MUHIMBILI UNIVERSITY COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF DAR ES SALAAM.

DEPARTMENT OF PAEDIATRICS AND CHILD HEALTH.

PERFORMANCE OF PRIMARY HEALTH CARE WORKERS AND THE KNOWLEDGE AND PRACTICE OF MOTHERS/CARETAKERS IN THE MANAGEMENT OF CHILDREN WITH ACUTE RESPIRATORY INFECTIONS IN DAR ES SALAAM.

By

DR. Higgins B. P. Massawe, M.D. (University of Dar es Salaam)

A Dissertation submitted in partial fulfilment of the requirement for the degree of Master of Medicine (M Med) in Paediatrics and Child Health

2000

SUPERVISORS: 1. Prof. Abel E. Msengi; MD, M.Med.

Associate Professor, Department of Paediatrics and Child Health,

Muhimbili University College of Health Sciences.

2. Dr. Maulidi R. Fataki; MD, M.Med.

Lecturer, Department of Paediatrics and Child Health,

Muhimbili University College of Health Sciences.

CERTIFICATION

The undersigned certify that he has read and recommend for acceptance by the University of Dar es Salaam a dissertation entitled: *Performance of primary health care workers and knowledge and practice of mothers /caretakers in the management of children with acute respiratory infections in Dar es Salaam*, in partial fulfilment of the requirements for the degree of Master of Medicine, Paediatrics and Child Health.

A.E. Msengi

.....

Prof.A.E.Msengi, MD, M.Med

Principal Supervisor.

M.R. Fataki

.....

Dr. M. R. Fataki, MD, M.Med

Supervisor

DECLARATION

I declare that this dissertation is my own original work, and that it has not been submitted for a similar degree in any other university.



.....

H. B. P. Massawe

COPYRIGHT

All rights reserved. No part of this dissertation may be reproduced, stored in any retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written permission of the author or the University of Dar es Salaam in that behalf.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisors Prof. A.E. Msengi and Dr. M.R. Fataki who helped me in producing the research proposal and for their tireless supervision in producing this dissertation, without them this would have not been possible.

I would also like to thank the head of the Paediatric Department Dr. F. Kalokola and the Postgraduate Coordinator Dr. K. Manji and all other academic members of the Department of Paediatrics and Child Health for their contribution and advice.

I would also like to thank the health authorities of Dar es Salaam City Commission, the health facilities visited and the primary health care workers who participated for their co-operation.

I also thank the mothers of the children who participated in the study.

I would also like to thank Mrs. R. Mpembeni of the Department of Biostatistics for her stastistical advice.

Lastly I thank my wife Salvatora and my daughters Winifrida, Aquina and Gloria for the tolerance they showed during my long absence from them in order to accomplish my study.

ABSTRACT

Background

Acute respiratory infections (ARI) are a major cause of morbidity and mortality in children in developing countries. This is reflected in the global burden of diseases in children, which shows that out of the 12 million deaths which occur in children less than 5 years of age in developing countries, 36% are caused by ARI.

Studies have also demonstrated that correct case management of ARI by primary health care workers can significantly reduce ARI associated morbidity and mortality in children. Therefore, health care workers should be able to assess, classify and treat children with ARI appropriately according to Standard World Health Organisation (WHO) guidelines on case management of ARI.

For effective control of ARI, the families should also be able to recognise the symptoms and signs of illness and seek early medical care in the course of the disease.

Therefore, a cross-sectional study was undertaken in a primary health care setting in Dar es Salaam region, which documented the clinical performance of the health workers and at the same time looked into the knowledge and practice of mothers/caretakers in relation to the case management of ARI.

Objectives of the study

1. To determine the level of performance of primary health care workers in the assessment, classification and treatment of ARI in children basing on WHO standard case management guidelines.
2. To determine the proportion of primary health care workers who correctly counselled mothers /caretakers on home care of children with ARI.

3. To determine the knowledge and practice of mothers/caretakers regarding management of ARI in their children.

Methodology

A cross-sectional study was carried out in 11 primary health facilities in Dar es Salaam region to determine the performance of health care workers on correct case management of ARI. Furthermore, knowledge and practice of mothers/caretakers regarding management of ARI in their children was also determined. During the study period the author observed and documented the performance of 78 primary health care workers while they were assessing, classifying and treating children who were suffering from ARI using a checklist. The author's clinical assessment was used as the standard yardstick to gauge the performance of the health care workers being studied.

