Knowledge, Attitude and Practice of Mothers of under Five Year-old, to words Children towards Pneumonia, Bashir Banaga Health Centre, Gezira State, Sudan (2013)

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Bismillah al-Rahman al-Rahim

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Supervision Committee

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Date: August, 2013
Knowledge, Attitude and Practice of Mothers of under Five Year-old, to words Children towards Pneumonia, *Bashir Banaga Health Centre, Gezira State, Sudan (2013)*

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Date of Examination: 15/8/2013
Dedication

To soul of my husband Bakri (رحمه الله)

To my family

To the children
Acknowledgement

I am deeply grateful to my supervisor, Dr:Salwa Alsanosi the head of department of community for guiding me through the various stages of this research and for putting me at ease each time I met with her. I value hers wise judgment highly. A special gratitude goes to my local supervisor, Dr: Abdelnasir, for his wise and valuable guidance during my work, I thank my, mother and sisters for constantly supporting me and for making it all worthwhile. My appreciation goes out to Dalia, Sara & Adawia, my research assistants, for their dedication during the data collection. I would like to extend my thanks to Badr Aldien who patiently sat for hours, teaching me the fundamentals of statistical analysis; and to Sara, who critically read the draft of this work, giving me valuable comments. Last but not least, I am deeply grateful to all the mothers and children for their participation in this study. I hope that this study will contribute to the well being of our children.
Knowledge, Attitude and Practice of Mothers of under Five Year-old, to words Children towards Pneumonia, Bashir Banaga Health Centre, Gezira State, Sudan (2013)

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Abstract

Mothers’ Knowledge, Attitude and Practice To words Pneumonia in children under-five: a study in Bashir Banga Catchment Area in Hassahisa, Sudan: Pneumonia is a major cause of under-five morbidity and mortality in Sudan. Pneumonia standard case management has been followed in Sudan through the National ARI Programme. The aim of this study to assess Bashir Banaga mothers’ knowledge and recognition of pneumonia among children under 5 years of age, the mothers’ attitude toward seeking medical help if they had a child with symptoms of pneumonia. In this cross-sectional study, 250 mothers were selected randomly and were interviewed Between March and April 2013. Using SPSS software, descriptive statistics were applied to summarize the demographic data and the data regarding the mothers’ knowledge of pneumonia and recognition of signs of the disease. Cross-tabulations and chi-squares test were done to assess the relationships between variables and to make comparisons. Results: About (75.6%) of the mothers said that they knew what pneumonia is. Most believed that pneumonia is dangerous. A majority (35.6%) indicated that pneumonia is caused by lack of parental care. Only 26% believed that a virus causes the disease. More than 80% correctly picked rapid breathing and/or chest retraction from a list of possible signs and symptoms of pneumonia, and 67.6% said they were ready to take their child to the closest health center if they thought their child had pneumonia. Although the percentage of mothers believing they can recognize pneumonia through rapid breathing and chest retraction seems to have increased in recent years, there is still a sizable percentage of mothers who remain uninformed about pneumonia and its possible fatal consequences. Efforts need to continue to educate Bashir Banaga catchment area mothers about the causes, recognition of the signs, and treatment of pneumonia.
ملخص الدراسة

التهاب الرئوي هو سبب رئيسي في زيادة معدلات الاعتلال والوفيات للأطفال دون سن الخامسة في السودان، وقد اتبعت ادارة الحالات القياسية في السودان من خلال برامج ARI والالتهاب الرئوي إدارة الحالات القياسية في السودان من خلال برنامج ARI، والهدف من هذه الدراسة هو تقييم معرفة الأمهات وا تجاهات حول الالتهاب الرئوي بين الأطفال دون سن 5 سنوات من العمر، وا تجاه طلب المساعدة الطبية إذا كان لديهم طفل يشكو أعراض الالتهاب الرئوي.

في هذه الدراسة المستعرضة، تم اختيار 250 من الأمهات بشكل عشوائي في الفترة مابين مارس وابريل 2013، باستخدام برنامج SPSS الإحصائي، وطبقت إحصاءات وصفية لتلخيص البيانات الديموغرافية والبيانات المتعلقة بمعرفة الأمهات من الالتهاب الرئوي والاعتراف علامات المرض. تم القيام به عبر الجداول وتشي الساحات اختبار لقيم العلاقات بين المتغيرات وإجراء مقارنات النتائج. أعطت النتائج معلومات عن (75.6٪) من الأمهات قالوا إنهم يعرفون ما هو الالتهاب الرئوي. معظمهم يعتقد أن الالتهاب الرئوي هو خطير. وأشارت الغالبية (35.6٪) أن الالتهاب الرئوي ينجم عن الافتقار إلى الرعاية الأبوية. يعتقد 26٪ فقط أن الفيروس المسبب للمرض. أكثر من 80٪ اخترت بشكل صحيح وسرعة التنفس و / أو انكماش الصدر من قائمة علامات محتملة وأعراض الالتهاب الرئوي، وقال 67.6% أنهم كانوا على استعداد لاتخاذ أطفالهم إلى أقرب مركز صحي إذا كانوا يعتقدون كان طفليهم مصابين بالالتهاب الرئوي.

على الرغم من أن نسبة الأمهات يعتقدون أنهم يمكن التعرف على الالتهاب الرئوي من خلال التنفس السريع وترعى الصدر يبدو أنه قد أزداد في السنوات الأخيرة، لا تزال هناك نسبة كبيرة من الأمهات الذين ما زالوا غير مطمئنين على الالتهاب الرئوي وعواقبه قاتلة. تحتاج إلى جهود لمواصلة تنفيذ البشير بانقا أمهات منطقة القابضة حول أسباب الالتهاب الرئوي، وعلاج الالتهاب الرئوي.
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<tbody>
<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
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<tr>
<td>ANA</td>
<td>Acute Respiratory Infections Needing Assessment</td>
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<tr>
<td>CDD</td>
<td>Control of Diarrhoeal Diseases</td>
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<td>CLHP</td>
<td>Child Lung Health Programme</td>
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<tr>
<td>EPI</td>
<td>Extended Programme of Immunization</td>
</tr>
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<td>EPI-LAB</td>
<td>LAB Epidemiological Laboratory</td>
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<tr>
<td>ETAT</td>
<td>Emergency Triage and Treatment</td>
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<tr>
<td>FMoH</td>
<td>Federal Ministry of Health</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>IDPs</td>
<td>Internally Displaced Persons</td>
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<tr>
<td>KAP</td>
<td>Knowledge, attitude and practice</td>
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<tr>
<td>UNION</td>
<td>International Union against Tuberculosis and Lung Disease</td>
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<td>MCH</td>
<td>Maternal and Child Health</td>
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<td>MICS</td>
<td>Multiple Indicator Cluster Survey</td>
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<tr>
<td>NCHS</td>
<td>National Centre for Health Statistics</td>
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<tr>
<td>NGO</td>
<td>Non-governmental Organization</td>
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<tr>
<td>NTP</td>
<td>National Tuberculosis Programme</td>
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<tr>
<td>OPD</td>
<td>Out-patient Department</td>
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<tr>
<td>PHC</td>
<td>Primary Health Care</td>
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<td>SCM</td>
<td>Standard Case Management</td>
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<tr>
<td>SDD</td>
<td>Sudanese Dinars</td>
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<tr>
<td>SMoH</td>
<td>State Ministry of Health</td>
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<tr>
<td>SMS</td>
<td>Safe Motherhood Survey</td>
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<tr>
<td>UNICEF</td>
<td>The United Nations Children’s Funds</td>
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Annex II Consent Form

Introduction: Introduce yourself

I am _______________ from _______________. I am here to conduct a study on pneumonia in children under five. The study is trying to understand the care that is provided to children with pneumonia. I will ask questions on your child’s current illness and what you did.

