PERCEPTIONS AND HEALTH CARE SEEKING PRACTICES OF GUARDIANS OF YOUNG CHILDREN TOWARDS CHRONIC SUPPURATIVE OTITIS MEDIA IN MACHAKOS COUNTY, KENYA

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I57/7521/2002

A thesis submitted in partial fulfilment of the requirements for the award of the degree of Master of Public Health and Epidemiology in the School of Pure and Applied Sciences of Kenyatta University

September, 2013

DECLARATION

This thesis is my original work and has not been presented for a degree in any university or for any other award.

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Supervisors' Approval

We confirm that the candidate under our supervision carried out the work reported in this thesis.

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DEDICATION

This work is dedicated to my parents, Mbeke Kamuti and the late John Kamuti Ngoma, who passed on during my study, and my wife Jemima Mueni Wambua and children Ndunge Wambua, Mbeke Wambua, Kamuti Wambua and Mutunga Wambua. They were all a source of inspiration for my study.

I would also like to dedicate this work to the guardians of young children in developing countries, majority who are mothers, for ensuring that most children have the chance to achieve their full potential for healthy and productive lives free from disease and disability despite their limited knowledge on symptoms, cause and prevention of most childhood diseases.

ACKNOWLEDGEMENT

First and foremost, I wish to acknowledge the mentorship of my supervisors: Prof Ephantus W Kabiru, School of Public Health, Kenyatta University, Dr Isaac Mwanzo, Department of Community Health, Kenyatta University and Dr Mujahid F Din, Department of Medical Physiology, University of Nairobi, through motivation, support and advice throughout the research period. They had the time and energy to read through the manuscript and offer invaluable input towards my research. I wish also to thank Mr Robert Oswago for his statistical expertise and relevant contribution in both my proposal and thesis.

My appreciation also goes to the staff of Mbiuni and Kisiiki Health Centres in Machakos County, for their contribution during pre-testing of questionnaires and the then Clinical Officers in-charge, Matuu District Hospital, Mr Robert Kilonzo and Mwala District Hospital, Ms Ruth Musyoka, for their support during data collection. My appreciation is also extended to the two field assistants, Ms Pauline Kimeu and Ms Angeline Mutua, who helped me with the actual collection of data. I am indebted to my family for the patience, support and understanding that enabled me to complete this work. My absence during coursework and data collection denied them paternal care and support.

I acknowledge the support of Ms Lucy Muriuki during proposal writing and Ms Ruth Ogall during thesis writing for their typing skills when I had deadlines to meet. They offered special assistance for successful completion of this work

My last acknowledgement goes to all my friends and other well-wishers, who in one way or another, encouraged and gave me material and moral support in accomplishing the task.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AOM	Acute Otitis Media
ARI	Acute Respiratory Infection
CHL	Conductive Hearing Loss
CSOM	Chronic Suppurative Otitis Media
CWC	Child Welfare Clinic
dB	Decibels
DDP	District Development Plan
ENT	Ear, Nose and Throat
FB	Foreign Body
GHC	Giants Hearing Centre
HL	Hearing Loss
HIV	Human Immune Virus
IEA	Impact East Africa
KEF	Kenya Ear Foundation
NGO	Non- Governmental Organisations.
OED	Operation Ear Drops
OME	Otitis Media with Effusion
SPSS	Statistical Package for Social Sciences
WHO	World Health Organisation
SNHL	Sensorineural Hearing Loss
URTI	Upper Respiratory Tract Infection
ROK	Republic of Kenya

DEFINITION OF OPERATIONAL TERMS

Dependant	Unmarried guardian who is the mother of child and relies on her parent (s) for upkeep
Family	Restricted to nucleus family consisting of mother, father (where applicable) and their children.
First line Health Personnel	Health workers involved in curative, preventive and promotive health services at Dispensaries (level 2) and Health Centres (level 3) in Kenya's Health Care System. They are usually clinical officers and nurses.
Guardian	Care giver of a young child who may be the mother, father, grandmother, sister, aunt or foster parent.
Housewife	Married guardian who is the mother of child and is not in formal employment or undertaking any kind of business.
Young child	Under five years old child.

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ABSTRACT

Chronic suppurative otitis media (CSOM) occurs as a complication of untreated, or inadequately treated acute otitis media, commonly in the first five years of life. CSOM is related to poor socio-economic conditions and is the commonest cause of persistent mild to moderate hearing impairment in children and young people in developing countries. When the hearing loss associated with CSOM occurs during the first two years of life, it is likely to have serious effects on (the period of) language development of a young child, with sub-sequent delays in school progress. This study was therefore designed to determine the perceptions and health care seeking practices of guardians of young children towards CSOM in Machakos County. A cross sectional descriptive study using an interview schedule was carried out on 400 guardians with under five years old children seeking medical attention in two public health facilities in Machakos County. The main objective was to determine the prevalence, perceptions, health care seeking practices and the socio-demographic factors associated with CSOM in children. The study was conducted in one purposively selected health facility in each of the two conveniently selected districts. Probability proportional to size sampling method was used to determine the number of guardians to participate from each health facility. Data collected was processed using SPSS. Chi-square and contingency coefficient measure of association was used to determine the significance and extent of the relationship between the variables. CSOM was found in 12(3%) of the children and an overall prevalence rate of 0.03% calculated. There was a significant relationship between CSOM infection in young children and guardians' relationship to child ($p=0.008$) and guardians age ($p=0.003$). However, there was no significant relationship between gender of child ($p=0.958$), birth position of child in the family ($p=0.846$), size of family ($p=0.967$), marital status ($p=0.727$), education level of guardian ($p=0.349$) and CSOM infection in young children. A large proportion of the guardians was aware of CSOM symptoms, but had limited knowledge on cause and associated factors. The guardians had the right perceptions on susceptibility, prevention, curability and outcome of untreated CSOM. Instilling chicken soup, gun oil and juice from traditional herbs in the ear were popular practices by the community. Sensitization program to the community, formulation and implementation of a policy on primary ear care by government and its stakeholders, and a national survey on prevalence of CSOM and other middle ear diseases are required.

CHAPTER 1: INTRODUCTION

1.1 Background Information

The ear can be divided anatomically and clinically into three parts, that is, the external (outer) ear, the middle ear and the internal (inner) ear. The external and the middle ears are concerned primarily with the transmission of sound. The internal ear functions both as the organ of hearing and also part of the balance system of the body (Maran, 2010) (See Appendix V).

Infections of the ear can occur at any age but are more common in children than in adults. They mainly affect the outer and the middle ear (Chole and Choo, 2000; Russel, 2004). Conditions of the inner ear are less common and when they occur, they are mostly congenital in origin or associated with toxicity emanating from the use of certain drugs (Chole and Choo, 2000). At other times, certain infections outside the ear may affect the inner ear, for example, meningitis, measles, mumps and syphilis (Stalker, 1984).

The outer ear, which is the exposed part, comprises of the pinna and external auditory canal (EAC). Infections or conditions affecting the outer ear include congenital malformations, for example, microtia and atresia of EAC. Other infections may be haematoma of the pinna and impacted wax, foreign bodies, furunculosis and otomycosis, all affecting the EAC (Curruth, 1986; Maran, 2010).

Middle ear infections form a significant group of ear infections in young children due to their long-term effects if not, or inadequately, attended to. They are a continuing cause of hearing loss (HL), related complications and even mortality. The problem is particularly prevalent in developing regions of the world (Berhman, 1995). The most common and significant among

middle ear infections include acute otitis media (AOM), chronic suppurative otitis media (CSOM) and otitis media with effusion (OME), also called “glue ear”. In almost all the cases of otitis media, there is a proceeding infection of the upper respiratory tract in the child (Stalker, 1984). The most common route of infection for the middle ear is the Eustachian tube through which there may be extension of infection from nasopharynx or infected secretions forced through it by pressure changes associated with excessive nose blowing, diving and under water swimming (Garden *et al*., 2002). Other ways in which infection can reach the middle ear is through the external auditory meatus in a pre-existing perforation of the eardrum or, in extremely rare cases, be blood-borne (Maran, 2010).

Acute otitis media is the rapid and short onset of signs and symptoms of inflammation in the middle ear cleft**.** It is extremely common in infancy and childhood in all countries (Russel, 2004). CSOM occurs as a result of untreated, or inadequately treated, acute otitis media. It is the stage of the ear disease in which there is chronic inflammation of the middle ear and mastoid, long standing perforation of the eardrum and painless purulent ear discharge (otorrhoea) associated with hearing impairment. The disease may affect one or both ears with ear discharge as the most common feature, though not universal to all cases of CSOM. The length of time of continuous discharge through a perforation necessary to make a CSOM diagnosis has been a subject of discussion but the most acceptable minimum period is two (2) weeks **(**WHO, 1991). It has been shown that irreversible tissue disease occurs in an animal model in 2 to 3 weeks following onset of acute otitis media (Meyerhoff, 1988).Without treatment, CSOM may continue for months or even years with purulent discharge, progressive destruction of the ossicles and impairment of hearing (Russel, 2004). There may also be involvement of the mastoid and other

life threatening complications such as septicaemia, meningitis or brain abscess. Alternatively, the discharge may dry up only to reappear after a bout of acute respiratory tract infection (ARI) or swimming and other activities that may lead to accidental entrance of water into the ear (Garden *et al*., 2002; Colman, 2009).

In the acquisition of speech, the important years of life are the first two and therefore the acquired hearing loss associated with CSOM, if it occurs within this period, impacts negatively on speech development, interferes with school learning and a full economic productivity of a child in adult life (Maran, 2010). In view of the foregoing, it is imperative for guardians to recognize and discern the seriousness associated with chronic middle ear infection in young children, take appropriate health-care actions and institute proper preventives measures. This study endeavored to determine perceptions and health care seeking practices among guardians in Mwala and Yatta Districts of Machakos County, Kenya.

1.2 Problem Statement

Due to age-related dependence, young children count on their guardians for a healthy living. They spend much of their time at home with their guardians who control much of their environmental surroundings. In the event that a child contracts CSOM, prompt treatment is required but if treatment is unavailable and the duration of infection is prolonged, the effects could be persistent foul smelling discharge with its attendant social stigma, complications such as meningitis and hearing loss, leading to poor educational progress and low economic productivity. If the guardians, majority of who are mothers, do not understand the risk associated with CSOM, they may have little motivation to seek prompt healthcare for their

children. It is therefore imperative for guardians to recognise and discern the seriousness associated with middle ear infections in young children, take appropriate health care actions and institute proper preventive actions.

Machakos County, which is the focus of this study, is vast, with poor transport infrastructure. It has a high proportion of the population (55.8%) residing in the rural areas far away from the only referral hospital, Machakos Level 5 Hospital. In addition, the researcher was unable to come across any systematic research material in the visited libraries and therefore the magnitude of CSOM and its associated effects are not adequately documented. Available data from the District Health Records Officer combines all ear diseases together with no provision for CSOM alone. Similarly there is no mention of CSOM and other ear diseases in the current Kenya Demographic Health Survey (GOK, 2010).This perhaps indicates that there is little work that has been done in the topic of concern, thus giving a perfect setting for this study. This study is therefore necessary to determine the prevalence of CSOM in young children and the associated socio-demographic factors, perceptions and the health care seeking practices of their guardians in Machakos County.

1.3 Justification of the Study

Disease perceptions determine the treatment mode chosen, promptness with which the health care is sought and any preventive measures undertaken by a community towards a disease. Hence, determining the prevalence and elucidation of perceptions and health care seeking practices by the community towards CSOM will generate data that may form a basis for a programmatic intervention measures for control of the disease.

1.4 Research Questions

a) What is the prevalence of CSOM among young chidren in Machakos County?

b) What are the guardian's perceptions towards CSOM?

c) What are the guardians's health care seeking practices towards CSOM?

d) What are the socio-demographic factors associated with CSOM?

e) What are the guardian's home based care practices to CSOM infection.

1.5 Hypotheses

a) There is no association between socio-demographic factors and CSOM infections.

b) The guardians have positive perceptions towards CSOM.

c) The guardians' health care seeking practices promote hearing health.

1.6 Objectives

1.6.1 General Objective

The study aimed at determining the perceptions and health care seeking practices of guardians of young children towards chronic suppurative otitis media in Machakos County.

1.6.2 Specific Objectives

a) To determine the prevalence of CSOM in the study area.

b) To establish the guardian's perceptions to CSOM infection.

c) To establish the guardians health care seeking practices to CSOM infection

d) To establish the socio-demographic factors associated with CSOM infection in young children.

e) To determine the guardians home based care practices to CSOM infection.

1.7 Study Limitations

The guardians were interviewed at the health facility where they had brought their children either for treatment or for child welfare clinic (CWC). This therefore shows that the guardians had already exhibited a heath seeking behaviour. Thus the views of the guardians of young children who had no reason to visit the two health facilities during the study period were therefore not captured. Most health facilities do not have defined catchment areas, that is, areas that require that all persons in those areas who visit a particular health facility must be residents of that particular area and none from outside this area should visit the health facility. This may affect the definition of the denominator when calculating rates (prevalence rate) as there may have been clients or patients from outside the catchment area.

1.8 Conceptual Framework

The conceptual framework in figure 1.0 below shows the relationship between the underlying factors, proximate factors and eventually the ultimate outcome. Government policy, cultural and belief systems of the community constitute the underlying factors in CSOM infection (Parker *et al.,* 2004). The proximate factors such as the guardians and child characteristics and their usual locality within a country may, depending on the impact of the underlying factors, have a strong bearing on the occurrence of CSOM (Kelly, 2008).

According to Parker *et al*. (2008) the interaction between the underlying and the proximate factors leads to awareness by the guardians of the serious effects of a disease. This empowers them to make decisions concerning the infection at the house hold level.

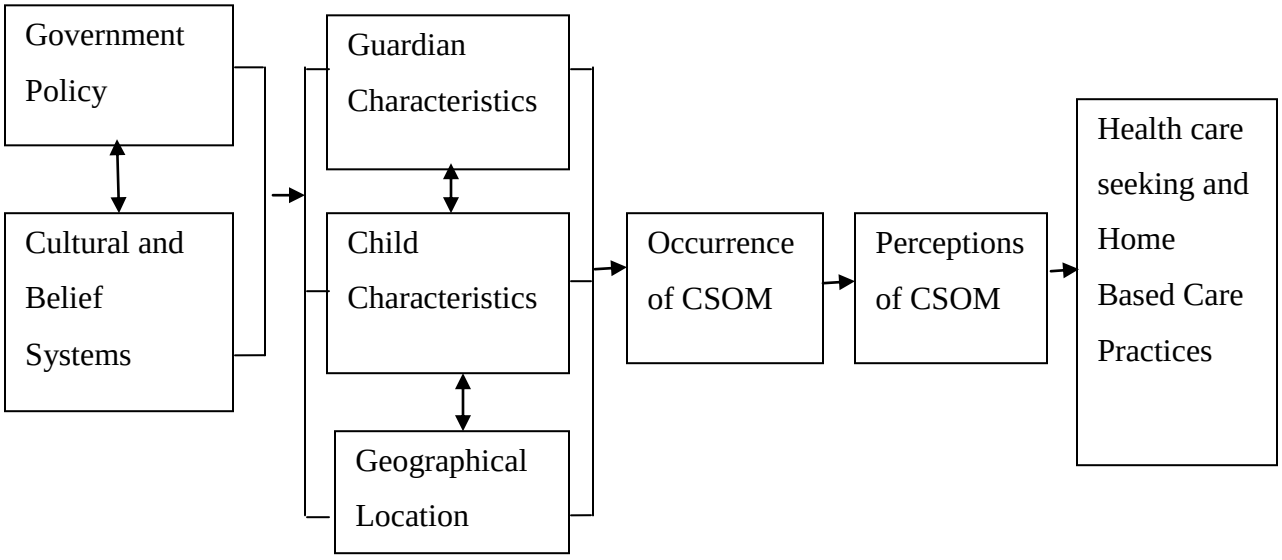

Figure 1.0: Conceptual Framework

CHAPTER 2: LITERATURE REVIEW

2.1 Historical Perspective of Otitis Media

There is likelihood that humans have always had acute infection of the middle ear and its suppurative complications. Studies done on 2600 year-old Egyptian mummies reveal perforations of the ear drum and destruction of the mastoid (Lynn and Benitez, 1974). There has also been evidence of middle ear disease in skeletal material from pre-historic Irarian population existing in 1900 to 800 B.C (Rathbun and Mallin, 1977). Studies done by Bawkin and Jacobinzer (1932) in Bellvue Hospital in the U.S indicated that suppurative otitis media was a leading cause of illness/disease accounting for 27 percent of paediatric admissions. However, introduction of antibiotics limited the course of otitis media with resultant reduction in its suppurative complications (Bawkin and Jacobinzer, 1932).

Before the advent of antibiotics, bacterial otitis media either resolved spontaneously by central perforation of the ear drum or evacuation of the middle ear contents through the Eustachian tube. Alternatively, the physician would drain the middle ear contents by means of a surgical procedure (myringotomy) where a hole is bored through the ear drum and the contents of the middle ear, mostly pus, aspirated (Bluestone *et al.*, 1990).

2.2 Global Overview of Prevalence of CSOM

There is a strong relationship between upper respiratory tract infections and otitis media, with the former predisposing children to the latter. This relationship is also reflected in the prevalence of the two conditions such that otitis media is the most common childhood disease after respiratory

tract infections (Behrman and Vaughan, 1983). In a survey of the frequency of infectious diseases during the first year of life in 246 Rochester children (in U.S), otitis media was second only to common cold as a cause of infectious illnesses (Hoekelman, 1977). A related study done by Teele *et al*. (1983) on the proportion of office visits of young children, diseases of the middle ear accounted for a large proportion of visits during the first 5 years of age, rising from 22.7% in the first year to approximately 40% in year 4 and 5. About one visit in every three made for illness of any kind resulted in the diagnosis of middle ear disease. Chronic suppurative otitis media has a very high incidence and prevalence in certain racial groups in the developing countries or living in hostile environmental conditions such as the American Indians, the Eskimos, the Maoris and Aborigines of Australia and the Inuits of Canada. A population survey of Aboriginal children under 14 years of age in Queensland, Australia, showed 16.5% to have unilateral or bilateral perforations of the eardrum. Among these, two thirds were suppurative (Lewis *et al.,* 1977).

Children in developing countries are also prone to a kind of middle ear infection called necrotizing otitis media. In this kind of infection, an attack of the middle ear infection progresses to perforation of the ear drum with profuse discharge. Necrosis of the ear drum follows leaving a large perforation that may persist for many years. Since the perforation allows drainage of the middle ear infection, and complications rarely occur even without use of antibiotics, it is referred to as "safe ear". The parents of the children accept ear discharge as a way of life. However African-Americans' children have been found to be less susceptible to middle ear disease than their white American counterparts (ASHA, 1997).

According to a report by Hasselt (2003), the three most frequent diagnoses made in Bamalete Lutheran Hospital Ear Clinic, Botswana, in descending order was: CSOM, otitis externa and OME. A school screening study also done by Hasselt (2000) in Malawi on primary school children to obtain baseline figures on prevalence on CSOM showed that 9.4% had impacted wax, CSOM or dry perforations was in 3.3%, foreign bodies in 0.2% and 0.3% had OME. Clinic-based studies done in Uganda (Roland, 1960), Tanzania (Manni and Lema, 1987), Ghana (Murphy, 1981) and Nigeria (Okafor, 1984), found CSOM as the most common problem presenting in ENT clinics and most infections began in the first 5 year of life.

A high incidence of middle ear disease such as CSOM may be found in patients with cleft palate, Down's syndrome or mid-face anomalies. In these groups, eustachian tube dysfunction allowing own reflux of pharyngeal secretions into the middle ear may account for a high incidence of CSOM (Maran, 2010).

There has been little epidemiological work done to determine the burden of CSOM in Kenya. Evidence that CSOM is a main cause of avoidable hearing loss is exemplified by the large number of patients who turn up during ear camps held in various parts of the country (Macharia, 2003). In a prevalence survey of ear problems among school children in Kiambu District, 18.6% were affected, with perforation of the eardrum and CSOM accounting for 2.4% and 1.1% respectively (Hatcher *et al.,* 1995).