Exit interviews using a standard questionnaire were conducted on 246 mothers/caretakers who had children suffering from ARI regarding their knowledge and practice on the management of ARI, and also to determine whether they were properly counselled by the health care workers on home care of a child with ARI, with regard to compliance with the treatment regimen, increasing fluid intake and feeding the child during illness and when to return to clinic.

Results

During the study period, 129 episodes of case management of ARI being performed by the health care workers were observed and documented. Of these 129 episodes, correct case assessment was done in 50% and the correct treatment according to the assigned classification was prescribed in only 46.8% of the cases.

The exit interviews showed that only 20.5% of the health care workers counselled the mothers/caretakers correctly on when to bring the child back for review.

The mothers/caretakers knowledge on home management of a child with ARI was correct in 41.9%, and the average duration of onset of illness to reporting to health facility was 3.6 days. Self-medication before seeking medical care was found to be a common practice.

Conclusion

This study shows that the overall performance of the primary health care workers regarding management of ARI was correct in only 50% of the cases, and was sub-optimal in the other 50% of the cases.

The mothers/caretakers' knowledge was satisfactory in only 41.9%, and early treatment seeking behaviour was lacking in the majority and self medication before seeking medical care was found to be a common practice.

TABLE OF CONTENTS

Aknowledgements..... v

Summary..... vi

Abbreviations..... xi

1.0 Introduction and review of literature..... 1

1.1 Introduction..... 1

1.2 Epidemiology of acute respiratory infections..... 3

1.3 Aetiology of acute respiratory infections..... 5

1.4 Risk factors of acute respiratory infections..... 6

1.5 Control strategies..... 7

2.0 Rationale of the study..... 12

3.0 Study Objectives..... 13

4.0 Materials and methods..... 14

5.0 Results..... 20

6.0 Discussion..... 34

7.0 Conclusion..... 42

8.0 Recommendations..... 43

9.0 Study limitations..... 43

10.0 List of references..... 44

11.0 Appendix I: Mother / caretaker questionnaire..... 50

12.0 Appendix II: Health worker check list..... 55

13.0 Appendix III: Definitions of terms..... 59

14.0 Appendix IV: ARI programme indicators..... 61

15.0 Appendix V: ARI case management charts..... 63

ABBREVIATIONS

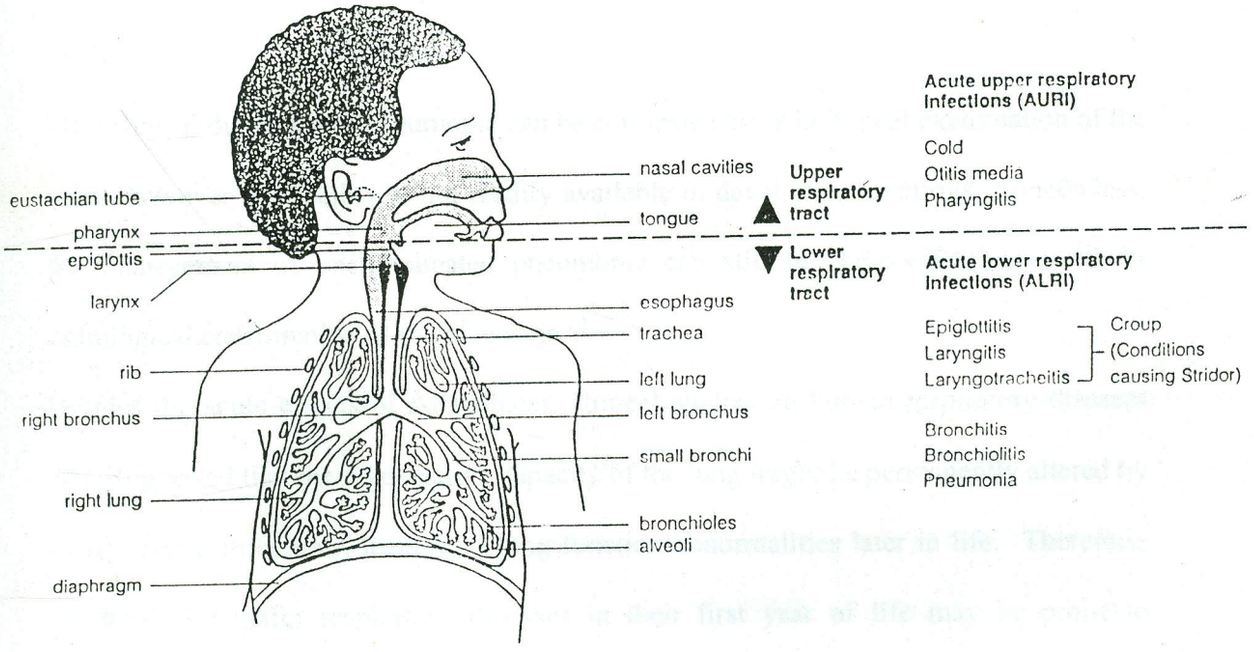
AIDS	Acquired Immunodeficiency Syndrome
ARI	Acute Respiratory Infections
HIV	Human Immunodeficiency Virus
IMCI	Integrated Management of Childhood Illness
LRTI	Lower Respiratory Tract Infections
MCH	Maternal and Child health
PHC	Primary Health Care
UN	United Nations
UNICEF	United Nations Children's Fund
URTI	Upper Respiratory Tract Infections
WHO	World Health Organisation