Request to participate

You are completely free to participate in this study. You do not have to answer any question that you don’t wish to, and you can end the interview at any time. All the answers you give will be confidential and will not be known to anyone except the main researcher and researcher assistant. The information you give will not be used in connection with you. Acceptance or refusal to participate will not affect the care you get here at this hospital. However, your answers will help us understand the care that people seek for their children before they bring them to hospitals. I will greatly appreciate your participation.

Do you have any questions?

If you wish to participate, please sign here.

Participant’s signature _______________
Witness’s signature _______________
Date -- / -- / ----

If the participant cannot write, obtain witnessed consent.
Chapter One

1. Introduction

Acute respiratory infections (ARI), predominantly pneumonia, are one of the leading causes of death amongst young children in developing countries (1-3). The World Health Organization (WHO) estimated that ARI accounted for 18% of death among children under five years of age globally (4). In Sudan, ARI is the third cause of outpatient department (OPD) consultation in children under five (5) and pneumonia remains the leading cause for under five hospital admission and mortality (6). From this stemmed the importance of promoting child lung health through the Child Lung Health Programme (CLHP). The ARI programme, under the Federal Ministry of Health (FMoH), has entered into a co-operation with the International Union of Tuberculosis and Lung Disease (UNION) and Epidemiological Laboratory (Epi-Lab) to implement the CLHP. The Epi-Lab is a national centre developed from the experiences of the Sudanese National Tuberculosis Programme (NTP). The aims of the CLHP are to implement the UNION programme for the surveillance, diagnosis and treatment of respiratory diseases in children, based on the successful model for tuberculosis control, and by applying the WHO standard case management (SCM) strategy. The CLHP is still in the situation analysis phase.

In Sudan, little is known about the case management of pneumonia in first referral hospital settings, and the extent to which standardised guidelines are being followed in inpatient management. In this study we are trying to put forth baseline data on SCM which the CLHP can use in its implementation activities, and against which it can monitor and evaluate its progress once it has started. In doing so, we are aiming to identify measures that should be taken at a first referral hospital to improve delivery of SCM. Moreover, we are describing the health seeking patterns and different care providers for children under five with pneumonia before reaching the hospital, enabling the development of community-targeted health education messages that could be complementary to the programme.
Background

Country Profile

Sudan is the largest country in Africa with an area of 2.5 million square kilometers. It has borders with the Red Sea and seven other African countries, where the Sudanese population and those of the neighbouring countries move freely across these borders. It is characterized by a strategic geographical location, which links the Arab world to Sub Saharan Africa. Sudan is a multicultural and multi-ethnic society. The country is a federal state, divided administratively into 16 states. The climate is arid in the north and tropical in the south, where the rainy season lasts from April to October.

Population and demographic characteristics

The population of the country is estimated at 33.419.625 million (projected from 2008 census).

The population is unevenly distributed in the 20 States; the majority is concentrated in 6 States of the Central Region with a mean population density of 10 people per square kilometers, increasing to 50 at the agricultural areas(7). Around 30% of the population lives in urban areas due to migration which includes large numbers of internally displaced persons (IDPs) from southern Sudan. The United Nations estimates that there are 4 million IDPs in Sudan. In many cases, particularly in Khartoum, the distinction between the IDPs and the urban poor has become blurred over the years(8).

With an annual growth rate of 2.6% and fertility rate of 5.9 (5.1 in urban and 6.5 in rural areas), young people dominate Sudan's demographic structure: 16% of the population is less than 5 years and 45% less than 15 years(5).

Socioeconomic context

Sudan is rich in terms of natural and human resources, but economic and social development have been below expectations. Life expectancy at birth, a measure of the general health condition and an indicator of the standard of living, was estimated around 54 years, about the average of least developed countries(7). Half of the population over age 15 years is illiterate with a wide range of variation between urban (33%) and rural (61%), without a notable gender gap (9).
In Sudan, well over 50% of the population lives below the poverty line. The overall government health expenditure is very low and the health sector is under-funded. As overall government expenditure has increased largely due to growth in oil revenues, allocation to health sector in absolute terms have also increased. The Gross Domestic Product (GDP) per capita for 2001 was estimated at $395. Recently, increased government revenues (largely due to oil production) have allowed an increase in public expenditure on the health sector. However, as a proportion of total government spending it has remained relatively constant at very low levels in comparison with other developing countries (7). No data is available concerning the specific expenditure on child health, and the current initiatives and programmes working in child health depend mainly on resource from external donors, mainly UN agencies and international organizations (10).

**General Organization of the health system**

The introduction of federalism in Sudan in 1994 fostered a three-layered health system structure. These are Federal, State Ministries of Health (SMoH) and Local health system. The Federal Ministry of Health (FMoH) is responsible for the development of national health policies, strategic plans, monitoring and evaluation of health systems activities. The SMoH are mainly responsible for policy implementation, detailed health programming and project formulation. Sudan has 26 SMoH, one in each State. Within each State there are a number of localities (134 in total) managed through the Health Area System; however less than half of the localities have a functioning Health Area System, and only 19 are reportedly working to the standards (11). Health services are provided through different partners in addition to federal & state ministries of health, including armed forces, universities and the private sector (7).

The delivery of care is organized in three tiers. The first level consists of Primary Health Care (PHC) units (providing essential PHC services), dispensaries (managing more serious cases) and health centres (which include laboratory and X-ray units, but no inpatient wards, and are usually staffed with medical assistants, doctors, vaccinators, laboratory technicians and nutritionists). The PHC units are usually staffed by community health workers and dispensaries are staffed by medical assistants and nurses. The second level (first referral) is represented by rural hospitals, which are usually staffed by physicians, medical assistants, nurses and other paramedical staff. Specialized and teaching hospitals in the state capitals, offering more developed services, represent the tertiary (second referral)
level. Primary level health facilities represent 95% of the total network, while the two higher levels contribute only 5%. The system is not uniform and variations do exist especially in the worse-off states and localities. Urban-rural variations also exist(5).