2.3 Risk Factors to Otitis Media

2.3.1 Age

Otitis media is a disease of infancy and early childhood. The peak age-specific incidence attack rate occurs between 6 and 18 months of age (Ricardo *et al*., 2001). Children who have had little or no experience with otitis media by three years of age are unlikely to have subsequent severe or recurrent disease. The association of otitis media with early life is thought to be as a result of maturing anatomic features of the body, that is, changes in skull configuration and vectors of the Eustachian tube; and physiologic and immunologic factors, for instance, development of antibodies to bacterial pathogens (Maran, 2010). The infection is common in infants beyond neonatal period and when found in newborns, it is either an isolated infection, or it is associated with sepsis, pneumonia or meningitis. The incidence declines with age after the first year of life, except for a limited reversal of the downward trend between five and six years of age, which is associated with time most children enter into school. It is less common in children of seven years and above (Bluestone *et al*., 1990; Engel *et al*., 1999; Erwin *et al*., 2006).

2.3.2 Sex

Males have a higher incidence of otitis media than do females and this is true of most infections of infancy and childhood. In a study done by Teele *et al.* (1989) in Boston, US, males had significantly more single and recurrent episodes. Males have more myringotomies and tympanoplasties than do females, a fact suggesting that chronic or severe infections of the middle ear are more common among males (Solomon and Harris, 1976).

2.3.3 Social and Economic conditions

There is a strong relationship between CSOM and poor social conditions. In India, the incidence of CSOM in 46/1000 in the rural population and 16/1000 in the urban population and is one of the commonest causes of deafness in the poor socio-economic members of the population (Tuli and Tuli, 2005). The specific reasons for the high incidence are not well known but suggestions include crowded living conditions, poor sanitation and inadequate medical care (lack of immunization). "The running ear is the heritage of the poor" may be true today as in the past, but still no reasons have been advanced to bring forth the association between poverty and the high incidence of and marked severity of the disease (Bulkley *et al.,* 1991; WHO, 1996; Fliss *et al.,* 2008).

2.3.4 Season

The pattern of upper respiratory tract infections is such that there is a seasonal variation, with infections reaching their peak in winter, less frequent in spring and least common in summer. It is this seasonal incidence that is also followed by infections of the middle ear. Teele *et al*. (1984) observed in a three-year Boston study that 27% of children had an attack of otitis media in summer as compared with 48% in spring and 51 % in winter. In Kenya, the variations are present, with high incidences noted in the cold months of June and July and lower incidences in the dry and dusty months of January, February, August, September, October and December. It is also during the period of cold months that the incidence of ARI was noted to be high in the study area (MOH, 2005).

2.3.5 Smoking and surrounding air pollution

Estimates show that children spend most of their time indoors and with their guardians (Wickinoff *et al.,* 2003). Consequently, there is increased scrutiny of passive smoking and environmental pollutants as agents able to cause structural and physiological changes in the respiratory tree. An increased association has therefore been found between household cigarette smoking and increased incidences of acute otitis media, which almost invariably precedes CSOM development (WHO, 2002; Erwin *et al.,* 2006). Related studies in America have documented otitis media in children, among other diseases, to be a sequalae of exposure to environmental tobacco smoke (Billing *et al*., 2004). In a more recent study in the USA, Kollof (2008) found that socially disadvantaged parents smoke most and children from such families are more susceptible to acute otitis media secondary to environmental tobacco smoke.

2.3.6 Effect of Breast-feeding

Breast-feeding has been identified as an important factor in the prevention of respiratory tract and gastrointestinal infections in infancy. In a Boston study, Teele (1989) observed that breastfeeding was strongly associated with decreased risk of otitis media during the first year of life. Analysis of duration of feeding indicated that breast-feeding for 3 months was associated with decreased risk for otitis media or recurrent episodes of otitis media in the first year as was breast-feeding for the entire life. In another study by Duncan (1993), it was found that exclusive breast-feeding of 4 months or more protected infants from single and repeated attacks of otitis media during the first year of life. Thus, some factor in breast milk of durable quality protects against middle-ear infections (Duncan *et al.,* 1993; WHO, 1996).

2.3.7 Altered host defenses and underlying disease

Some children may have disease states that may per se lead to otitis media. For instance, an increased incidence of otitis media occurs in children with Down syndrome (Ricardo *et al*., 2001). Alternatively, surgical interventions in some disease states or conditions may in itself lead to CSOM, for instance, otolaringological surgeries in otitis media with effusion (OME) and persistent adenoid hypertrophy (Ricardo *et al*., 2001). One of the early manifestations of HIV/ AIDS in infants is otitis media. In a study by Barnet *et al*. (1992), children with AIDS were found to have a higher age-specific incidence of otitis media beginning at 6 months of age, compared with uninfected children or children who initially had antibody for human immuno-deficiency virus (HIV), but sero-converted (Barnett *et al.,* 1992). In a related report on ENT manifestations in HIV in Zimbabwe, Chidziva (2003) lists chronic suppurative otitis media (CSOM) and otitis media with effusion (OME) as some of the conditions manifesting early in HIV patients.

2.4 Aetiology of CSOM

CSOM commonly occurs as sequelae of acute otitis media that has not been treated or inadequately treated. The most direct way of infections reaching the middle ear cavity is through the ear drum. However, in situations where the eardrum is intact, the middle ear cavity can only be infected through the Eustachian tube or, in rare circumstances, through the blood stream (Maran, 2010). Principally, the Eustachian tube is infected from adenoids but any other infection in the nasopharynx, for example, infections of the tonsils, nasal cavity or nasal sinuses may infect the tube (Tuli and Tuli, 2005; Colman, 2009; Maran, 2010). The most common bacteriological pathogens implicated in acute otitis media are the Gram positive bacteria such as

streptococcus, staphyllococus, haemophillus influenza and pneumococcus. Viruses such as rhino virus or adenovirus may be implicated in some cases, but mostly at the initial stages before the bacteriological pathogens supervene (Tuli and Tuli, 2005; Maran, 2010). Unlike in otitis media, it is the Gram negative pathogens that are implicated in CSOM and they include: the pseudomonas sp, *B. proteus*, *E. coli* and anaerobes (Colman, 2009).

2.5 Pathology of CSOM

There are two clinical types of CSOM, that is, tubotympanic and the tympanomastoid type. The tubotympanic type of CSOM is confined to the mucosa of the Eustachian tube and the anterior inferior part of the middle ear (Tuli and Tuli, 2005). It starts, and is also common, in childhood period of life. It also follows a benign clinical course rarely giving rise to serious complications (Tuli and Tuli, 2005; Maran, 2010). The main pathological condition in tubotympanic type of CSOM is a perforation of the ear drum resulting from acute otitis media. The perforation does not heal after the initial acute attack because of persistence of the infection. If the infection continues for a long time, the edges of the perforation are covered by the squamous epithelium from the outer surface joining the mucosa of the middle ear so that the perforation is lined up by epithelium. A child with such a perforation is liable to persisting or recurring discharge secondary to the upper respiratory tract infection (URTI), but the discharge may also be as a result of direct entry of bacteria into the middle ear through the perforation from the external meatus (Tuli and Tuli, 2005; Colman, 2009 ; Maran, 2010).

The tympanomastoid type of CSOM is also referred to as unsafe or dangerous type of CSOM. This is not only due to its destruction to the sense of hearing, but by virtue of its life threatening

complications (Colman, 2009). Tympanomastoid type of CSOM is associated with destruction of the bone towards the middle cranial fossa, the posterior crania fossa as well as damage to the middle ear contents. The destruction may lead to a suppuration and hearing loss from the ear(s), or the formation of a cholesteatoma (Tuli and Tuli, 2005; Colman, 2009; Maran, 2010).

2.6 Clinical Features of CSOM

In most cases of CSOM, there is a preceding history of the upper respiratory tract infection (URTI). There may be a discharge which is copious mucopurulent non foul smelling in tubotympanic type or scanty foul smelling and blood stained in tympanomastoid type. Hearing loss is a finding, which in most cases is of conductive type and of moderate intensity (35 -45 dB). In some instances, the hearing loss may be mixed, that is, condutive hearing loss (CHL) and sensorineural hearing loss (SNHL) occurring at the same time. Pain in CSOM is not a feature and only occurs where there is accompanying otitis externa or complications. Tender mastoid process and eardrum may be found during examination (Morris and Leach, 2009).

2.7 Complications and Sequalae of CSOM

Children with severe or recurrent otitis media equally have middle ear effusion with accompanying hearing impairment. If the hearing impairment occurs in early life, a period when there is rapid intellectual growth, there is resultant impaired development of speech language and cognitive abilities (Colman, 2009). In the school going child, the environment in school is primarily auditory-verbal where the interpersonal interactions associated with teaching and learning depends heavily on the auditory channel. Consequently, the child will perform poorly in school and have reduced accomplishment of economic abilities in later life (Toensing *et al.*,

2004). Other mild sequelae of otitis media may include inflammation of the outer ear (otitis externa) due to chronic ear discharge and development of a polyp. More serious outcomes include development of a cholesteatoma, extension of infection to the mastoid and brain tissue (Verhoeff *et al*., 2006; Colman, 2009; Maran, 2010).

2.8 Ear, Nose and Throat (ENT) Services in Kenya

In Kenya, despite an increase in the number of ENT specialists in the last 10 years, provision of ENT services in the rural areas is still dependant on ENT clinical officers. This cadre of health workers, also forming the backbone of the whole health care system, is found in the district hospitals across the country where they provide ENT services. The whole spectrum of health workers offering ENT services is shown in Appendix I. Apart from the services offered by ENT surgeons and clinical officers, various Non-Governmental Organizations (NGO) offer ENT services, mostly screening for CSOM and ear surgery. These NGO's include: Kenya Ear Foundation (KEF), Operation Eardrops (OED), Giants Hearing Centre (GHC) and Impact East Africa (IEA). However, the NGO services are limited to sporadic ear camps and / or periodic hospital-based activities. The skewed distribution of ENT personnel, with majority in the big towns, implies that majority of Kenyans, who live in the rural areas, have no access to the services and depend on the first line health personnel. In view of above, the first line health personnel require being adequately prepared in terms of knowledge, skills and be provided with facilities to handle basic ear problems and promote hearing health (Macharia, 2003; GoK, 2009).

In Machakos County, ENT services are offered by one ENT surgeon, three (3) ENT clinical officers based at Machakos Level 5 Hospital within Machakos Municipality and Kangundo

District Hospital within Kangundo Town. Their services are hospital-based and no outreach services are available to the rural populace in the county. In Matuu and Mwala District Hospitals, there is no ENT Clinical Officer and the community within the catchment area requiring basic ENT services has to do with the general clinical officers and nurses in the health facilities. Hence, the rural population depends on the health personnel at health centers and dispensaries and where there is need for specialized ENT services, they have to commute long distances and persevere long waiting in queues (MOH, 2005).

CHAPTER 3: MATERIALS AND METHODS

3.1 Study Area

The study was conducted in two divisions of Mwala and Yatta (Appendix IV). However, upon the promulgation of the Constitution in Kenya on 17th August 2010, Machakos District changed to Machakos County and Yatta and Mwala Divisions, after each combining with one other division, became districts. Yatta is one of the eight (8) districts in Machakos County and covers an area of 1,059 square km, most of it lying within the Yatta Plateau. The district has a population of 314,606 spread unevenly within three divisions of Yatta, Ikombe and Katangi. High temperatures of 25^0 to 29^0 degrees centigrade and low bimodal average rainfall of 450 - 800mm are characteristic of the district. The economic mainstay of the inhabitants of Yatta is crop farming and livestock rearing, which are greatly affected by persistent droughts. However, Yatta Canal, which sources its water from Thika River, offers alternative window for crop productivity through a developed irrigation infrastructure. There is one hospital, one (1) health centre, fifteen (15) public and three (3) faith-based dispensaries (GOK, 2003; GOK, 2009).

Mwala District covers an area of 1,014.5 square km, most of which is semi-arid and has a population of 274,530. It is divided into two (2) divisions of Mwala and Yathui, thirteen (13) locations and fifty eight (58) sub locations. The district receives a bimodal rainfall of which the more reliable short rains come in October to December and long rains in March to May. The rains are unevenly distributed and unreliable with an annual average of between of 250 - 1300mm. Most of the people of Mwala District engage in crop farming and livestock rearing. However, the low and inadequate rainfall, often resulting in droughts, negatively affects

activities in both subsectors of the economy. The district has one (1) hospital, two (2) health centres and seventeen (17) dispensaries (GOK, 2003; GOK, 2009).

Matuu Health Centre and Mwala Health Centre have since been converted to district hospitals with elevation of the divisions they were serving into districts, though with little upgrading of the existing infrastructure and health personnel. The top three diseases in the districts are malaria, diseases of respiratory tract and of the skin in that order. Ear diseases do not feature in the top ten diseases. However, diseases of the upper respiratory tract, which are a major predisposing factor to CSOM, are reported at number 2 in terms of frequencies. The Machakos Level 5 Hospital ENT Clinic reports an average of 5 cases of acute and chronic otitis media per week. According to the District Health Records Office, there is lack of elaborate system in compiling reports on ear infections from outlying health facilities and the hospitals. There is also no system of determining the number of children below five years with CSOM (MOH, 2005).

3.2 Study Population

The population of the study were all the guardians of children below the age of five years seeking medical attention for their children in the two main public health facilities in Mwala and Yatta Districts, that is, Mwala District Hospital and Matuu District Hospital respectively. First line health personnel (Clinical Officers and Nurses) offering services within the study area were also included to augment the information given by the guardians.

3.3 Inclusion Criteria

a) Any guardian, presenting at the health facility with an under five year-old child either for treatment or follow up of the child at the child welfare clinic (CWC) and agreed to be interviewed.

b) First line health personnel (Clinical Officer or Nurse), working in the public health facilities in the study area for more than one (1) year, and agreed to fill in the questionnaire.

3.4 Exclusion Criteria

a) Any guardian presenting at the Health Facility with an under five year-old child but declined to be interviewed.

b) Health personnel (Clinical Officer or Nurse) working in the study area but declined to fill in the questionnaire or a Clinical Officer or Nurse who has been working in the study area for less than one (1) year.

3.5 Study Design

The study was descriptive, using a cross-sectional design, and was carried out using an interview schedule to a sample of the guardians and a self-administered questionnaire for the first line health workers in the study area. The guardians' questionnaire was designed so as to bring out the crude total of reported cases of CSOM in the family and community (old cases). In addition, confirmation of all suspected cases of CSOM (new cases) in children presented by the guardian under study was undertaken by clinician. The specific steps followed in arriving at a diagnosis of CSOM were documented as the screening protocol for CSOM (Appendix VII).

This information was used to calculate the prevalence of CSOM in the study area. Thus prevalence is equal to the sum total of old and new cases of CSOM divided by the population under study, then multiplied by a base (arbitrarily chosen as 1000).

3.6 Sampling Method

The target group were guardians of the under five year old children bringing them for medication or for child welfare clinic (CWC) at the study sites in the months of June and July 2004. The study was conducted in two conveniently selected Districts, Yatta and Mwala, which were representing the rural area of Machakos County far away from ENT services. For each District, the study was conducted in one purposively selected health facility (as CSOM occurs in both districts).

Probability proportional to size sampling was used to determine the number of guardians to participate from each health facility. This was done using an average attendance in each health facility of the under five years old children for the previous year**.**

Thus:

Number of under five years old children that attended Mwala District Hospital in year 2003 = X_1

Number of children that attended Matuu District Hospital in the year 2003 = X_2

Total number of under five years children in Machakos County = Y

The ratio of guardians to be interviewed from each health facility was therefore calculated as shown below:

Mwala District Hospital $= \frac{X_1}{Y} \times 400$

Matuu District Hospital $= \frac{X_2}{Y} \times 400$

From these calculations, Mwala was allocated 227 respondents while Matuu was allocated 173 respondents, to make up a total of 400 guardians**.** Systematic sampling method was used to determine the guardians to be interviewed. The guardian with under five years children presenting at each of the hospitals due to illness or to attend the CWC were given numbers 1, 2, 3 et cetera up to the last one depending on the number per day. The researcher used simple random sampling method to decide on interviewing all guardians bearing even numbers, which is, 2, 4, 6...et cetera. This was replicated each day until the guardians' total number required from each health facility was attained.

Except for those guardians with children attending CWC, all other guardians selected for interview and had brought their children to the health facility due to an ailment were examined by clinicians in the health facility. An appropriate diagnosis was arrived at and a suitable medication and advice offered. However, all suspected cases of CSOM were referred to an ENT clinician for screening and specialized advice.

3.7 Sample Size Determination

The sample size was arrived at using the formula as used by Fisher *et al*. (1998).

$$n = \frac{Z^2pqD}{d^2}$$

Where n = sample size

Z = standard normal deviate (1.96) and it corresponds to 95% confidence interval (CI).

p = Proportion of target population estimated to have the particular characteristic under study. No data is available that shows the number of under- five year children suffering from otitis media (Use 0.5 if not known).

q = 1- p

d = Degree of accuracy (usually 0.05).

D = Design effect (usually 1 where there are no replications or comparisons Therefore D = 1)

Therefore Z = 1.96; p = 0.5; q = 0.5; d = 0.05; D = 1.

Thus $n = \frac{(1.96)^2 \times 0.5 \times 0.5 \times 1}{(0.05)^2}$

$= 384.16$

The minimum sample size required was 384. However a total of 400 guardians were interviewed in this study.

3.8 Research Instruments

Interview schedule using a pre-tested questionnaire was used for guardians while a self administered questionnaire was used for the key informants, that is, clinical officers and nurses working in the study area (Appendix V and VI, respectively).

3.9 Pre-test of Research Instruments

A pre-testing of the research instruments was conducted prior to the main study in two health facilities, that is, Kisiiki Health Centre and Mbiuni Health Centre in the two Districts of Yatta

and Mwala, respectively. An interview schedule was conducted for guardians of under five year children who had brought them to the health facilities. In addition, the first line health workers in the two health facilities were subjected to a questionnaire. The two tools were consequently modified according to the difficulties or omissions noted during their administration.

3.10 Data Collection

Data was obtained through an interview schedule conducted for guardians and self administered questionnaire for clinical officers and nurses. Interview schedule was conducted on guardians of young children with assistance of two research assistants who were trained by the researcher on research methods, data collection skills and ethics. The responses from the sampled guardians were then recorded in interview guide sheets containing both open and closed ended questions.

The self administered questionnaires were distributed to purposively sampled clinical officers and nurses within the study area to solicit for expert information on the issues under investigation. This was considered important in providing new and additional information from other sources to aid in interpretation of results.

3.11 Ethical Considerations

Permission to carry out the research was sought from Kenyatta University, Ministry of Education Science and Technology, and the Medical Officer of Health and the District Commissioner, Machakos District. Informed consent was sought from the guardians and confidentiality of information given ensured.

3.12 Data Management

The data collected from the field was coded and entered into a computer sheet and processed using the Statistical Package for Social Sciences (SPSS). Chi- square was used to test the significance of the relationship between the independent (socio-demographic factors) and dependent (CSOM infection) variables. In addition, contingency coefficient measure of association(C) was used to determine the extent of the relationship between the variables. C varies from 0 to 1 or -1 where 0 is no association, 1 is complete association and -1 is complete inverse association between the variables. Frequency tables, percentages, pie charts and graphs were also used to present the data. Cumulative frequency of responses for an issue was used to measure the perception. A correct (positive) perception was considered where one or more responses had a cumulative frequency of more or equal to 50%. Where no response attains 50% cumulative frequency, this was considered a wrong (negative) perception.

CHAPTER 4: RESULTS

4.1 Introduction

The following chapter discusses the results of a cross sectional study carried out on guardians of young children presenting in two health facilities in Machakos County. The results are based on interview schedules administered to guardians of young children and self-administered questionnaire on the first line health workers in the study area.

4.2 Socio- Demographic Characteristics of the Guardians and children

4.2.1 Age of Guardians

Figure 4.1 shows that the highest number of guardians were within the age group of 20-24 years, accounting for 36.4% (N=145), followed by 25 – 29 with 29.1% (N = 116). Age group 45 years and above had only 1.5% (N = 6) guardians.