1.0 INTRODUCTION AND REVIEW OF LITERATURE

1.1 Introduction

Acute respiratory infections (ARI) refers to infections of the respiratory tract lasting for 30 days or less, or 14 days when is accompanied with ear discharge or pain.[1] ARI is classified into upper and lower respiratory tract infections. Acute upper respiratory infections include common colds, otitis media and pharyngitis.[1,2] Acute lower respiratory infections include epiglottitis, laryngitis, laryngotracheitis, bronchitis, bronchiolitis and pneumonia (Figure 1).[1,2]

Figure 1: Clinical syndromes of acute respiratory infections



(Reproduced from the WHO Manual: Acute respiratory infections in children: Case management in small hospitals in developing countries. A Manual for Doctors and other Senior Health Workers - 1990).

The main presenting symptoms of ARI are cough, difficult breathing, ear discharge or pain, throat pain and stridor. The main presenting signs of ARI include tachypnoea, respiratory distress, nasal flare, grunting especially in young infants, head nodding, stridor and lower chest indrawing. Children with cough or difficult breathing may also present with wheezing. Children suffering from very severe pneumonia may present with central cyanosis, inability to drink or breastfeed, lethargy or loss of consciousness.[1,2]

Auscultatory findings of the chest may include decreased breath sounds, bronchial breathing, crackles, rhonchi, abnormal vocal resonance and pleural rub. Although fever is not a specific symptom of ARI, children suffering from ARI often have fever of varying degrees.

The clinical diagnosis of pneumonia can be confirmed by radiological examination of the chest, however this facility is not readily available in developing countries. Nonetheless, the management of uncomplicated pneumonia can still be done effectively without radiological confirmation of the diagnosis.[1,2]

Besides the acute effects of ARI illness, clinical studies on human respiratory diseases have suggested that the regenerative capacity of the lung might be permanently altered by injury due to infections, leading to lung function abnormalities later in life. Therefore, children who suffer respiratory illnesses in their first year of life may be prone to recurrent chest symptoms and acute respiratory illnesses in later childhood and in early adulthood, thus predisposing the child to chronic infections of the lower respiratory tract.[3,4]

Childhood pneumonia has also been associated with reduced ventilatory functions in adults.[5] The clinical and physiological consequences of childhood respiratory illnesses is therefore an increased risk for the development of chronic lung diseases in adulthood.[5]

1.2 Epidemiology of acute respiratory infections

1.2.1 Morbidity

Acute respiratory infections (ARI) among children less than 5 years of age are still a significant public health problem in developing countries including Tanzania.[1,2,6]

On average, a child in both developed and developing countries has from 5 to 8 attacks of ARI annually, mostly upper respiratory tract infections. However, the difference is in the incidence of pneumonias which is almost 6 times more common among children in developing countries.[2]

Demographic and health surveys carried out in Tanzania in 1991/92 and in 1996 showed that ARI accounted for 70% of all out-patient attendances and the prevalence of ARI was found to be higher between the age of 6 months to 23 months and the problem was noted to be more prevalent in urban areas including Dar es Salaam.[7,8]

Data from the Paediatric wards of Muhimbili Medical Centre Dar es Salaam showed that ARI accounted for 14.3% of paediatric admissions in 1991/92,[9] and 19.0% and 23.0% in 1996/97 and 1997/98 respectively,[10] indicating an increasing trend. Most of these were pneumonia cases.

