KNOWLEDGE, ATTITUDES AND PRACTICES OF MOTHERS IN RELATION TO CHILDHOOD PNEUMONIA AND FACTORS ASSOCIATED WITH PNEUMONIA AND SEEKING HEALTH CARE IN KAPSABET DISTRICT HOSPITAL IN NANDI COUNTY, KENYA

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Knowledge, Attitudes and Practices of Mothers in relation to Childhood Pneumonia and factors associated with Pneumonia and Seeking Health Care in Kapsabet District Hospital in Nandi County, Kenya

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DECLARATION

This thesis is my original work and has not been presented for any degree in any other University.

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DEDICATION

I dedicate this thesis to my family for their unconditional love and endless support. A special dedication goes to the love of my life Sharon for holistic support, motivation and encouragement throughout this study.

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ABBREVIATIONS AND ACRONYMS

ALRI	Acute Lower Respiratory Infection
ARI	Acute Respiratory Infection
CAP	Community Acquired Pneumonia
CBS	Central Bureau of Statistics
DHS	Demographic and Health Surveys
FDGs	Focus Group Discussions
GAPP	Global Action Plan for Prevention and Control of pneumonia
GAVI	Global Alliance for Vaccines and Immunizations
H. influenza	*Haemophilus influenza*
HAART	Highly Active Antiretroviral Therapy
IMCI	Integrated Management of Childhood Illness
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KAP	Knowledge, Attitudes and Practices
KDHS	Kenya Demographic Health Survey
KEMRI	Kenya Medical Research Institute
KII	Key Informants Interviews
KNBS	Kenya National Bureau of Statistics
MCH	Maternal Child Health
MDGs	Millennium Development Goals
MOH	Ministry of Health
PI	Principal Investigator
PID	Personal identifiers
S. pneumonia	*Streptococcus pneumoniae*
SPSS	Statistical Package for Social Sciences
TMP-SMX	Trimethoprim-Sulfamethoxazole
UNICEF	United Nations Children's Fund

USAID   United States Agency for International Development

WHO   World Health Organization

ABSTRACT

Pneumonia is one of the most common childhood killers in developing countries. In efforts to meet the Millennium Development Goal of reducing child mortality, there is need to prioritize pneumonia prevention and appropriate management of cases. The main objective of this study was to evaluate knowledge, attitudes and practices of mothers in relation to childhood pneumonia at Kapsabet District Hospital in Nandi County, Kenya. A hospital-based cross-sectional study was conducted among mothers attending the Maternal Child Health Clinic from August 2012 through to November 2012. A total of 422 mothers were recruited and structured questionnaires administered. Using SPSS, descriptive statistics were used to summarize mothers' demographic data, recognition and response to childhood pneumonia. Binary Logistic regression was used to identify factors that predicted mothers' knowledge of pneumonia and health care seeking behaviour. Additional data was obtained through focus group discussions and key informants interviews which were subjected to qualitative analysis. Majority of mothers (93.1%) knew what pneumonia is. However, (67.1%) perceived childhood pneumonia as highly dangerous. Mothers who previously had a child suffering from pneumonia, mothers' level of education and the total number of children showed significant associations with knowledge of pneumonia. Mothers who previously had a child suffering from pneumonia were approximately 6 times more likely to have knowledge of pneumonia than those who did not (Adjusted Odds Ratio (AOR) 6.3 [95% CI 1.4-27.9]). Subsequently, mothers with more than three children were more likely to have knowledge of pneumonia compared to mothers with three or less children (AOR 13.0 [95% CI 2.7-62.9]) and also those with higher levels of education compared to those with reduced levels of education (AOR 14.3 [95% CI 1.3-161.3]). A majority (75.8%) picked chest pain from a list of possible signs and symptoms and (82.4%) indicated they would visit the nearest health facility or a doctor if they thought their child was suffering from pneumonia. However, a substantial proportion (49.5%) would

not seek treatment/advise immediately or within 24 hours. Mothers' level of education, mothers who previously had a child suffering from pneumonia and the perceptions towards childhood pneumonia showed significant associations with healthcare seeking behaviour. Mothers with higher levels of education were more likely to seek immediate medical help compared to those with reduced levels of education (AOR 20.5 [95% CI 2.4-173.5]). Mothers who previously had a child suffering from pneumonia (AOR 34.7 [95% CI 14.1-85.2]) and those who perceived pneumonia as highly dangerous (AOR 10.4 [95% CI 2.2-48.5]) were also more likely to seek immediate healthcare. The majority (96.7%) believed pneumonia is caused by weather change and (93.4%) would clothe warmly during cold season to prevent pneumonia. There was no known home treatment for pneumonia in this community and the majority (77.3%) would feed a sick child with fluids at home prior to hospital attendance. This study showed most mothers knew what pneumonia is and would mention at least one feature of pneumonia. Delayed seeking of healthcare may hinder effective management of pneumonia and inappropriate home management practices are likely to interfere with treatment. This study highlighted the need for continued health education on childhood pneumonia at the community level.

CHAPTER ONE

INTRODUCTION

1.0 Background Information

Pneumonia is an inflammatory condition of the lung affecting primarily the microscopic air sacs known as alveoli (McLuckie, 2009; Leach *et al,* 2009) It is usually caused by infection with viruses or bacteria and less commonly other microorganisms, certain drugs and other conditions such as autoimmune diseases (McLuckie, 2009; Jeffrey *et al,* 2010). Typical signs and symptoms include a cough, chest pain, fever, and difficulty breathing (Ashby *et al,* 2007). Diagnostic tools include x-rays and culture of the sputum. Vaccines to prevent certain types of pneumonia are available. Treatment depends on the underlying cause. Pneumonia presumed to be bacterial is treated with antibiotics. If the pneumonia is severe, the affected person is generally hospitalized.

Pneumonia remains the leading cause of death in children under 5 years in low and middle income countries despite the introduction of case management guidelines and the development of new preventative strategies including effective vaccines. It currently accounts for 18% of annual deaths in children under five worldwide, 20% in low income countries compared to only 4.3% in high income countries (Black *et al.,* 2008). In children, many of these deaths occur in the newborn period. The World Health Organization estimates that one in three newborn infant deaths is due to pneumonia (Garenne *et al.,* 1992). Over two million children under five die each year worldwide and it is estimated that up to 1 million of these (vaccine preventable) deaths are caused by the bacteria *Streptococcus pneumoniae*, and over 90% of these deaths take place in developing countries (WHO, 1999). After the neonatal period, the main causes of death in sub-Saharan African are pneumonia and malaria, both manifesting as acute febrile illness (Hildenwall *et al.,* 2007).

Severe pneumonia requiring hospitalization makes up a significant proportion of these pneumonia episodes, accounting for 7-13% of cases (Rudan *et al.,* 2008). Childhood pneumonia is caused by a combination of host and environmental factors. In low and middle income countries pneumonia is frequently caused by bacterial pathogens, in contrast to high income countries where viral pathogens predominate (Gray & Zar, 2010). Pneumococcal disease is the most common cause of vaccine preventable deaths (O'Brien *et al.,* 2009).

Mortality from pneumonia generally decreases with age until late adulthood with increased mortality in the elderly. More cases of pneumonia occur during the winter months than during other times of the year. Individuals with underlying illnesses such as Alzheimer's disease, cystic fibrosis, emphysema, tobacco smoking, alcoholism, or immune system problems are at increased risk for pneumonia (Almirall *et al.,* 1999). These individuals are also more likely to have repeated episodes of pneumonia. People who are hospitalized for any reason are also at high risk for pneumonia. Pneumonia is common in malnourished children and frequently associated with fatal outcome (Bryce *et al.,* 2005; Rice *et al.,* 2000; Loeb & High, 2005; Nannan *et al.,* 2007). Of children with malnutrition requiring hospital admission, up to two-thirds are diagnosed with pneumonia (Shimeles & Lulseged, 1994; Ahmed, 1999).

Typically, oral antibiotics, rest, fluids, and home care are sufficient for complete resolution. Caregivers' home management is appropriate and is in conformity with family and community practices that promote child survival and development stipulated by household and community component of IMCI (UNICEF, 1999). Children with pneumonia should be encouraged to feed orally unless there are indications for nasogastric feeding/intravenous fluid infusions. If children are too distressed to take fluid and feeds orally, continuous enteral feeds via a nasogastric tube may be provided (Ashraf *et al.,* 2010). People who are having trouble breathing, with other medical

problems, and the elderly may need greater care. If the symptoms get worse, the pneumonia does not improve with home treatment, or complications occur, then hospitalization may be recommended. However, over the counter cough medicine has not been found to be helpful in pneumonia (Chang *et al.,* 2007).

According to IMCI guidelines, mothers are advised to replace animal milk with increased breast-feeding or a fermented product such as yoghurt, or to replace half of the milk with a nutrient-rich semisolid complementary food (Gove, 1997). Exclusive and early breastfeeding in the first 6 months of an infant's life has a significant protective effect against pneumonia and other diseases (Chisti *et al.,* 2011). However, only 35% practice exclusive breastfeeding for six months (Bhutta *et al.,* 2010).

Substantial gains have been made in improving the overall burden of childhood pneumonia. However, it is apparent that efforts must be focused on the available pneumonia interventions if the 90% immunisation target set by Global Action Plan for Prevention and Control of Pneumonia (GAPP) is to be met (Otczyk *et al.,* 2013). Prioritizing the prevention and appropriate management of childhood pneumonia is essential to meet the Millennium Development Goal 4 of decreasing under 5 child mortality by two thirds from 1995 by 2015. Recognizing the significant impact that vaccines might have on morbidity and mortality caused by pneumonia, the World Health Organization (WHO) recommended in November 2006 and March 2007 that Hib and pneumococcal conjugate vaccines, respectively, be routinely used in the immunization schedules of all countries (WHO, 2007; WHO, 2006). In response to this the WHO and UNICEF have developed the Global Action Plan for Prevention and Control of Pneumonia (GAPP) to highlight pneumonia as a major cause of death in children and to assist in scaling up of interventions with proven benefit (WHO, 2009). As infants are not fully immunized until 6 months of age, community case management strategies such as the 'Integrated Management of Childhood Illness' (IMCI) have the potential to

significantly reduce mortality from pneumonia (Theodoratou *et al.,* 2010). Pneumococcal vaccine initiative was launched in Kenya where it received the pneumococcal vaccines through a partnership with GAVI. The free vaccine is administered to all children under twelve months of age; protecting thousands of children across the country (UNICEF, 2011).

Understanding how locally recognized signs and symptoms relate to the clinical definition of pneumonia is important in constructing messages that families can understand and which they are likely to adhere to (Irimu *et al.,* 2008). Mothers' practices, knowledge of pneumonia, their perceptions of its causes, their ability to recognize the signs of pneumonia, and their behaviour if they were to have a child with the signs helps to build a better understanding of mothers' reaction to child pneumonia (Muhe, 1996). Community health education is required to empower the caretaker with an understanding to appreciate and recognize signs and symptoms of pneumonia as well as understand the appropriate supportive care. This will enable the caretaker to perceive pneumonia disease for what it should be, and improve adherence to health care messages (Irimu *et al.,* 2008). Mothers should be encouraged to seek medical help when a child has any of the signs of pneumonia, and particularly in the winter months when the problems are more acute (Galvez *et al.,* 2002). However, financial constraints and perception that an illness is not serious have been described to be main reasons given for failure to seek health care outside home (Metlay *et al.,* 1997). Effective Acute Respiratory Infection (ARI) health education needs to be based on understanding the prevailing knowledge, beliefs, and practices of the mothers which are appropriate for successful management of pneumonia (UNICEF, 1999).

With increased global interdependence there is need to develop country preparedness plans that take into consideration overall immunization plans, building capacity within countries to ensure appropriate and timely response to disease outbreaks that may

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involve among other steps vaccination, which is key to reducing mortality and associated morbidity (GAVI, 2008). Concurrent with the release of the GAPP and in support of its vision, a diverse group of advocacy, academic and service organizations joined forces in 2009 to form the Global Coalition against Child Pneumonia. Working together, the Coalition launched the first-ever World Pneumonia Day on November 2, 2009 (now observed annually on November 12) to raise awareness about the disease, promote interventions to protect against, prevent and treat pneumonia as called for in the GAPP, and generate action to combat the world's leading killer of young children (International Vaccine Access Centre, 2012).

1.1   Problem Statement

Pneumonia remains the leading infectious cause of death among children under-five, killing nearly 2,600 children a day. Pneumonia accounts for 15 per cent of all under-five deaths and killed about 940,000 children in 2013 (UNICEF, 2015). It kills more children than any other illness (accounting for 19% of all under-five deaths), more than AIDS, malaria and measles combined which accounts for 8%, 4% and 3% of all under-five deaths respectively (UNICEF, 2006). Each year, more than 2 million children under five die of pneumonia in the developing world, compared to an estimated 800,000 children who die from malaria and around 300,000 children under five who die from AIDS, yet little attention is paid to this disease (UNICEF, 2006). Childhood pneumonia is a major public health issue for Kenya. In 2008, pneumonia was the second leading cause of death among under fives, claiming over 30,000 childrens' lives, equivalent to 16 % of child mortality in Kenya (Black *et al.,* 2010). Medical records further show that pneumonia is among the top three causes of hospital admissions and among the top five causes of infant and under five mortality in Kenya (CBS, 2004). There is no documented study on knowledge, attitudes and practices of mothers in relation to childhood pneumonia that has been carried out at Kapsabet District Hospital in Nandi County, yet this information is critical in effective health care delivery. So far, declines in child

mortality are far too slow to achieve the fourth Millennium Development Goal (MDG) to reduce under five mortality by two thirds between 1990 and 2015 in most countries (Murray *et al.,* 2007). Inappropriate and harmful health practices such as over the counter medication are detrimental by drawing mothers into a false sense of security and delay of appropriate health seeking with timely management. Poor nutritional practices and cultural practices by mothers due to their literacy level may also be fatal (Muhe, 1996). The findings of this study are intended to provide information on how mothers perceive and respond to pneumonia as well as the main factors that affect care-seeking for children with signs of pneumonia. The information will enable health authorities develop health education programmes aimed at persuading mothers to seek medical help for children with pneumonia in order to reduce mortality.