**Child mortality and morbidity in Sudan**

The 1999 Safe Motherhood Survey (SMS) data suggest that the infant mortality rate was 68 per 1000 live births with little difference between urban and rural areas.

Under-five mortality rate was 104 per 1000 live births in the north (101 urban, 105 rural). These levels are lower than the Sub-Saharan Africa average of 162 but, masks rates that are comparable and sometimes higher than the Sub-Saharan average, namely in South Kordofan, Kassala, Blue Nile and Red Sea(9).

The 2003 health statistical report showed that deaths among children under five were caused by pneumonia (17%), malaria (12%), malnutrition (10%), septicemia (12%), dehydration (9%) and diarrhoea (8%), which is highly correlated with life style, living conditions and the nutritional deprivations experienced by the poor. The top five causes of under-five hospital admission were pneumonia (27.4%), malaria (23.5%), dehydration (9.3%), malnutrition (7.6%) and diarrhea (7.4%) in 2003 (6).

Seventeen percent of under-five children in the north and 14% in the towns of the south had an acute respiratory infection in the two weeks prior to the Multiple Indicator Cluster Survey (MICS) in 2000. In the north, about 15 percent of children under five in urban compared to 17.8% in the rural areas had ARI. Approximately 62% of these children were taken to an appropriate health provider(9).

**Child health services**

The child health services are routinely provided at the PHC facilities at both rural and urban areas. The services are included within the maternal and child health (MCH) package of services and focused on immunization, nutritional services, education and curative services of the sick child. The distribution of the MCH centers varies widely is different states. Out of a total 2,500 eligible health facilities, only 820 health facilities (33%) provide MCH services with a breakdown of 133 hospitals, 433 health centers and 254 health units. In nine states, MCH services are not provided through public sector health facilities. Of the total number of health facilities providing MCH services, 395 or 48% are located in Khartoum state. The two extremes are that there is one public sector owned MCH facility.
for 12,500 population in Khartoum state and 230,570 in West Darfur versus no facility in another nine states. The specialized curative services are provided at tertiary facilities mainly for the seriously sick and complicated cases. The child health service standards at various levels of the health care delivery system are not well addressed. Accessibility and availability, early referral and emergency management especially in the rural areas are chronic problems of the child health services(11).

**The Child Lung Health Programme**

The FMoH has entered into a co-operation with the UNION and Epi-Lab to implement the CLHP. The aims of the CLHP are to implement the UNION programme for the surveillance, diagnosis and treatment of respiratory diseases in children, based on the successful model for tuberculosis control. At the same time it aims to build up the competence of the programme by strengthening the management and technical capacity at central and district levels of the ministry of Health. The ultimate purpose is to establish national self sufficiency of health services delivery for respiratory diseases in children. The programme's specific objectives are:

1. To standardize case management for severe and very severe pneumonia in the secondary level hospital paediatric inpatient wards.

2. To reduce mortality due to respiratory diseases especially severe/very severe pneumonia in children under 5 years of age.

3. To rationalize the use of drugs for ARI in children under 5 years of age.

4. To provide uninterrupted supplies of essential drugs and oxygen at secondary level hospitals. The programme will be incorporated into the existing structure for organization of health services and will be implemented by the personnel already working within these services.
Objectives

General objective
To assess Bashir Banaga mothers' knowledge and recognition of pneumonia in children under 5 years of age, the mothers’ attitude toward seeking medical help if they had a child with signs of pneumonia,

Specific objectives
1. To determine the proportion of mothers who know danger signs of pneumonia that require health care seeking behavior.
2. To assess the knowledge of mother on pneumonia
3. To assess the practice of mother on pneumonia
4. To correlate the knowledge of mother with the practice regard pneumonia
5. To associate the practice of mother regarding pneumonia with the selected demographic variables
6. To associate the practice of mother regarding Pneumonia under 5 year with the selected demographic variables
Chapter Two

Literature review

Burden of Acute Respiratory Infections in the Developing World

ARI is the leading cause of deaths in young children in low income countries; the form of ARI most often leading to death, in this age group, is pneumonia (1). The percentage of children dying from pneumonia in developing countries rises up to 26%. The largest part of these deaths is due to pneumonia either as an underlying cause, or as a result of infections complicating measles, pertussis or AIDS (12).

ARI cause one of the most frequent illnesses in children under five years throughout the world with an average of 4 to 9 episodes per child annually. The high incidence of ARI is reflected in the use of healthcare services: up to 60 percent of all paediatric outpatient visits and 20 to 49% percent of paediatric hospitalizations in low income countries are patients with ARI(12).

Standard Case Management

The WHO established a global ARI programme in the early 1980s to promote the early detection of ARI, especially pneumonia in the community. The specific aims of the programme are the reduction of the incidence and mortality of pneumonia, the reduction of inappropriate use of medications for the treatment of ARI, and the reduction of upper ARI complications. The cornerstone of the programme is the standard case management (SCM).

Case management involves: (1)
- early recognition of pneumonia by health workers using signs of fast breathing and chest indrawing
- prompt referral to hospital for injectable antibiotic treatment and other intensive care, for severe and very severe cases
- antibiotic treatment at home with recommended drugs, for cases of pneumonia that are not severe
- supportive home care for the vast majority of ARI that do not require antibiotics. Case management intervention studies have shown that the case management strategy has a substantial effect on infant and under five mortality(13).
Case management guidelines

The WHO and the United Nations Children's Fund (UNICEF) combined the successful approaches to ARI and diarrhoeal disease case management, and added to them the clinical management of malaria, measles, meningitis and malnutrition.

Integrated Management of Childhood Illness (IMCI) is the name given to this combined approach(14). The IMCI strategy is to improve case management at first level facilities. Case management guidelines at the first-level outpatient facility describe the following basic steps:

• The health worker first *assesses* the child by asking questions, examining the child, and checking the immunization status.

• The health worker then *classifies* the child's illnesses, using a colour-coded triage system; each illness is classified according to whether it requires urgent referral, specific medical treatment and advice, or simple advice on home management.

• Specific *treatments* are then identified; if the child is to be referred urgently, the health worker gives only essential treatment before the child is transferred.

• The *mother is taught* how to treat her child at home, including how to give oral drugs, to increase fluid intake during diarrhoea, and to treat local infections.

• The *mother is advised* on how to recognize the signs which indicate that the child should immediately be brought to the clinic and is given the dates for routine follow up; feeding practices are assessed and the mother is advised on how best to feed her child.

• Finally, any necessary *follow-up instructions* are given when the child returns to the clinic.

Case management at the first referral level

Further reduction in child mortality can be achieved by effective care at the first referral level, such as district or small hospitals in developing countries. Guidelines were developed that focused on the inpatient management of the major causes of childhood mortality, such as pneumonia, diarrhoea, severe malnutrition, malaria, meningitis, measles, and related conditions(15). These address the need for high quality of care of children admitted to referral facilities. There is an emphasis on the sequential process for managing sick children as soon as they arrive in hospital, starting from triage and emergency treatment, to assessment (including history, examination and appropriate laboratory investigations), treatment, monitoring progress and discharge.
In this context, pneumonia case management means that a child presenting with cough/difficulty breathing is assessed for the presence of danger signs (e.g. convulsions, inability to drink, cyanosis) and clinical signs (e.g. respiratory rate and chest in drawing), classified, treated and monitored accordingly.