1.2.2 Mortality

Pneumonias are a major cause of childhood mortality in children with ARI in developing countries especially among children less than 5 years of age. In 1992, Garenne at al estimated that of the 12.5 million children less than 5 years of age who die each year in developing countries, about 4.5 million (36.0%) die of ARI, and of these 0.8 million (18.6%) occur in the first year of life.[11] Other studies in 1995 showed that ARI accounted for 19% of 12 million deaths that occurred in children less than 5 years of age.[6] In South Africa, Robert et al and Schirnding et al reported pneumonia as the second cause of death in children less than 4 years of age after diarrhoeal diseases.[12,13]

In Dar es Salaam, community based data showed that ARI mostly pneumonias was the fourth commonest cause of death reported (6.2% in males and 7.5% in females) in children aged 0 to 4 years as documented during the adult morbidity and mortality survey in 1997. The other common causes of mortality reported were perinatal causes (34.6% in males and 28.5% in females), acute febrile illnesses including malaria (25.8% in males and 28.5% in females), and acute diarrhoeal diseases (7.7% in males and 9.3% in females).[14]

Hospital based data of Muhimbili Medical Centre Dar es Salaam in 1991/92 had shown that pneumonia was responsible for 11.75% of all deaths that occurred in the paediatric wards, and the case fatality rate was 10%.[9]

In most other African countries and the developing world, about 50% of deaths occur in children under 5 years of age and ARI account for about one fourth to one third of these deaths.[15]

The risk factors that have been associated with increased mortality in other African studies were large families of low socio-economic status, malnutrition, a positive blood culture, low birth weight and indoor pollution.[12,13] Malnutrition is also associated with a greater frequency of complications from ARI such as empyema, sepsis and meningitis which contribute to the observed increased mortality. [16.]

1.3 Aetiology of acute respiratory infections

The causes of ARI in children include bacteria, viruses and fungi. Viruses are the most common causes of upper respiratory infections and respiratory syncytial virus is considered to be the most predominant cause in the first two years of life.[6,17,18]

Lung puncture studies in developing countries indicate that most cases of pneumonia in children are caused by bacteria, usually *Streptoccocus pneumoniae, Haemophilus influenzae* and sometimes *Staphylococcus aureus.*[19,20,21]

It is usually not possible, however to determine the specific cause by clinical features or chest X-ray.[6,22]

Moreover, the bacterial aetiologic agents have evolved with time due to the widespread use of antibiotics, which has led to the emergency of antibiotic resistant organisms. Studies in Singapore had detected penicillin resistance in 38.5% of the bacterial isolates in 1995, which had not existed in 1988.[21,23]

1.4 Risk factors for acute respiratory infections

The common risk factors for ARI include both host and environmental factors. Host factors include young age, malnutrition, low birth weight, Vitamin A deficiency, lack of immunisation and impaired immunity.

Environmental factors include exposure to air pollution such as smoke, low socio-economic status, cold weather or chilling and overcrowding.

The prevalence of ARI has been found to be higher in urban population than in rural communities and this has been attributed to the higher levels of outdoor pollutants especially from industrial and automobile smoke. However, the increased prevalence has also been associated with household pollutants such as wood smoke exposure, passive smoking and gas cooking.