1.2   Justification of the Study

The study on knowledge, attitudes and practices of mothers in relation to childhood pneumonia and factors associated with pneumonia and seeking health is critical in effective health care delivery. Since mothers are usually the primary care providers for their children, their ability to recognize symptoms of pneumonia early determine the success of controlling childhood mortality by initiating early management. There is need to ensure all mothers know the danger signs of pneumonia in children, for instance, cough and fast or difficult breathing. Given the mothers' essential role in home-based treatment, education programmes need to ensure that they seek appropriate medical care immediately for children with signs of pneumonia, broadly understand the importance of the disease and its treatment regimen and are convinced of treatment efficacy (UNICEF, 2006). The findings of this study are useful in providing background information for planning strategic interventions that will help address pneumonia morbidity in the study area and in efforts to meet the Millennium Development Goal of reducing child mortality.

1.3 Objectives

1.3.1 General Objective

To evaluate knowledge, attitudes and practices of mothers in relation to childhood pneumonia and factors associated with pneumonia and seeking health care in Kapsabet District Hospital in Nandi County

1.3.2 Specific Objectives

1.3.2.1 To evaluate mothers' knowledge of pneumonia and factors associated with childhood pneumonia

1.3.2.2 To evaluate mothers' attitudes, recognition of childhood pneumonia and explore the local illness concepts involving pneumonia typical signs

1.3.2.3 To determine mothers health care seeking behaviour and identify factors associated with care seeking

1.3.2.4 To determine mothers' home management practices of childhood pneumonia prior to hospital attendance

CHAPTER TWO

LITERATURE REVIEW

2.0 Burden of Pneumonia

Pneumonia is the single largest infectious cause of death in children worldwide. Pneumonia is a common illness affecting approximately 450 million people a year and occurring in all parts of the world. Pneumonia killed an estimated 935 000 children under the age of five in 2013, accounting for 15% of all deaths of children under five years old (Ruuskanen *et al.,* 2011). In 2008, pneumonia occurred in approximately 156 million children (151 million in the developing world and 5 million in the developed world) (Ruuskanen *et al.,* 2011). Annual child deaths from pneumonia decreased by 44 per cent from 2000 to 2013, from 1.7 million to 940,000 million, but many more lives could be saved (UNICEF, 2015). Pneumonia accounts for one fifth of all childhood deaths worldwide, with approximately 2 million children dying each year (Bryce *et al.,* 2005) and is a major contributing factor to infant mortality (WHO, 2009). It is a public health problem in children aged less than 5 years in developing countries, with 150 million new clinical cases occurring each year, between 11-20 million (7-13%) of the children require hospitalization and two million die (Rudan *et al.,* 2004). After the neonatal period, the main causes of death in sub-Saharan African are pneumonia and malaria, both manifesting as acute febrile illness (Hildenwall *et al.,* 2007).

Estimates from the United Nations Children's Fund (UNICEF) show that pneumonia continues to be the number one killer of children around the world - causing 18% of all child mortality, an estimated 1.3 million child deaths in 2011 alone (UNICEF, 2012). In Kenya, pneumonia is the second highest killer of children below five years after malaria; one in every five deaths is attributed to pneumonia, a situation that can be averted through increasing immunizations (KNBS, 2010). In 2008, pneumonia was the second

leading cause of death among under fives, claiming over 30,000 childrens' lives, equivalent to 16 % of child mortality in Kenya (Black *et al.,* 2010). Declines in child mortality are far too slow to reach the fourth Millennium Development Goal to reduce under five mortality by two thirds between 1990 and 2015 (Murray *et al.,* 2007).

Pneumonia death reduction in children under 5 years of age has also been shown to be possible by improving recognition of the signs by parents, earlier presentation of children with these signs to health care facilities or to trained community health workers, availability of antimicrobial agents at the primary health care level, and rational decisions by health care workers about the use of these agents (Ryan *et al.,* 1996). In fact, a major decrease in pneumonia and malaria morbidity and mortality occurs when living conditions improve (Mulholland, 2007). All children should be protected against pneumonia through promoting a healthy environment and access to effective preventive and treatment measures (Gray & Zar, 2010). Strategies for reducing childhood pneumonia include: Nutrition and micronutrient supplementation (Exclusive breastfeeding for 6 months in HIV-uninfected mothers, adequate nutrition,Vitamin A and Zinc supplementation), Environmental factors (Avoidance of indoor air pollution and handwashing), Immunisation (Measles, *Haemophilus influenzae* type B, Pneumococcal and Pertussis), Antibiotic prophylaxis, Prevention of HIV infection in children and HAART in HIV-infected children early (Gray & Zar, 2010).

2.1 Acute Respiratory Infection and Fever

ARI represent an important cause of morbidity and mortality in developing countries. Together with malnutrition and diarrhoeal diseases, ARI ranks among the top three diseases in terms of morbidity and mortality worldwide. An early recognition of pneumonia by mothers is important to initiate an early management and prevent mortality (Kapoor *et al.,* 1990). The Kenya Government adopted the Integrated Management of Childhood Illness (IMCI) strategy in 1998. The strategy's core

interventions are integrated management of the five most important causes of death among children under five, namely: acute respiratory infection (ARI), diarrhoea, measles, malaria, and malnutrition and anaemia. One of the IMCI approaches to combating ARI is to treat cases of ARI early before complications develop. Early diagnosis and treatment with antibiotics can prevent a large proportion of deaths due to pneumonia. Emphasis is therefore placed on early recognition of signs of impending severity, both by mothers and primary health care workers so that help can be sought (CBS, 2004). Most of the infections are treated by home remedies in the villages. The restriction on feeding the child can complicate the course of illness (Kapoor *et al.,* 1990).

2.2   Knowledge, Practices and Care-seeking Behavior

According to USAID-supported Demographic and Health Surveys on care-seeking behaviour for suspected pneumonia, 49% of under-fives with pneumonia in Kenya were taken to an appropriate health care provider (UNICEF, 2006). Care-seeking actions for a sick child depend, among other factors, on the family's, and foremost the mother's, interpretation of symptoms, labelling of disease in local terms, and the locally preferred treatment actions (Feyisetan *et al.,* 1997, Nichter & Nichter, 1994). Subsequently, care seeking patterns are strongly related to socio-economic status with wealthier households being more likely to seek care or advice outside the home, compared to members of poorer homes (Filmer, 2005). In fact, many sick children do not reach health-care facilities, and children from poorer families are even less likely to obtain care. In Bangladesh, for example, only 8 percent of sick children are first taken to appropriate health facilities (WHO, 2002). Like in Peruvian study, the importance of care seeking and early recognition of childhood pneumonia by the caregivers must be strongly emphasized (Gálvez *et al.,* 2002). Mothers' knowledge of pneumonia, their perceptions of its causes, their ability to recognize the signs of pneumonia, and their behaviour if

they were to have a child with the signs helps to build a better understanding of mothers' reaction to child pneumonia (Gálvez *et al.,* 2002).

A community based study in Baringo District, Kenya, recommended that health education to mothers enhances knowledge of early signs of ALRI such as increased respiratory rate, encourage early appropriate health seeking behaviour and discourage inappropriate health practices such as over the counter medication (Simiyu *et al.,* 2003). The World Health Organization focused ethnographic studies suggest that in most cultures people distinguish between mild and severe ARIs (Gove & Pelto, 1994). For instance, a study conducted in suburbs of Nairobi, Kenya, showed that pneumonia was perceived by the community to be the most serious childhood illness. Chest in-drawing, fever, difficulty in breathing, startling at night and convulsions were perceived as features of pneumonia and that caretakers perceived severe pneumonia as outlined in the IMCI guidelines. Only non-severe pneumonia was not perceived for what it should be. Consecutively, inappropriate knowledge on causes of pneumonia and signs of non severe pneumonia has been found to interfere with compliance with home care messages (Irimu *et al.,* 2008).

2.3   Causes of Pneumonia

Pneumonia can be caused by infection from virus, bacteria, fungi or parasites as well as chemical injury to the lungs (chemical pneumonia). In children under the age of five, the most commonly described pathogens are respiratory syncytical (RS) virus, adenovirus, Haemophilus influenza and *Streptococcus pneumoniae*. A virus infection in the respiratory tract may predispose to secondary bacterial infections in the lungs (Jakab, 1977). A significant proportion of serious childhood invasive disease and pneumonia morbidity and mortality are attributed to the pathogens *Streptococcus pneumonia* (O'Brien *et al.,* 2009) and *Haemophilus influenza type b* (Hib) (Watt *et al.,* 2009). It is estimated that viruses cause 11-36% of lower respiratory tract infections in low income

countries (Weber *et al.,* 1998) while *S. pneumoniae* have been identified in 30-50% of pneumonia cases, and *H. influenza* in 10-30% of cases (Rudan *et al.,* 2008).

2.4   Integrated Management of Childhood Illnesses

The World Health Organization (WHO) and UNICEF initiated a strategy for integrated management of childhood illnesses (IMCI) such as pneumonia at the health facility and community level (WHO, 2006). The community component of IMCI consists of education messages and programs in support of key family practices focused on health promotion, development as well early care seeking and compliance with health workers advice. Effective management of pneumonia entails active participation by the caretaker seeking appropriate health care and adequate adherence to home care messages. Adequate participation is only possible if the caretakers' perception of pneumonia is appropriate (WHO, 2006).

In low and middle income countries, weak health systems are impeding the implementation of major global initiatives for health (Travis *et al.,* 2004). In the absence of appropriate diagnostic tools, management of childhood illnesses is presumptive and symptom based under WHO and UNICEF's Integrated Management of Childhood Illness (IMCI). In these guidelines, fever alone defines malaria while cough and/or difficulty breathing with an increased respiratory rate are classified as pneumonia (WHO, 2009).

2.5   Treatment of Pneumonia

WHO guidelines provide strategy to promote classification of a child presenting with cough or difficulty breathing as either no-pneumonia or three grades of severity: non severe pneumonia, severe pneumonia and very severe pneumonia (WHO, 2000). This classification is intended to guide decisions on referral, antibiotic therapy, need for oxygen and intensity of monitoring, thus offering a system of prioritizing and

rationalizing resource use through agreed, national policies (WHO, 2000). Case management efficacy is dependent on timely access to health facilities, on health worker ability to recognise and treat pneumonia or severe pneumonia and on availability of appropriate antibiotics and functioning referral pathways (Gray & Zar, 2010). Overlap between these symptoms is common and children with overlapping symptoms need to be treated with both antimalarials and antibiotics (Kallander *et al.,* 2004). Nevertheless, much public commitments have been made for improved management of malaria forgetting pneumonia-the forgotten killer of children (UNICEF, 2006). Health workers in Kenya use a variety of antibiotics in the treatment of outpatient pneumonia including cephalosporins and macrolides that are strongly promoted by the pharmaceutical industry as better or 'stronger' antibiotics (playing on concerns of widespread resistance to older antibiotics) (English *et al.,* 2004). For children admitted to the hospital a distinction between severe and very severe pneumonia is rarely made with the majority of children receiving therapy recommended for very severe cases (English *et al.,* 2004).

2.5.1 Non-Severe Pneumonia

For children with non-severe pneumonia, the WHO recommends treating the child as an outpatient using oral trimethoprim-sulfamethoxazole (TMP-SMX) or, as second line, oral amoxicillin for 5 days (WHO, 2000). However, a recent IMCI technical update recommends administering oral antibiotics for 3 days in children in non-HIV endemic areas (WHO, 2005).

2.5.2 Severe Pneumonia

In the treatment of severe pneumonia in hospitalized children the policy option adopted by many low-income countries is for initial parenteral treatment with benzylpenicillin before changing to oral amoxicillin when the child improves (WHO, 2000).

2.5.3   Very Severe Pneumonia

Chloramphenicol is recommended for the treatment of children with very severe pneumonia in low income settings with benzylpenicillin and gentamicin given in combination as an alternative (WHO, 2000).

2.6   Prevention and Control

Pneumonia is one of the most solvable problems in global health, and must remain a priority if we are to successfully combat the world's leading killer of young children (IVAC, 2011). The control of pneumonia requires a combination of preventive combined with rapid and appropriate case management (WHO *et al.,* 2007). Several environmental and socio-economic preventable factors have been identified. Micronutrients like vitamin A may decrease the incidence of measles-associated pneumonia (Hussey and Klein, 1990) and the value of zinc in pneumonia treatment are being discussed (Natchu *et al.,* 2008).

Vaccines have the potential to reduce the incidence of pneumonia. The first conjugate *Haemophilus influenza type b* (Hib) vaccine was licensed in the United States in the early 1980's (Lees *et al.,* 2008). The conjugate vaccine prevents immunized children from asymptomatic pharyngeal carriage for which a considerable herd effect has been seen (Adegbola *et al.,* 1998). Sadly, the routine use of pneumococcal vaccine in most low income countries may be hampered by the high prices in the short to medium term (Peny *et al.,* 2005). However, the Global Alliance for Vaccines and Immunizations (GAVI) is working to alleviate costs of new vaccines in low income countries (GAVI, 2008).

2.7   The Use of Drugs

Irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half

of all patients fail to take them correctly (WHO, 2006). Like other developing countries, over the counter drugs in Kenya are often used without prescription. They may be purchased from local shops, markets, or street vendors, obtained by sharing with other users, or used when left over from previous treatments (McCombie, 1996). Most patients reporting at clinics and hospital facilities would have gone through home based treatment or community drug shops/ pharmacies initially. Thus mainly resistant, severe, or recurrent episodes are seen at clinics and hospitals (Deming *et al.,* 1989).

In a review of studies of the treatment of childhood febrile illness in Africa, a half of patients (a median 50%) consulted the retail sector for treatment (Brieger *et al.,* 2005). Poorly trained providers may prescribe wrong drugs or fail to offer the appropriate strength and dose of drug (Nshakira *et al.,* 2002). As unofficial drug shops are responsible for provision of uncontrolled use of antimalarials and antibiotics, they may still be a suitable target for interventions to improve treatment (Goodman *et al.,* 2004). Appropriate use of drugs is crucial to achieve adequate treatment, while simultaneously limiting the development of drug resistance, and to avoid wastage of scarce resources and potential health hazards (Hildenwall *et al.,* 2009).

2.8   The Risk Factors for Pneumonia

The exposure to indoor air pollution is a proven risk for pneumonia among children that merits attention in interventions aiming at reducing risks for pneumonia (Dherani *et al.,* 2008). Crowding also increases the risk of pneumonia (Cardoso *et al.,* 2004). Malnutrition (Caulfield *et al.,* 2004), lack of breastfeeding and low coverage of measles vaccination (Perry & Halsey, 2004) can all contribute to a higher risk of developing pneumonia. The inhalation of cold air causes cooling of the nasal epithelium. This reduction in nasal temperature (sudden changes of temperature) is sufficient to inhibit respiratory defences against infection, such as mucociliary clearance and the phagocytic activity of leukocytes (Eccles, 2002). Persons with underlying chronic diseases, patients

with treated diabetes, heart disease, and non active pulmonary tuberculosis (Camus *et al.,* 2004; Decramer *et al.,* 2005) are also vulnerable to pneumonia. Oral cavity may influence the initiation and/or progression of respiratory infections (Quagliarello *et al.,* 2005). Individuals with dental caries and periodontal disease are also at high risk of contracting pneumonia through aspiration of contaminated saliva (Eccles, 2002). Finally, hand washing with soap has been found to reduce the risk of acute respiratory infections and diarrhoea (Luby & Halder, 2008), where widespread implementation of hand washing when used together with improved water and sanitation has been estimated to reduce child deaths by 3% (Jones *et al.,* 2003).