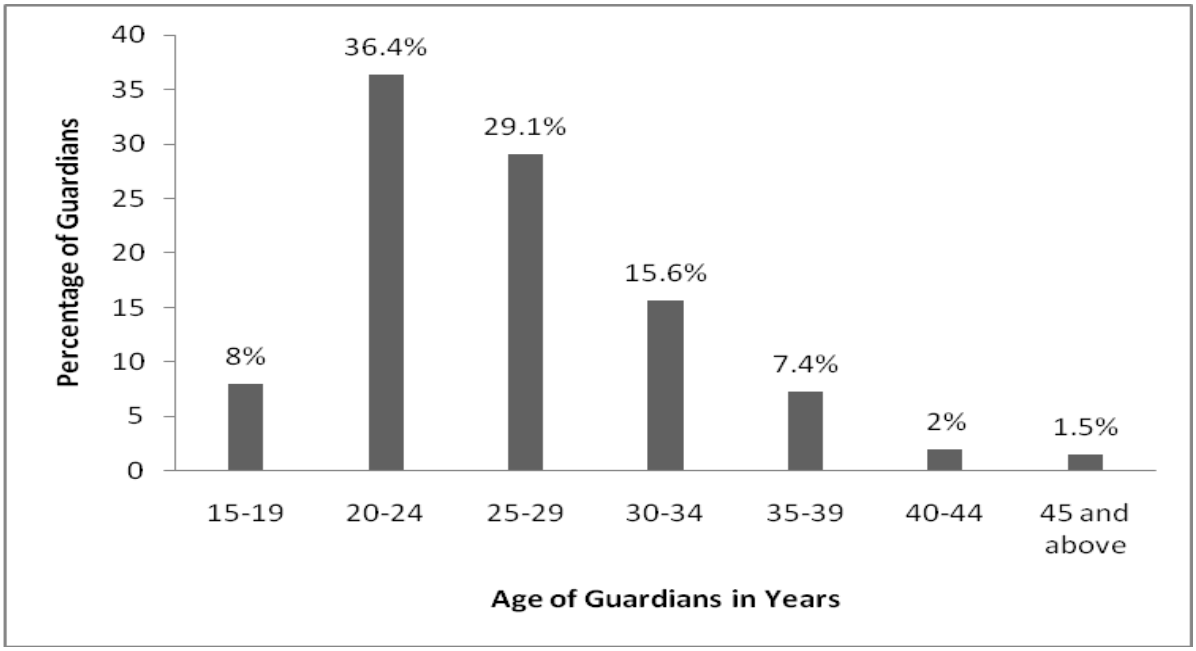

Figure 4.1: Age group of guardians

Table 4.1 shows majority of CSOM infections in children are within the guardians' age strata lying between 20-24 years (N= 146; 2.7%). No CSOM was noted in age stratum of 15-19 years and 35-39 years. Analysis of the results using chi-square test of significance (χ^2 =18.334; df = 5; p = 0.003) at probability of error 0.05 shows a significant relationship between the age of guardian and the CSOM infection in their child. Additional analysis using contingency coefficient measure of association attributes 20.9% of the variations in CSOM infection in children to their guardian's age (C = 0.209).

Table 4.1: Relationship between guardian's age and CSOM infection in children under five years of age.

Stratum(in years)	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
15 – 19	0 (0)	32 (8)	32 (8)
20-24	4 (1)	142 (35.5)	146 (36.5)
25 – 29	3 (0.75)	113(28.25)	116 (29)
30-34	2 (0.5)	61 (15.25)	63 (15.75)
35 – 39	0 (0)	29 (7.25)	29 (7.25)
40 and above	3 (0.75)	11 (2.75)	14 (3.5)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C=0.209; χ^2=19.334; df=5; p=0.003)

4.2.2 Religion of Guardian

All guardians were Christians. The major denomination was Catholic (N = 217; 54.25%) followed by protestants (N=183; 45.75%).

4.2.3 Guardian's relation to child

As shown in Figure 4.2 below, 387 (96.75%) guardians were mothers, 7 (1.75%) grandmothers, 4 (1.0%) aunts and 2 (0.5%) falling in the category of "Others", that is, sister or stepmother.

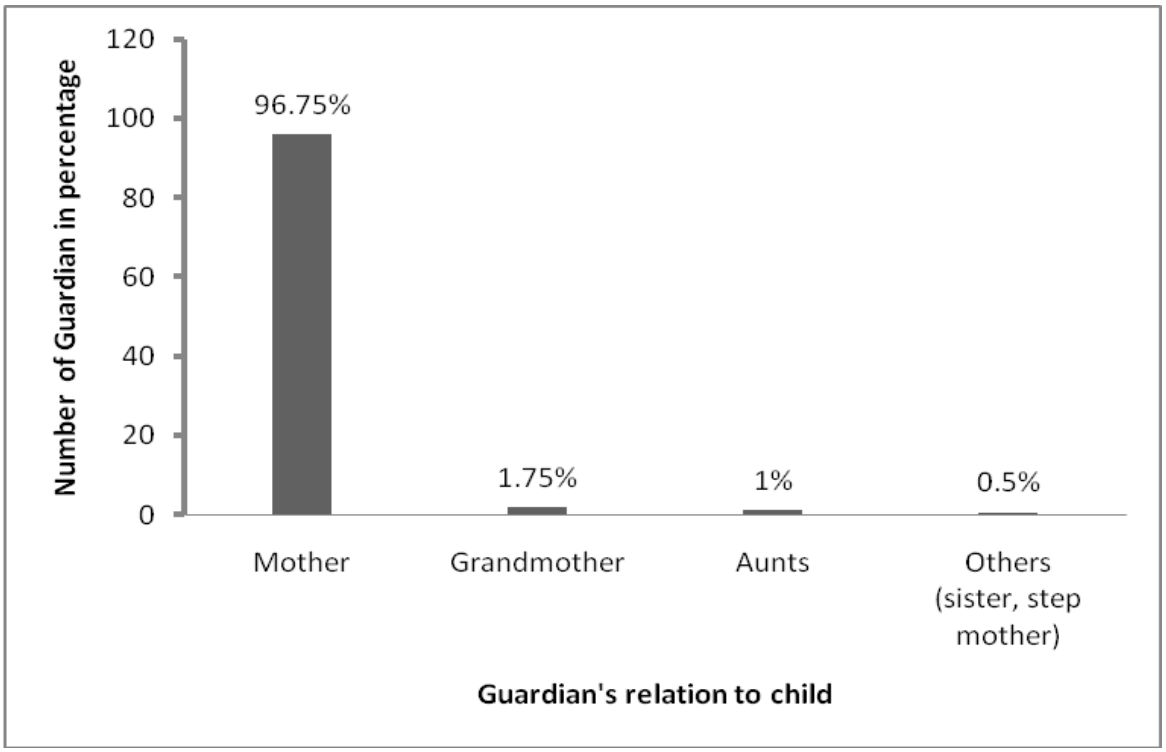

Figure 4.2: Relationship of guardian to the child.

The results in table 4.2 shows that majority of the children infected, 10 (2.6%) had their guardians as mothers**.** Analysis of the results using chi-square test of significance at probability of error 0.05 showed a strong relationship between guardian's relations to child and CSOM

infection (χ^2 =7.082; df = 1; p = 0.008). A further analysis of the results using contingency coefficient measure of association attributed 13.2% of variations in CSOM infection to guardian's relation to child (C = 0.132).

Table 4.2: Relationship between the guardians relation to child and CSOM infection

Guardian relation to the child	**Infected** N %	**Not infected** N %	**Total** N %
Mother	10 (2.5)	377 (94.25)	387 (96.75)
Other Guardians	2 (0.5)	11 (2.75)	13 (3.25)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C=0.132; χ^2 =7.082; df = 1; p = 0.008)

4.2.4 Guardians' Level of Education

Majority of the guardians (N = 397; 99.25%) had undergone formal education. Of those with formal education, primary level education constituted the largest number with 308 (77%) then 87 (21.75%) with secondary education and university education with the least number at 2(0.5%) (Figure 4.3).

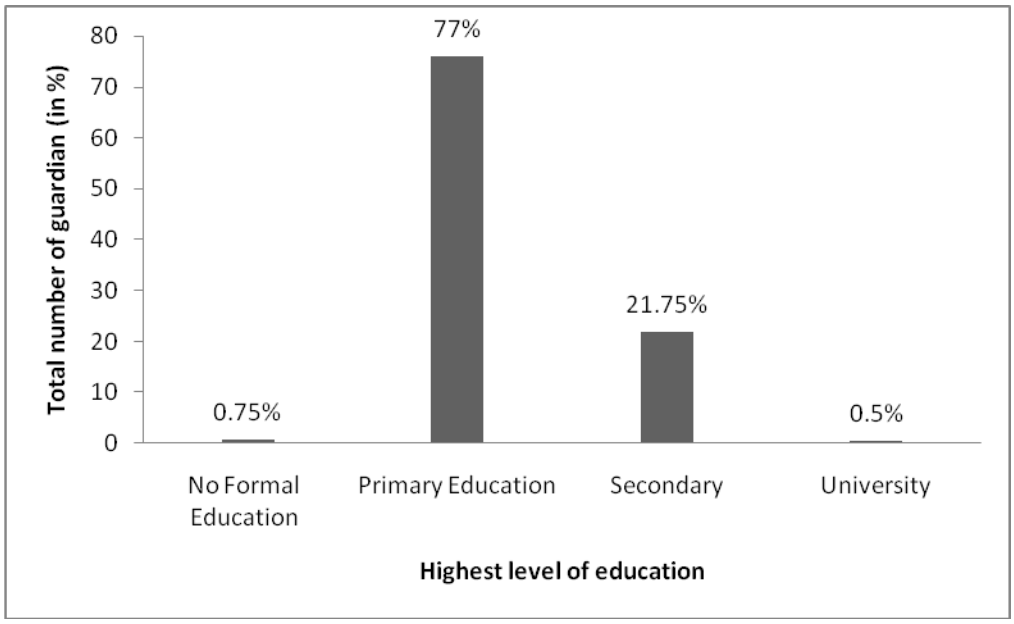

Figure 4.3: Level of education of the guardians.

A shown in Table 4.3, 8 (2%) CSOM infection were found in children whose guadians' highest level of education was primary or no formal education and 4(1%) in guardians of secondary and university education. Analysis using chi- square test of significance at probability of error 0.05 showed no significance relationship between the guardians' level of education and CSOM infection among their children (χ^2 =0.878; df = 1; p = 0.349). Further analysis using contingency coefficient measure of association only attributed 4.7% of the variations in CSOM infection among children to their guardian's education level (C = 0.047).

Table 4.3: Relationship between guardians' education level and CSOM infections

Guardian education level	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
Primary / no formal education	8 (2)	303 (75.75)	311 (77.75)
Secondary / University education	4 (1)	85 (21.25)	89 (22.25)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C=0.047; χ^2 =0.878; df = 1; p = 0.349).

4.2.5 Gender and Marital Status of guardian

All the guardians were females. Irrespective of their relationship to the child, the guardians were further asked to state their marital status. Figure 4.4 below shows that 354(88.5%) were married, 42(10.5%) single and only 4(1%) were widowed.

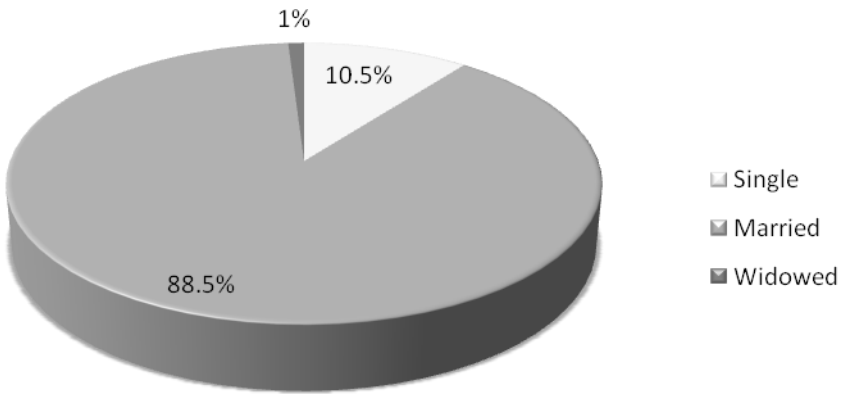

Figure 4.4: Marital status of the guardians

The results in Table 4.4 indicate that the most infections occur in married guardians. Analysis of the results of analysis using chi-square tests of significance at probability of error 0.05 showed that there were significant relationship between marital status and CSOM infection among children (χ^2 =0.122; df = 1; p = 0.727). Further analysis using contingency coefficient measure of association attributed only 1.7% of the variations in CSOM infection in children to marital status of their guardian (C = 0.017).

Table 4.4: Relationship between the guardians' marital status and CSOM infections

Marital Status	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
Married	11 (2.75)	343 (85.75)	354 (88.5)
Single	1 (0.25)	45 (11.25)	46 (11.5)
Total	**12 (3)**	**388(97)**	**400 (100)**

(C= 0.017; χ^2 =0.122; df = 1; p = 0.727)

4.2.6 Occupation of the guardians

As shown in figure 4.5, majority of guardians were housewives (N=323; 80.75%), followed by those in business (N= 30; 7.5%) and dependants (N=15; 3.8%). Guardians who were teachers were 5 (1.25%).

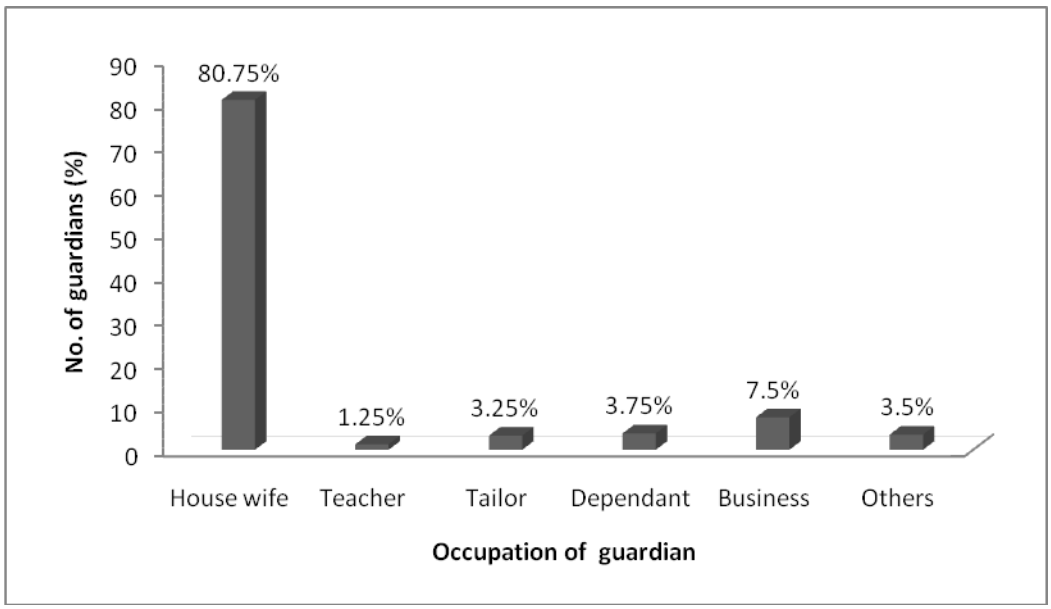

Figure 4.5: Occupation of guardians

Results in Table 4.5 show that all 12(3%) cases of CSOM were recorded in children whose guardians were housewives. Analysis of the results using chi-square test of significance at probability of error 0.05 did not bring out a significant relationship between guardians' occupation and CSOM infection (χ^2 =2.949; df = 5; p = 0.708). Further analysis using contingency coefficient measure of association attributed 8.6% of the variations in CSOM infections in children to occupation of their guardians (C = 0.086).

Table 4.5: Relationship between the guardians' occupation and CSOM infections in children

Occupation of guardian	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
House wife	12 (3)	311 (77.75)	323 (80.75)
Teacher	0 (0)	5 (1.25)	5 (1.25)
Tailor	0(0)	13 (3.25)	13 (3.25)
Dependant	0 (0)	15 (3.75)	15 (3.75)
Business	0 (0)	30 (7.5)	30 (7.5)
Others	0 (0)	14 (3.5)	14 (3.5)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C=0.086; χ^2 =2.949; df = 5; p = 0.708)

4.2.7 Occupation of husband

The married category of guardians had their husbands in various occupations. Results in Table 4.6 show that there was almost an equal proportion of husbands in farming and self employment, with 113 (28.25%) in farming and 109 (27.3%) in self employment. Only 65 (16.3%) were on permanent employment.

Table 4.6: Occupation of husbands

Occupation of husband	Frequency	Percentage
Farmer /Peasant	113	28.25
Self Employed	109	27.25
Casual Employment	69	17.25
Permanent Employment	65	16.25
No husband	44	11
Total	**400**	**100**

4.2.8 Family size of guardian

For the purpose of this study, family size was restricted to the nuclear family consisting of mother, father (where applicable) and their children. Figure 4.6 below shows a summary of the family size. Most of the families consisted of 2-4 members (N = 223; 55.75%) followed by 5-7 members (N=152; 38%), 8-10 members (N=24; 6%) and above 11 members with (N=1; 0.3%).

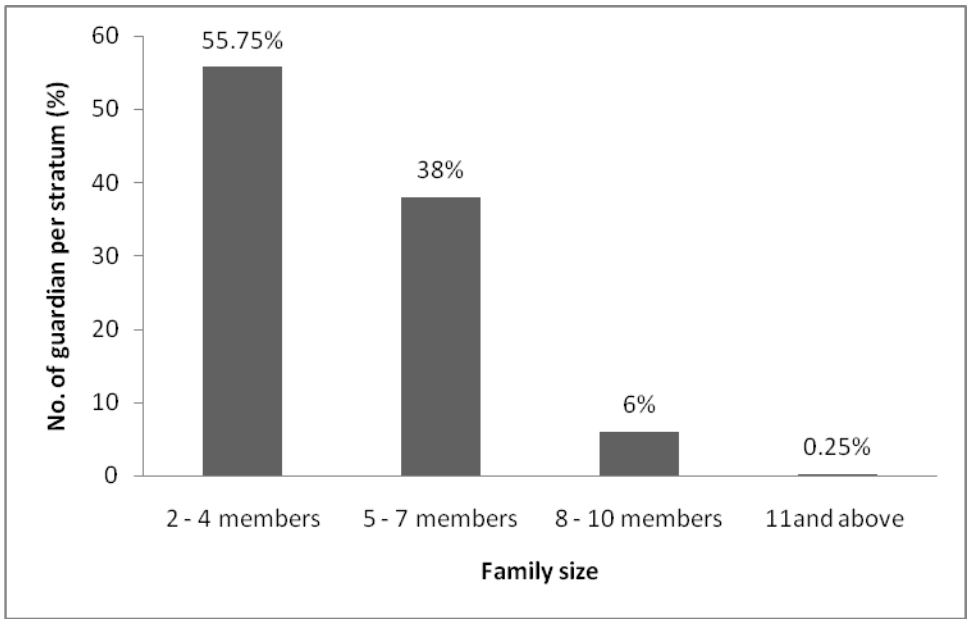

Figure 4.6: Family size of guardian

The result in table 4.7 shows that most CSOM infections occurred in children from smaller families, that is, 223 (2.7%) for stratum of 2-4 members and 152 (3.3%) for stratum of 5-7 members. Large families, that is families having 11 members and above, were free from CSOM infection. Analysis of the results using chi-square tests of significance at probability of error 0.05 showed that there was no significant relationship between the size of family and CSOM infection (χ^2 =0.260; df = 3; p = 0.967). Further analysis of the results using contingency coefficient measure of association attributed 26% of variations in CSOM infections to the size of the family(C = 0.26).

Table 4.7: Relationship between size of family and CSOM infection

Size of family	Infected N %	Not infected % N %	Total N %
2 – 4	6 (1.5)	217 (54.25)	223 (55.75)
5 – 7	5 (1.25)	147 (36.75)	152 (38)
8 – 10	1 (0.25)	23(5.75)	24 (6)
11 and above	0 (0.0)	1 (0.25)	1 (0.25)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C=.026; χ^2 =0.260; df = 3; p = 0.967)

4.2.9 Source of income for family of guardian

Table 4.8 shows that most of the guardians were engaged in peasant farming (N=238; 59%), some form of business (N=92; 23%) and were in formal employment (N=52; 13 %). Only a small fraction (N=18; 5%) of the guardians were dependants.