A study done in England and Scotland among children aged 6 to 12 years showed that coughs, colds and bronchitis were more prevalent among children from homes where gas was used as the cooking fuel than those from homes using electricity.[24]

A similar observation was also reported by Ekwo et al in Iowa city in which the risk of hospitalisation for respiratory illnesses in children less than 2 years of age and the frequency of coughs and colds was found to be significantly higher when gas was used for cooking, or at least one parent smoked.[25]

Wood smoke exposure significantly increases the prevalence of ARI. In a case controlled study among infants in South Africa, 70% of those with severe lower respiratory tract disease had a history of daily exposure to heavy wood smoke compared to only 33% from among the controls.[26]

Other studies in Nigeria and elsewhere in developing countries have also shown a strong association between wood smoke exposure and ARI. Cooking with wood burning stoves is associated with higher indoor air concentrations of respirable particles, which increase the risk of ARI.[27,28,29]

Studies have also shown a strong association between passive cigarette smoking and ARI in children during the first year of life, and an increased risk of morning coughs, respiratory infections such as bronchitis and pneumonia, and breathlessness among older children.[28,30,31,32]

Pneumonia is also more frequent and more severe in malnourished children and in those with Vitamin A deficiency than in well nourished children, and is more likely to result into a fatal outcome in those who are malnourished.[33,34]

1.5 Control Strategies

In 1984 World Health Organisation (WHO) officially initiated a programme for the control of acute respiratory infections. The main objective was to reduce ARI associated mortality by improving case detection and patient management by primary health care workers. This objective was incorporated in the Declaration of the World Summit for children, which established the goal of reducing by one-third the deaths due to ARI in children less than 5 years of age by the year 2000.[35]

The WHO recommended strategies for reducing ARI associated morbidity and mortality are: 1) standard case management, 2) strengthening of health facilities and 3) community component to raise awareness of ARI problem to facilitate for early treatment seeking behaviour.

Control of ARI is part of primary health care, which has been defined by WHO as "advice given to a person or group of persons by one or more members of the health or related professions, acting alone or in a team." Primary health care is more comprehensive than primary medical care in that it includes health promotion and disease prevention as well as curing, caring and rehabilitating those who are ill. It is generally the first level of contact with health care system for individuals, the family and the community; after self-care, it constitutes the first element of the health care process.[36]

1.5.1 WHO ARI standard case management guidelines

The entry point to the use of ARI standard case management guidelines is cough or difficult breathing in a child aged less than 5 years of age. Once it is established that the child has symptoms of ARI then the assessment algorithm recommended by WHO is as follows:

Assess for danger signs (not able to drink or breast feed, history of convulsions, lethargy or loss of consciousness and if child is convulsing at the time of examination). The presence of any danger sign would indicate that the child is suffering from a potentially life-threatening condition and hence the need for urgent measures, which include giving the first dose of an antibiotic, treating fever if present and urgent referral to hospital..

Next the health care worker assesses the child for cough or difficult breathing in order to determine whether signs of pneumonia are present or not. If signs of pneumonia are present, the health care worker then assesses the severity of pneumonia and classifies the illness. He/she then identifies appropriate treatment on the basis of the assigned classification and treats.

The last step is to counsel mothers or caretakers appropriately. For those mothers or caretakers going back home, the health worker is supposed to counsel on adequate home care and when to come back to the health facility. For children aged 2 months up to 5 years with cough or difficult breathing they can be classified as follows:[1,2,37,38,39] Very severe disease - presence of any danger sign puts the child in this category

severe pneumonia - presence of lower chest indrawing in the absence of danger signs

pneumonia - presence of fast breathing in the absence of danger signs and chest indrawing.

no pneumonia: cough or cold - a child with ARI who presents with no danger sign and neither has chest indrawing nor fast breathing. These are classifications rather than diagnoses but have important management implications.

The cut off points for fast breathing in children less than 5 years of age are as follows:

Age	There is fast breathing if the patients has the following breathing rate in one minute
One week up to 2 months	60 breaths per minute or more counted twice
2 months up to 12 months	50 breaths per minute or more
12 months up to 5 years	40 breaths per minute or more

For young infants (under 2 months of age), pneumonia is identified when the respiratory rate is 60 breaths per minute or above (confirmed by a second reading), or when there is marked chest indrawing. This is because under normal circumstances a neonate may have slight chest indrawing because of the softness of the thoracic bones. Pneumonia in young

infants should always be considered severe since young infants can become sick and die very quickly from pneumonia.