CHAPTER THREE

METHODOLOGY

3.0 Study Design

A hospital based cross sectional study primarily utilizing quantitative data collection approach was used. Additional qualitative data was also obtained through focus group discussions and key informant interviews.

3.1   Study Site

The study was conducted from August 2012 through to November 2012 at Kapsabet District Hospital in Nandi County. The hospital is the largest in the area and located in Kapsabet town, the Nandi County headquarters. Nandi county is located in the North Rift Valley of Kenya and covers an area of 2,884.2 km^2 with a population density of 261 persons per Km^2 (Appendix II). Based on National Population Census, it has a population of 752,965 (male–50%, female–50%) with an Annual Growth Rate of 2.9 % (KNPC, 2009). The fertility rate is 4.7%, under five mortality rates 111/1000 and infant mortality rates 66/1000. The poverty level in the county is at 47.4% (KIHBS, 2009). The main economic activities are; maize, tea, coffee, sugar cane and dairy farming. Although there are number of different ethnic communities in Nandi, the majority of the people belong to the ethnic group, Nandi.

3.2   Study Population

The study participants were mothers of reproductive age (15-49 years) with children under the age of 5 years attending Maternal Child Health Clinic.

3.2.1 Inclusion Criteria

➢ Mothers aged 15 to 49 years with children under five years of age.

➢ Mothers who have given birth at least once while in the study area.

➢ Mothers who gave informed written consent to participate in the study.

3.2.2 Exclusion Criteria

➢ Mothers below 15 years and above 49 years and those with children above five years of age.

➢ Mothers in their first pregnancy or those who have not given birth while in the study area.

➢ Mothers who declined to give informed written consent to participate in the study.

3.3 Sampling of Study Population

3.3.1 Sample Size Determination

Using the Fisher's statistical formula (Fisher *et al.,* 1998) the minimum sample size was determined.

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

Where; N = the sample size required, Z = Confidence level at 95% (standard value of 1.96),

P= Estimated proportion at 49%, Q= [100-P], d=Level of precision at 5%

Thus; $N = \dfrac{1.96^2 \ (0.49) \ (1\text{-}0.49)}{0.05^2} = 384$

A 10 % increase in sample size was included to give room for attrition (non-response) bringing it to 422.

3.3.2 Sampling Procedure

Systematic sampling of mothers attending MCH clinic who met the inclusion criteria was used. Every third mother was recruited after randomly selecting the first respondent.

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In case the recruited mother did not consent the next mother was included. Sampling was done on alternative visiting days until the required sample size was attained. Focus group discussion participants were purposively sampled from a different but homogenous group of mothers besides those who responded to the questionnaires and key informant interviews conducted amongst the selected health workers from relevant departments in the health facility.

3.4 Data Collection Method

Primary data was obtained using a structured questionnaire administered in English or Swahili for those who did not understand English language (Appendix IV). The questionnaire was pre-tested in a health facility outside the study area in order to establish its validity and reliability. Respondent mothers were asked about their demographic information (age, education level, marital status, total number of children) and socio-economic information (type of household and sources of income). The questionnaire included information regarding knowledge about pneumonia. The first question on the questionnaire was used to assess whether the respondent mothers knew what pneumonia is. Those who reported that they knew or have heard of pneumonia were asked to indicate the source of information and were allowed to select at least one possible sign and symptom of pneumonia, causes of pneumonia and measures taken to prevent childhood pneumonia (multi response was allowed for these questions and there was no wrong response). Mothers were further asked questions regarding their health care seeking behaviour (when and where to seek treatment if they suspected their child had pneumonia) and home management practices (what they would do at home prior to hospital attendance). In these questions, mothers were allowed to select more than one response, some of which were correct and others wrong). Mothers' attitudes towards dangers of childhood pneumonia, categorised as highly dangerous or dangerous were also determined. In addition, two focus group discussions of between 8-10 mothers categorised based on age, that is, 15-30 years and 31-49 years were held after the

individual questionnaires had been administered and were conducted on different mothers with similar characteristics as those of individual respondents (Appendix V). This was aimed at obtaining more information on recognition of childhood pneumonia, factors affecting seeking of health care and their home management practices. Some responses were determined to be correct while others were not. Key informant interviews were conducted amongst the selected health workers from the relevant departments in the health facility. They included; medical officers, public health officers, nursing officers and community health workers. This was aimed at determining mother's response to childhood pneumonia and the utilization of health care services in this community (Appendix VI).

3.5 Data Management and Analysis

3.5.1 Data Management

All study participants received a unique participant identification number that was recorded on the questionnaire. Collected data from the study was thoroughly checked and validated for accuracy and completeness and stored in a database established using Microsoft Excel. A password was used to prevent unauthorized access to the database. Also, the data was backed up in a flash and hard disks before and after analysis. Data on the questionnaire was kept under lock and key while electronically stored data was password protected.

3.5.2 Data Analysis

The quantitative data was analysed using SPSS Version 16.0. Descriptive statistics including mean, standard deviations, cross tabulation and frequencies were performed. Univariate analysis was done using the Pearson's chi-square test and Independent T-test for testing associations of selected factors with mothers' knowledge of pneumonia and their health care seeking behaviour. Multivariate analysis was done using binary logistic regression to control for confounders and effect modification. Backward conditional

method was used to establish true predictors. The predictors of knowledge of pneumonia and health care seeking behaviour were estimated by the calculation of odds ratios (OR) and 95% Confidence Intervals (CIs) and a $p < 0.05$ was considered as significant. In determining mothers' knowledge of pneumonia, independent variables included: age of the mother, mothers' level of education, occurrence of childhood pneumonia and total number of children. The dependent variable was knowledge of pneumonia which was dichotomized (NO was coded as zero and YES coded as one). On health care seeking behaviour, the independent variables included: age of the mother, mothers' level of education, occurrence of childhood pneumonia, knowledge of pneumonia and perception towards childhood pneumonia. The dependent variable was mothers' healthcare seeking behaviour and was dichotomized (Seeking healthcare after 24hrs was coded as zero while immediate/within 24hrs coded as one). Variables with $P < 0.05$ in the logistic regression were considered to have significant associations with mothers' knowledge of pneumonia and health care seeking behaviour. Tape-recorded data was transcribed, translated into English and manual thematic analysis done.

3.6   Ethical Considerations

Approval to carry out the study was obtained from KEMRI Ethical and Scientific Steering Review Committees (Appendix VII and Appendix VIII respectively). Prior to the study, sensitization meetings with the health authorities in charge of the health facility were held. Explanations of the objectives of the study were done and permission sought from Medical Superintendent to carry out the study at the health facility (Appendix IX). After voluntary and informed consent was explained, only those mothers, who met the study requirements, consented and voluntarily signed the consent forms were enrolled into the study and questionnaires administered. Consent for tape recording was also sought from mothers and key informants prior to participation in focus group discussions and key informant interviews respectively. Only those who voluntarily signed the consent form were recruited. Those who could not write indicated

their consent by a fingerprint and witnessed by the interviewer (Appendix III). Mothers who met the inclusion criteria and were willing to participate in the study but aged below 18 years of age were asked to introduce their spouse (if over 18 years of age), parent or guardian to consent on her behalf. Each respondent was informed about their right to decline or withdraw any time from participating in the study without feeling constrained. Respondents were informed that the information would not be made available to persons outside the study team. Respondents were further assured that no Personal-Identifiers (PID) would be used for publication. Data collection and storage observed issues of confidentiality and privacy. Data on the questionnaires were coded and kept under lock and key while electronically stored data in a database was password protected. Also, access to information collected from FGD's and KII's was restricted. The interviews were conducted in identified private rooms to ensure that no information leaked. All information about the respondents were handled with utmost confidentiality and only used for intended purposes.

CHAPTER FOUR

RESEARCH RESULTS

4.0 Results

The quantitative data collected from a total of 422 mothers was analyzed using SPSS and the results presented in pie charts, graphs, percentages and tables. Additionally, tape-recorded data from FGD's and KII's were transcribed, translated into English and manual thematic analysis done and results presented in tables.

4.1   Socio-demographic and economic characteristics of respondent mothers

A total of 422 mothers aged between 15 and 49 years with children under the age of 5 years were interviewed. Table 4.1 show descriptive summaries of the population characteristics.

4.1.1   Age of respondent mothers

Overall mean age of the mothers interviewed was 30.1±7.5 years ranging from 15 to 49 years. The highest proportions of mothers (31.3%) were aged 29-35 years while 4.0% were aged 43-49 years. Their percentage distribution by age categories is shown in Figure 4.1.
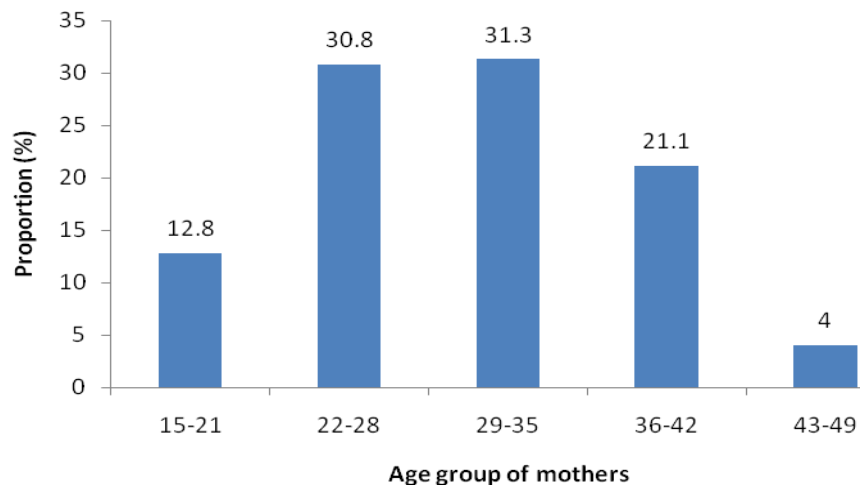
Figure 4.1: Age of mothers

4.1.2 Marital status of mothers

The majority of mothers (75.4%) were married, 23.5% single, 0.5% widowed while 0.7% were separated. There was a significant relationship between age and marital status ($\chi2$ = 113.7, df = 12, $p<0.001$). The highest percentage of single mothers (38.4%) was among mothers aged 15-21 years while the highest percentage of separated mothers (66.7%) was among mothers aged 36-42 years as shown in Figure 4.2.
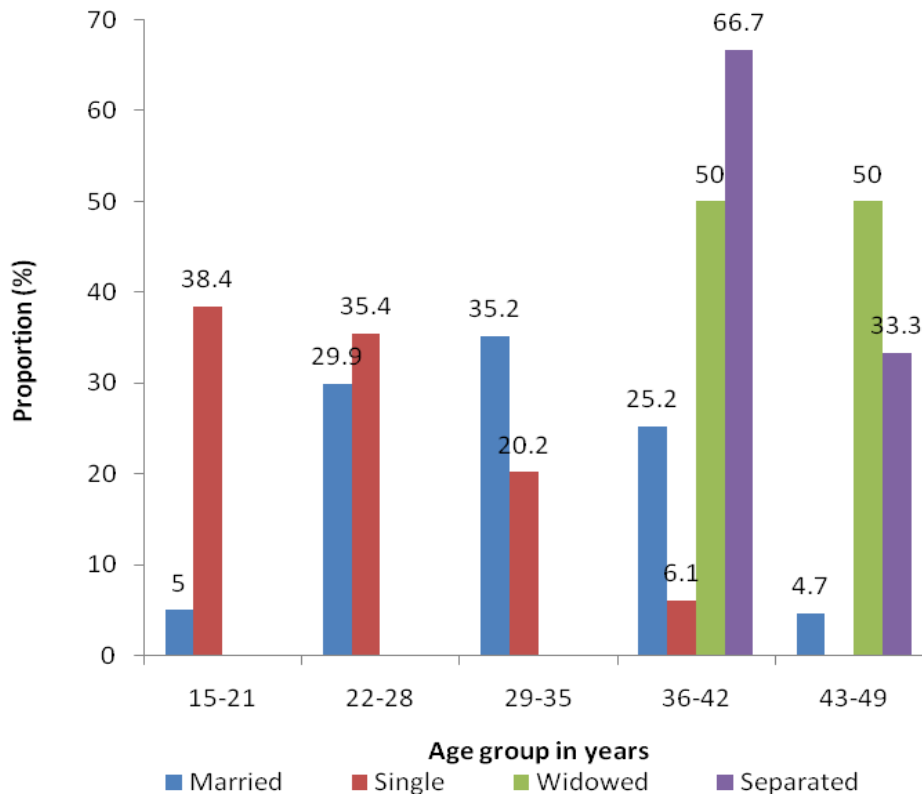
Figure 4.2: Marital status of mothers by age category

4.1.3 Level of education among mothers

The majority of mothers (62.1%) had acquired primary level education, 31.5% had secondary education, 5.2% had tertiary education while 1.2% had no formal education as shown in Figure 4.3.
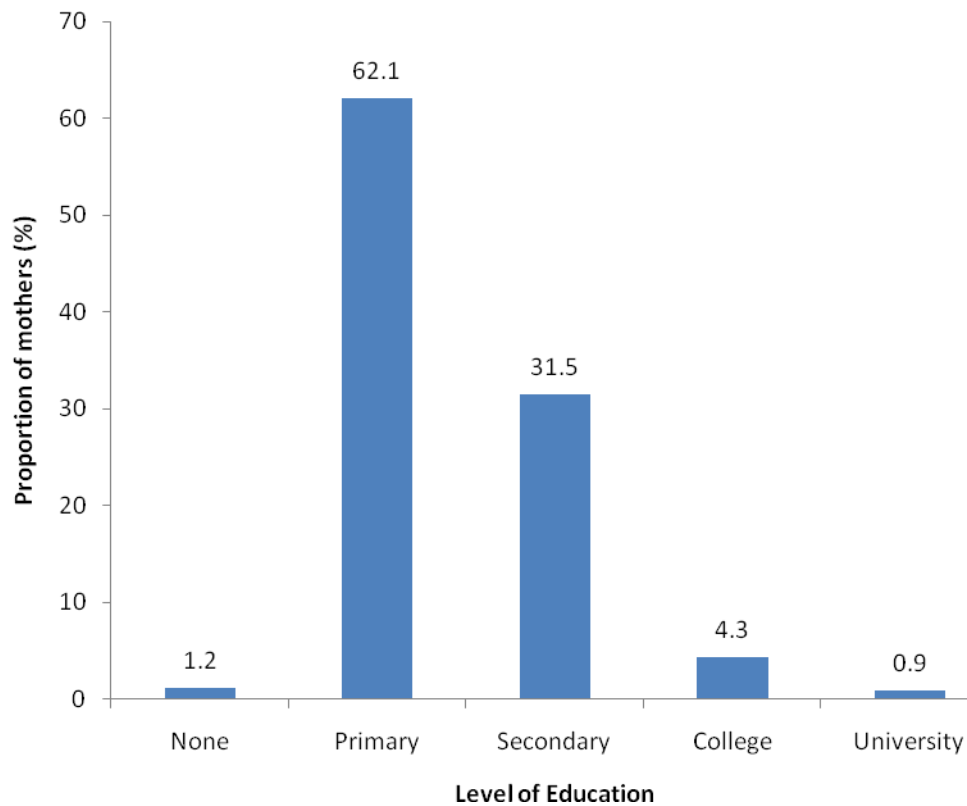
Figure 4.3: Mothers' level of education

4.1.4 Distribution of children among mothers

Overall mean number of children was 3.1±1.9 ranging from 1 to 10 children. The majority mothers (64.0%) had less than three children while 36.0% had more than three children. There was a significant relationship between mother's age and the number of children ($\chi2=306.0$, df=36, $p<0.001$).