Table 4.8: Source of Income for Guardians Family

Family source of income	Frequency	Percentage
Formal employment	52	13
Business	92	23
Peasant farming	238	59.5
Dependant	18	4.5
Total	**400**	**100**

As shown in Table 4.9, all recorded cases of CSOM were found in families whose main source of income was either formal employment or farming (peasant farming). Analysis of the results using chi-square test of significance at probability of error 0.05, showed that no significant relationship was found between the family source of income and CSOM infection in their children (χ^2 =5.272; df = 3; p = 0.153). Upon further analysis using contingency coefficient measure of association 11.4% of variations in CSOM infections in children could be attributed to family source of income **(**C = 0.114).

Table 4.9: Relationship between the guardians' family source of income and CSOM infections in children.

Family source of income	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
Formal employment	3 (0.75)	49 (12.25)	52 (13)
Business	0 (0)	92 (23)	92(23)
Farming	9(2.25)	229 (57.25)	238 (59.5)
Dependant	0 (0)	18 (4.5)	18 (4.5)
Total	**12 (3%)**	**388 (97%)**	**400 (100%)**

(C = 0.114; χ^2 =5.272; df = 3; p = 0.153).

4.2.10 Age of children whose guardians were interviewed

The ages (in months) of children whose guardians were interviewed are shown on table 4.10. Majority of the children were within the strata of ages 0-9 months (N=221; 56%) and 10-19 months (N=100; 25%). The least age stratum encountered was 50-59 months (N= 6; 1%).

Table 4.10: Age of children whose guardians were interviewed.

Age group (in Months)	Frequency	Percentage (%)
0 – 9	221	55.25
10 – 19	100	25
20 – 29	32	8
30 – 39	24	6
40 – 49	18	4.5
50 – 59	5	1.25
Total	**400**	**100**

4.2.11 Sex of child

Sexes of children whose guardians were interviewed are shown in Table 4.11. According to the results, slightly more female (50.75%) than male (49.25%) children presented with guardians at the study sites. Then male to female ration is almost the same.

Table 4.11: Sex of child

Sex	Frequency	Percentage (%)
Male	197	49.25
Female	203	50.75
Total	**400**	**100**

However, the results presented in Table 4.12 shows that an equal proportions of male and female children in the study area were diagnosed to have CSOM (3.0%). Additional analysis of the

results using chi-square test of significance at probability of error 0.05 indicated that there was no significant relationship between CSOM infection and sex of the child (χ^2=0.003; df = 1; p=0.958). The result of contingency coefficient measure of association attributes 3% of the variations in CSOM infections to sex of the child (C = 0.03).

Table 4.12: Relation between sex of child and CSOM infection

Sex	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
Male	6 (1.5)	191 (47.75)	197 (49.25)
Female	6 (1.5)	197 (49.25)	203 (50.75)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C= 0.03; χ^2=0.003; df = 1; p=0.958)

4.2.12 Birth position of Child in the family

The study set to determine the birth position of each child in the family. Table 4.13 shows that majority of the children were within the range of first born to fourth born. The modal birth position was second with a total of 117(29.25%) and least frequent was tenth position with only one child (0.25%).

Table 4.13: Birth position of child in the family.

Birth Position	Frequency	Percentage (%)
1	101	25.25
2	117	29.25
3	81	20.25
4	45	11.25
5	29	7.25
6	15	3.75
7	9	2.25
8	2	0.5
9	0	0
10	1	0.25
Total	**400**	**100**

The results presented in table 4.14 show CSOM infection was found to be higher among first born (N = 101; 1%), second born (N = 117; 0.75%) and third born (N = 81; 0.75%). The CSOM frequency decreased as the number of siblings increased so that it was almost negligible in siblings born at birth position four and above. However, analysis of the results using chi-square test at probability of error 0.05 showed no significant relationship between birth position of child in family and CSOM infection (χ^2 =4.116; df = 8; p = 0.846). Further analysis of the results using contingency coefficient measure of association attributed 10.1% of the variations in CSOM infections to position of child in the family (C = 0.101).

Table 4.14: Relationship between birth position of the child in family and CSOM infection.

Birth position of child	Infected N %	Not infected N %	Total N %
1	4 (1)	97 (24.25)	101 (25.25)
2	3 (0.75)	114 (28.5)	117 (29.25)
3	3 (0.75)	78 (19.5)	81 (20.25)
4	1 (0.25)	44 (11)	45 (11.25)
5	0 (0)	29 (7.25)	29 (7.25)
6	0 (0)	15 (3.75)	15 (3.75)
7	1 (0.25)	8 (2)	9 (2.25)
8	0 (0)	2 (0.5)	2 (0.5)
9	0 (0)	1 (0.25)	1 (0.25)
Total	**12 (3)**	**388(97)**	**400 (100)**

(C= 0.101; χ^2 =4.116; df = 8; p = 0.846)

4.3 Access to Health Facility

4.3.1 Health Facility

Results presented in Table 4.15 shows that 7(1.75%) children with CSOM were found in Matuu as compared to 5(1.25%) in Mwala. Upon further analysis of these findings using chi-square test at probability of error 0.05, no significant relationship was found between the health facility and CSOM infection (χ^2 =1.147; df = 1; p = 0.284). Additionally, results of contingency coefficient measure of association attributed 5.3% of variations in CSOM infection to the health facility (C = 0.053).

Table 4.15: Relationship between health facility and infection with CSOM in children

Health facility	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
Mwala	5 (1.25)	222 (55.5)	227 (56.75)
Matuu	7 (1.75)	166 (41.5)	173 (43.25)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C= 0.053; χ^2 =1.147; df = 1; p = 0.284)

4.3.2 Time taken to reach health facility

The most frequent time taken to reach the health facility was 30 minutes to 1 hour (38%), followed by one and a half hour to 2 hours (31.75%). Only 5.75% (24) of guardians accessed the health facility in 2 or more hours (Figure 4.7). The results in Table 4.16 show that majority of the guardians with children infected with CSOM spent between 30 minutes and 2 hours to reach the health facility. Analysis of the results using chi-square test of at probability of error 0.05 showed no significant relationship between the time taken to reach the health facility and CSOM in the children (χ^2 =4.095; df = 4; p = 0.393). However, further analysis using contingency coefficient measured of association showed that 10.1% of the variations in CSOM infections in children could be attributed to the time taken to reach the health facility (C = 0.101).

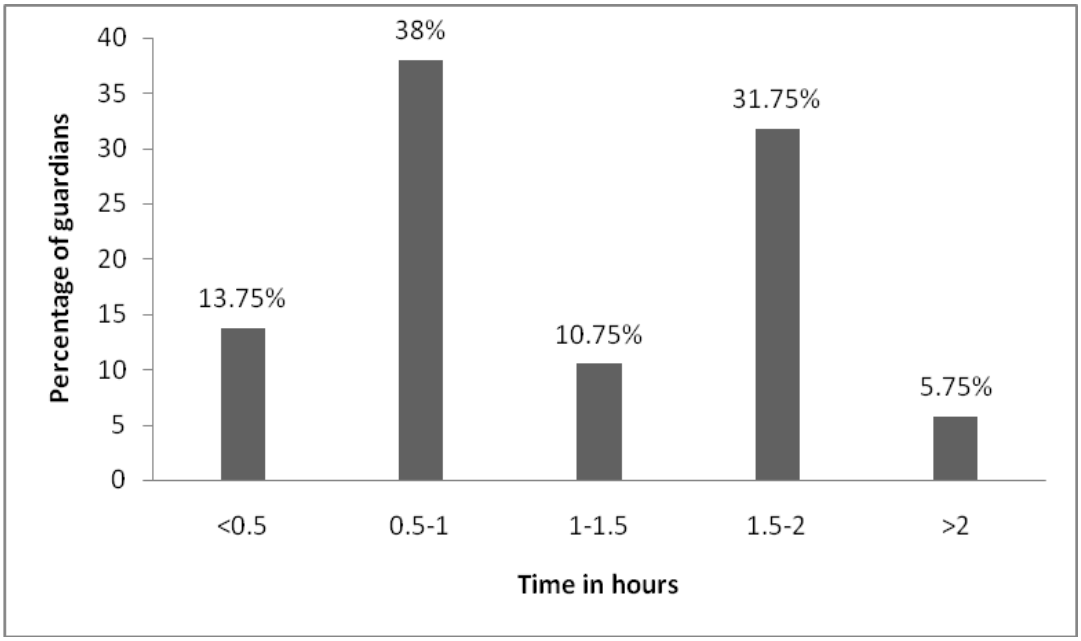

Figure 4.7: Time taken by guardian to reach health facility

Table 4.16: Relationship between time taken to reach the health facility and CSOM infection.

Time	**Infected** N %	**Not infected** N %	**Total** N %
Less than 30 Minutes	0(0)	55 (13.75)	55 (13.75)
30 Minutes to 1 hour	3 (0.75)	149 (37.25)	152 (38)
1 hour to 1 hour and 30 minutes	2(0.5)	41 (10.25)	43 (10.75)
1 hour and 30 minutes to 2 hours	6 (1.5)	121 (30.25)	127 (31.75)
More than 2 hours	1 (0.25)	22 (5.5)	23 (5.75)
Total	**12 (3)**	**388(97)**	**400 (100)**

(C= 0.101; χ^2 =4.095; df = 4; p = 0.393)

4.3.3 Means of transport used by the guardian to health facility

As shown in figure 4.8, majority (69.25%) of guardians accessed the health facility by walking, 28.75% used a vehicle and only 2% used a bicycle. There were no commercial motorcycles during the time of this study.

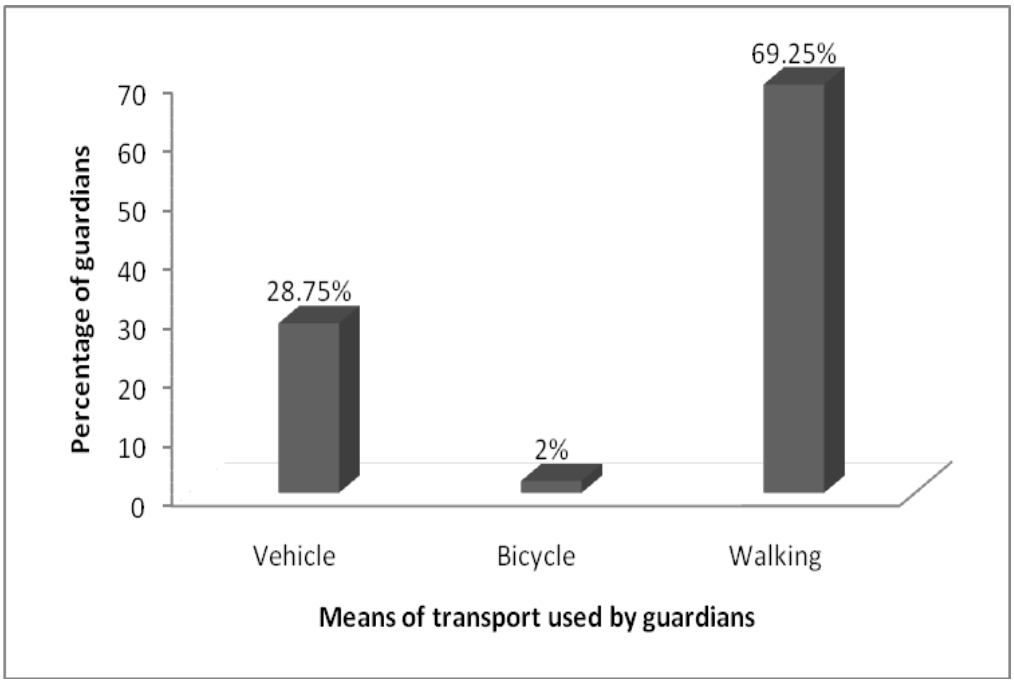

Figure 4.8: Means of transport to health facility.

The results in Table 4.17 showed that majority of guardians with recorded children diagnosed with CSOM either walked or used a vehicle to the health facility. Analysis of the results using chi-square test at probability of error 0.05 revealed no significant relationship between the means of transport used by the guardians to the health facility and CSOM infection in their children (χ^2=0.350; df = 2; p = 0.840). Further analysis using contingency coefficient measure of association attributed 3% of the variations in CSOM infection in children to means of transport used to health facility (C = 0.030).

Table 4.17: Relationship between means of transport to health facility and CSOM infections.

Means of transport	**Infected** **N %**	**Not infected** **N %**	**Total** **N %**
Vehicle	4 (1)	111 (27.75)	115 (28.75)
Bicycle	0 (0)	8 (2)	8 (2)
Walking	8 (2)	269 (67.25)	277 (69.25)
Total	**12 (3)**	**388 (97)**	**400 (100)**

(C = 0.030; χ^2 =0.350; df = 2; p = 0.840)

4.3.4 Monetary expense incurred in reaching the health facility

The total fare in Kenya Shillings (Kshs) used to reach the health facility was recorded. As shown in figure 4.9, 71.3% of guardians incurred no monetary expense and only 28.7% incurred fare to reach health facility. Of those who incured expense, 11.3% used between Kshs 51 – 99 and 8.8% used less than Kshs 50 (Figure 4.9).

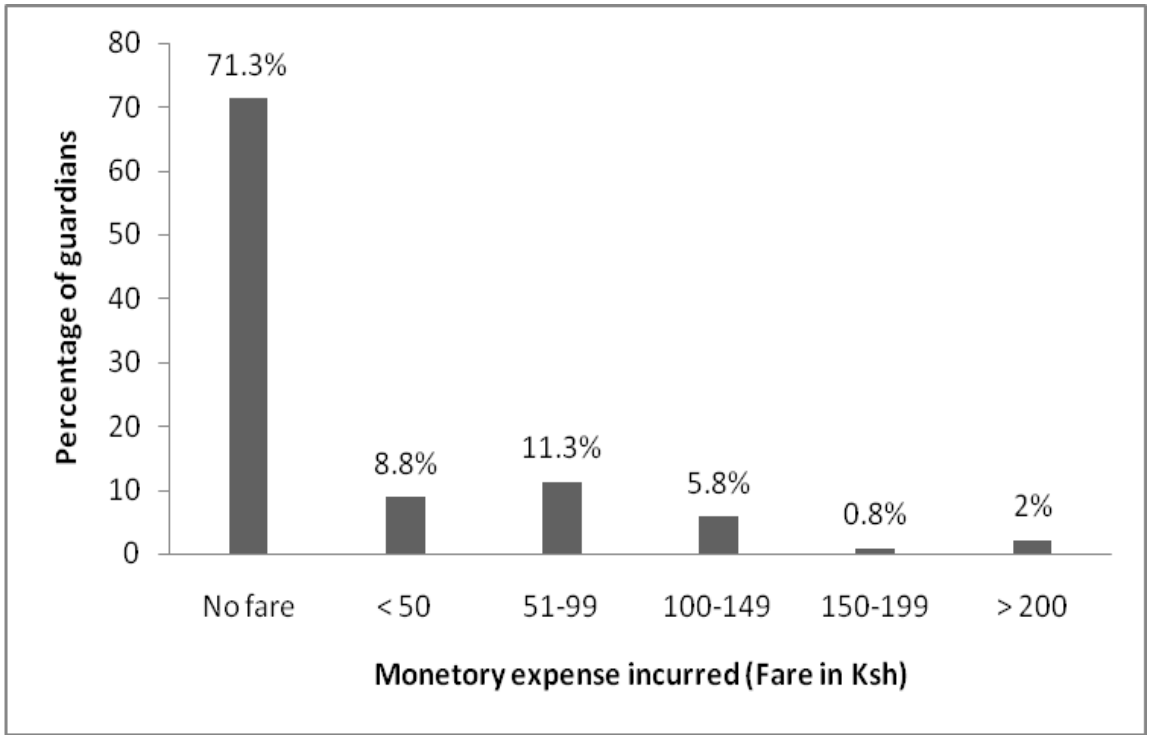

Figure 4.9: Monetary expenses incurred in reaching health facility.

The results in table 4.18 shows that guardians with children having CSOM infection were either those who did not incur monetary expense or those who spent between Ksh.50 and Ksh.149 to reach the health facility. Upon analysis of the results using chi-square test at probability of error 0.05, no significant relationship was found between monitory expense incurred by the guardians and CSOM infections in their children ($\chi 2$ =3.275; df = 5; p = 0.510). Further analysis using contingency coefficient measure of association showed that 16.6% of the variations in CSOM infection in the children could be attributed to monetary expense incurred to reach health facility (C = 0.166).

Table 4.18: Relationship between monetary expenses incurred to reach the health facility and CSOM infections.

Monetary expense incurred (Ksh)	**Infected** N %	**Not infected** N %	**Total** N %
No expense	8 (2)	276 (69)	284 (71)
Less than 50	0 (0)	35 (8.75)	35 (8.75)
50 - 99	3 (0.75)	42 (10.5)	45(11.25)
100-149	1(0.25)	20 (5)	21 (5.25)
150 - 199	0 (0)	7 (1.75)	7 (1.75)
200 and above	0 (0)	8 (2)	8 (2)
Total	**12 (3)**	**388(97)**	**400 (100)**

(C= .0166; $\chi 2$ =3.275; df = 5; p = 0.510).

4.4 Prevalence of CSOM Infection among Children

4.4.1 Occurrence of CSOM

a) Reported cases of CSOM at community level.

Respondents were asked to recall any child with a discharging ear in the neighbourhood or village, including their approximate ages. Those able to recall were 81 (20.25%) and the affected children were within the range of 24 months to 120 months.

b) Reported cases of CSOM at family level.

Guardians whose children were diagnosed with other conditions (other than CSOM) were asked whether their child or any other in the nuclear family had had ear discharge since birth. Analysis of the responses showed 22 (6%) reported history of previous attacks with CSOM infection in the presenting child or another in the nuclear family.

c) Guardians with children suffering from CSOM.

There were (12) 3% guardians with children having CSOM as confirmed through examination. As shown in table 4.19, majority of these children were experiencing their first, third or more than their third attack of CSOM.

Table 4.19: Experience of attacks of CSOM among children

Experience of CSOM attack	**Frequency**	**Percentage**
1st attack	4	1
2nd attack	1	0.25
3rd attack	2	0.5
More than 3rd attack	5	1.25
Not experienced any attack	388	97.0
Total	400	100

4.4.2 Prevalence of CSOM in young children

The total number of children recorded with CSOM from recall at level of family and community constitutes a crude total of the old cases of CSOM in the study area, in this case, 103. Those examined and found to be having CSOM (12) constitutes the new cases. However the old cases may not constitute a credible numerator in the calculation of prevalence since they were recorded from recall by guardians and hence prone to recall bias. Consequently, those considered were the ones examined and confirmed by clinician as having CSOM. Therefore:

$$\text{Prevalence} = \frac{\text{Old cases + New cases of disease}}{\text{Midyear under five year population of study area}} \times \text{base (1000)}$$

$$= \frac{12}{48147} \times 1000$$

= 0.25 children per 1000. Therefore the prevalence rate of CSOM is 0.25 children per 1000. (This prevalence can be approximated to 3 children per every 10,000 or 0.03%).

The mid-year population for under five children for Mwala and Yatta was 15808 and 32339 respectively (ROK, 2003).

4.4.3 Diagnoses for young children

The various diagnoses arrived at, or reason for visiting health facility, for each child accompanying a guardian who was interviewed for the study are shown in figure 4.10. Diagnosis of CSOM was done using a standard procedure described in appendix VII. Nose and throat infections comprised 29.75% and those attending the CWC were 34.75%.