**Quality of care**

Many factors contribute to quality of care. Donabedian defined and assessed quality of care using a framework incorporating structural, process and outcome elements which have several measures\(^{(16)}\). Structural components include materials, equipment, personnel and training. Some of the process components are adequacy of diagnosis, treatment and prevention procedures, use of case management guidelines and skills of health workers and supervision. One of the most important and most commonly used outcome measures in clinical settings is patient satisfaction.

There is little published literature on general paediatric quality of care from developing countries. Most of the literature from industrialised countries relates to specific diseases or to admission and discharge experience with very little published on general quality of paediatric care\(^{(17)}\). One study that attempted to get an overview of paediatric emergency care in hospitals in developing countries was that conducted by Nolan and his colleagues\(^{(18)}\). It covered a broad range of quality issues including emergency triage and treatment (ETAT); in-patient management; knowledge, skills and practices of health workers and support services. This study sought to identify potentially reversible causes of poor quality of care /poor outcomes in 21 hospitals in countries (typically one teaching hospital and 2 district hospitals in each country).

Many problems with triage, emergency care, monitoring, drug availability, staffing levels, and the use of protocols were found. In all instances the quality of care delivered by teaching hospitals was found to be higher than that within small hospitals in the same country. Another important area that has received little attention and that was highlighted by the study was the importance of monitoring of the progress of the sick child in hospital.

In Nigeria, shortcomings in equipment, training, supervision and non-use of national case management algorithms, in addition to a range of quality measures, contributed to inadequacy in the quality of health service delivery at the PHC level \(^{(19)}\). Case management was found to be deficient in both Benin and Zambia, where it was found to be inconsistent and not standardized, with incomplete assessment of children’s signs and symptoms,
incorrect diagnosis and treatment of potentially life threatening illnesses, and failure to refer seriously ill children to hospitals (20;21).

Health worker evaluation studies can be used to identify predictors of health worker performance. The knowledge of these predictors can be used to help in the design of interventions. Quality improvement, however, should not focus too narrowly on individual competence as measured by knowledge and skills, rather than make an overall status assessment of health practices within the health system (17).

**Care seeking**

The decision to take a sick child to a health facility is part of a complex care-seeking process that can involve many people. It has three interlinked components which differ in importance depending on the setting. Caregivers:

1. Initially *recognize* that the child is ill
2. *Label* the illness, both within the local classification system and by severity, based on the recognized symptoms and illness context
3. *Resort to care*, influenced by the label, along with barriers such as time and money constraints.

The process is not linear; for example within an illness episode the label may change as community members offer advice, new symptoms are recognized and treatments fail (22). Appropriate care-seeking means that the need to take the child for treatment outside the home is recognized, that the care is not delayed, and that the child is taken to an appropriate health facility or provider (22). Throughout the literature, care seeking for childhood illnesses has been associated with many factors including child, caregiver, facility and illness characteristics. Child characteristics are the age and sex of the child. Caregiver characteristics include age, education, occupation and income of the caregiver. Facility's costs, physical and social distance, and quality of care are implicated as important factors. Finally, the illness characteristics; in the form of type, severity and local beliefs/perceptions; play a major role in care seeking patterns. All these factors differ in importance depending on the different settings, but definitely all have an important impact on the care seeking process.

The prevalence of caregiver recognition of severe illness varies. In an urban community in Addis Ababa, most mothers didn’t recognize rapid breathing and chest indrawing(23),while in a rural setting in northeast Ethiopia mothers recognized pneumonia by grunting, fast
breathing, decreased feeding and fever (24). In other settings recognition appeared to be good, with 65% of mothers in Egypt correctly identifying children with ARI as having fast, abnormal or rapid breathing (25).

Ethnographic studies also report variations in recognition. A study in Ghana found that poor recognition of danger signs was a barrier to care seeking (26). In Sri Lanka however, high care seeking of mother caretakers was noted, particularly for illnesses with acute high-risk symptoms and signs (27). In India, there was little recognition of fast breathing (28). In two studies, one in Pakistan and one in Bangladesh, however, ARI symptoms were well recognized (29;30). Recognition is only part of the care seeking pathway however, and is not always the reason for poor care-seeking. In the rural setting study in Ethiopia, even though the caretakers recognized important respiratory signs, only 36.5% would take their children to a nearby health center (24).

Similarly, in Egypt, caretakers didn't use their recognition to take appropriate action (25). On the contrary, in Sri Lanka, recognition was not necessary for careseeking; caretakers could not recognize danger signs and symptoms but overall careseeking was high (27).

Illness management practices vary from home remedies; self prescribed drugs and dietary restrictions to immediate care seeking from different providers. Most studies report home treatment in the initial stages (24;26;29;31;32). Providers may be broadly divided into allopathic and alternative health providers. Several studies have shown variations in the use of the two systems of care. In Indonesia (33) and Ethiopia (24) there was a high prevalence of using the traditional sources of health care, while in other settings private doctors were used more frequently (25;27;29). Possible explanations put forth for such a phenomena is that private doctors are often perceived as being of better quality, having more convenient opening hours, a better supply of drugs and shorter waiting times. In some settings, medical care was promptly sought for most severely ill children but the choice of providers was inappropriate or the overall quality of care poor (28;29).

Mothers’ age and education, age and sex of the child, duration of the illness and socioeconomic status have all been given different weights in the care seeking process and in the utilization of different health services. In Brazil, mothers’ education and family income were not found to be positive predictors of the type of care sought, whereas the duration of illness was significantly associated with the first source of care sought (34).
Indonesia, Sutrisna et al. found that the child's age and duration of his/her illness were independent predictors of care seeking behaviour (33).

**IMCI in Sudan**

IMCI was introduced as a strategy to address the most important causes of under-five mortality and morbidity using an integrated approach in line with the primary health care policy. The early implementation phase of IMCI in Sudan started in December 1997, involving two states (Khartoum and Gezira). Since 2000, the strategy has been expanding and IMCI is now implemented in 15 states: 8 in the expansion phase, 4 in the early implementation phase & 3 states in the introductory phase (10).

The main component adequately addressed through the IMCI is the training of the health care providers at various levels on standard case management through establishing training centers. The other two, namely strengthening of the health care system and improving the quality of the community-based childcare are not well addressed (11).