4.1.5 Type of housing and house ownership of mothers

With regards to overall house ownership, the majority (64.7%) owned a house, 21.1% lived in rental houses and 14.2% lived with their parents or guardian. Moreover, the

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majority (61.4%) lived in semi-permanent houses, 32.5% lived in permanent houses while 6.2% lived in temporary houses as shown in Figure 4.4.
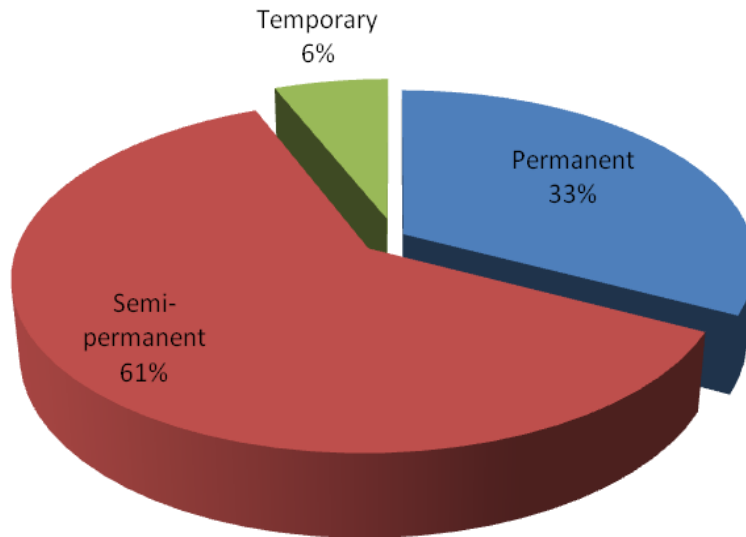
Figure 4.4: Distribution of type of housing

4.1.6 Occupation of mothers and their spouses

The majority of mothers (61.1%) were unemployed/housewives, 13.7% farmers, 10.0% were in formal employment, 7.8% self employed, 6.4% casual labourers and a few 0.9% were students as shown in Figure 4.5.
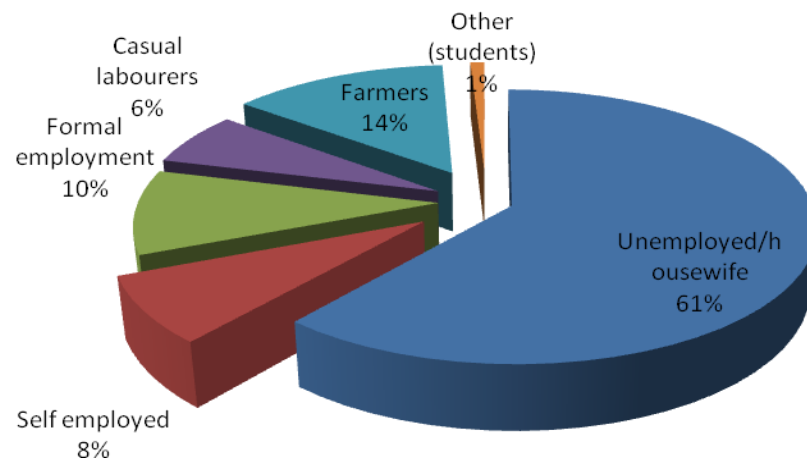
Figure 4.5: Occupation of mothers

For their spouses, the highest proportion (36.2%) were farmers, 25.5% self-employed, 18.2% were in formal employment, 11.9% unemployed and a few 8.2% were casual labourers as shown in Figure 4.6.
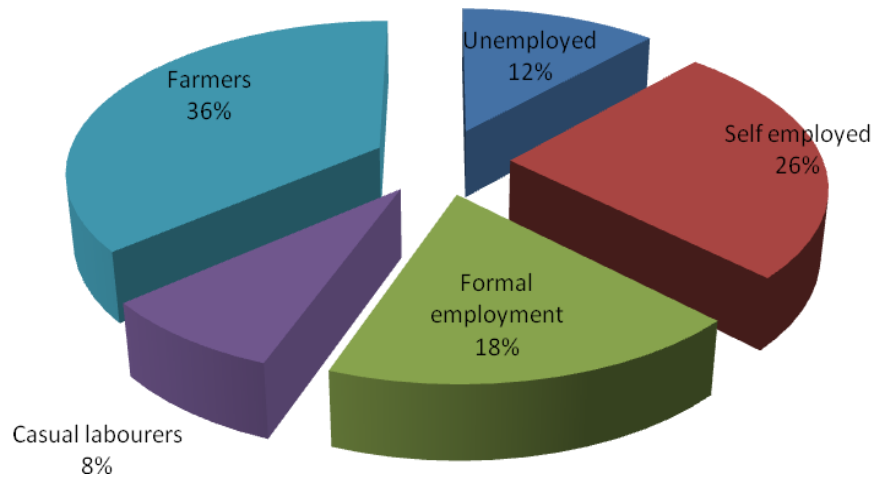
Figure 4.6: Occupation of spouse

Table 4.1: Socio-demographic and economic characteristics of the mothers

Characteristics	N	%†	Characteristics	N	%†
Mothers' age			**Type of housing**		
Mean age [SD] years	30.1 [7.5]°		Semi-permanent	259	61.4
15-21	54	12.8	Permanent	137	32.5
22-28	130	30.8	Temporary	26	6.2
29-35	132	31.3	**House ownership**		
36-42	89	21.1	Owned a house	273	64.7
43-49	17	4.0	Rental house	89	21.1
Marital status			Lived with parents/guardian	60	14.2
Married	318	75.4	**Occupation of mothers**		
Single	99	23.5	Unemployed/housewife	258	61.1
Widowed	2	0.5	Farmer	58	13.7
Separated	3	0.7	Formal employment	42	10.0
Level of education			Self employed	33	7.8
None	5	1.2	Casual labourer	27	6.4
Primary	262	62.1	Others (student)	4	0.9
Secondary	133	31.5	**Occupation of spouse***		
College	18	4.3	Farmer	115	36.2
University	4	0.9	Self employed	81	25.5
Total no. of children			Formal employment	58	18.2
Mean no. [SD]of children	3.1 [1.9]°		Unemployed	38	11.9
Less than 3 children	270	64.0	Casual labourer	26	8.2
More than 3 children	152	36.0			

Abbreviations: N=422; SD, standard deviation; † Column percentages; *Not equal to overall sample size (n=318)

4.2   Knowledge, attitudes and recognition of childhood pneumonia

As shown in Table 4.2, the vast majority (93.1%) knew what pneumonia is. Of these, the highest proportion (39.2%) reported to have obtained the first information through health workers, 35.9% through older persons in the family or community, 21.1% through television or radio, 1.8% newspapers or magazines while a paltry 2.0% could not recall. Twenty nine point one percent of mothers (29.1%) reported to have had a child suffering from pneumonia previously. However, the majority (67.1%) perceived childhood pneumonia as highly dangerous, 24.8% as dangerous while (8.1%) did not know. In addition, the majority (61.4%) were not aware of pneumonia vaccine. Of those who were aware, the majority (69.3%) reported to have known it from health workers, 21.5% TV/radio, 4.9% relatives or friends while (4.3%) knew through reading the newspapers.

Table 4.2: Knowledge, attitudes and occurrence of childhood pneumonia

Characteristics	Response	n	%†
Knowledge of pneumonia	Yes	393	93.1
	No	29	6.9
Source of pneumonia information	Health workers	154	39.2
(only those who knew pneumonia)	Older persons in the family/community	141	35.9
	TV/Radio	83	21.1
	Newspapers, journals or publications	7	1.8
	Don't know	8	2.0
Occurrence of childhood pneumonia	Yes	123	29.1
	No	299	70.9
Perception towards pneumonia*	Highly dangerous	281	67.1
	Dangerous	104	24.8
	Don't know	34	8.1
	Non-response	3	0.7
Awareness of pneumonia vaccine	Yes	163	38.6
	No	259	61.4
Source of information (only those who were aware of pneumonia vaccine)	Health workers	113	69.3
	TV or radio	35	21.5
	Relatives/friends	8	4.9
	Newspapers	7	4.3

Abbreviations: † Column percentages; *Total number of responses may not be equal to the overall sample size due to non-response

4.3   Association of selected factors with knowledge of pneumonia among the mothers

4.3.1   Univariate and multivariate analysis of factors associated with mother's knowledge of pneumonia

Univariate analysis was performed on selected factors associated with mothers' knowledge of pneumonia as shown in Table 4.3. There was a significant association between occurrence of childhood pneumonia and knowledge of pneumonia (OR 6.0, 95% CI 1.4-25.7, p=0.006). Mothers who reported to have had a child suffering from pneumonia previously were more likely to have knowledge of pneumonia than those who did not. There was a significant association between mothers' level of education and knowledge of pneumonia (OR 8.1, 95% CI 0.9-77.1, p=0.004). Mothers with higher level of education were more likely to have knowledge of pneumonia compared to those with reduced level of education. There was a significant association between mothers' age and knowledge of pneumonia (OR 6.1, 95% CI 1.4-25.6, p=0.006). This showed that older mothers were more likely to have knowledge of pneumonia compared to the younger mothers. Also, there was a significant association between the total number of children in a lifetime and knowledge of pneumonia (OR 8.3, 95% CI 2.0-35.6, p=0.001). Mothers with more than three children were more likely to have knowledge of pneumonia compared to those with less than three children. Binary logistic regression using the backward conditional method was then done to eliminate confounding factors and examine the effect of the four predictive factors which significantly associated (independently) with knowledge of pneumonia at univariate analysis (Table 4.4). Mothers who reported to have had a child suffering from pneumonia previously were approximately six times more likely to have knowledge of pneumonia than those who did not (AOR 6.3 [95% CI 1.4-27.9]). Mothers' with higher level of education were approximately fourteen times more likely to have knowledge of pneumonia compared to those with reduced level of education (AOR 14.3 [95% CI 1.3-161.3]). Mothers with more than three children were thirteen times more likely to have knowledge of

pneumonia compared to those with less than three children (AOR 13.0 [95% CI 2.7-62.9]).

Table 4.3: Association of selected factors with knowledge of pneumonia among mothers

Variables	Knowledge about pneumonia						Univariate OR (95%C.I)	P Value
	Yes		No		Total			
	n	%*	n	%*	n	%†		
Mother's age								
>35	103	97.2	3	2.8	106	25.1	6.1 (1.4-25.6)	0.006
31-35	74	96.1	3	3.9	77	18.2	4.4 (1.0-18.5)	
26-30	93	95.9	4	4.1	97	23.0	4.1 (1.1-15.4)	
21-25	89	87.3	13	12.7	102	24.2	1.2 (0.4-3.4)	
≤ 20	34	85.0	6	15.0	40	9.5	Reference	
Level of education								
Tertiary	21	95.5	1	4.5	22	5.2	8.1 (0.9-77.1)	0.004
Secondary	126	94.7	7	5.3	133	31.5	6.9 (1.9-25.0)	
Primary(class 4-8)	233	93.6	16	6.4	249	59.0	5.6 (1.8-17.7)	
Primary(class 1-3)	13	72.2	5	27.8	18	4.3	Reference	
Occurrence of pneumonia								
Yes	121	98.4	2	1.6	123	29.1	6.0 (1.4-25.7)	0.006
No	272	91.0	27	9.0	299	70.9	Reference	
Number of children								
> 3 children	150	98.7	2	1.3	152	36.0	8.3 (2.0-35.6)	0.001
≤ 3 children	243	90.0	27	10.0	270	64.0	Reference	

Abbreviations: CI, confidence interval; OR, odds ratio; *Column percentages; †Row percentages

Table 4.4: Logistic regression model for variables predicting knowledge of pneumonia among mothers

Variables	Knowledge about pneumonia						Multivariate AOR (95%C.I)
	Yes		No		Total		
	n	%*	n	%*	n	%†	
Level of education							
Tertiary	21	95.5	1	4.5	22	5.2	14.3 (1.3-161.3)
Secondary	126	94.7	7	5.3	133	31.5	14.6 (3.2-66.4)
Primary(class 4-8)	233	93.6	16	6.4	249	59.0	10.6 (2.6-42.8)
Primary(class 1-3)	13	72.2	5	27.8	18	4.3	Reference
Occurrence of pneumonia							
Yes	121	98.4	2	1.6	123	29.1	6.3 (1.4-27.9)
No	272	91.0	27	9.0	299	70.9	Reference
Number of children							
> 3 children	150	98.7	2	1.3	152	36.0	13.0 (2.7-62.9)
≤ 3 children	243	90.0	27	10.0	270	64.0	Reference

Abbreviations: CI, confidence interval; AOR, adjusted odds ratio; *Column percentages; †Row percentages; Dependent variables: Knowledge about pneumonia (0 = No, 1 = Yes)

