry of health together with developing partners so as find ways of preventing and reducing cases of such illness in different parts of the country. Sensitization programs about comorbid illnesses should also be encouraged.

5.4 Household factors responsible for otitis media among patients attending ENT clinic in Mulago hospital

Among all the household factors responsible for otitis media, this study found out that it was only cooking in house of sleeping that has significant relationship with otitis media at bivariate but not at multivariate analysis. This is probably because many of the patients had moderate economic status thus, could have used their houses for cooking and sleeping.

Comparing this study finding with the ones by authors whose studies have been reviewed in the literature, it can be said that the study in case of Mulago hospital is in agreement with the one done by Lous *et al.* (2005) whose study with the poor communities in France and found out that children who were exposed to smoke from firewood. The authors also described such smoke as a risk factor for otitis media but the exact mechanism by which it contributes to otitis media was not clear. Similarly, research by Rosenfeld *et al.* (2004) on "*Otitis media with effusion clinical practice guideline*" with American children is also consistent with the one carried out with

patients attending ENT clinic in Mulago hospital as they indicated that smoke may also damage the upper respiratory environment in young children, leading to increased bacterial colonization. These findings could be in agreement because the most of the patients who participated in this study were from the moderate socio-economic status thus could not afford have different kitchen just like those poor communities in France. Thus, community members should be sensitized by health workers to desist from cooking in the same room of sleeping as it exposes people to otitis media.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter draws conclusions that were derived from the research findings and they are done objectively. The chapter also forwards recommendations so as reduce prevalence of otitis media among people. Lastly, the chapter proposes some topics for further research in the similar area.

6.1 Conclusions

Prevalence of Otitis Media among Patients attending ENT clinic in Mulago

Regarding the prevalence of otitis media among patients attending ENT clinic in Mulago, this study concludes that the level of prevalence of the disease among the patients is high. That is about eight in every ten patients had otitis media.

Socio-demographic Factors Associated with Prevalence of Otitis Media among Patients attending ENT Clinic in Mulago

Concerning the socio-demographic factors associated with prevalence of otitis media among patients attending ENT clinic in Mulago hospital, this study concludes that the prevalence of otitis media was found to be associated with the female gender.

Comorbid Illness Associated with prevalence of Otitis Media among Patients Attending ENT clinic in Mulago

This study found that patients who had history of allergic rhinitis, ear discharge, URTI and snoring while sleeping were at higher risk of developing otitis media than those without these conditions.

Household Factors Associated with prevalence of Otitis Media among patients Attending ENT Clinic in Mulago Hospital

Based on the results of this study, the only household factors which was found to be associated with prevalence of otitis media is cooking in the same house of sleeping.

6.2 Recommendations

Since the level of prevalence of otitis media among patients attending ENT clinic in Mulago is generally high and different factors positively associate with otitis media among them, the following recommendations have been forwarded.

The ministry of health should establish a comprehensive campaign country wide to sensitize people about different factors, conditions, circumstances that lead to otitis media. This program can be spearheaded by the village health team after they have been fully trained about the disease. Through this approach, prevention measures can be put in place by people and the rate of prevalence of the disease can significantly reduce.

Since the female gender is prone to otitis media, the ministry of health together with other development partners should also launch a campaign to educate women about the factors that expose them more to otitis media. Churches and mosques among other places should be targeted

such that women acquire knowledge about conditions that expose them more to otitis media and take appropriate measures towards prevention.

Comorbid illnesses such as allergic rhinitis, ear discharge, URTI and snoring while sleeping were the main factors for otitis media among patients attending ENT clinic in Mulago. The ministry of health through its partners should also sensitize people about the symptoms of these illnesses, their dangers and ensure that drugs for them are made available in all Health Center Is, IIs and IIIs. In some case, annual programs should be made country wide to check such illnesses among people and have them treated in time. This approach can significantly reduce chances for these illnesses that lead to otitis media throughout the country.

Since cooking in the same house of sleeping is closely associated with otitis media, ministry of health through local community leaders such as local councilors should encourage people to establish kitchens with proper ventilation for cooking. In some cases, enforcement can be put in place such that people can adhere to such health guidelines.

6.3 Areas for Further Research

- (1) Residential differences and the prevalence of otitis media among patients attending ENT clinic in Mulago hospital.
- (2) Factors affecting accessibility of medical services for otitis media among patients in Uganda.