**Acute Respiratory Infections in Sudan**

Sudan implemented a national ARI programme from 1987, thus following the SCM guidelines that were established by the WHO. Relatively few studies were done on ARI in Sudan. Through our literature review, two studies looking at risk factors in hospitalised children were identified (35;36). A community based intervention study assessed mothers’ and caretakers’ knowledge, attitude and practice (KAP) about appropriate care seeking for children with ARI, and evaluated the impact of a health education on their KAP (37). A quasi-experimental study to evaluate the capability of community health workers to correctly manage ARI cases in the Red Sea State suggested that these latter could effectively detect and treat ARI cases (38).

Two main survey instruments for the evaluation of ARI programmes have been developed by the WHO: the health facility survey, which provides information on progress made in training, supervision and logistics to ensure population access to SCM of pneumonia, and the household survey, which is intended to measure the effect of communication activities in increasing families’ use of the SCM of pneumonia offered by health facilities (39). Both types of surveys were conducted in Sudan. The ARI health facility survey was conducted in November 1994 in hospitals and health centers in Khartoum and four central states (Gezira, Sennar, Blue Nile and White Nile) (40). Results showed that while 57% of the
health facilities were able to give standard case management, only 39% of pneumonia cases managed in the health facilities received SCM. Nevertheless, the findings provided some encouraging evidence: surveyors and health workers agreed on correct ARI classification in 71% of cases observed, and recommended antibiotics were the most commonly used drugs to treat pneumonia. This was followed in 1995 by a CDD/ARI household survey in three states: Khartoum, Gezira and Kassala (41). This survey revealed a 23% prevalence of ARI Needing Assessment (ANA). The survey found some encouraging findings: caretakers' knowledge about when to seek care for ARI was 80%, and care was sought from an appropriate provider in case of ANA in 79%. More recently, in 2003, an IMCI health facility survey was conducted in seven states (42). It assessed the quality of outpatient care, including both clinical and counseling care, provided to sick children less than five years of age. Moreover, it described organizational and other health systems support elements influencing the quality of care and tried to identify major constraints to it. It also measured key indicators of quality care to monitor progress of the IMCI strategy at health facilities. The results on case management showed a better performance for tasks carried out by providers trained in IMCI than those untrained; evidence that IMCI training can improve quality of care. The overall level of performance however remained suboptimal. Pneumonia is associated with as many as 2 million annual deaths among children globally as 19% of all deaths in children less than 5 years of age. It is one of the most common diagnoses made in the acutely ill children with an annual incidence of 34-40 cases per 1,000 children in Europe and North America.
Pneumonia is the most common bacterial cause of community acquired pneumonia in children – the reference standard for etiological diagnosis is isolated of streptococcus pneumonia from blood since the advent of conjugate vaccines disease caused by this organism can now be preventable many studies have been performed of the global incidence of invasive pneumococcal infections & pneumococcal meningitis but few studies investigated bacteremie pneumococcal pneumonia and its complication in children.

In the past viral pathogens were estimated to cause as many as 80% of cases. streptococcus pneumonia was generally regarded as the most frequent bacterial cause of community acquired pneumonia (CAP) especially in cases with complicated parapneumonie effusions infections etiologies are age specific predominating in the very young infant & adult knowledge of the most likely pathogen. The prevailing susceptibilities of these infecting pathogens and the severity of the illness will help guide antibiotic and other treatment decision making Most children do not require hospital admission and mildly ill children WHO likely have a viral illness do not need antibiotics the following guideline will attempt to help the partition identify those WHO do require hospitalization and provide band approach to management of those with complication infection pneumonia Infection is one of the leading cause of pneumonia in developing countries . we have in rest gated possible risk factor for pneumococcal disease among children living in the rural area a children with pneumococcal infection were identified from among children under five an increased of pneumococcal disease was associated with poor weight gain a history to serious illness in the previous 6 months the risk of pneumococcal disease was reduced among children whose months had a personal source of income.
Chapter Three

Methodology

Study design and setting
The study conducted was a cross sectional, community based descriptive study. It was conducted in the Hassahisa locality in Gezira state, Sudan. Hassahisa is a city located in Gizira State, central Sudan on the west bank of the Blue Nile at an altitude of 401 meter (1316 feet) above sea level, and away from Khartoum, capital of Sudan, about 121 kilometers (75 mile) to the north-west, and the city of Wadmadani, capital of the state 46 kilometers (28 miles), almost matched on the east bank of the river city Rufaa. And is characterized by Hassahisa warning in the urban area and a major agricultural and industrial mediated where the famous Island project on the road link between eastern Sudan and Khartoum. Includes Hasha-Issa Like the rest of the cities and regions of the mandate of the island population groups from different tribes and ethnic groups Sudan, including groups Aldbasin and Lhalaoyen and others. The population is estimated at about 606,389 people.

There are local in Hassahisa 12 hospitals, 6 of them in Hassahisa include general hospital with underground sections of the surgery and accidents, and a hospital for gynecology and obstetrics, and Children's Hospital and Dental Hospital, for the eyes. There are 29 health centers and 39 local Pharmacy and 8 parts as well as point 2 Veterinary Hospital and 6 veterinarian Pharmacy.

Bashir Banaga catchment area consist of three Residential neighborhoods:

- Alhay alshargy;
- Alhay alawsat
- Hay almwathfeen

The population is estimated at about 3967 people.

Under five = 708

Women (15-45 year) = 560

Study population

The population consisted of mothers have children under 5 years (708).

Inclusion criteria:
This study will include the mother those who are willing to participate in this study. And mother who are all have under 5 year of age children.

Exclusion criteria:
study will not include mother who are have children with congenital problems.

Children older than 5 years

Sample size A sample of 250 children is enough to study with confidence level more than 95% (probability less than 0.05) in the study population according to sample size equation.

Steven Sampthon Equations:

\[
m = n \times p(1-p) \\
\frac{[(n-1) \times (D^2)] + p(1-p)}{(Z^2)}
\]

\[
M = 708 \times 0.5(1-0.5)
\]

\[
(708-1)\times(0.05)2/(1.96)2 +0.5(1-0.5)
\]

\[
M=250
\]

N = population size =708=(under 5 children)

Z = 1.96

D = 0.05

P = 0.5
Data Collection tools:
Data was collected using a variety of tools to obtain the required information (Annex 1). A structured questionnaire was designed to caretakers of children under five who were admitted in Bashir Banaga centers, to identify the care seeking behavior of targeted mothers.
The questionnaire was used in a face-to-face interview with the caretakers. It contained demographic characteristics of the child, signs and duration of that episode of illness, care sought outside the home. And mothers attitude when her child complaining of symptoms of Pneumonia.

OPERATIONAL DEFINITIONS
Assess : In the study it refer to evaluate or estimate the quality of the person
knowledge : Information and skill through experience or education
Attitude : A pattern of mental views established by commutative prior experience
Mother : Bring up a child with care and affection
Prevention : Avoiding accorent of infection [pneumonia] in community

Pneumonia: It’s the infection of the lung that will be too difficulty in breathing

Under 5 years: Children who are in the age group of less than 5 years age

- Family income: pre-categorized into high, middle and low income according to the Sudanese Diwan Azakat2. On converting this monthly family income into US dollars:
  - High income corresponded to > $ 225
  - Middle income: $112 - $ 225
  - Low income: < $ 112
This was approximated to the respondent by the daily allowance he/she used.