4.4 Mothers' recognition of childhood pneumonia and the local illness concepts

A list of possible signs and symptoms of pneumonia was provided to the mothers who knew pneumonia and the most selected response was chest pain by (75.8%), followed by fever (62.3%), shortness/difficulty in breathing (60.8%), cough (57.0%), rapid/fast breathing (45.5%), chest in drawing (40.5%), convulsions (29.5%), chills (28.8%), fatigue/weak (25.2%), loss of appetite (21.1%), wheezing (17.3%), excessive sweating (14.0%), headache (8.9%) and body/muscle pain (2.0%) in that order as shown in Figure 4.7.
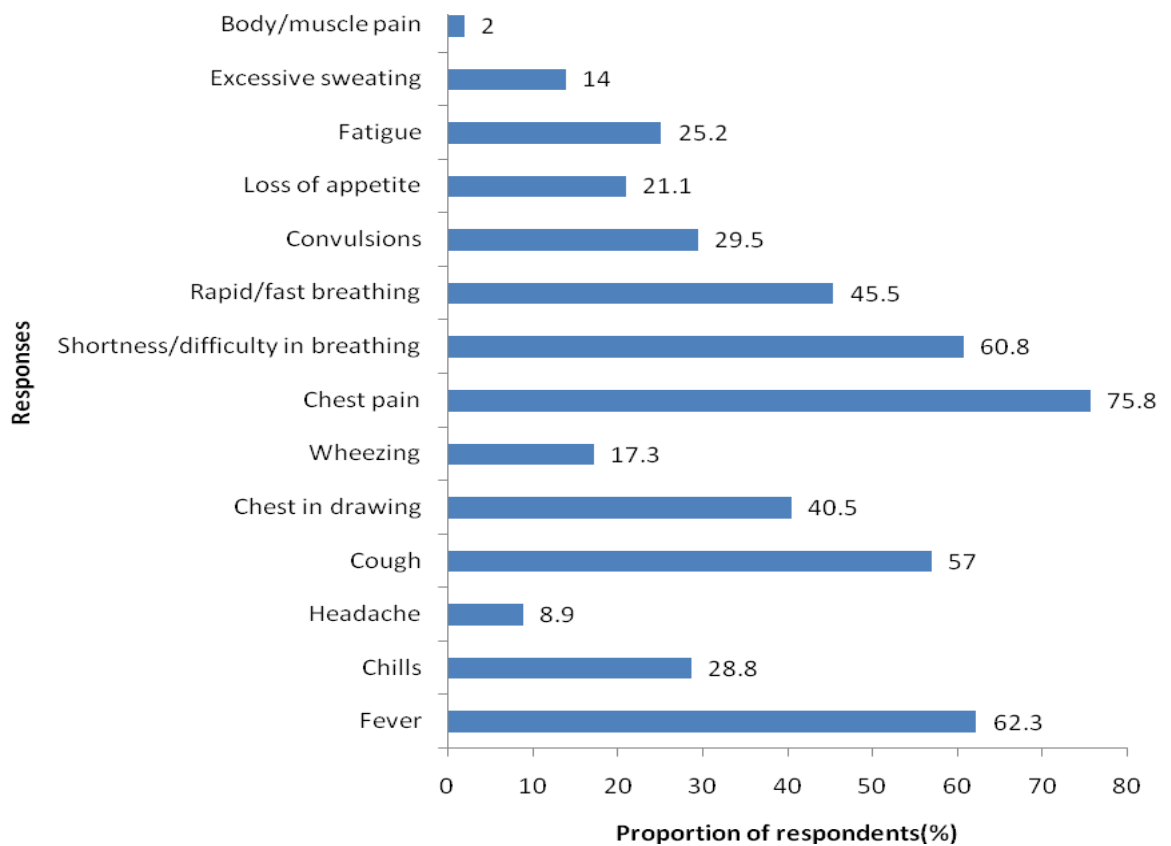
Figure 4.7: Mothers' recognition of signs and symptoms of pneumonia

In addition, focus group discussions revealed the terminologies and phrases used to describe pneumonia in this locality as shown in Table 4.5. Also, key informants' views on mothers' knowledge and response to childhood pneumonia were captured as shown in Table 4.6.

Table 4.5: Local illness terminologies used to describe childhood pneumonia

Name in English	Nandi Terminologies	Literal Dictionary Translation
Chest pain	*Kipruteit*	Sharp or stabbing pain in the chest
Common cold/flu	*Tung'wek*	To catch or get cold or flu
Cough	*Lolyot*	To expel air from the lungs suddenly and noisily
Fast breathing	*Kapuset ne o Kochakta kapuset*	Increased heart beat
Shortness/difficulty in breathing	*Kaker tikiis* *Tigenet*	To get out of breathe To get short of breathe
Fever	*Maat ap porto*	Elevated body temperature
Chest in drawing	*Kakulok karas*	In ward push of the ribs
Convulsions	*Kiptaleit* *Tanuito*	Sudden involuntary contractions of the body muscles

Table 4.6: Key informants' views on mothers' knowledge and response to childhood pneumonia

Main Responses

"...pneumonia is a significant public health problem in this locality due to the fact that it is an area that receives moderate to very high rainfall throughout the year and cases are normally very high during cold/rainy season and it is mostly caused by the bacterial infections..."

"...Although most mothers may know or have heard of pneumonia in this locality, I think the majority still do not easily recognise early signs and symptoms of pneumonia because most children suffering from pneumonia are brought into the hospital when they are in serious condition. In this hospital, for instance, we receive between 80 to 100 cases of childhood pneumonia in a month and this tells a lot about the seriousness of the disease in this area..."

"...I have observed that most mothers assume the seriousness of some illnesses, for example, common cold. They have a negative perception that the illness is not serious until it is serious and even others neglect their sick children..."

"...I once attended to a seriously ill child who was suffering from pneumonia and when I asked his mother why she could not seek treatment immediately on the onset, she told me that she did not know that his son had contracted pneumonia, but thought it was a normal headache with fever and had already given him some aspirin and panadol..."

"...we have also noted that, most mothers adhere to treatment when the child is still sick but when they get well they forget about it, hence not completing the dosage. This may result to drug resistance..."

"...I have observed that some mothers fail to feed, breastfeed or even offer liquids/fluids to their sick children and by the time they bring their children to the hospital, they are seriously dehydrated.......... there is need to be educate them on responsive feeding when a child is ill..."

4.5   Causes of Pneumonia

Most mothers (96.7%) indicated that pneumonia is caused by cold temperature/weather change, 28.0% by dust/germs, 12.7% bacteria, 2.3% virus, 0.5% fungi while (2.3%) did not know the causes of pneumonia as shown below in Figure 4.8. (Multi response was allowed where mothers could select more than one cause of pneumonia).
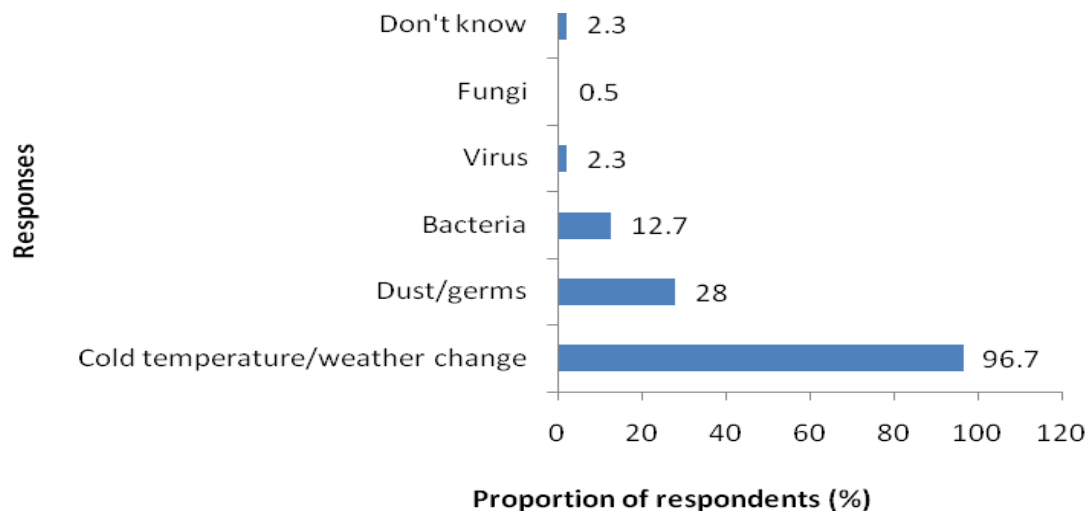
Figure 4.8: Mothers' responses on causes of pneumonia

4.6   Prevention of Childhood Pneumonia

With regard to prevention measures, the most selected response was clothing warmly during cold season (93.4%) followed by vaccination/immunization (80.9%), exclusive breastfeeding (43.8%), proper nutrition (39.7%), improving child's immune system (34.6%), proper house ventilation (26.0%), washing hands (19.3%) and a paltry (0.8%) indicated the use of herbs as shown in Figure 4.9.
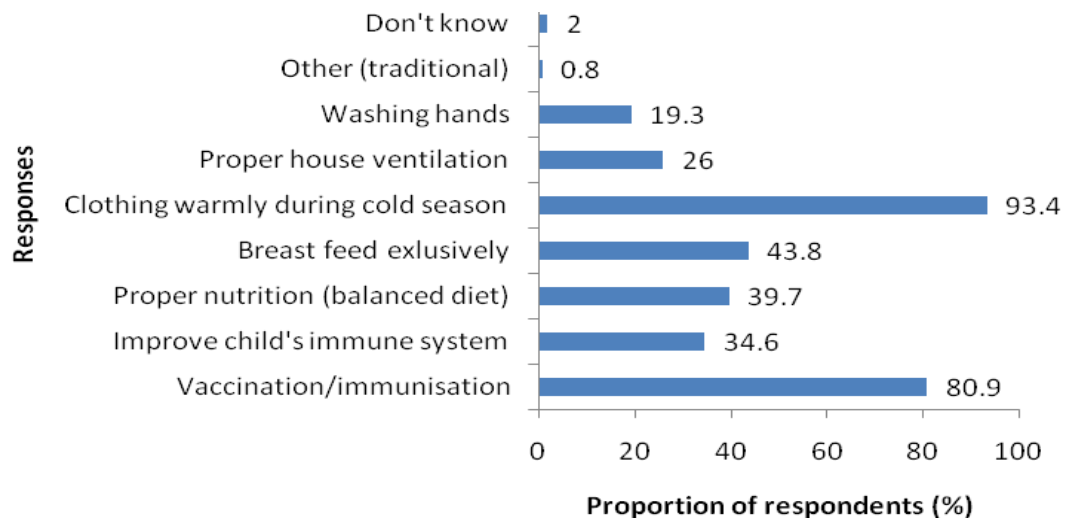
Figure 4.9: Mothers' responses on prevention of childhood pneumonia

4.7 Potential risk factors for childhood pneumonia

In response to potential risk factors, the most selected response was cold weather (88.5%), followed by inadequate breastfeeding (49.9%), common cold/flu (47.6%), inadequate parental care (47.3%), poor nutrition (43.8%), germs (32.3%), chronic underlying illnesses (26.2%), overcrowding (11.7%), air pollution (7.6%) and the least selected was measles (3.1%) as shown in Figure 4.10.
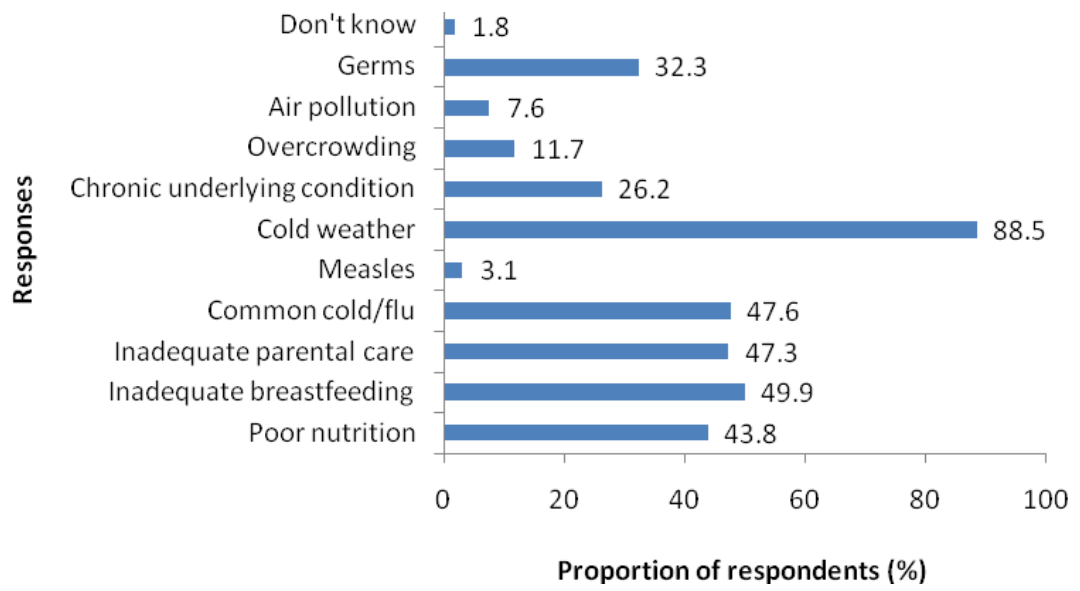
Figure 4.10: Responses on potential risk factors of childhood pneumonia

Table 4.7: Distribution of responses on knowledge of pneumonia among mothers

Characteristics	No.	%†	Characteristics	No.	%†
Signs & symptoms of pneumonia:			**Prevention of pneumonia:**		
Fever	245	62.3	Vaccination or immunisation	318	80.9
Chills	113	28.8	Improve child's immune system	136	34.6
Headache	35	8.9	Proper nutrition (balanced diet)	156	39.7
Cough	224	57.0	Breastfeed exclusively	172	43.8
Chest in drawing	159	40.5	Clothing warmly during cold	367	93.4
Wheezing	68	17.3	Proper house ventilation	102	26.0
Chest pain	298	75.8	Washing hands	76	19.3
Shortness/difficulty in breathing	239	60.8	Other (traditional)	3	0.8
Rapid breathing	179	45.5	Don't know	8	2.0
Convulsions	116	29.5	**Total***	**1338**	**340.5**
Loss of appetite	83	21.1			
Fatigue	99	25.2	**Potential risk factors:**		
Excessive sweating	55	14.0	Poor nutrition	172	43.8
Body/muscle pain	8	2.0	Inadequate breastfeeding	196	49.9
Total*	**1921**	**488.8**	Inadequate parental care	186	47.3
			Common cold or flu	187	47.6
			Measles	12	3.1
Causes of pneumonia:			Cold weather	348	88.5
Cold temperature/weather change	380	96.7	Chronic underlying illnesses	103	26.2
Dust/germs	110	28.0	Overcrowding	46	11.7
Bacteria	50	12.7	Air pollution	30	7.6
Virus	9	2.3	Germs	127	32.3
Fungi	2	0.5	Don't know	7	1.8
Don't know	9	2.3	**Total***	**1414**	**359.8**
Total*	**560**	**142.5**			