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APPENDICES

APPENDIX I: ASSENT FORM

Dear,

My name is Chandiru Fiona pursuing Bachelor Degree in Nursing Science from International Health Sciences University. As one of the requirements of the above mentioned degree, I have been tasked to carry out a study on: prevalence of otitis media and associated risk factors among Outpatients in Mulago Hospital. Apart from obtaining a degree, I am trying to learn about various risk factors that lead to otitis media because the illness is becoming a big problem to a number of people such that proper interventions can be undertaken to reduce the risk factors. If you would like, you can be in my study.

If you decide you want to be in my study, you are requested to confirm your acceptance by indicating your signature and the date as indicated below.

Other people will not know if you are in my study. I will put things I learn about you together with things I learn about other [children, teens], so no one can tell what things came from you. When I tell other people about my research, I will not use your name, so no one can tell who I am talking about.

Your parents or guardian has to say it is OK for you to be in the study. After they decide, you get to choose if you want to do it too. If you do not want to be in the study, no one will be annoyed with you. If you want to be in the study now and change your mind later, that is OK. You can stop at any time.

My telephone number is 0704025333/0772606074. You can call me if you have questions about the study or if you decide you do not want to be in the study any more.

I will give you a copy of this form in case you want to ask questions later.

Agreement

I have decided to be in the study even though I know that I do not have to do it. Chandiru Fiona has answered all my questions.

Signature of Study Participant

Signature of Researcher

Date

Date

APPENDIX II: CONSENT TO BE A RESEARCH SUBJECT

Dear Sir/madam

I am Chandiru Fiona from International Health Sciences University. I am carrying a research to determine prevalence of otitis media and associated risk factors among Outpatients in Mulago Hospital.

Procedures

You will be asked to complete a questionnaire. The questionnaire consists of 34 questions and will take approximately 20 minutes. Questions will include details about your profile and then your views about socio-demographic factors as risk factors of otitis media, co morbid illnesses as risk factors and household factors as risk factors to otitis media.

Benefits

There are no direct benefits to subjects. However, it is hoped that your participation will help researchers learn more about the prevalence of otitis media and how socio-demographic factors, co morbid factors and household factors act as risk factors to otitis media. This will enable researchers to suggest appropriate measures that can benefit individuals as well as Uganda at large.

Confidentiality

All information provided will remain confidential and will only be reported as group data with no identifying information. All data, including questionnaires will be kept in a secure location and only those directly involved with the research will have access to them. After the research is completed, the questionnaires will be destroyed.

Participation

Participation in this research study is voluntary. You have the right to withdraw at anytime or refuse to participate entirely without jeopardy to your consecutive treatment or any other help that you would like to seek from ENT clinic.

Questions about the Research

If you have questions regarding this study, you may contact me and my telephone number is 0704025333/0772606074.

I have read, understood, and received a copy of the above consent and desire of my own free will and volition to participate in this study.

Signature:.....

Date:

APPENDIX III: QUESTIONNAIRE FOR RESPONDENTS

Section A: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

1. Gender:

- 1. Male
- 2. Female

2. Age:

- 1. 10-19
- 2. 20-39
- 3. 40-59
- 4. 60 and above

3. Education level of patient:

- 1. None
- 2. Primary School
- 3. Secondary School
- 4. Tertiary

4. If a child, what is the education level of caregiver?

- 1. None
- 2. Primary School
- 3. Secondary School
- 4. Tertiary

5. Marital Status

- 1. Single
- 2. Married/ Cohabiting
- 3. Separated / Divorced
- 4. Widow / Widower