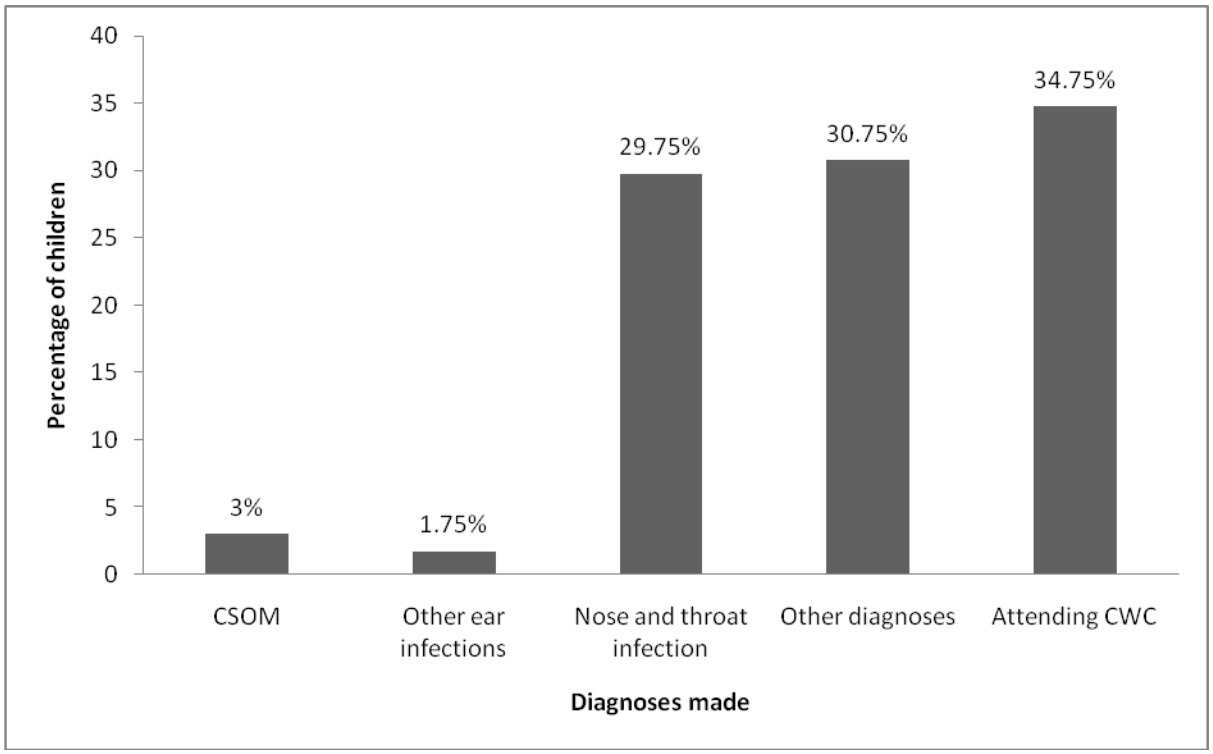

Figure 4.10: Diagnoses of children

4.5 Guardians' awareness on Common Ear Disease, Symptoms and Prevention of CSOM

4.5.1 Awareness on Common Ear Diseases

The guardians were asked to name the ear diseases known to them so as to determine their awareness on the common ear diseases in the study area. These were: discharging ear (74%),

pain in the ear (39.5%), itching ear (18.8%), deafness (10%) and wounds (18.5%). Those who could not name a disease comprised 12.5% (Figure 4.11).

The guardians were further asked to identify the three most common ear diseases. Those identified were: discharging ear (54.5%), pain in the ear (39.5%) and wound in the ear (18.5%). Each guardian was further asked to identify the local name for CSOM. The results are summarised in Appendix III. Only 20.5% were able to correctly name the disease by its local name (it is called nzika in Kikamba language). However, majority (74.8%) did not know the local name for CSOM.

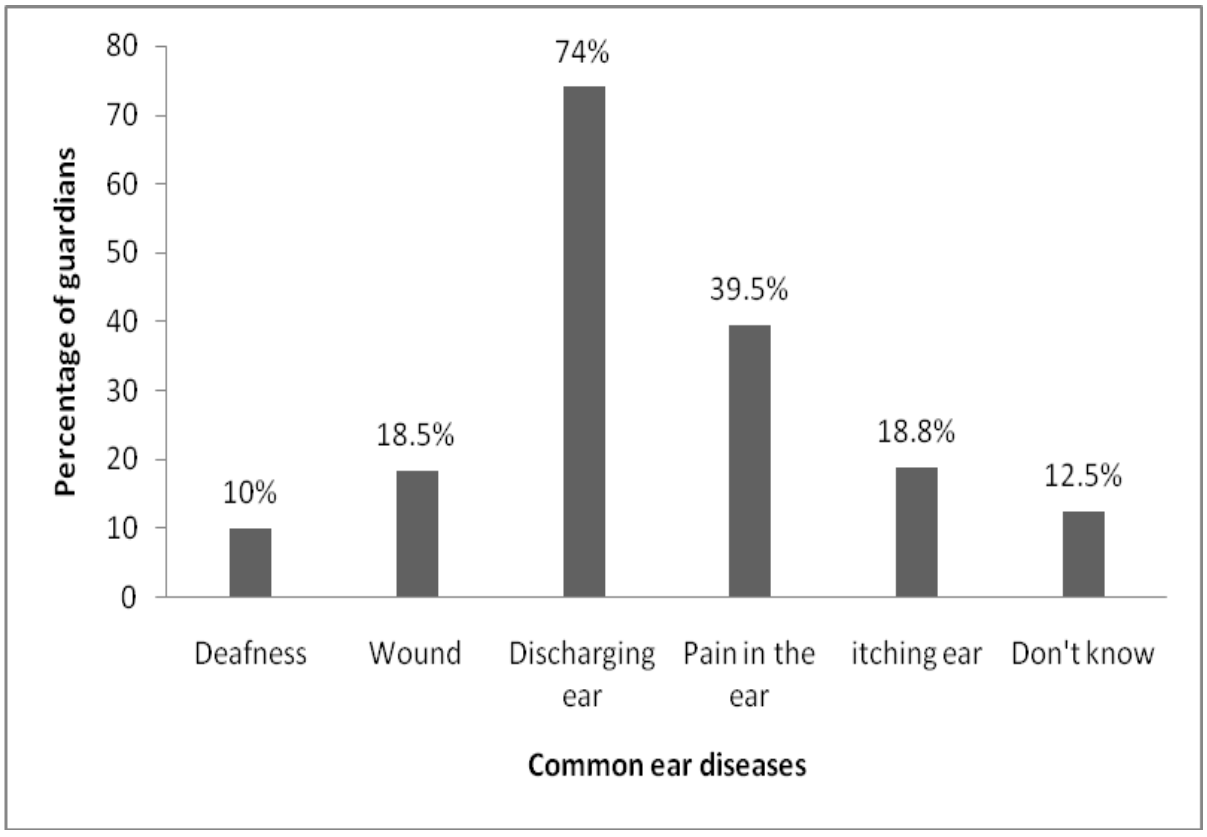

Figure 4.11: Common ear disease named by guardians

4.5.2 Awareness on General Symptoms of Ear Diseases among Guardians

In order to determine general awareness on ear diseases, the guardians were asked to name the general symptoms associated with ear diseases. The four commonly mentioned symptoms were: crying or screaming (85.5%), putting hands on affected ear (56%), ear discharge (33.8%) and pain (32.3%) (Figure 4.12).

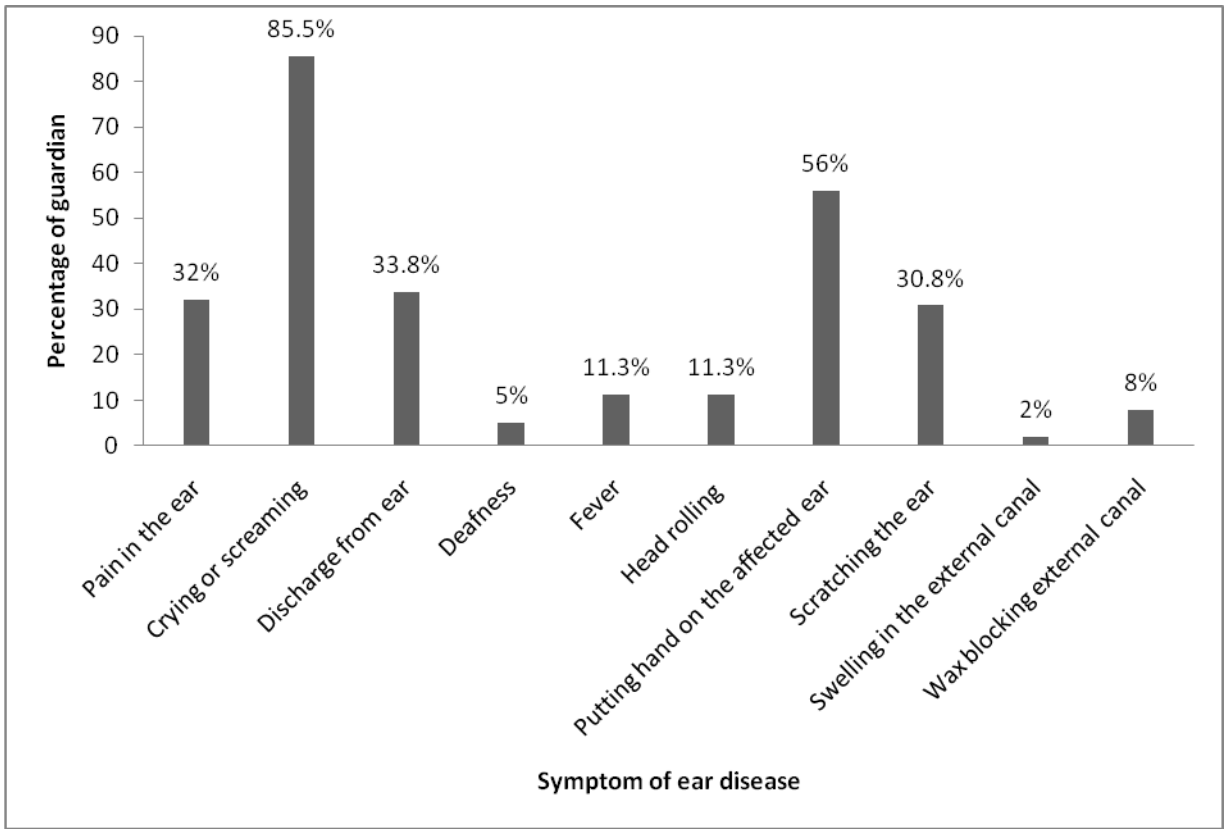

Figure 4.12: General symptoms of ear diseases named by guardians.

4.5.3 Awareness on prevention of Ear Infections among Guardians

The guardians were asked to state whether ear infections were preventable. Majority (85%) of them stated that they could be prevented. However 3.8% felt ear diseases were not preventable and 11.3% had no idea. On being further asked to state methods of preventing ear disease, majority (66.5%) were of the opinion that the practice of proper bathing while avoiding water entering the ears was the best method. Other preventive methods were: Immunisation (9%), giving a balanced diet (3.3%), health education to the community (2.5%) and effective treatment of childhood diseases, for example common cold, measles (2.3%). The least mentioned was breastfeeding (1%) (Figure 4.13).

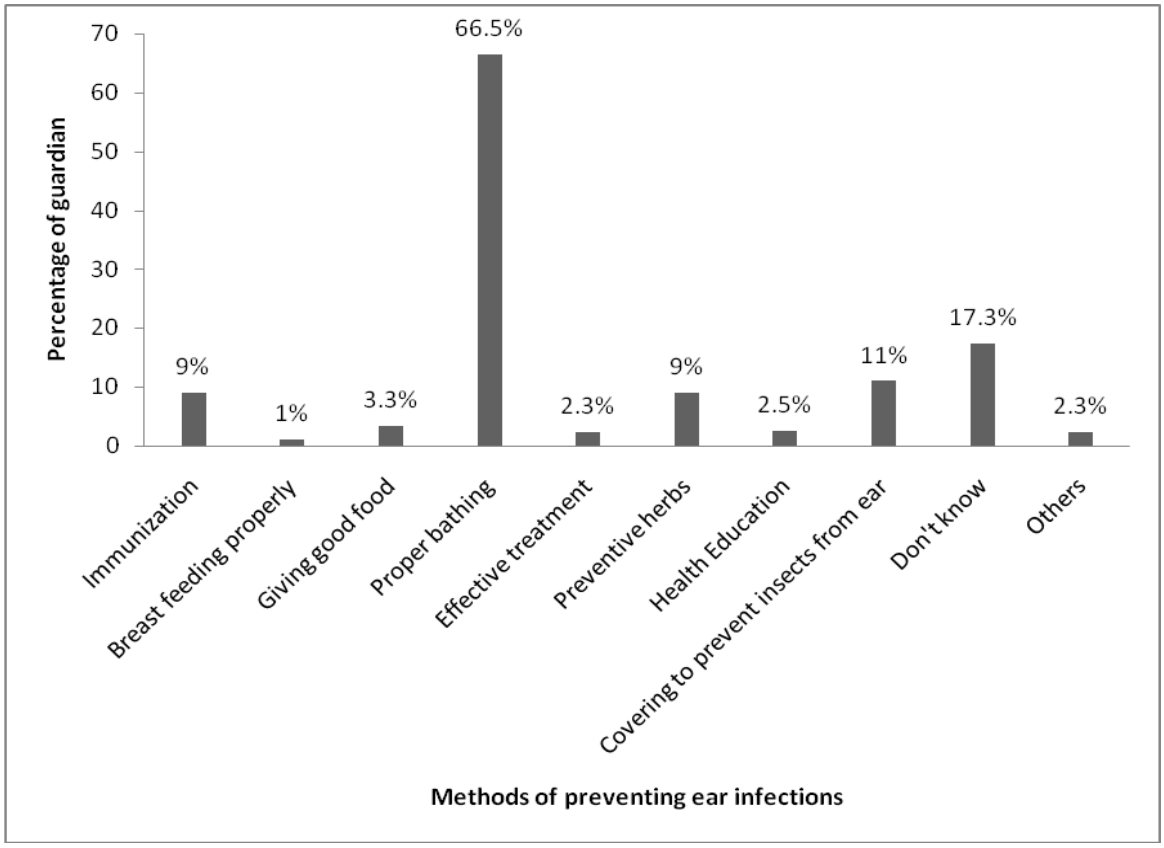

Figure 4.13: Methods of preventing ear infections named by guardians

4.5.4 Target Group for Health Education on Ear Diseases.

The guardians were asked to identify the right person to receive information from health workers on ear diseases. Most guardians (77.75%) indicated that mothers were the right group, followed by fathers (10%). However, 11.25% indicated that it was necessary to teach both mother and father. Other preferences were: older children (0.75%), grandfather or grandmother (0.25%) (Figure 4.14). Reasons given for the high preference on the mother were varied and included that the mother is always with the child and is the one given the role of taking care of children. The most preferred venue for the dissemination of above information was health facility (55%), church (26.8%), school (8.8%), home (6.3%) and chief's baraza (3.3%).

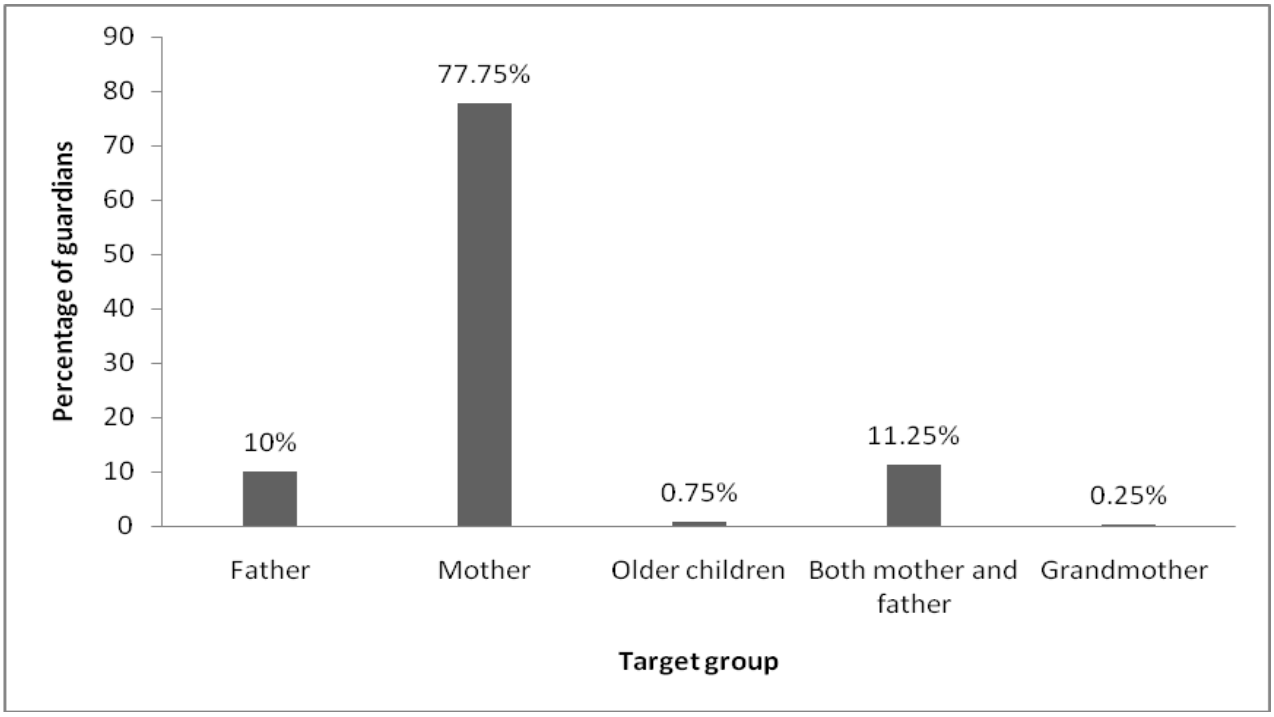

Figure 4:14 Target group for health education on ear diseases

4.6 Guardians' Perceptions to CSOM

4.6.1 Perceptions on susceptibility to CSOM

The guardians were asked to identify the most vulnerable age bracket to CSOM. They perceived young children (85%) as the most vulnerable and the adolescents (0.75%) as the least (Table 4.20).

Table 4.20: Perceptions on susceptibility to CSOM

Group	**Frequency**	**Percentage**
Young children (0-5 years)	340	85
School going children (6-14 years)	9	2.25
Adolescent	3	0.75
Adults	21	5.25
Elderly	27	6.75
Total	**400**	**100**

Guardians were further asked to identify the kind of young children that are most susceptible to CSOM. In the responses elicited, malnourished children (39.9%) formed the largest group (figure 4.15). Under the category of others (29.3%), various responses were recorded such as: children not bathed or those improperly bathed such that water gets into their ears.

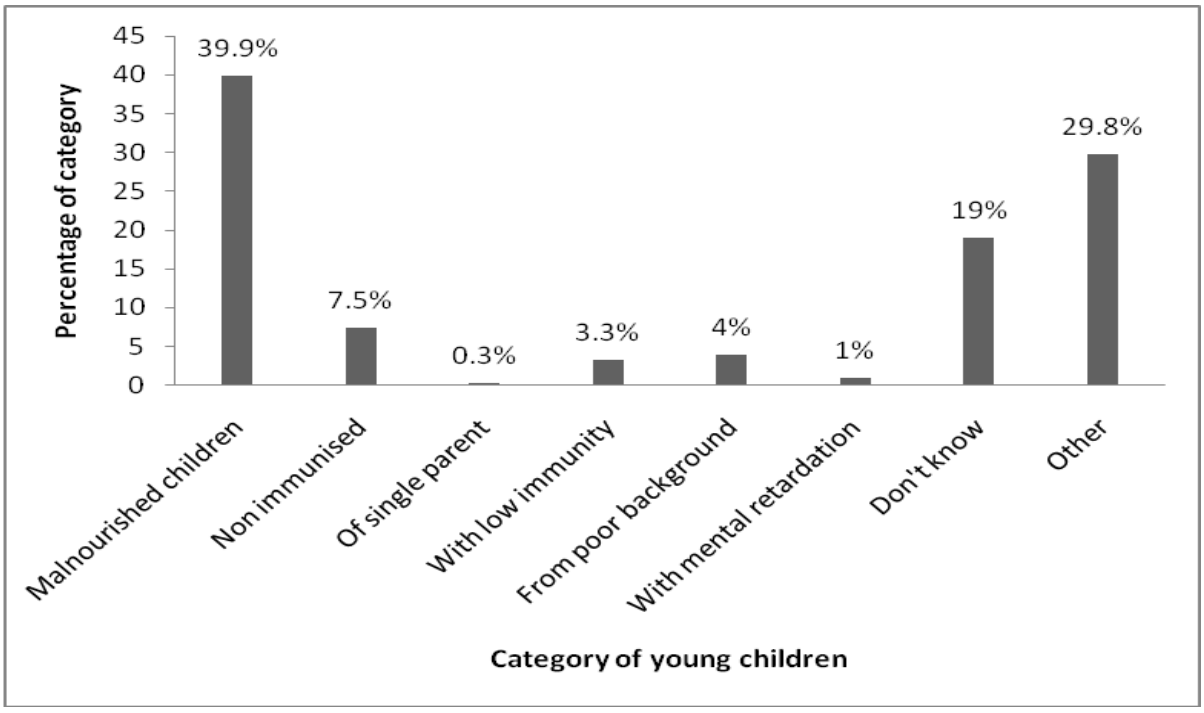

Figure 4.15: Perceptions on the category of children likely to suffer from CSOM

4.6.2 Perceptions on Cause of CSOM

Figure 4.18 show the cumulative frequencies of responses by guardians on what is perceived to be the main cause of CSOM. The three most mentioned associations were: water entering the external ear canal while bathing the child (80.3%), dust (29.0%) and entry into ears by foreign bodies (27.3%). Other responses were: injuries to the ear (15.5%), tears entering the ear while child is crying (9.3%), products of conception (at birth) (5.5%), living in poorly ventilated houses (5.0%), sneezing (3.3%), witchcraft (3.0%) associated or following some childhood disease (for example, common cold, measles) (1.5%), cold breeze (1.3%), oral thrush (0.3%) and those who did not know accounted for 10.5%. Responses falling under the cluster of "others", which constituted 4.8%, included: breast milk entering the ear during feeding, heavy blow or slap on ear(s), consumption of some foods for a long time (for example, cowpeas) and congenital association.