Care seeking behavior:
Variables regarding care seeking were identified from the interviews with the caretakers.
  - Recognition of symptoms that prompted care seeking
Duration (in days) of symptom/symptoms before seeking care
First action taken since recognition of symptoms: using a home made remedy or a self prescribed drug, or taking no action.
Decision maker to seek care outside the home
The reason why the caretaker didn’t attend the closest provider, if that applied.

1- Assessment:
The child’s assessment was determined if he/she was assessed for the following clinical features by the recording of the symptoms/signs, whether negative or positive:
- cough, difficulty breathing, chest indrawing, central cyanosis, inability to drink/breastfeed, convulsions/lethargy, respiratory rate count and wheeze.

2- Classification:
Classification in relation to the assessment tasks that were performed for the child(figure 3.1):
- very severe pneumonia
- severe pneumonia
- pneumonia

![Figure 3.1 Classification of the severity of pneumonia for the child with cough/difficult breathing](image)

<table>
<thead>
<tr>
<th>Age</th>
<th>Classification</th>
<th>Sign or symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months to five years</td>
<td>Very severe pneumonia</td>
<td>• chest indrawing plus at least one of the following</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• central cyanosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• unable to drink/breastfeed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• convulsions/lethargy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• severe respiratory distress</td>
</tr>
<tr>
<td>2 months to five years</td>
<td>Severe pneumonia</td>
<td>• fast breathing*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chest indrawing</td>
</tr>
<tr>
<td>2 months to five years</td>
<td>Pneumonia</td>
<td>• fast breathing*</td>
</tr>
</tbody>
</table>

*fast breathing: age 2-11 months: 50 breaths/minute
Age 12 months – 5 years: 40 breaths/minute
**Data collection**

The questionnaire was translated into Arabic before the pre-testing. The aim of the pilot study was to pretest the questionnaire to check whether respondents understood it and followed its sequence. In addition, the feasibility and sequencing of the checklist used to extract information from the patient file was assessed. Subsequent changes were made to the questionnaire; an example of which was that some open ended questions were changed into closed ones.

Data was collected from 1st of March until 30th of April.

Particular attention was given to interview techniques when training the assistants, for example not prompting care takers when asking questions three employed medical doctors.

**Data handling and analysis**

The questionnaires were collected from the research assistants by the principle researcher on a regular basis throughout the data collection period. They were then checked for accuracy and completeness. When information was found missing, corrective measures were taken when possible. All questionnaires were kept in order according to the center by the principle researcher. Data entry and cleaning was completed by the principle researcher. The Statistical Package for Social Sciences (SPSS version 12) was used for data entry and analysis. General descriptive analyses were used. Cross tabulations for variables that were thought to have an association were performed. The chi-square test and Fisher's exact test were used as appropriate.

A P-value of 0.05 was used to determine significance.

**Ethical considerations**

permission to perform the study and extract informations by Verbal consent which obtained from the respondents after an explanation of the interview aims (Annex II). Participation was on a completely free will basis. All approached respondents agreed to participate in the study.
Chapter Four

Results

Demographic information from the 250 mothers who were surveyed is presented in table 1:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-20</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>21-25</td>
<td>60</td>
<td>24</td>
</tr>
<tr>
<td>26-30</td>
<td>90</td>
<td>36</td>
</tr>
<tr>
<td>31-35</td>
<td>37</td>
<td>41.8</td>
</tr>
<tr>
<td>36-40</td>
<td>21</td>
<td>8.4</td>
</tr>
<tr>
<td>41-45</td>
<td>18</td>
<td>7.2</td>
</tr>
<tr>
<td>46-50</td>
<td>11</td>
<td>4.4</td>
</tr>
<tr>
<td>51-63</td>
<td>3</td>
<td>1.2</td>
</tr>
</tbody>
</table>
N = 250

<table>
<thead>
<tr>
<th>Current job</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't work</td>
<td>183</td>
<td>73.2</td>
</tr>
<tr>
<td>Work</td>
<td>67</td>
<td>26.8</td>
</tr>
</tbody>
</table>
N = 250

<table>
<thead>
<tr>
<th>Income</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10 n.s</td>
<td>17</td>
<td>3.4</td>
</tr>
<tr>
<td>11-20n.s</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>21-30n.s</td>
<td>28</td>
<td>5.6</td>
</tr>
<tr>
<td>31-40n.s</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>41-50n.s</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>51-60n.s</td>
<td>23</td>
<td>4.6</td>
</tr>
<tr>
<td>61-80n.s</td>
<td>28</td>
<td>5.6</td>
</tr>
<tr>
<td>81-100n.s</td>
<td>24</td>
<td>4.8</td>
</tr>
<tr>
<td>101-200n.s</td>
<td>36</td>
<td>7.2</td>
</tr>
<tr>
<td>201-300n.s</td>
<td>9</td>
<td>1.8</td>
</tr>
</tbody>
</table>
Average income per week

Knowledge about pneumonia
As is shown in Table 75.6% of the mothers said that they knew what pneumonia is. When these mothers were given a list and asked to check what pneumonia is, only 12.4% chose the “strong cold” alternative. Most mothers (73.6%) believed that pneumonia is highly or very dangerous, and 35.7% believed that pneumonia is caused by a lack of parental care. In addition, weather change (17.6%) and cold temperature (12.4%) were indicated as causes. Only 26.0% of mothers reported that a virus or germ causes pneumonia.

Knowledge of mothers about Pneumonia

N = 250
Recognition of pneumonia

Table 3 shows the mothers’ responses to recognition of pneumonia. Most mothers said they would recognize pneumonia if their child had rapid breathing (23.6%) or if the child had cough (34.0%). The mothers also pointed to other, congruent signs such as panting, chest retraction when the child inhales, rapid heartbeat, fever, and appearance of weakness. Only 5.4% of the mothers said that they were not sure how to recognize the presence of pneumonia in their children.

Warming symptoms and signs

<table>
<thead>
<tr>
<th>Symptoms and signs</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child breath rapidly</td>
<td>59</td>
<td>23.6</td>
</tr>
<tr>
<td>Child's heart beats rapidly</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Child has fever</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>Child looks very weak</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Child cough</td>
<td>85</td>
<td>34</td>
</tr>
<tr>
<td>Childs chest makes snoring sounds</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Child doest have not an appetite</td>
<td>6</td>
<td>2.4</td>
</tr>
<tr>
<td>Child chokes with cough</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Child is irritable</td>
<td>5</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Seeking medical help

In terms of seeking medical help, most mothers (39.2%) indicated that they would take their child to the closest health center and 28.4% to the doctor if they thought their child had pneumonia (Table 4). There were small percentages of mothers who said they would take other actions such as taking the child to a pharmacist, using medicinal herbs and herbal baths as well as using other alternative treatments or home remedies.
Actions taken by caretakers since signs were recognized:

Two fifths of the caretakers (89) took no action and sought care outside the home as a first line of action (table 4.3). Thirty percent of the caretakers used a home made remedy as opposed to 17% who used a self-prescribed drug.