6. Religious Affiliation

1. Catholic
2. Anglican
3. Moslem
4. Others (please specify)

8. Occupation Status

1. Pupil/Student
2. Employed
3. Self-employed
4. Unemployed

SECTION B: HEALTH STATUS OF THE PATIENT

9. Is the patient diagnosed with otitis media?

1. Yes
2. No

10. What is the type of otitis media diagnosed?

1. Acute otitis media
2. Otitis media with effusion
3. Chronic suppurative otitis media

11. How long have you suffered from otitis media?

1. Newly diagnosed
2. 1-2 Years
3. 3-4 Years
4. 5 years and above

12. How long have you been on treatment for otitis media?

- 1. Less than one month
- 2. 1-2 Months
- 3. 3-4 Months
- 4. 5 Months and above

13. Do you experience some change since you started treatments?

- 1. Yes
- 2. No

SECTION C: CO-MORBID ILLNESS

14. Have you ever experienced episodes of nasal obstruction?

- 1. Yes
- 2. No

15. Do you sometimes experience seasonal rhinitis or allergies?

- 1. Yes
- 2. No

16. Do you usually get discharge from your ears?

- 1. Yes
- 2. No

17. Do you usually get upper respiratory tract infections (like flue, cough etc.?)

- 1. Yes
- 2. No

18. Has any one ever told you that you snore while sleeping?

- 1. Yes
- 2. No

19. Nutritional status of the patient

- 1. Malnourished
- 2. Not Malnourished

SECTION D: HOUSEHOLD FACTORS

20. Do you cook from the house where you sleep?

- 1. Yes
- 2. No

21. What do you use for cooking in your home/house?

- 1. Solid fuel (wood and charcoal)
- 2. Dung
- 3. Gas
- 4. Others

22. Does any one in the house smoke?

- 1. Yes
- 2. No

23. What is the socio-economic status of your family?

- 1. High
- 2. Moderate
- 3. Low

24 How much do you spend in a day?

- 1. Less than 3000 Uganda Shillings
- 2. 3000 -5000 Uganda Shillings
- 3. More than 5000 Uganda Shillings

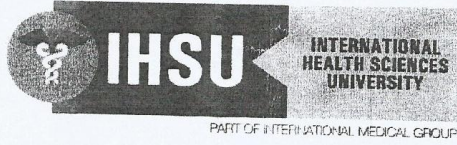
25. If a child, did the child breastfeed exclusively at least six months?

1. Yes

2. No

Thanks you for taking your time to respond to these Questions!

APPENDIX IV: INTRODUCTORY LETTER



Office of the Dean, School of Nursing

Wednesday 28th August 2013

TO WHOM IT MAY CONCERN

Re: Assistance for Research

Greetings from International Health Sciences University.

This is to introduce to you **Chandiru Fiona** Reg. No. **2010-BNS-TU-030**, who is a student of this University. As part of the requirements for the award of a Bachelor of Nursing Sciences of this University, the student is required to carry out field research for the submission of a Research Project.

Ms. Chandiru would like to carry out research on issues related to: **The prevalence and risk factors of Utitis media among out-patients in Mulago Hospital**

I therefore request you to render her such assistance as may be necessary for her research.

I, and indeed the entire University are thanking you in anticipation for the assistance you will render to her.

Sincerely Yours,

28 AUG 2013
Elizabeth Wafula
P.O. Box 7782
Kampala - Uganda

MRS. WAFULA ELIZABETH

DEAN

MAKING A DIFFERENCE IN HEALTH CARE

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APPENDIX V: AUTHORIZATION LETTER

TELEPHONE: +256-414-
REFERRAL HOSPITAL
FAX: +256-414-5325591
E-mail: admin@mulago.or.ug
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554008/1MULAGO NATIONAL

P.O. Box 7051
KAMPALA, UGANDA

IN ANY CORRESPONDENCE ON THIS
SUBJECT PLEASE QUOTE NO...

THE REPUBLIC OF UGANDA

21st Oct, 2013.

Ms. Chandiru Fiona
International Health Sciences University
Kampala – Uganda.

Dear Chandiru,

**RE: APPROVAL OF PROTOCOL MREC: 470: THE PREVALENCE AND RISK
FACTORS OF OTITIS MEDIA AMONG OUT PATIENTS IN MULAGO HOSPITAL.**

The Mulago Hospital Research and Ethics Committee reviewed your proposal referenced above and hereby grant approval for the conduct of this study for a period of (1) year from 21st October 2013 to 20th October, 2014.

This approval is subjected to the following conditions:

1. That you will be abide by the regulations governing research in the country as set by the Ugandan National Council for Science and Technology including abiding to all reporting requirements for serious adverse events, unanticipated events and protocol violations.
2. That no changes to the protocol and study documents will be implemented until they are reviewed and approved by the Mulago Research and Ethics Committee.
3. That you provide annual progressive reports and request for renewal of approval at least 60days before expiry of the current approval.
4. That you provide an end of study report upon completion of the study including a summary of the results and any publications.

I wish you the best in this Endeavour.



DR.NAKWAGALA FREDERICK NELSON
CHAIRMAN MULAGO RESEARCH AND ETHICS COMMITTEE

Vision: "To be the leading centre of Health Care Services"