Abbreviations: *Total no. of responses may not be equal to the overall sample size

(Multiple responses were allowed); † Responses in percentages

4.8 Healthcare seeking behaviour and home management practices prior to hospital attendance

4.8.1 Healthcare seeking behaviour

In relation to health care seeking when a child is suspected of pneumonia, the majority (72.7%) would visit the nearest health facility, 9.7% would visit a doctor, 6.4% a pharmacist/chemist, 6.2% would buy medicine from a shop, 2.4% would seek advice from neighbour/friend, 1.7% religious leader while (0.9%) would visit traditional practitioners as shown in Figure 4.11. However, half of the respondents (50.5%) would seek treatment immediately or within 24hrs, an almost similar proportion (49.5%) would not as shown in Table 4.9. Some of the main reasons identified to delay health care seeking were explored during focus group discussions and key informant interviews as shown in Table 4.8.
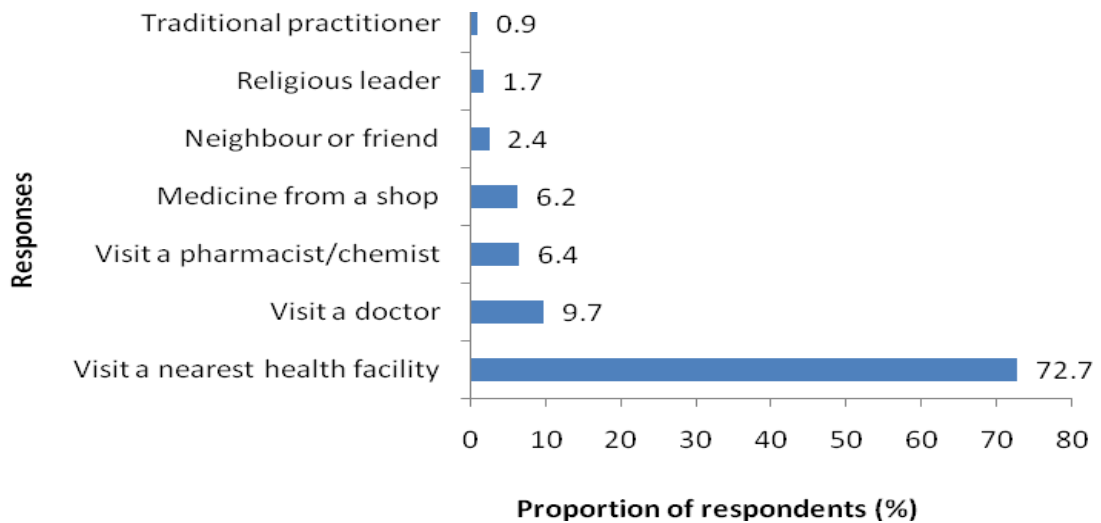
Figure 4.11: Mothers' responses on health care seeking

Table 4.8: Main reasons for delayed health care seeking among the mothers

Reasons	Main Responses
Ignorance	* *"...some mothers still believe in traditional and spiritual healing. Others use leftover drugs or buy from nearby shops/chemists, even when the child's illness is different..."* * *"...most mothers can recognise a sick child, but some of them often assume the seriousness of some illness, e.g., common cold..."*
Accessibility to health facilities	** *"...When I had a sick child, I experienced many challenges travelling to the hospital because of the bad road condition due to heavy rains. No vehicle was plying the route at the time. I hired a 'boda boda' (motor byke), though it didn't help much, because we had to go by foot at some point where the road was completely impassable. By the time we arrived at the hospital, my child's condition had worsened....luckily he survived..."* ** *"...some of us live far away from the health centres and we have to trek long distances to arrive at the health facility. For example, the village I come from is a 2 hour journey by foot and there are no vehicles because of poor road and rugged landscape...."*
Financial constraints	** *"...I almost lost my first born baby. She fell sick, but I lacked money for travelling to the hospital. I borrowed cough syrup and pain killers from a local chemist so that I could pay him later. I gave it to my child and hoped that cough and fever would disappear after a few days. After 3 days her condition got worse and had to borrow some money from my neighbours to rush her to the hospital where she was diagnosed with pneumonia and had to be admitted for a whole week...."* ** *"...I took my child to the hospital and nurses told me that drugs, needles and syringes were out of stock and asked me to purchase from a chemist, yet I couldn't afford. I had to seek treatment from a traditional practitioner...."* * *"... treatment of children in government hospitals is free. However, we always have challenges, especially with drug shortages.......most mothers here are poor and such a situation may force them to resort to cheap drugs or use of herbs..."*

Abbreviations: * Responses from key informants; ** Responses from focus group discussions

4.8.2   Association of selected factors with healthcare seeking among mothers

4.8.2.1 Univariate and multivariate analysis

As shown in Table 4.9, univariate analysis identified four factors that significantly associated with healthcare seeking behaviour among mothers, they included; mothers' level of education (OR 20.0, 95% CI (3.5-115.4), $p<0.001$), previous occurrence of childhood pneumonia (OR 41.2, 95% CI (17.5-97.0), $p<0.001$), knowledge of pneumonia (OR 9.9, 95% CI (3.0-33.4), $p<0.001$) and the perception towards childhood pneumonia (OR 29.4, 95% CI (6.9-125.3), $p<0.001$) (Table 4.9). Binary logistic regression using the backward conditional method was performed to eliminate confounding factors and examine the effect of these four predictive factors. Three factors were found to predict healthcare seeking behaviour amongst the respondent mothers; mothers' level of education (AOR 20.5 [95% CI 2.4-173.5]), previous occurrence of childhood pneumonia (AOR 34.7 [95% CI 14.1-85.2]) and the perception towards childhood pneumonia (AOR 10.4 [95% CI 2.2-48.5]) as shown in Table 4.10.

Table 4.9: Association of selected factors with healthcare seeking behaviour among mothers

Variables	Healthcare Seeking Behaviour						Univariate OR (95%C.I)	P value
	Within 24hrs		After 24hrs		Total			
	n	%*	n	%*	n	%†		
Level of education								
Tertiary	20	90.9	2	9.1	22	5.2	20.0 (3.5-115.4)	**<0.001**
Secondary	76	57.1	57	42.9	133	31.5	2.7 (0.9-7.5)	
Primary(class 4-8)	112	45.0	137	55.0	249	59.0	1.6 (0.6-4.4)	
Primary(class 1-3)	5	27.8	13	72.2	18	4.3	Reference	
Occurrence of pneumonia								
Yes	117	95.1	6	4.9	123	29.1	41.2 (17.5-97.0)	**<0.001**
No	96	32.1	203	67.9	299	70.9	Reference	
Knowledge of pneumonia								
Yes	210	53.4	183	46.6	393	93.1	10.0 (3.0-33.4)	**<0.001**
No	3	10.3	26	89.7	29	6.9	Reference	
Perception towards pneumonia								
Highly dangerous	182	64.8	99	35.2	281	67.1	29.4 (6.9-125.3)	**<0.001**
Dangerous	28	26.9	76	73.1	104	24.8	5.9 (1.3-26.2)	
Do not know	2	5.9	32	94.1	34	8.1	Reference	

Abbreviations: CI, confidence interval; OR, odds ratio; *Column percentages; †Row percentages

Table 4.10: Logistic regression model for variables predicting health care seeking behaviour among mothers

Variables	Healthcare Seeking Behaviour						Multivariate AOR (95%C.I)
	Within 24hrs		After 24hrs		Total		
	n	%*	n	%*	n	%†	
Level of education							
Tertiary	20	90.9	2	9.1	22	5.2	20.5 (2.4-173.5)
Secondary	76	57.1	57	42.9	133	31.5	2.3 (0.5-10.1)
Primary(class 4-8)	112	45.0	137	55.0	249	59.0	1.2 (0.3-4.9)
Primary(class 1-3)	5	27.8	13	72.2	18	4.3	Reference
Occurrence of pneumonia							
Yes	117	95.1	6	4.9	123	29.1	34.7 (14.1-85.2)
No	96	32.1	203	67.9	299	70.9	Reference
Perception towards pneumonia							
Highly dangerous	182	64.8	99	35.2	281	67.1	10.4 (2.2-48.5)
Dangerous	28	26.9	76	73.1	104	24.8	6.6 (1.4-31.7)
Do not know	2	5.9	32	94.1	34	8.1	Reference

Abbreviations: CI, confidence interval; AOR, adjusted odds ratio; *Column percentages; †Row percentages; Dependent variables: Health care seeking practices (0 = after 24hrs, 1 = immediately or within 24hrs)

4.8.3 Home management practices prior to hospital attendance

In terms of home management practices for a child with fever and/or suspected of pneumonia, the majority (77.3%) indicated they would feed a child with liquid food/fluids (like milk and porridge), 48.3% would breastfeed, 45.3% would give drugs, for example, pain killers, aspirin, 12.6% would do nothing while (0.7%) would use herbs as shown in Figure 4.12. From focus group discussions, there was no known home treatment for pneumonia in this community. Other home management practices were identified as shown in Table 4.12.
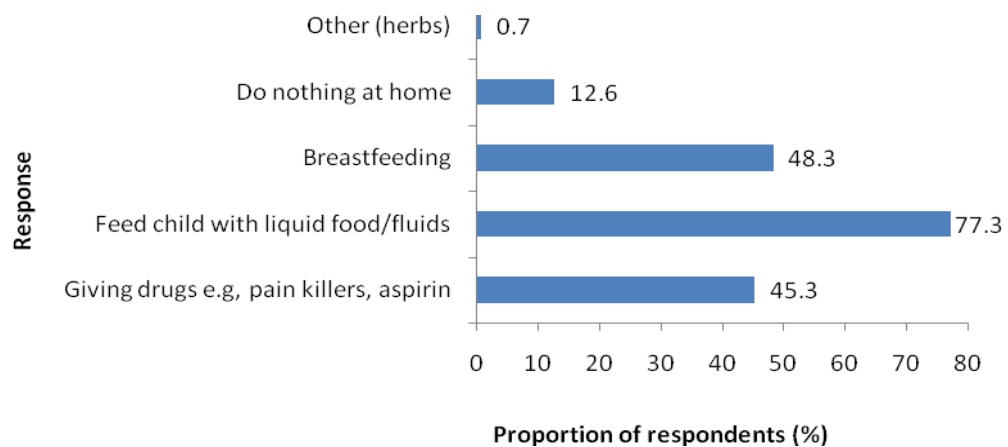
Figure 4.12: Mothers' responses on home management practices prior to hospital attendance

Table 4.11: Healthcare seeking behaviour and home management practices among mothers prior to hospital attendance

Characteristics	No.	%†
Healthcare seeking practices		
Visit a nearest health facility	307	72.7
Visit a doctor	41	9.7
Visit a pharmacist	27	6.4
Medicine from a chemist/shop	26	6.2
Neighbour or friend	10	2.4
Religious leader	7	1.7
Traditional practitioner	4	0.9
Total	**422**	**100**
When to seek healthcare		
Immediately or within 24hrs	213	50.5
After 24hrs	209	49.5
Total	**422**	**100**
Home management practices		
Giving drugs, e.g., pain killers, aspirin	191	45.3
Feed child with liquid food/fluids	326	77.3
Breastfeeding	204	48.3
Do nothing at home	53	12.6
Other (herbs)	3	0.7
Total*	**777**	**184.1**

Abbreviations: *Total no. of responses may not be equal to the overall sample size (Multiple responses were allowed); † Responses in percentages

Table 4.12: Other home management practices among mothers

Main Responses
"...whenever my child has fever, I usually undress and fan him with a piece of clothe or use a sponge soaked in warm water to help cool the body temperature..."
"...a child with fever should be covered with warm blankets or clothes to allow sweating, this will help remove toxins from the body and relieve the pain..."
"...if I had a child with common cold and cough, I would give him/her painkillers, aspirin or cough syrup at home before I visit the hospital..."
"...natural honey and squeezed lemon juice can be used for treatment of common cold. In case of a blocked or running nose, drop vicks/robb in hot water and allow a child to inhale its vapour/steam in order to ease breathing..."

CHAPTER FIVE

DISCUSSION

5.0 Summary

Of the 422 mothers interviewed, the vast majority (93.1%) knew what pneumonia is. Health facilities and older members in the family/community were the most common channels for dissemination of health information to mothers compared to mass media (television or radio). Televisions, for instance, have successfully been used by the Peruvian government to run pneumonia campaign that improved mothers' recognition of signs and symptoms of pneumonia (Gálvez *et al.,* 2002). Mothers who previously had a child suffering from pneumonia were approximately 6 times more likely to have knowledge of pneumonia than those who did not (AOR 6.3 [95% CI 1.4-27.9]). This finding concurs with a study in Bangkok (Zaman, 1994) but contrasts with other studies that found no significant associations between occurrence of childhood pneumonia and knowledge of pneumonia (Siswanto *et al.,* 2007; Hui, 2000; Ngoclan 1999). Mothers' with higher levels of education were also more likely to have knowledge of pneumonia (AOR 14.3 [95% CI 1.3-161.3]) compared to those with lower levels of education. Mothers with >3 children were more likely to have knowledge of pneumonia compared to those with ≤3 children (AOR 13.0 [95% CI 2.7-62.9]). This difference may be attributed to mother's frequent visits to maternal child health clinics or even social interactions (talks within peers).

Compared to previous studies in Peru and Thailand that showed over 80% of mothers perceived pneumonia as a highly or very dangerous disease (Gálvez *et al.,* 2002; Siswanto *et al.,* 2007), this study showed only (67.1%) believed pneumonia is highly dangerous and this difference may be due to low levels of awareness among the mothers in the study area. Appropriate perception towards childhood pneumonia is very important in its effective management. Most mothers were able to correctly pick signs and symptoms of pneumonia from the list provided. This trend was almost

similar to the previous studies done in Peru and Tanzania (Gálvez *et al.,* 2002; Athumani, 2010). However, recognition of childhood pneumonia would be improved if health education is thoroughly and consistently done through community health educators and mass media. The government of Peru, for instance, conducted aggressive pneumonia campaign through television and radio that improved mothers' recognition of childhood respiratory infections (Gálvez *et al.,* 2002).