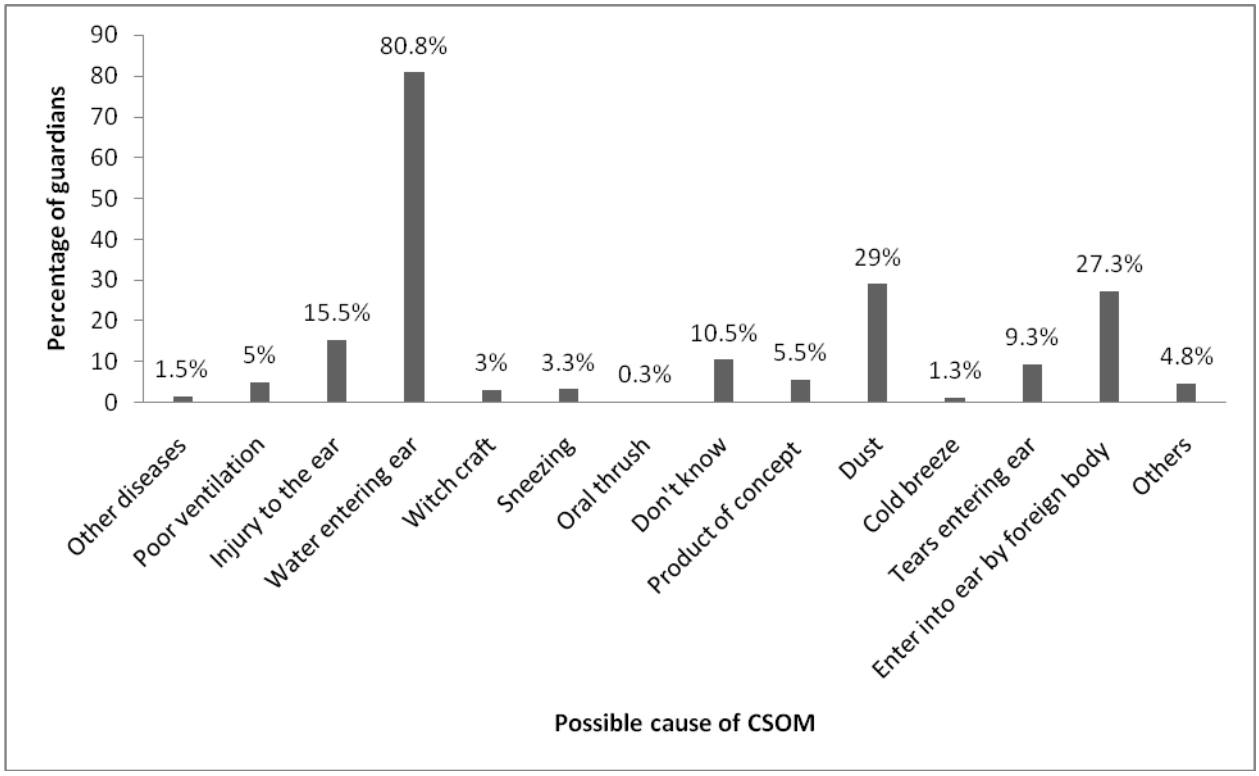

Figure 4.16: Possible causes of CSOM named by guardians

4.6.3 Perceptions on curability of CSOM

Majority of the guardians (94.0%) perceived CSOM as curable, 2.5% rarely or sometimes, 2.3% not curable and those who did not know accounted for 1.3% (Figure 4.17).

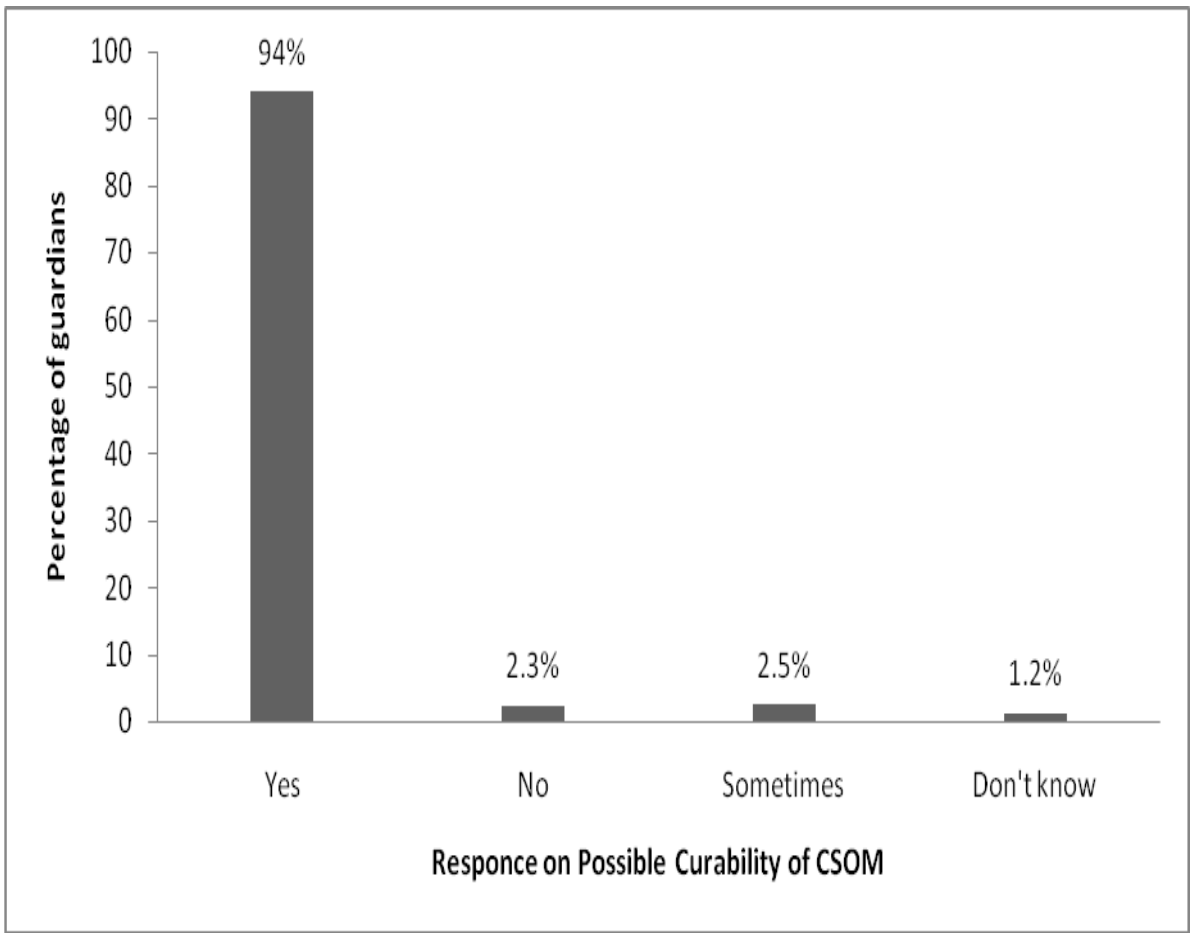

Figure 4.17: Perceptions on curability of CSOM

4.6.4 Perceptions on consequences of delayed or lack of treatment of CSOM

Deafness (84.8%) was the most perceived consequence, followed by chronic ear discharge (15.8%) and a state of being deaf and dumb (6.5%) (Figure 4.18).

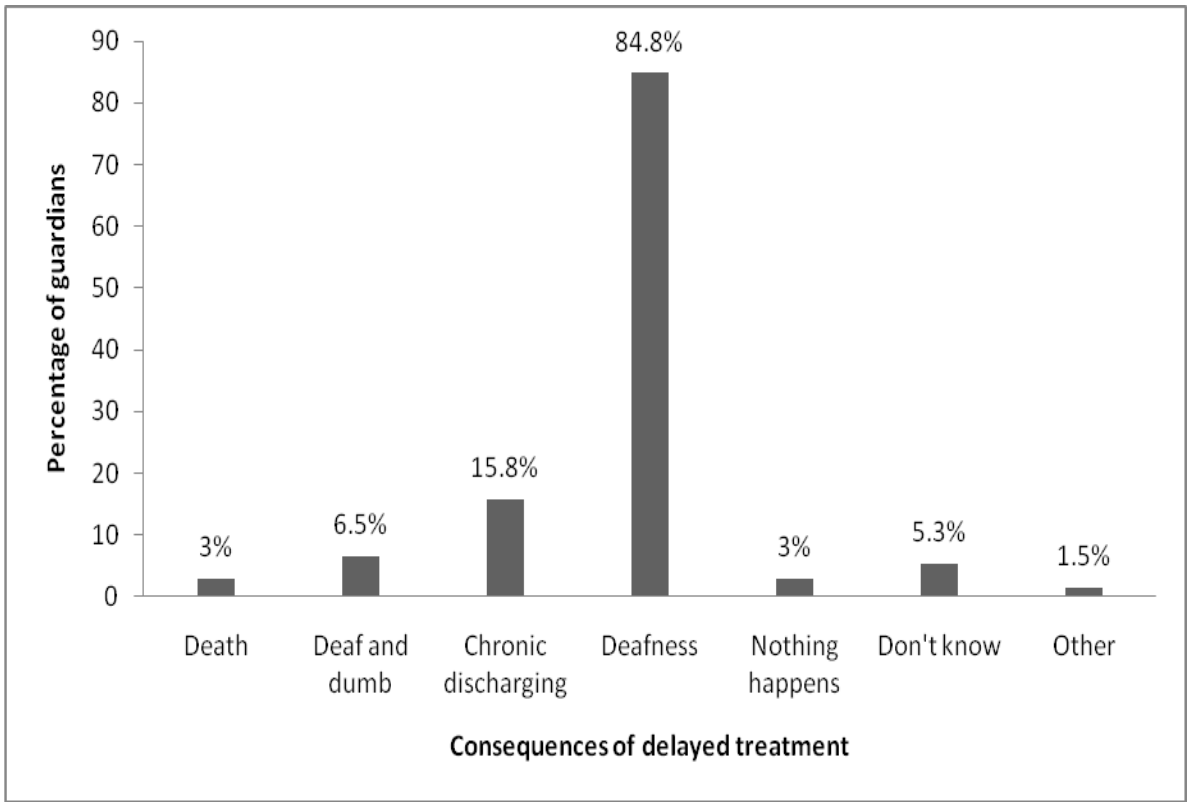

Figure 4.18: Perceptions on consequences of delayed or lack of treatment of CSOM

4.7 Guardian's Health Care Seeking Practices and Decision Making

4.7.1 Decision-making on where to seek medication at family level

The onus of who to make decision on where to seek medication when a child has CSOM was probed. A large proportion of the guardians bestowed this onus on mothers (43.75%), followed by father (30%). The least considered for this task was the father in-law (0.25%) (Table 4.21).

Table 4.21: Onus on decision-making at family level

	Frequency	Percentage (%)
Mother	175	43.75
Father	120	30
Mother in-law	12	3
Father in-law	1	0.25
Either father or mother	85	21.25
Others (Anybody)	7	1.75
	400	100

4.7.2 The factors influencing decision making on choice of health facility to take child with ear infection or CSOM

The three dominant factors were: prompt and efficient services (61.8%), cost of services (53.5%) and availability of drugs in the health facility (16.5%) (Table 4.22).

Table 4.22 Factors influencing decision making on choice of health facility (Multiple Responses Allowed (n=400))

Factor	Frequency	Percentage (%)
Belief on cause of the disease	1	0.3
Prompt and efficient service	247	61.8
Availability of ENT specialist	13	3.3
Distance to nearest health facility	33	8.3
Cost of service	214	53.5
History of previous successful treatment	17	4.3
Good attitude of health staff	56	14.0
Availability of drugs in health facility	66	16.5
Others	26	6.5

4.7.3 Health care seeking and home based care practices to CSOM

The researcher sought to know if there were any home therapies given to children with CSOM before visit to a health facility is made. Table 4.23 shows that instilling chicken soup or fat into a discharging ear (s) was the most popular practice accounting for 61%, followed by instilling gun oil (38.5%). There were those who would pray for the child or simply do nothing, accounting for 8% and 4.5% respectively, while those seeking drugs from traditional healers accounted for 3%. A number of guardians (29.3%) gave a wide range of practices of instilling all manner of concoctions into the ear. These are summarised which are shown in Appendix II. The

concoctions ranged from juice from traditional herbs, fats from various domestic animal and industrial lubricants.

Table 4.23: Frequency of home based care practices (Multiple Responses Allowed) (n=400)

Home based practice	Frequency	Percentage
Seek help from traditional healers	12	3
Instil chicken fat or soup into ear (s)	244	61
Instil gun oil into ear (s)	155	38.5
Pray for child	18	4.5
Do nothing	32	8
Others	117	29.3

4.8 Data from First Line Health Workers

4.8.1 Background Characteristics

A total of thirteen (13) questionnaires were filled in and returned. Majority (92%) of first line health workers were of secondary level of education. Nursing was the most frequent profession at both diploma and certificate levels (77%), with the rest 23% being clinical officers. Female guardians were the majority (62%). Health workers with the least years of service were clinical officers (between 3 and 7 years). Nurses were found to have the longest service (between 10 and 26 years).

4.8.2 Health Workers Exposure and Knowledge on Ear Diseases

All the health workers had come across cases of CSOM in their practice. Common encountered ear diseases were CSOM, otitis externa, foreign bodies (FB) in the ear, and deafness in order of frequency. However, the most encountered were CSOM and otitis externa. The first line health workers overwhelmingly mentioned malnourished and chronically ill children as the ones likely to suffer from CSOM. Predisposing factors to CSOM mentioned by health workers were upper respiratory tract infections (URTI), measles, poor nutrition and poor hygiene, in order of frequency. Other less mentioned predisposing factors were low immunity (HIV), home delivery and water entering ears.

The first line health personnel reported that most children presented for medication at early acute and late acute stages of otitis media and only a few children presented while in chronic stage. The cases referred to ENT specialists were the ones in chronic stage. In order of frequency, deafness, meningitis, mastoiditis and perforated ear drums were mentioned by the first line health workers as the complications of CSOM. The complications could be prevented or their occurrence reduced by the following methods in order of frequency: early diagnosis and treatment, balanced diet and proper bathing of children. Other less mentioned methods were preventions of foreign bodies (FB) getting into the ears, early treatments of URTI, home delivery and immunization.

Only 5(38.5%) of the health workers felt they were competent enough to handle cases of CSOM. However, none of the workers reported having ever attended an in-service course or seminar on

ear diseases while in service. One of the health workers from Yatta District Hospital had this to say about CSOM: “CSOM is a challenge to health providers and should not be underscored”.

4.8.3 First line Health Workers’ Experience on Community Perceptions and Health Care Seeking Practices towards CSOM

According to the health workers, the community perceives water entering ears as the foremost cause of CSOM. Other causes were: bathing in dirty water and poor hygiene. The community perceived young children as the most susceptible to CSOM and were aware of the dangers of untreated or inadequately treated CSOM. The first line health workers recorded sex during pregnancy, witchcraft, bad omen, entry of breast milk into ear and a familial tendency as some of the beliefs held by the community as the cause of CSOM. Majority of the first line health workers held the opinion that the community members preferred modern medicine in the management of CSOM. However, a substantial number of health workers reported that the community also preferred alternative medicine in the form of home therapies. The home therapies administered by the community included instilling herbs, chicken soup and gun oil as the most popular practices. Others were instilling ghee and visit to a witchdoctor.

4.8.4 First Line Health Workers Views on Barriers to Facility Based Management of CSOM

Analysis of the health workers data showed that cost of service, distance to health facility and attendant cost of transport, lack of knowledge of CSOM, lack of drugs in the health facility, lack of ENT specialist and poor roads in that order of frequency were hindering access to facility based management of CSOM. Majority of the health workers (93.5%) reported to have been

receiving no supply of drugs for the management of CSOM. The few who reported to have received the supply named gentamycin and chloramphenicol eardrops as their supply. Equally, a large proportion (N = 9; 69.2%) reported having no instruments and equipment for management of ear diseases. The ones who had received them mentioned auriscope and a diagnostic kit.

CHAPTER 5: DISCUSSION

5.1 Prevalence of CSOM

A review of secondary data on the most common diseases in the study area showed that CSOM was not featuring among the ten most common diseases. This was widely expected and in line with the general trend of the disease nationally and globally as reported by MOH (2005) and Woodfield and Dugdale (2008). Nonetheless, the low prevalence may not be considered as the actual presentation of prevalence of this disease in the area since there was a general lack of an elaborate system for compiling data on specific ear diseases within the study area. A review of the children's general health problems showed a prevalence of 3 children per every 10,000 for CSOM. The relatively low prevalence of the disease was found to affect the general health seeking behavior and management by the first line health workers in terms of resources, diagnosis and other responses. That notwithstanding, the low prevalence is reflective of other studies. Aduda (2005) and Hatcher *et al*., (2005) reported prevalence of 0.74% and 1.1 % in their studies in Kisumu and Kiambu Districts respectively. However, they targeted a wider age group of 3 to 14 years. Within the region, Minja and Machemba (1999) reported a prevalence of 2.6% among school children in rural and urban Dar es Salaam in Tanzania. Similarly, Hasselt (2000) did a school screening study in Malawi focusing on primary school children in general and obtained a baseline prevalence of 3.3% for CSOM.

5.2 Socio-demographic factors

Most CSOM infections were found in children whose guardians were within ages of 20 to 34 years, with most at 20 to 24 years. Age of a guardian is an important factor which plays a role in

making sound judgments concerning their children. It is expected that young mothers are inexperienced and therefore unlikely to make decisions like older mothers**.** Experience confers knowledge and attitude that assist a guardian in positively changing their health care seeking practices concerning their childrens' illness and augment acceptance of preventive and promotive health programs (Shaheen *et al.,* 2012). Goldman and Heuviline (1995) found that families are more likely to seek a provider when a child experiences fever and gastrointestinal symptoms, as compared with respiratory and other symptoms and when a mother perceives the illness to be serious.

In the study of child illness the most consistent guardian who will most often accompany a sick child to a health facility is usually the mother. This study was no different as 96% of the guardians were mothers. A cross-tabulation of relation of guardian to the child and CSOM infection revealed that the most infected children were the ones whose guardians were mothers. However, children attended to by guardians other than the mother presented with relatively fewer infections. These variations could be attributed to the fact that mothers formed the highest segments of guardians as opposed to other categories of guardians rather than a positive statistical association between mothers and CSOM infections in children.