* Two of the caretakers weren’t sure of the duration. Younger mothers tended to use more self prescribed drugs and sought care outside the home as a first line of action more often than the older mothers, while mothers in the middle age group used more home remedies. These differences however showed no statistical significance using Fisher's exact test (P = 0.955).

Infants received more self prescribed drugs and home remedies compared to older children. Low income families were the most likely to take no action at home, but rather seek care outside the home as their first action (18% compared to 13% and 9% of the middle and high income families respectively), while high income families used a self prescribed drug and a home remedy the least. On the other hand, the middle income families were the most likely to use a home remedy and self prescribed drug. These differences were found to be statistically significant (Fisher's exact test = 15.99; P= 0.033).

The decision maker

In 85% of the sample population, it was the mother who took the decision to seek care for the sick child outside the home. Even though the mother took the decision to seek care outside the home
Chapter Five
Discussion

Of the 250 mothers surveyed, 19.2% said they either did not know what pneumonia is or they had never heard about pneumonia. Most of these mothers (73.6%) believe that pneumonia is highly or very dangerous.

The World Health Organization focused ethnographic studies suggest that in most cultures people distinguish between mild and severe ARIs. There were similar findings in Honduras, where mothers invariably considered pneumonia to be the most serious of the ARIs and said that children could die from it. When asked about the causes of pneumonia, only 26% of the mothers in our study said they believe that a virus or germ causes pneumonia, and few of them see poor nutrition as a cause of pneumonia. Mothers were influenced by their worldview regarding the perception of what causes pneumonia. The majority would feel responsible if their child had pneumonia. In many cultures there is a tendency to put the blame on the mother in cases of pneumonia in children. In our sample that responsibility is based on the belief that the cause of pneumonia is lack of care when the child is exposed to sudden weather change and/or to a cold temperature. The most commonly cited causes related to an external cold temperature are being exposed to cold air, removing a child’s clothes when he or she is warm, exposing him or her to outdoor air in a sudden fashion, and bathing the child outdoors. Mothers also cited causes related to an internal cold temperature such as the intake of cold foods and drinks. Cold, as a cause of pneumonia.

Finally, in this study mothers cited only natural causes. This contrasts with most cultural models, in which pneumonia in very young children is not generally attributed to natural causes.
**Care seeking**

**Sign recognition**

Caretakers should be able to recognise and correctly interpret the symptoms of illness in their children, and to seek timely and appropriate medical care (23;28;37). In our study, it was demonstrated that fast breathing and difficult breathing (in combination with other symptoms/signs) were the reason that 59% of the caretakers sought medical care. The fact that these 2 signs were not mentioned alone as reasons for care seeking is noteworthy. The Sudan IMCI survey reports that most caretakers had missed the breathing problem in their children or had not paid particular attention to it alone (42).

Caretakers, almost always mothers, are very attentive to subtle changes in their children’s behaviour, e.g. feeding and sleeping patterns or excessive crying, as was found in India (28). It might be that in our study, mothers’ primary concern was not the breathing problems; therefore more sensitization to these signs of pneumonia is required.

It was found that mothers in Egypt, Nigeria & Ethiopia were able to recognise symptoms/signs like rapid and difficult breathing, fever, grunting and decreased feeding, even though this recognition was not used to seek appropriate care in Egypt and Ethiopia(24;25;48)

**Action at home**

The largest proportion of caretakers in our study sought care outside the home as a first line of action (40%), followed by those who used a home remedy (30%) and a self prescribed drug (17%). Higher usages of home remedies were reported in Ethiopia for ARI, in Zimbabwe for cough and in Nigeria for childhood illnesses(24;32;50). Also a higher proportion of parents reported using self-prescribed antibiotics in Ghana than in our study (31). The higher proportions of seeking medical care in our study might be explained by the extensive health care system network in the locality, or it might point to a high confidence in the health system.

It is important for caretakers to know that home made remedies can be used for children with cough or colds, but it is also essential that they know when to seek medical care. She demonstrated an increase in the knowledge of management of mild ARI at home using home made remedies(37).
The mother's age, child sex and age were not significantly associated with the caretakers' action at home. We found that family income was the only factor significantly associated with the caretakers' action at home, where high income families were the least to seek care outside the home and the most to use a combination of self prescribed drug and home remedy. explained a similar phenomenon of high income families seeking care less often in India by suggesting that higher income families have the resources needed to seek care later in the course of the disease should it not resolve (51).

Most of the mothers in our study said that they would take their child to the closest clinic if they thought the child had signs of pneumonia. However, about 19.2% of mothers would use alternative methods such as talking to a pharmacist, treatment with medicinal herbs, and treatment with an herbal bath.

**Patterns of providers sought**

Varying degrees of seeking care for ARI at traditional healers was found across developing countries, ranging from 4% and 18% in Malawi (53) to 64% in Ethiopia (24), and to a large extent in both the Philippines (54) and Bangladesh (52). We found that none of the caretakers in our study visited a traditional healer. This is an interesting finding that is comparable to other findings from Sudan. In the 1995 household survey conducted in Khartoum, Kassala and Gezira, only 2% of caretakers sought care for ANA and cough from a traditional healer (41). El Tayeb similarly found that 2% of caretakers took their child with ARI to a traditional healer (37). The non-reporting of traditional healers use in our study might be attributed to the fact that interviews were carried in hospitals (as opposed to the mentioned survey and study). The caretakers might have felt the reporting of contact with traditional healers inappropriate in a hospital setting. On the other hand, it is possible that in Sudan traditional healers do not represent a significant health provider option for ARI symptoms, since these studies used samples that are representative of different states across different geographical areas. Consultation of traditional healers might also be more likely in conditions of a chronic nature (e.g. pain or psychological disorders), while in an illness of acute onset like ARI, medical services are preferred. Traditional healers might also be an option for care seeking where health services are inaccessible and educational levels of parents low. It is still to be
established if this pattern of care seeking at traditional healers is the case in other regions of the country, e.g. the southern and western parts.

The private sector was surprisingly popular among our study population, which is noteworthy since the majority of the caretakers belonged to middle and low income groups. Similar results were found in the 1995 survey, where 18% of children with ANA and 12% of those with cough were taken to the private sector(41). Similarly, in Sri Lanka, mothers preferred the private sector(27). El Tayeb, however, reported much lower rates of 1.5% in 2005, possibly due to the rural setting of her study(37). It is likely that caretakers perceive higher quality services in the private sector, or have higher confidence in private physicians’ ability as was found in Egypt (25). Little research has been done on the quality of services of the private sector in Sudan, and caretakers’ perceptions on them. It is an area to look further into in future research.