Qualitative data analysis showed most mothers interviewed would correctly mention at least one feature of pneumonia. However, all the key informants were of the view that a majority would still not easily recognise its early signs and symptoms. Most mothers said a child with fever, chest pain or difficulties in breathing associated with cough was a typical case of pneumonia. Although less than half of the mothers listed chest in drawing and convulsions as features of pneumonia, most of them believed that these were very serious conditions that would require immediate medical attention. Chest in drawing alone with or without fever was believed by some mothers to be a case of severe pneumonia. A child with fast breathing, convulsions and refusing to feed or breastfeed was believed by some mothers to be a case of very severe pneumonia. A study in Pakistan showed chest in drawing to be the main recognition and severity indicator of pneumonia followed by signs and symptoms relating to the quality of breathing and the presence of high fever, anorexia and lethargy (Hussain *et al.,* 1997). Also, fast breathing recognition by the mothers correlates well with the presence of pneumonia as shown in Gambian study (Gampbell *et al.,* 1988) and failure to recognize it may result in delay in seeking appropriate health care, hence delayed treatment resulting into avoidable deaths (Simiyu *et al.,* 2003). Community health education is required to empower the caretaker with an understanding of early signs and symptoms of pneumonia (Irimu *et al.,* 2008).

Diversity of local illness concepts describing pneumonia were explored in this study through focus group discussions. While most mothers were familiar with the medical term, pneumonia, it was mostly referred to as *kipruteit* in native (Nandi) language, a

term synonymously used to refer to chest pain. This may explain why most mothers selected chest pain (75.8%) as one of the indicative sign of pneumonia. Shortness/difficulty in breathing was mostly referred to as *kaker tikiis* while some used the term *tigenet*. While there was no specific term for fast breathing, the phrases *kapuset ne o* and *kochakta kapuset* would be used interchangeably. In a similar trend, other ethnographic studies in ARI have found diversity of terms used to describe pneumonia, where health workers and the caretakers may be using the same words but their understanding of these terminologies may be different (Gove & Pelto, 1994; Rashid *et al.,* 2001). To that effect, understanding how locally recognized signs and symptoms relate to the clinical definition of pneumonia is important in constructing messages that families can understand and which they are likely to adhere to (Irimu *et al.,* 2008).

Most mothers believed pneumonia is caused by cold temperatures/weather change while a few indicated dust/germs, bacteria, virus and fungi. In a similar trend, Honduran mothers and rural Bolivian mothers have cited cold temperature to be the cause of pneumonia (Hudelson, 1994). Also, in Pakistan, exposure to cold through a variety of mechanisms was perceived to be the dominant causal model of pneumonia and the concept of contagion was virtually non-existent (Hussain *et al.,* 1997). However, this study contrasts with most cultural models, in which pneumonia in very young children is not generally attributed to natural causes (Gove & Pelto, 1994) In Bangladesh, for example, respiratory illnesses were attributed to humoral imbalances, supernatural causes and 'negligent' mothers. Concept of germs was nonexistent (Zaman *et al.,* 1997).

With regard to prevention measures, all the mothers' responses were correct. The most selected response was clothing warmly during cold season. However, the majority were not aware of the recently introduced pneumococcal vaccine (IVAC, 2012). This may be due to lack of enough health education on pneumonia prevention at the community level. A small proportion selected exclusive breastfeeding, proper nutrition and washing of hands. During focus group discussions some mothers

interviewed admitted to have started weaning their children before the age of 6 and as early as 4 weeks after birth which and this was confirmed by the key informants. This is an inappropriate practice since exclusive breastfeeding in the first 6 months of an infant's life has a significant protective effect against pneumonia and other diseases (Chisti *et al.,* 2011). According to IMCI guidelines, mothers are advised to replace animal milk with increased breast-feeding or a fermented product such as yoghurt, or to replace half of the milk with a nutrient-rich semi solid complementary food (Gove, 1997). Pneumonia has been found to be common in malnourished children and frequently associated with fatal outcomes (Bryce *et al.,* 2005; Rice *et al.,* 2000; Loeb *et al.,* 2005; Nannan *et al.,* 2007). Also, hand washing with soap reduces the risk of acute respiratory infections and diarrhoea (Luby & Halder, 2008).

In relation to healthcare seeking when a child is suspected of pneumonia, most mothers indicated they would visit the nearest health facility or a doctor. A small proportion of mothers would take other inappropriate actions like; visiting a pharmacist, neighbour/friend, religious leaders and traditional practitioner. Notably, a substantial proportion of mothers (49.5%) would not seek treatment/advise immediately or within 24 hours. Mothers with higher levels of education were more likely to seek immediate medical help compared to those with reduced levels of education (AOR 20.5 [95% CI 2.4-173.5]), mothers who previously had a child suffering from pneumonia were more likely to seek immediate healthcare compared to those who did not (AOR 34.7 [95% CI 14.1-85.2]) and those who perceived pneumonia as highly dangerous would also immediately seek medical care (AOR 10.4 [95% CI 2.2-48.5]). As established from this study, the following were the main reasons for the delayed seeking of healthcare among mothers:

i)   Accessibility to health facilities

Some mothers said they lived in villages that are far from the government health facilities and had to cover long distances while seeking healthcare. Others mentioned poor road infrastructure connecting these villages to the nearest health facilities.

ii) Ignorance

Some mothers perceived some illnesses like common cold as natural and not so serious. Non adherence to treatment where mothers would stop medication once a child feels better was also highlighted and others would use non prescribed drugs or herbs to treat their sick children. These negative attitudes may hinder effective management of childhood pneumonia because mothers would not seek immediate treatment.

iii) Financial constraints

Lack of money was cited as a major hindrance to healthcare seeking by most mothers. Although treatment of children under 5 years is free in all government health facilities, most mothers were concerned about shortage or unavailability of drugs that forced them to buy drugs from elsewhere.

In a similar trend, these factors have been cited in previous studies in Kenya and Mexico (Negussie *et al.,* 2005; Irimu *et al.,* 2008; Reyes *et al.,* 1998; Bojalil, 2002). While the care seeking chain may be quite straightforward in a high income country, caretakers in a low income country are many times confronted with serious barriers when caring for a sick child (Hildenwall *et al.,* 2007). A number of children dying from acute febrile illness may do so without any contact with formal health services during the course of the illness (Breman, 2001).

Finally, almost all the respondent mothers in this study indicated that there was no known home treatment for pneumonia in this community. Nonetheless, most home remedies as practiced by mothers prior to hospital attendance were appropriate, like feeding a sick child with liquid food/fluids and breastfeeding. However, a few mothers would do nothing at home prior to hospital attendance and some would give their sick children drugs without prescription, for example, pain killers and aspirin. Self medication with over the counter drugs have been cited in other studies in Kenya, Mexico and Tanzania (Negussie *et al.,* 2005; Reyes *et al.,* 1998; Tarimo *et*

al., 2000), a practice WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly (WHO, 2006).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Conclusions

➢ This study showed most mothers knew what pneumonia is, correctly mentioned at least one feature of pneumonia and perceived pneumonia as highly dangerous

➢ There were significant associations between (mothers who previously had a child suffering from pneumonia; mothers' levels of education; the total number of children in a lifetime and the mothers' age) with knowledge of pneumonia. Mothers' levels of education, previous occurrence of childhood pneumonia and the total number of children in a life time were found to be the predictive factors of knowledge about pneumonia

➢ There were significant associations between (mothers' levels of education; mothers who previously had a child suffering from pneumonia; knowledge about pneumonia and perceptions towards childhood pneumonia) with healthcare seeking behaviour and that mothers' levels of education, previous occurrence of pneumonia and perceptions towards childhood pneumonia were predictive factors of healthcare seeking behaviour among mothers.

➢ Inaccessibility to healthcare facilities, ignorance and financial constraints were found to be the main factors resulting to delay in seeking of healthcare among the mothers. Delayed seeking of healthcare may hinder effective management of pneumonia

➢ Health facilities and older members in the family/community were found to be the most common channels for dissemination of health information among mothers unlike through mass media which can effectively be used to reach more mothers

➢ There was no known home treatment for pneumonia in this community. Nonetheless, most home remedies as practiced by respondent mothers prior to hospital attendance were appropriate. However, some inappropriate home

management practices are likely to interfere with treatment and management of childhood pneumonia

7.0 Recommendations

➢ This study highlighted the need for health administrators and policy makers to implement measures that would significantly reduce pneumonia morbidity and mortality in this locality

➢ The need for agencies to train, encourage and empower community health workers to provide continuous health education to mothers on pneumonia prevention and control and appropriate home management practices

➢ The need to widely utilize media platforms like televisions and radios to run health education campaigns on pneumonia prevention and control mechanisms in efforts to sensitize more mothers

➢ The need for national and county governments to improve accessibility to healthcare facilities and adequate resourcing of healthcare systems for effective healthcare delivery

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APPENDICES

APPENDIX I: Definition of Terms used in this Study

Acute Lower Respiratory Infection (ALRI)

Acute lower respiratory infections (ALRI) are defined in the International Classification of Diseases as those infections that affect airways below the epiglottis and include acute manifestations of laryngitis, tracheitis, bronchitis, bronchiolitis, lung infections or any combination among them. ALRI is often used as a synonym for pneumonia. Symptoms include shortness of breath, weakness, high fever, coughing and fatigue.

Attitude

A settled way of thinking or feeling typically reflected in a person's behaviour. A predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude influences an individual's choice of action, and responses to challenges, incentives, and rewards (together called stimuli).

Health facility

A health centre responsible for a defined population, and for providing or supervising all the curative, preventive and promotive health activities within that population.

Knowledge

Knowledge is a familiarity with someone or something unknown, which can include information, facts, descriptions, or skills acquired through experience or education. It can refer to the theoretical or practical understanding of a subject. It can be implicit (as with practical skill or expertise) or explicit (as with the theoretical understanding of a subject); and it can be more or less formal or systematic.

Maternal Child Health (MCH) Clinic

A centre within a health facility responsible for providing antenatal and postnatal care to mothers as well as curative and preventive services to the newborn babies and children.

Perception

A process involving beliefs, ideas, observation and feelings by which human beings interpret and organize sensation. It best describes one's ultimate experience of the world and dispositions to act in certain ways.

Pneumonia

Is a Lower Acute Respiratory Infection which manifests itself as an inflammation of the lung parenchyma with abnormal alveolar filling with fluid. Pneumonia can be caused by infection from virus, bacteria, fungi or parasites as well as chemical injury to the lungs (chemical pneumonia).
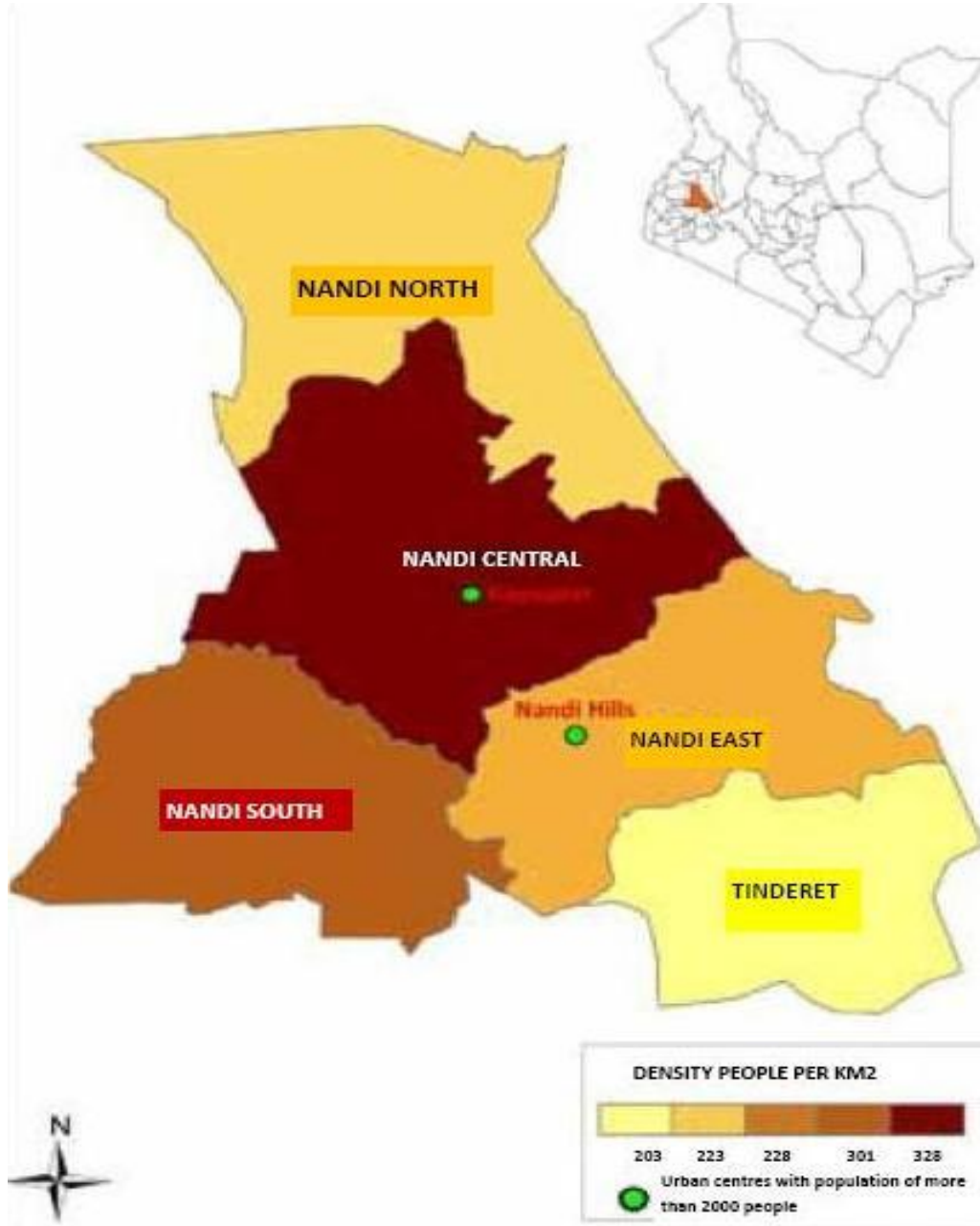
Practice

A habitual or customary action or way of doing something, repeated performance or systematic exercise for the purpose of acquiring skill or proficiency. A condition arrived at by experience or exercise.

Socio-economic status (SES)

It is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position relative to others, based on income, education, and occupation.

APPENDIX II: Map of Nandi County and its position in the National Context

Source: Kenya National Bureau of Statistics (web).