Educated guardians are expected to have healthier children, since they are more likely to be able to marshal information and other inputs that positively affect child health. Guardians with at least primary education are deemed to understand the importance of better nutrition and immunization of their children. In case of illness, a guardian with education easily knows where to seek treatment. A majority (99.2%) of the guardians in the study had undergone formal education. A

cross-tabulation of level of education and CSOM infections revealed that most infections were found in the cluster of the guardians without formal education and those with primary level of education. There was no statistical association between level of education of guardian and CSOM infection in children. This implies that level of education of guardian has no influence on CSOM infection in children. This contrasts with findings by Govindamsy and Ramesh (1997) in India who found that education in general and female education in particular exerts a very strong influence in reducing child morbidity and mortality. Educated guardians are better able to break away from traditions to utilize modern means of safeguarding the health of their children. Similarly, Adjei (2012) found that prevalent diseases in a particular community were higher in households of guardian of low education level. In another study, Erwin *et al.* (2006) found that having parents with low education level is a predictor of CSOM in children. The variations observed in this study could therefore be attributable to poor utilization of modern health services due to traditional beliefs about CSOM by the local community. Findings from qualitative data obtained from first line health personnel working in the study area points to these beliefs.

All guardians interviewed were females and 88.5% of them were married. A cross tabulation of the guardians marital status and CSOM infections in their children showed that CSOM is more common in children of married guardians. However, there was no significant statistical relationship ($p=0.727$) between marital status and CSOM infections. Therefore this could imply that marital status has no influence on CSOM infections.

Majority of the guardians interviewed for the study fell in the category of housewives (80.3%). A cross-tabulation of guardians' occupation and CSOM infections reveals that all CSOM infections were in children whose guardians were housewives. However, there was no significant statistical relationship (p=0.708) between occupation of guardian and CSOM infections. This therefore could imply that occupation of guardian has no influence on CSOM infection in their children. The occupation of a guardian may be a pointer to their income and hence economic status. Barker (2008) found out that where people have to pay for health services in situations of poverty, then the service may become inaccessible. This finding contrast with results of another study by Adjei *et al.* (2012) where a strong correlation between income and disease occurrence was found such that an increase in income would lead to a significant improvement in health status of the household. In a related study, Shaheen *et al*. (2012) found a significant statistical association between CSOM and guardians' income. Income is directly related to occupation and guardians with a higher income level are more likely to meet the basic health needs of their children and consequently able to avert the occurrence of common childhood diseases.

The size of the family determines the economic burdens borne by the parents or guardians of the children in their upbringing. The smaller the family, the lower the burden and vice versa. Most families of the guardians interviewed for the study consisted of 2 to 4 members. A cross-tabulation of family size and CSOM infections revealed that most CSOM infections are found in children who came from the family size of 2 to 4 and 5 to 7 members. However, there was no statistical association (p= 0.967) between family size and CSOM infections in children. This therefore implies that family size has no influence on CSOM infections in children. However,

Shaheen *et al.* (2012) in a study of socio-demographic factors in rural primary school going children in Bangladesh found a strong association between family size and CSOM infection.

Peasant farming and business constitutes the major source of income for the family of guardians interviewed. A cross-tabulation of family source of income and CSOM infections showed that all recorded cases of CSOM in children were from families whose source of income was peasant farming and formal employment. A statistical association ($p=0.153$) was not found between the family source of income and CSOM infections in children. This finding could therefore imply that family source of income has no influence on CSOM infections in children. This contrasts with finding by Shaheen *et al.* (2012) that an association exists between guardian's income and CSOM infection.

Most of the children whose guardians were interviewed were within the ages of 0 to 9 months (56%) and 10 to 19 months (25%). This finding brings out a general trend that younger age groups were more represented as opposed to the older age groups among the under 5 years children who presented at the study area. This could imply that younger children are more prone to infections and therefore had been brought for medication by the guardians. Alternatively, it could also mean that these children were being brought by their guardians for immunization since the results shows that 34.8% of guardians had brought their children for child welfare clinic and 56% of the children were within the national immunization schedule age of 0 to 9 months.

Sex is a host characteristic that has a major role on disease susceptibility (Gordis, 2010). A cross tabulation of sex of child and CSOM infection showed that equal proportions of male and female

had CSOM infection. However, there was no statistical association (p=0.958) between sex of child and CSOM infection. This finding contrast with finding by Teele *et al*. (1989) and Solomon and Harris (1976), who found that male children were more affected by CSOM than female children and Shaheen *et al.* (2012) who found that more girls are affected than boys.

Mothers and by extension parents pay a lot of attention to their first child. At this time they receive a lot of advice from their immediate and extended members of the family on how to take care of their child. However, due to naivety and inexperience, they are bound to sometimes miss important symptoms of illnesses of their children. As the number of children increases, so does the burden of taking care of them and many hours are spent away from the children engaging themselves in economic activities. The general assumption is that as the family size increases and the guardian age increases, there is a corresponding widening of guardians experience in noting symptoms of illnesses and taking prompt and appropriate health care actions. This thinking favourably compares with a WHO report (2004) which states that as the family size increases, a guardian become more knowledgeable about childhood diseases and is able to take measures to control or prevent their occurrence. A cross tabulation of birth position of child and CSOM infection showed that most CSOM infections were concentrated between the first born and the third born. There was, however, no statistical association (p=0.846) between birth position of child in family and CSOM infection. This could imply that birth position of child in the family has no influence in CSOM infection.

5.3 Guardians' perceptions of CSOM

Young children were named as the most vulnerable to CSOM followed by the elderly and school going children. There seems to be a right perception on who is more vulnerable to CSOM as found by Bluestone *et al.,* (1990) that CSOM is common in infants. Similarly, infections are more common in the two extremes of life, which is, in paediatric and geriatric.

Various responses were given by the guardians on the main cause of CSOM. They may be grouped into: those based on sound medical knowledge and can directly or indirectly be associated with CSOM such as water entering the ear, injuries to the ear, sneezing, cold breeze and oral thrush. Others are those associated with or follow some childhood diseases such as measles, common cold, and foreign body entering the ear. The other category is based on beliefs such as dust, tears entering the ear(s) when child is crying, products of conception entering the ear(s) at birth and witch craft. The results indicate that although most guardians have the right perceptions on the main cause(s) of CSOM, a number of them had their responses on the main cause of CSOM based purely on beliefs as opposed to sound medical knowledge. Though not a cause of CSOM per se, the strong perception by guardians that water entry into a child's ear during bathing causes CSOM is a positive perception since this entry is associated with recurrence of CSOM in a child with a dry perforation of ear drum.

There was positive perception on the treatment of CSOM, with 94.0% being aware that it is curable and 2.3% not sure. The guardians also had right perceptions and understanding on the

consequences of delayed treatment of CSOM. A large proportion (84.5%) had the perception that this could lead to deafness, 15.8% chronic ear discharge and 6.5% deafness and dumbness.

This indicates that majority of the guardians have the right perception on the availability of treatment for CSOM and are alive to the consequences of the same if not treated. However, there was a small proportion of guardians that was unsure of curability and consequences of the disease. These could be the guardians contributing to the burden of the disease in the community.

5.4 Susceptibility to CSOM

Guardians perceived young children as the most susceptible to CSOM. Among these young children, the most vulnerable were the malnourished children. Susceptibility to disease is determined by a variety of factors including genetic background, nutritional status and immunologic characteristics (Gordis, 2010). Erwin *et al.* (2006) in a study found that URTI, malnutrition and having parents with low level of education as some of the predictors of CSOM in children.

5.5 Health care seeking practices of guardians towards children with CSOM.

The decision on what action to take when a child falls ill makes the difference between successful controls of progression of a disease with the resultant complications. The onus of making this decision at family level was shown by the guardians to be bestowed on the mother, father and both father and mother in that order of priority. The results showed that the mother and the father have a role to play in the health of the child. However, the mother has a more significant role in the care of the young child.

In making the decision on the health facility to seek medical care for a child with CSOM, availability of ENT specialist as a consideration featured least in the responses of the guardians. These results suggest that the guardians in study area are least concerned with specialization in ENT or closeness to the health facility but more concerned with prompt, efficient and cheap service, good attitude of staff and availability of drugs. These findings compare favourably with results of qualitative data from first line health personnel that showed lack of knowledge of CSOM as a factor in health care seeking behaviour. However, the finding that guardians are least concerned with specialization in ENT may be fallacious since they may not be aware of such a speciality and therefore believe that the first line health personnel are capable of handling any kind of illness. A study by Awiti (2002) on health seeking behaviour of patients found out that patients' age, gender, marital status and highest level of education influences the choice of health facility.

The most popular practice in the treatment of CSOM at home level was instilling chicken soup or fat (61%), followed by gun oil (38.8%). Though very popular, there may be no proven medicinal value in these two practices. In addition, the researcher had not come across any study on these home-based therapies. However, Barker (2008) found that social factors like language barriers, certain beliefs, customs and taboos and preference to remedies especially among the old affect their health seeking behavior.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

1. The prevalence of CSOM is 3%. Since the study was health facility based, there is likely hood that many children with CSOM may have been missed.
2. Except for cause, the guardians had the right perception of susceptibility, curability and the consequences of delay or lack of treatment of CSOM. One of the commonly mentioned perceptions of cause of CSOM is water entering ears during bathing of the child. This is a positive perception which has an overall preventive effect on the recurrence of CSOM in a child who has a dry perforation of ear drum.
3. A substantial number of guardians first instil chicken soup, gun oil and juice from traditional herbs and other concussions into the ear (s) of child with CSOM and then later seek help from a health facility.
4. Except for sex of the child, most other socio-demographic factors relating to guardian and child were not found to significantly influence the occurrence of CSOM. However, other studies revealed statistically significant association of CSOM with age, guardians' income, maternal education and family size.
5. The most common home based health care practices by guardian in order of popularity were: instilling chicken fat or soup and instilling gun oil into ear (s) of a child with CSOM.

6.2 Recommendations

1. The government and its development partners should:

a) Undertake an information, education and communication program to sensitize guardians, children and teachers on CSOM in terms of cause, preventive measures and curative services available in health facilities. Primary school teachers and parents or guardians are capable of playing a significant role in control of CSOM if empowered through imparting them with the requisite knowledge and skills.

b) Formulate and implement a policy that mainstreams primary ear care through its inclusion in the National Schedule. This will address issues of regular updates on ear diseases to the first line health personnel, regular drug supply, supply of relevant equipments and instruments.

c) Step up training of ENT specialists and post them to rural health facilities in order to augment ENT services.

d) Revive mobile ENT services to treat the sick as well as screen and refer those requiring specialised services and/or special school placement.

2. Suggested areas for further studies:

a) A national survey on the prevalence of CSOM and other middle ear diseases should be undertaken to determine the burden of middle ear diseases and offer a reference point for intervention programs.

b) A study should be undertaken to determine the impact of CSOM and other chronic middle ear diseases to education outcome. Such a study may offer a reference point for intervention programmes.

c) A study on the efficacy and the active moiety in the traditional herbs used by the local community in the treatment of CSOM to be undertaken.

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APPENDIX I

DISTRIBUTION OF ENT HEALTH WORKERS IN KENYA (ADOPTED FROM: MACHARIA, 2003).

Cadre of healthcare Workers	Number in Public service	Number in Full Time Private Practice
ENT Surgeons	25	10
ENT Clinical officers	58	30
Audiologists	2	2
Diploma in Audiology	3	-
Audiological Technicians	1	-
Audiological Clinical officers	24	-
Speech therapists	4	-

APPENDIX II

LIST OF VARIETY OF CONCOCTIONS USED TO TREAT CSOM.

1. Traditional herbs e.g Uti, Kitulu, muswiiswii, muvou, luta, munzee, kiluma, mukandu
2. Sap from sisal leaves
3. Instil tobacco leave sap, banana soup.
4. Break oil.
5. Aeroplane oil.
6. Beef oil(ghee)
7. Sewing machine oil that is used for lubrication
8. Cooking fat oil
9. Goats' milk
10. Sheep oil/fat
11. Pork fat ("mauta ma ngulue")
12. Drill the ear using chameleon tail ("kutheketha kutu na kisithe kya kimbu")
13. Instil urine from the sick person into the ear.
14. Liquid paraffin
15. Saline water
16. Battery "water" (Distilled water used for batteries) ("Kiwu kya mbetili").
17. Banana soup

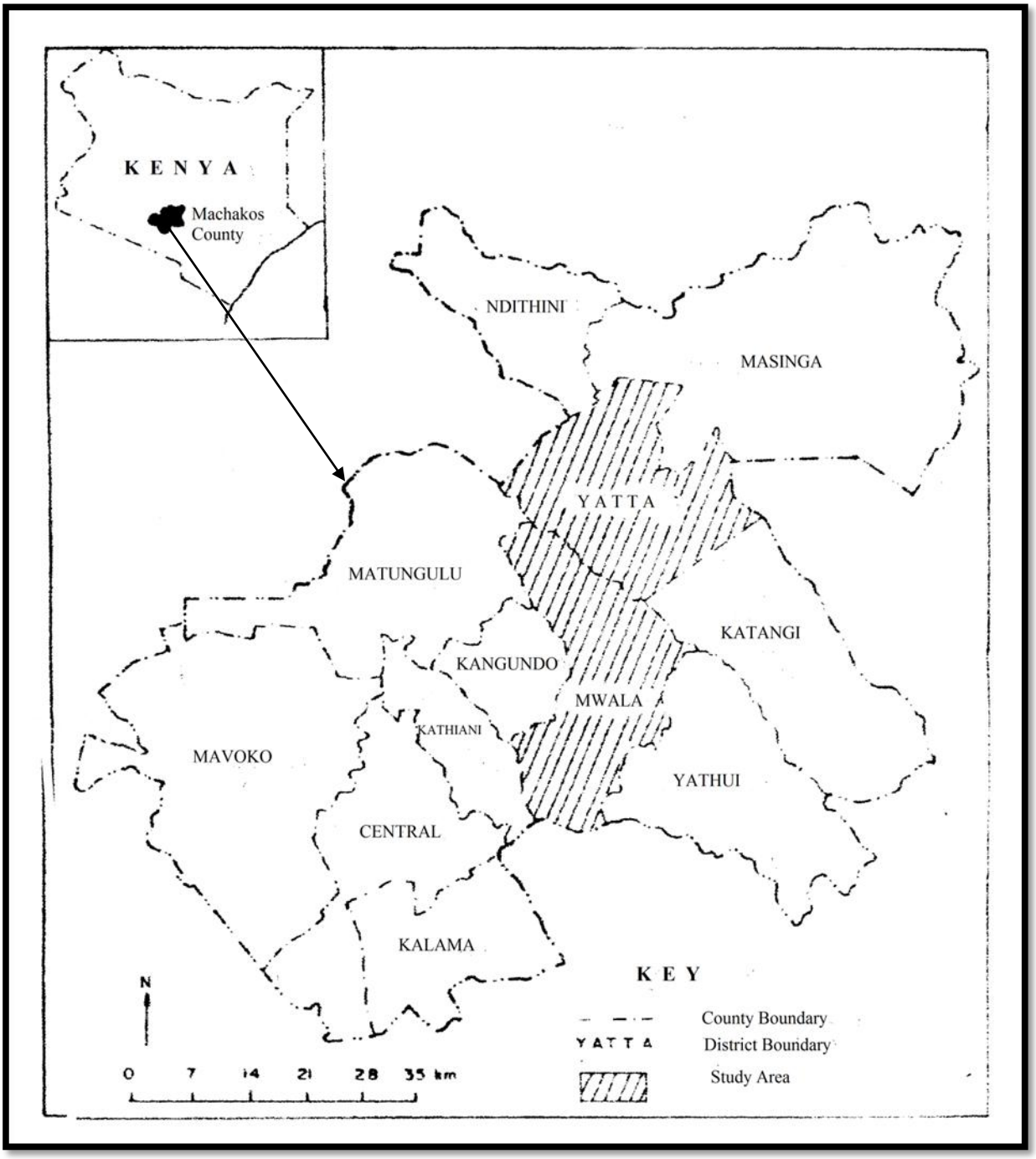
APPENDIX III

FREQUENCY TABLE ON LOCAL (KAMBA) NAME FOR CSOM

Local name	Frequency	Percentage
Nzika	82	20.5%
Uwau wa matu	7	1.8%
Nyungu ya mavia	1	0.3%
Don’t know	299	74.8%
Other	11	2.8%
Total	**400**	**100%**

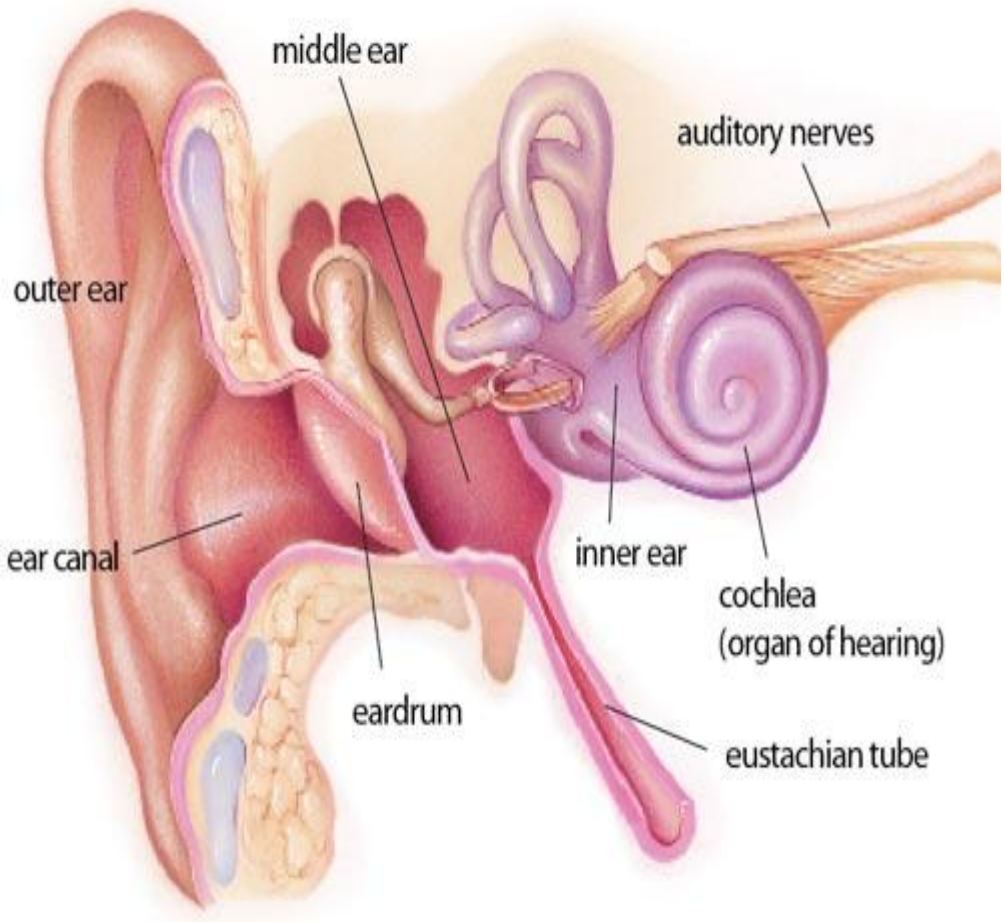
APPENDIX IV

MAP OF MACHAKOS COUNTY SHOWING THE STUDY AREA



APPENDIX V

ANATOMICAL STRUCTURE OF THE HUMAN EAR



APPENDIX VI

QUESTIONNAIRE

INTERVIEW SCHEDULE FOR MOTHERS

The purpose of this questionnaire is to establish the relationship between perception, the health care seeking practices and the preventive measures towards otitis media in young children by mothers.
The information you give will be confidential and will be used for purpose of this study only.