Almost a third of the caretakers in our study bypassed a facility closest to them, which was a health centre in most cases. Several reasons were mentioned for this bypass. Most caretakers mentioned that services they thought were necessary for treatment were not available at health centres (e.g. oxygen and intravenous antibiotics). There was a preference for hospitals because caretakers perceived that the treatment was better. An element of lack of confidence in health centres was conveyed by some caretakers. Similarly, a lack of confidence in peripheral quality of care was among the reasons mentioned for bypass in another setting in Sudan (55).

**Health costs**

Accessibility of health services depends on geographical, economic and/or cultural factors, depending on the different settings. It appears from our results that at least geographical factors (in terms of distance and travel time) were favourable in our setting, since more than two thirds of the study's population reached a referral hospital in less than half an hour and a further 25% reached it within an hour. That is expected since a good transportation network exists in the locality. Unfortunately, an assessment of cultural influences on accessibility of health services was beyond the scope of our study.
The larger proportion of the caretakers (74%) paid for drugs an average similar to that found in the IMCI survey in 2003(42). It should be taken into account that some drugs in the hospitals’ pharmacy (especially some parenteral antibiotics) are given free for the first 24 hours, but those that are not have to be purchased separately.

Ample differences also exist between locally produced and imported drugs.

The issue of health care cost plays an important role in access to care, as poorer families—who are those most in need for care—may be unable to afford services when they need them most. There were indications from an assessment of child health services in eleven states in Sudan that differences existed between and within states regarding fees (for consultation, investigations and treatment), and that there are no documents of a written policy and no clear definition of poor children who need free services (10).

**Validity and limitation of the study**

There were some limitations and threats to validity at different levels in our study; at the level of selection of our study subjects, information collected and data analysis. A bias in studying care seeking patterns of caretakers attending hospitals is possible, since care seeking behaviour of other caretakers not having the same access might be different. It was the study’s aim to identify care seeking patterns. Asking about care seeking practices mothers might have introduced a certain degree of information bias. Caretakers might have felt obligated to answer in a desirable way when asked about the first provider they visited or when they sought care outside the home. This might not have been the case had the interviews been conducted at a more neutral ground. However, our retrospective method of studying care seeking was more appropriate than asking about practices (by simulating a case for example), given the location of our study. Missing information from mothers restricted the analysis performed and conclusions drawn. For example, missing information on assessed signs lead to difficulties in reaching a matched classification, which in turn made it difficult to make firm conclusions. Furthermore, some statistical associations were not achievable, due to small numbers in some categories of certain variables. This limited our ability to identify any association between mothers’ education and the duration till care was sought or the first action taken at home.
Our research assistants were not constant throughout the data collection period. A certain degree of interviewer variation is therefore possible. The research assistants were trained to conduct the interviews in a standard procedure, starting from approaching the informant and throughout the interview. During the training we focused on interview techniques, e.g. recording answers to open questions as precisely as they were provided and not probing for answers.
Chapter Six
Conclusions and recommendations

Conclusion
In this study, we looked at knowledge, practice and attitude of mothers of under 5 children. Care seeking was satisfactory in our study population. Most mothers recognized important signs of pneumonia. There was also no delay in care seeking in the majority of the caretakers. None of the mothers reported taking the child to a traditional healer. We found that for sign recognition, action at home and duration till care was sought, there was no significant difference between genders. The only factor that significantly influenced the type of provider sought and the duration till care was sought was the family income.
Recommendations

- High priority should be given in the teaching of mothers about pneumonia, symptoms, signs, complications. Special emphasis should be placed on the recording of danger signs like cyanosis, convulsions and inability to drink/breastfeed (whether negative or positive) due to their important implications in both classification and treatment. In-service training at the work place would be especially beneficial, since it will allow health workers to review and change their own practices.

- Increase caretakers' recognition of pneumonia signs through extensive health communication activities by strengthening the third component of IMCI (improving family and community practices).
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Annexes

Annex 1 Data Collection Tools
University Of Gezira
Community Health

QUESTIONNAIRE TO EVALUATE KNOWLEDGE,
PRACTICE AND ATTITUDES OF POPULATION ON PNEUMONIA AMONG THE CHILDREN.
II. KNOWLEDGE OF CHILD’S PARENTS

Q1. Personal data
Q1.1 Date of birth : ___/___/____ Q1.2 Age (months): ______
Q1.3 Sex [M] 1 [F] 2
Q1.4 Residence: __________________________
Q1.5 Caretaker sex: [M] 1 [F] 2
Q1.6 Relationship of caretaker to child: Mother [1] Father [2]

If the informant is the mother ask her:
Q1.7 How many years of education did you have?


Q1.9 How much money does the head of the household earn per month?
a. >50 000 SD [1]
b. 25 000 – 50 000 SD [2]
c. <25 000 SD [3]

1. Do you know about pneumonia among the children?
   1) Yes 2) No
3) never heard about pneumonia

2. IF YES what pneumonia is? (Can be many answers)
   1) a mortal sickness
   2) a dangerous sickness
   3) a respiratory sickness
4) a strong cold

3. From which sources do you get information on pneumonia among the children?
   1) from health workers 2) TV and radio
   3) newspapers, publications and journals 4) other sources
   (please write)

4. What do you think, how do people get infection of pneumonia?
   1) air 2) contact way
   3) dirty hands 4) by other ways

5. What do you think are the causes of pneumonia among the children?
   1) lack care of parent
   2) weather change
   3) cold temperature
   4) a virus or germ
   5) other
   6) does not know

6. When you recognize that your child had pneumonia?
   1) Had rapid breathing
   2) Had chest retraction
   3) Rapid heart beat
   4) Cough
   5) Not sure
   6) Fever
   7) Appearance of weakness

III. PRACTICE OF PARENTS ON PNEUMONIA:
1. What mother would do if she thought that her child had pneumonia:
   1) Take her baby to the closest clinic
   2) Take child to doctor
   3) Take child to pharmacist
   4) Treat child with medicinal herbs
   5) Give child an herbal bath
6) Make child sweat
7) others *Mention the symptoms/signs she has mentioned from above, don’t read out the options*
   a. Garad [1]
   b. Honey [2]
   c. Hibiscus [3]
   d. Oil [4]
   e. self-prescribed drug [5]
   f. other (specify) ________________________[6]

Who took the decision that care should be sought outside the home?

IV. MORBIDITY OF STUDIED CHILD
1. How many times did your child have a pneumonia?
   1) Yes, if yes how many times ----- 2) No
2. How many times and in which season? Please circle appropriate one.
   1) winter ___ 2) spring ___ 3) summer ___
   4) Fall ___ 5) do not know____
3. If child got respiratory diseases more than once do you know cause of illness?
   1) Yes 2) No 3) Do not know
4. Did siblings get pneumonia last year?
   1) yes 2) No 3) do not know
5. Did child’s mother get pneumonia last year?
   1) yes 2) No 3) do not know

Thank you very much for your time