APPENDIX III: Informed Consent Explanation and Consent Form

Study Title: To evaluate Knowledge, Attitudes and Practices of Mothers in relation to Childhood Pneumonia and factors associated with Pneumonia and seeking of Healthcare in Kapsabet District Hospital in Nandi County

Principal Investigator: Mr. Paul Kibet Keter

Institutional affiliation: Jomo Kenyatta University of Agriculture and Technology (JKUAT) and Kenya Medical Research Institute (KEMRI)

Introduction

Good Morning/Afternoon,

My name is Mr. Paul Keter, a student at the Jomo Kenyatta University of Agriculture and Technology in collaboration with Kenya Medical Research Institute (Institute of Tropical Medicine and Infectious Diseases). I am with my research team to conduct a study on the knowledge, perception and practices of mothers in relation to childhood pneumonia at Kapsabet District Hospital. I would like to seek your permission and consent before conducting this study. I would be very glad if you accept my request to volunteer as a participant in my study. Please read the consent form below.

Being in the study is your choice

The purpose of this form is to obtain your consent to participate. If you choose to participate, a questionnaire will be administered to you and the interview will take between 10 and 20 minutes to complete. Participation is entirely voluntary and you can choose not to answer any individual question or all of the questions or withdraw from the study at any time. However, we hope you will participate in this interview since your views are very important.

Purpose of the study

1. To evaluate mothers' knowledge of pneumonia and factors associated with childhood pneumonia
2. To evaluate mothers' attitudes, recognition of childhood pneumonia and explore the local illness concepts involving pneumonia typical signs
3. To determine mothers health care seeking behaviour and identify factors associated with care seeking
4. To determine mothers' home management practices of childhood pneumonia prior to hospital attendance

Target groups

The study participants are mothers of reproductive age (15-49 years) attending the MCH clinic at Kapsabet District Hospital.

Risks and benefits of the study

Apart from the inconveniences caused by taking part of your time, the process is safe and there are no foreseeable risks involved. We will try as much as possible to make sure that we save on your time. There are no direct benefits to you by choosing to participate in this study. However, the results of this study will be communicated back to the health facility for necessary action by the health authorities and to KEMRI who will also take action depending on the outcome. The results will also be used in writing my thesis as part of requirements by the university.

Cost to you

You will not incur any cost during the study.

Data security and confidentiality

All information obtained by research team will be used in confidence for the sole purpose of this research only and it will be strictly confidential and data password protected only accessed by the Principal Investigator (PI) and the research team.

Participants in the study will be kept anonymous, being identified only by specific numbers assigned by the PI.

Findings of the study

Copies of the dissertation will be presented at Jomo Kenyatta University of Agriculture and Technology for partial fulfilment of the Degree of M.Sc. in Public Health. Other copies will be sent to the Center for Public Health Research, (KEMRI) and Kapsabet District Hospital for the purposes of instituting interventional programs to curb pneumonia.

Your right as a study participant

Participation is voluntary and you have the right to decline or withdraw at any time from participating in the study without feeling constrained.

Problems and questions

If you have any questions about this study, you should contact: Mr. Paul Keter, the Principal Investigator on 0721703362 or Email: paulkibet07@gmail.com OR the Secretary of Ethical Review Committee, KEMRI on 020-272-2541/6781 or 0722-205 901/0733-400003 or Email: erc@kemri.org

Participant submission

I, the undersigned have understood the above information which has been fully explained to me by the investigator. I have agreed to voluntarily consent to participate. I was given the chance to ask questions and I received satisfactory responses.

Name of respondent..Signature........…...........Date..............
Name of person obtaining consent…...........................Signature...................Date…....
(Must be the investigator or individual who has been designated to obtain consent)

APPENDIX IV: Questionnaire

Study Title: To evaluate knowledge, attitudes and practices of mothers in relation to childhood pneumonia and factors associated with pneumonia and seeking health care in Kapsabet District Hospital in Nandi County

Questionnaire no…………………Date of interview……....................................

Section 1: Socio-Demographic Characteristics

1. Mother's age (years) _____

2. Marital status

☐ Married   ☐ Single

☐ Widow   ☐ Separated

☐ Divorced

3. Level of education

☐ None   ☐ Lower Primary(Class 1-3)

☐ Upper Primary(Class 4-8)   ☐ Secondary

☐ College   ☐ University

4. How many children do you have?

☐ Alive   ☐ Dead

☐ Total

1. What type of house do you live in? (Tick appropriately)

Permanent (stone or brick walled)			Semi-permanent (iron sheets roof & mud/wooden walled)			Temporary (Grass thatched roof/mud walled)		
Own	Rented	Parent's/ guardian's	Own	Rented	Parent's/ guardian's	Own	Rented	Parent's/ guardian's

Section 2: Socio-Economic Characteristics

2. What is your occupation?

☐ Unemployed/housewife   ☐ Self employed (Business)

☐ Formal employment   ☐ Casual labourer

☐ Farmer   ☐ Others (Specify) _____

3. What is the occupation of spouse? (If married)

☐ Unemployed   ☐ Self employed (Business)

☐ Formal employment   ☐ Casual labourer

☐ Farmer   ☐ Others (Specify) _____

4. What are your sources of income in order of priority? _____

Section 3: Knowledge, Recognition and Response to Childhood Pneumonia

1. Do you know what pneumonia is?

☐ Yes   ☐ No

   If yes, (in your opinion) what is pneumonia? (Please write) _____

2. What is the name given to pneumonia in your local language?

_____

3. From which sources did you first get information on pneumonia?

☐ Health workers   ☐ TV or radio

☐ Older persons in   ☐ Newspapers, publications and

   family/community   journals

☐ Other (Specify) _____ ☐ Do not know

4. In your opinion, what are the signs and symptoms of pneumonia? (Can be many answers)

☐ Fever   ☐ Chills

☐ Headache   ☐ Cough

☐ Chest in drawing   ☐ Wheezing

☐ Shortness/difficulty in breathing   ☐ Chest pain/sharp/stabbing pain

☐ Convulsions ☐ Rapid/fast breathing

☐ Fatigue/weak ☐ Loss of appetite

☐ Excessive sweating and clammy ☐ Body/muscle pain
  skin

☐ Other (specify) _____ ☐ Do not know

5. What do you think are the causes of pneumonia?

☐ Cold temperature/weather change ☐ Dust/germs

☐ Bacteria ☐ Virus

☐ Fungi ☐ Witchcraft

☐ Others(specify) _____ ☐ Do not know

6. What measures do you think should be taken to prevent childhood pneumonia?
(can be many answers)

☐ Vaccination/immunisation ☐ Improve child's immune system

☐ Proper nutrition (balanced diet) ☐ Breastfeed exclusively

☐ Clothing warmly during cold ☐ Proper house ventilation
  season

☐ Washing hands ☐ Other (specify) _____

☐ Do not know

Section 4: Attitudes, Practices and Perception towards Childhood Pneumonia

1. Has your child ever suffered from pneumonia?

☐ Yes   ☐ No   ☐ Do not know

2. If you had a child suspected of pneumonia, where would you first seek
treatment/advice?

☐ Take child to the closest health ☐ Visit a doctor
  facility   ☐ Traditional practitioner

☐ Visit a pharmacist/chemist ☐ Religious leader

☐ Get medicine from a shop ☐ Other (specify) _____

☐ Neighbour/friend ☐ Do not know

3. When would you visit the doctor/health centre when a child is suspected of pneumonia?

☐ Immediately/within 24hrs   ☐ After 24 hours

4. At home, prior to hospital attendance, what would you do if you had a sick child with fever and/or suspected of pneumonia?

☐ Giving drugs e.g., aspirin, pain killers   ☐ Feed child with liquid food/fluids

☐ Breastfeeding   ☐ Nothing

☐ Do not know   ☐ Other (specify) _____

5. Have you seen or heard any information on pneumonia vaccine?

☐ Yes   ☐ No

If yes, please give source of the information?

☐ TV or radio   ☐ Newspapers

☐ Relative/friend   ☐ Health worker

☐ Other (specify) _____

6. What do you think is the potential risks of getting childhood pneumonia? (Can be many answers)

☐ Poor nutrition   ☐ Lack of breastfeeding

☐ Lack of parental care   ☐ Common cold or flu

☐ Measles   ☐ Cold weather

☐ Other chronic/underlying diseases, e.g., AIDs   ☐ Overcrowding

☐ Air pollution   ☐ Other (specify) _____

☐ Do not know

7. What do you think is the risk of childhood pneumonia?

☐ Not dangerous   ☐ Dangerous

☐ Highly dangerous   ☐ Do not know

APPENDIX V: Focus Group Discussion Guide for Mothers

My name is Mr. Paul Keter, a student at JKUAT. Before we start I would like to welcome you to this meeting and thank you all for coming. This is a participation and discussion group for all of you and everybody has an equal opportunity to contribute to the discussion. Let me encourage you to speak your minds freely and that there are no right or wrong answers in this discussion. At the end of the discussion, the contributions will be treated as having come from the group and not an individual. I have with me an assistant who will help me record the points that you will be sharing as I may not be able to talk, listen and write at the same time. We have also brought with us a tape recorder to record this discussion because sometimes we talk faster than he can write and we would not want to miss anything. Let me assure you that the recording will only be for my own use when I'm writing out the full report. Mothers are usually the primary care providers for their children and their ability to recognize symptoms of pneumonia determine the success of controlling mortality from this condition. I would like to hear your thoughts on;

1. Information on common childhood illnesses in the locality and specifically childhood pneumonia, categorise and rank in order of severity and explore signs and symptoms, causes, transmission and perceived potential risk factors.

2. The terminologies and phrases that is used to describe childhood pneumonia in your locality or community.

3. When to seek treatment or advise when a child is suspected of pneumonia and factors associated with seeking of healthcare services such as delays in seeking healthcare.

4. Whether there is any known treatment of childhood pneumonia in this community and home management practices prior to hospital attendance.

5. Community approach in prevention and control of pneumonia and whether you have heard of pneumococcal vaccine.

Conclusion: The discussion has been very interesting and we have learnt a lot. Thank you very much and anyone with a comment is free to make it.

APPENDIX VI: Key Informant Interview Guide for Health Workers

Date of the interview…………………….............

Key informant(s)………………...

1. Do mothers in this community easily recognize the early signs and symptoms of childhood pneumonia? And when do they bring their children (state conditions).

2. Are there any mothers' beliefs, attitudes and perceptions associated with childhood pneumonia in this community? What about their behaviour in seeking of healthcare?

3. Do you advice mothers on the importance of early seeking of health care?

4. How would you rate mothers' response and understanding of childhood pneumonia in this community?

5. Please give us the information on common illness in the locality, list them and rank in order of severity.

6. Are there any known terms and phrases used to describe childhood pneumonia and other common illness in this locality?

7. What are the major causes of childhood pneumonia in this locality? And is it a major public health concern in this area? How frequent is the illness in this locality? Any known treatment for pneumonia in this community?

8. What do you think should be done to ensure all mothers in this community recognize and respond appropriately to childhood pneumonia?

9. What are the constraints involved that affect the utilization of healthcare services by mothers in this locality?

10. Has the government done enough to prevent childhood pneumonia in this area? If no, what should the government do?

APPENDIX VII: KEMRI Ethical Review Committee Approval

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org   info@kemri.org   Website:www.kemri.org

KEMRI/RES/7/3/1   July 13, 2012

TO: MR. PAUL KETER (PRINCIPAL INVESTIGATOR)

THROUGH: DR. YERI KOMBE,
               THE DIRECTOR, CPHR
               NAIROBI

Dear Sir,

RE: SSC PROTOCOL No. 2212 – 2ND REVISION (*RE-SUBMISSION*): KNOWLEDGE,
       PERCEPTIONS AND PRACTICES OF MOTHERS IN RELATION TO CHILDHOOD
       PNEUMONIA AT KAPSABET DISTRICT HOSPITAL IN NANDI COUNTY (*VERSION
       DATED 9 JULY 2012*)

Reference is made to your letter dated July 9, 2012. The ERC Secretariat acknowledges receipt of
the revised proposal today, July 12, 2012.

This is to inform you that the Committee determines that the issues raised at the 202nd ERC
meeting of 28th May 2012 are adequately addressed. Consequently, the study is granted approval
for implementation effective this **13th day of July 2012** for a period of one year. Please note
that authorization to conduct this study will automatically expire on **July 12, 2013**.

If you plan to continue data collection or analysis beyond this date, please submit an application
for continuation approval to the ERC Secretariat by **May 31, 2013**. The regulations require
continuing review even though the research activity may not have begun until sometime after the
ERC approval.

You are required to submit any proposed changes to this study to the SSC and ERC for review
and the changes should not be initiated until written approval from the ERC is received. Please
note that any unanticipated problems resulting from the implementation of this study should be
brought to the attention of the ERC and you should advise the ERC when the study is completed
or discontinued.

Work on this project may begin.

Sincerely,

DR. CHRISTINE WASUNNA,
ACTING SECRETARY,
KEMRI ETHICS REVIEW COMMITTEE

In Search of Better Health

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APPENDIX VIII: KEMRI Scientific Steering Committee Approval

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org   info@kemri.org   Website:www.kemri.org

ESACIPAC/SSC/100274   23rd April, 2012

Paul Keter

Thro'
Director, CPHR
NAIROBI   *Forwarded*
                                                      26/4/2012

REF: SSC No. 2212 (2nd Revised) – **Knowledge perceptions and practices of**
       mothers in relation to childhood pneumonia at Kapsabet District
       Hospital in Nandi County

Thank you for your letter dated, 13th April, 2012 responding to the comments
raised by the KEMRI SSC.

I am pleased to inform you that your protocol now has formal scientific
approval from SSC.

The SSC however, advises that work on the proposed study can only start after
ERC approval.

Sammy Njenga, PhD
SECRETARY, SSC

In Search of Better Health

APPENDIX IX: Kapsabet District Hospital Approval

`REPUBLIC OF KENYA

MINISTRY OF MEDICAL SERVICES

Telegrams; MEDICAL;
Telephone; 52081,52623
When replying please quote

The Medical Superintendent
Kapsabet District Hospital.
P.O Box 5 - 30300
KAPSABET.

7th Aug 2012

To Paul Kibet Keter
P .O. Box 26086
Nairobi

RE: Research Study on Knowledge, Perceptions and Practices of mothers in relation to childhood Pneumonia at Kapsabet District Hospital in Nandi County

Reference is made to the above study.
I am glad to inform that your request to conduct the above study has been approved. Notify us the date you will begin.

Thanks

Dr Serem K. Edward
Medical Superintendent
Kapsabet District Hospital

07 AUG 2012