DEMOGRAPHIC INFORMATION

i. Health Unit_____

ii. Division_____ Location_____

Name of respondent_____

iii. Age:_____

iv. Religion: a) Catholic ☐ b) Protestant ☐ c) Muslim ☐

d) African Traditional Church e.g. Akorino ☐ e) Atheist ☐

v. **Level of education:-**

a) Not been to school ☐
b) Primary education ☐
d) Secondary School ☐
d) A- level ☐
e) University ☐

vi. Do you have any professional training? Yes ☐ No ☐ If yes which one?_____

vii. **Marital Status**
a) Single ☐

b) Married ☐

c) Widowed ☐

d) Divorced ☐

e) Separated ☐

viii. Occupation_____

ix. If married, husband's occupation_____

x. Family income: a) Formal Employment ☐ b) Business ☐

c) Farming ☐ ependant ☐

xi. Age of child_____

xii. Sex of child_____

xiii. Diagnosis_____

xiv. Size of the family_____

Background Information

1. How long did you take to reach this Health facility?_____*(in minutes or hours)*
2. What means of transport do you use to reach health facility?

   a) Vehicle ☐ b) Bicycle ☐ c) Footing ☐ d) Ox-cart ☐

   e) Others (specify)_____

3. If you incurred an expense, how much did you spend from home to this health facility? Ksh_____(*Probe for total amount for to and from home).*

Knowledge

4. Name the common ear diseases that affect children in this area.

   List them:-

   _____

   _____

_____

_____

5. Which are the most common? Name three

_____

_____

_____

6. What are the general symptoms of ear disease?

a) Pain ☐
b) Crying or screaming especially at night by child ☐
c) Discharge from ear (s) ☐
d) Deafness ☐
e) Fever ☐
f) Head rolling ☐
g) Putting hand on affected ear. ☐
h) Scratching of ear ☐
i) Swelling in external ear canal ☐
j) Wax blocking external ear canal ☐
k) Others(specify)_____

7. Have you ever or come across a child with CSOM? Yes ☐ No ☐
8. What is the local name for the disease (CSOM)_____
9. Has any of your children suffered from the disease (CSOM) Yes ☐ No ☐
   If yes, at what age?_____
10. In particular, which are the symptoms of CSOM?
    (a) Persistent or recurrent muco purulent ear discharge ☐
    (b) Deafness ☐
    © Foul smelling discharge ☐
    (d) Don't know ☐

(e) Others (Specify)

_____

11. Are ear infections preventable a) Yes ☐ b) No. ☐ c) Don't know ☐

12. If yes, in which ways are they preventable?

a. Immunisation ☐
b. Breastfeeding properly ☐
c. Give good food ☐
d. Proper bathing ☐
e. Effective treatment of associated childhood diseases e.g. measles, common cold et cetera. ☐
f. Consult witch doctor for preventive charms. ☐
g. Instilling preventive herbs ☐
h. Health education to the community. ☐
i. Use covering to prevent insects entering ears. ☐
j. Don't know ☐

Others (Specify):-

- _____

13. Are you aware about efforts or programmes meant to prevent childhood diseases?

Yes ☐ No ☐

If yes, which?

_____ _____ _____

Perception

14. Who in the community is likely to suffer from CSOM?

a) Young children ☐
b) School going children ☐
c) Adolescents ☐
d) Adults ☐
e) The elderly. ☐

15. Among the children, which ones are more likely to suffer from CSOM?

a. Malnourished children ☐
b. Non-immunised children ☐
c. Children of single mothers ☐
d. Don't know ☐
e. Children with low immunity ☐
f. Children from poor background ☐
g. Children with mental retardation. ☐

Others (Specify):-

- _____

16. What do you generally associate CSOM in children with? Mention them?

a. Diseases:- Measles, common cold, et cetera
b. Poorly ventilated house ☐
c. Injury to the ear ☐
d. Water entering the ear ☐
e. Witchcraft ☐
f. Sneezing ☐
g. Oral Thrush etc ☐
h. Don't know ☐
i. Products of conception ☐
j. Dust ☐
k. Cold breeze ☐
l. Tears entering the ears while crying ☐
m. Entry into ear by foreign body (insect etc) ☐

Others:- (Specify)

- _____

17. Do you think CSOM is curable?

a) Yes ☐ b) Rarely (sometimes) ☐ d) No ☐ e) Don't know ☐

18. What happens when CSOM is not treated?

a. Become chronic ear discharge ☐
b. Deafness ☐
c. Deaf and dumb ☐
☐

d. Nothing happens
e. Death ☐
f. Don't know ☐

Others:- (Specify)

- _____

19. How do you feel about the Child Welfare Clinic (CWC)

_____

_____

_____

Healthcare seeking practice

20. When you suspect your child has ear disease or is discharging pus from ear (s), what first aid and /or alternative treatment is given at home before going to health facility.

a. Seek help from traditional healer ☐
b. Instill chicken soup/fat into the ear (s) ☐
c. Instill gun oil into the ear (s) ☐
d. Pray for the child ☐
e. Do nothing ☐

Other actions (Specify):-

- _____

21. What is your child suffering from?_____

22. How often has the child suffered from this condition (CSOM) since birth?

(This question is for the child with CSOM. Indicate the number of times)_____

23. Has she/he ever had ear discharge since birth? *(This question is for the child with any other condition apart from CSOM)*

a) Yes ☐ b) No ☐

24. Where did you take him/her for medication with previous attacks?

_____

25. What did you do with the drugs given?

_____

26. Any other child with similar problem in:

a) family Yes ☐ No ☐ Don't know ☐

If yes, what age? _____

b) Neighborhood/Village Yes ☐ No ☐ Don't know ☐

If yes, what age? _____

27. Have you been taking your child to the child welfare clinic (CWC)?

Yes ☐ No ☐

If No, Why?

_____

_____

_____

Barriers

28. Who decides when/where to take the child with ear disease/discharge for medication?

a) Mother ☐ b) Father ☐ c) Mother in-law ☐ (c) Father in-law ☐

d) Either mother or father. ☐

Others:_

_____

29. In making the decision on where to take your child in No.28 above, what influences your decision?

a. Belief on cause of disease ☐
b. Prompt and efficient service. ☐
c. Availability of ENT specialist ☐
d. Distance to nearest health facility ☐
e. Cost of service ☐
f. History of previous successful treatment ☐
g. Good attitude of health personel ☐
h. Availability of drugs in the health facility ☐

Others:- (specify)

- _____

Prevention

30. Who should be taught about ear disease in the community?

a) Father ☐ b) Mother ☐ c) Older Children ☐ d) Both Mother and Father c) Grand father/Mother

☐ ☐

Reason for the above answer.

_____

_____

_____

31. Where should the information in No. 30 above be disseminated from?

a) School ☐ b) Church ☐ c) Health facility ☐ d) Home ☐

e) Chiefs Baraza ☐ d) Women Group meetings ☐

Others (Specify):

_____

END OF INTERVIEW

APPENDIX VII

FIRST LINE HEALTH PERSONEL QUESTIONNAIRE

(CLINICAL OFFICERS AND NURSES)

Dear Respondent.

My name is Kamuti B. Wambua. I am a MPHE student of Kenyatta University undertaking research.

The purpose of the questionaire is to establish how well prepared the first line health personnel are in the management of chronic suppurative otitis media (CSOM) and bring out the beliefs and health care seeking practices encountered among the community in the catchments area.

- The information you give will be confidential and will only be used for purpose of the study.
- You do not need to write your name anywhere on the questionaire.
- Tick the appropriate answer or fill in the blank spaces provided.
- You are requested to be as honest as possible in giving your answers.

Thank you.

Please turn over for the questionaire.

NAME OF DIVISION_____

NAME OF HEALTH FACILITY / CLINIC_____

Demographic Information

Highest academic qualification attained: Std.7 or 8☐ Form 4 ☐ Form 6 ☐.Year attained _____

Professional qualification: ECN ☐ KRCHN/KRN ☐ RCO ☐ .Year attained_____

Age: _____(in years).

Sex M ☐ F ☐

Other courses attended. List them:

_____

_____

How long have you been in the service (in years) _____

1. What ear diseases do you encounter in your practice? List them: -

   _____

   _____

   _____

   _____

2. Of the above ear conditions, name the two most common in your health facilities.

   _____

   _____

3. Do you encounter cases of CSOM in young children in your health facility?

   Yes ☐ No ☐

   If yes how many per month? _____

4. What kind of children suffers from CSOM?

   Malnourished ☐

   Non-immunised ☐

   Children of single mothers ☐

   Chronically ill with other conditions ☐

   Others: -

   _____

_____

_____

5. What are the predisposing factors associated with CSOM? List them;-

_____

_____

_____

_____

6. At what stage of the disease (Otitis media) do most of the children come to your healthy facility?

- Early acute stage (i.e when in pain, fever, crying or screaming)
- Late acute stage (discharge from ear (s) less than two weeks)
- Chromic stage (discharge from ear (s) more than two weeks).
- Months or years after having instilled traditional medicine without success.

7. Do you refer cases of CSOM? Yes? ☐ No? ☐ If yes which cases do you refer: -

- Early acute stage
- Late acute stage
- Chronic stage (with persistent ear discharge)

Others: -

_____

_____

_____

_____

8. What are the complications/dangers of untreated or inadequately treated CSOM? List them:

_____

_____

_____

9. What is the perception of guardians of young children, and the community in general, about CSOM in terms of:

(a) Cause _____

_____

_____

(b) Who is likely to suffer from the disease and why?

_____

_____

_____

(c) The dangers of untreated or inadequately treated CSOM.

_____

_____

_____

10. What beliefs have you encountered about the cause of CSOM in the community within your catchments area.

_____

_____

_____

_____

11. What are some of the home therapies administred to children with CSOM before coming to your health facility/clinic?

_____

_____

_____

_____

12. In which ways can the occurrence of the CSOM in children be reduced?

_____

_____

_____

_____

13. Which mode of health care does the community prefer in the management of CSOM?

a) Alternative medicine, that is herbs etc ☐

b) Modern medicine, as found in health facility or clinic. ☐

c) Others (specify)

_____

_____

14. What do you consider as the main barrier to the guardians of young in accessing the modern health care in the management of CSOM?

_____

_____

_____

15. Does your drug supply include drugs for the management of CSOM?

Yes ☐ No ☐

If yes, name them:

_____

_____

_____

_____

16. Are you supplied with any medical instruments for the management of ear diseases?

Yes ☐ No ☐

If yes, name them:

_____

_____

_____

_____

17. Do you think you are competent enough to handle cases of CSOM?

Yes ☐ No ☐

If No, which areas of deficiency can you identify?

_____

_____

_____

18. Have you attended an in-service course or seminar on ear diseases?

Yes ☐ No. ☐

If yes, give the topic, year attended and organization sponsoring the cause.

Topic	**Year**	**Sponsor**
_____	_____	_____
_____	_____	_____
_____	_____	_____

What recommendations can you give towards management of Otitis media?

_____

_____

_____

_____

_____

_____

Other comments: -

_____

_____

END OF QUESTIONNAIRE

THANK YOU FOR YOUR COOPERATION

APPENDIX VIII

SCREENING PROTOCOLS FOR CSOM

Requirements

- Examination room
- Natuaral light
- Otoscope
- Turning fork ($512H_2$)
- Disposable hand gloves
- Cotton wool
- Wooden probe

Steps in screening

I Probe for history of: painless purulent discharge from one or both; ear discharge lasting for two weeks or more; Hearing loss from one or both ears.

II Inspection: Finding out purulent discharge from one or both ears.

III Otology: Finding out unilateral or bilateral perforations of the ear drum.

IV Tuning fork test: Demonstration of hearing loss using the tuning fork (Rinne test)

For the purpose of this study, a diagnosis of CSOM was confirmed as from positive findings of: History of painless purulent unilateral or bilateral ear discharge lasting for two weeks or more; unilateral or bilateral ear discharge on inspection of the ears and unilateral or bilateral eardrum perforation on ontological examination.

APPENDIX IX

Research Authorization Document – Application by Self

KAMUTI B.WAMBUA
MPHE STUDENT
157/7521/02
P.O. BOX 3955
THIKA.

06/01/04

DIRECTOR
BOARD OF POSTGRADUATE STUDIES
KENYATTA UNIVERSITY

THRO'
DEAN
SCHOOL OF PURE AND APLIED SCIENCES

THRO'
CHAIRMAN,
DEPARTMENT OF ZOOLOGY

THRO'
SUPERVISOR: (DR E.W. KABIRU)

RE: AUTHORITY TO CARRY OUT RESEARCH

As partial fulfillment for the award of Master of Public Health and Epidemiology of Kenyatta University, I intend to carry out research on:

Disease perception and health care seeking practices by mothers to otitis media in Machakos District.

I am therefore writing to request for an introduction letter to the Ministry of Education Science and Technology, for authorization to carry out my research.

Thank you.

KAMUTI. B. WAMBUA
157/7521/02

APPENDIX X

Research Authorization Document – Kenyatta University

KENYATTA UNIVERSITY
BOARD OF POSTGRADUATE STUDIES
P.O. Box 43844,
NAIROBI
Tel. No. 810901/9 Ext. 57530
E-mail: kubps@yahoo.com

Our Ref: I57/7521/2002 **Date**: 10th March, 2004
Your Ref:

The Permanent Secretary,
Ministry of Education, Science & Technology,
P.O.Box 30040
NAIROBI.

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION:

I write to introduce Mr. Kamuti B. Wambua who is a Postgraduate Student of this University. He is registered for a Masters of Public Health & Epidemiology (M.P.H.E) degree programme in the Department of Zoology.

Mr. Wanbua intends to conduct research for a project entitled, "Disease Perception and Health Care Seeking Practices by Mothers to Otitis Media in Machakos District,'' as a partial fulfillment of the requirement of his degree programme.

Any assistance given to him will be highly appreciated.

Yours faithfully,

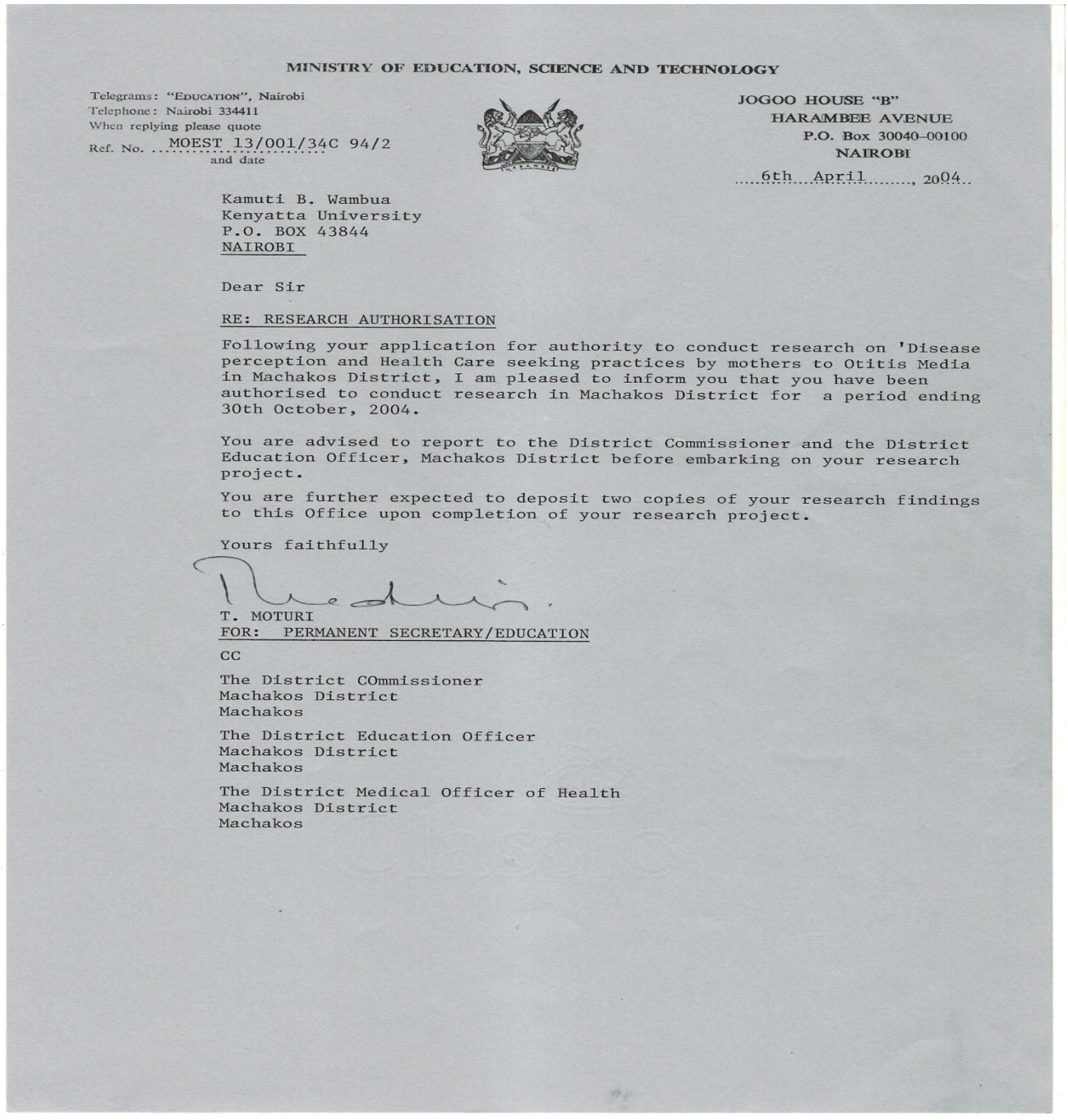
J.O. IFUKHO
FOR DIRECTOR, BOARD OF POSTGRADUATE STUDIES
C.C. Registrar (Academic)
Director, BPS - to see on file
Dean, School of Pure & Applied Sciences.
Chairman, Zoology Dept.

JOI:sa

BOARD OF POSTGRADUATE STUDIES
P. O. Box 43844,
NAIROBI.

APPENDIX XI

Research Authorization Document – Ministry of Eduaction



MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

Telegrams: "EDUCATION", Nairobi
Telephone: Nairobi 334411
When replying please quote
Ref. No. MOEST 13/001/34C 94/2
and date

JOGOO HOUSE "B"
HARAMBEE AVENUE
P.O. Box 30040-00100
NAIROBI

6th April, 2004

Kamuti B. Wambua
Kenyatta University
P.O. BOX 43844
NAIROBI

Dear Sir

RE: RESEARCH AUTHORISATION

Following your application for authority to conduct research on 'Disease perception and Health Care seeking practices by mothers to Otitis Media in Machakos District, I am pleased to inform you that you have been authorised to conduct research in Machakos District for a period ending 30th October, 2004.

You are advised to report to the District Commissioner and the District Education Officer, Machakos District before embarking on your research project.

You are further expected to deposit two copies of your research findings to this Office upon completion of your research project.

Yours faithfully

T. MOTURI
FOR: PERMANENT SECRETARY/EDUCATION

CC

The District COmmissioner
Machakos District
Machakos

The District Education Officer
Machakos District
Machakos

The District Medical Officer of Health
Machakos District
Machakos

APPENDIX XII

Research Authorization Document – Ministry of Health

MINISTRY OF HEALTH

Telephone:- (0145) 20594, 20847,
20234, 21685
Fax:- 0145-20594

OFFICE OF THE
DISTRICT MEDICAL OFFICER OF HEALTH,
P.O. BOX 646,
MACHAKOS.

Ref.No. C.4 Vol.II/39

May 11, 2004.

Registered Clinical Officer i/c
Matuu Sub-District Hospital
- Mwala Health Centre

RE : KAMUTI .B. WAMBUA

The above named is doing a research on Disease Perception and Health Care seeking practices by mothers to Otitis Media in Machakos.

This entails collection of data / information from our facilities.
Please accord him all necessary assistance.

MEDICAL OFFICER OF HEALTH
MACHAKOS DISTRICT
P. O. Box 646, MACHAKOS.

Dr. Waqo D.E
District Medical Officer of health
MACHAKOS.

When replying please quote reference number

APPENDIX XIII

Research Authorization Document – Provincial Administration

OFFICE OF THE PRESIDENT

Telegrams: "DISTRICTER", Machakos
Telephone: Machakos 21009 or 21983
When replying please quote
Ref. No. ADM.15/31/VOL.IV/40
and date

DISTRICT COMMISSIONER
P.O. Box 1-90100
MACHAKOS
11th May, 20 04

The District Officer,
YATTA DIVISION

The District Officer,
MWALA DIVISION

RE : RESEARCH AUTHORISATION

MR. KAMUTI B. WAMBUA

The above named person, who is a university student has been authorised to conduct a research entitled "Disease Perception and Health Care seeking practices by mothers to Otitis Media" in your Divisions. The research exercise will go on until 30th October, 2004.

I therefore request that you extend any assistance that he may need from your Office to make the exercise a success.

(F. C. KOMEN)
FOR : DISTRICT COMMISSIONERR
MACHAKOS