The antibiotic recommendations for the treatment of pneumonia in developing countries are based on the assumption that many cases of fatal pneumonia in developing countries are caused by *Streptococcus pneumoniae* and *Haemophilus influenza.*[2]

The first line antibiotics of choice are co-trimoxazole, amoxycillin and ampicillin or procaine penicillin.[2,40] These are relatively cheap and widely available antibiotics in the primary health care facilities and are efficacious. The second line antibiotics of choice include benzyl penicillin, chloramphenicol, cloxacillin and gentamicin.[2,40]

Clinical experience and intervention studies in developing countries have indicated that early treatment can reduce mortality from pneumonia.[2,40] Thus correct case management of ARI has a substantial effect on the reduction of ARI associated infant and under five mortality.

The effectiveness of correct and early case management of ARI in reducing ARI associated mortality from pneumonia was also demonstrated in Bagamoyo Tanzania. In this study, after two year period of proper use of the standard ARI case management, the disease specific mortality rate for pneumonia was reduced by 30.1% from 14.3 to 10.0/1000 under-fives per year, contributing 40% to the overall mortality reduction.[41]

In another case control study in India, using the standard case management approach, childhood mortality due to pneumonia was significantly reduced in the intervention group after one year of followup.[42]

1.5.2 Strengthening of the capability of health care facilities

The effectiveness of the case management strategy of ARI depends on the availability of well trained health care workers who can correctly assess, classify and manage ARI appropriately.

The provision of essential drugs and equipment are also an important component in the management of children with ARI. This include also availability and direct accessibility to the population served, and reliable means of referral for patients who cannot be managed at the primary health care level.

1.5.3 Community component for early detection of cases

The utilisation of health facilities in a community is determined by several factors including socio-economic factors, distance from the health facility, and/or availability of the health facilities and health seeking behaviour of the community. Other factors are cultural beliefs, religion, ethnicity, gender and belief in traditional medicine.[43]

Early treatment seeking behaviour by the family and the community are important determinants of disease outcome, and will ensure early treatment and therefore prevent the development of complications of the disease and death.

In order to facilitate early treatment seeking behaviour, mothers or caretakers should be educated on the importance of early treatment once an illness develops and should also be taught to recognise symptoms and signs of ARI in their children that should prompt them to take the child to a health facility urgently. A study in Ethiopia among rural mothers demonstrated that they could be educated to recognise signs suggesting difficult in

breathing and take appropriate action i.e. seek medical advice early in the course of the illness.[44,45]

2.0 Rationale of the study

ARI is still a problem of public health significance in Tanzania among children less than 5 years of age as are diarrhoea, malaria, malnutrition, severe anaemia, ear problems, neonatal sepsis and HIV/AIDS.

Although the programme for control of ARI in Tanzania has been in place for several years, the control of ARI in Tanzania has not been achieved to a satisfactory level partly because the basic training of the various cadres of health care workers does not provide adequate knowledge and skills to ensure case management capability for ARI. In-service training on ARI standard case management guidelines has also limited coverage.

This study was therefore planned to determine and document the current state of performance of primary health care workers and practice of mothers/caretakers in the management of children with ARI in Dar es Salaam. The information obtained could be useful as baseline data and may form a basis for intervention measures with regard to management of ARI and other common childhood illnesses.

2.1 Hypothesis

The hypothesis was that most health care workers in the primary health care facilities in Dar es Salaam cannot manage cases of ARI correctly, and that most mothers are not knowlegeable in detecting signs of pneumonia and hence do not seek early medical advice.

3.0 Study Objectives

3.1 Broad Objective

To assess and document the knowledge and the performance of primary health care workers and mothers/caretakers in the correct case management of acute respiratory infections in children less than 5 years of age.

3.2 Specific Objectives

The specific objectives of this study were to:

1. Determine the level of performance of primary health care workers in the assessment, classification and treatment of ARI in children basing on WHO standard case management guidelines of ARI.
2. Determine the proportion of primary health care workers who correctly counsel mothers/caretakers on home care of ARI.
3. Determine the knowledge and practice of mothers/caretakers regarding the management of ARI in their children.

4.0 MATERIALS AND METHODS

4.1 Study Setting

This was a cross sectional health facility survey. The study was conducted at primary health care facilities (dispensaries and health centres) in the three districts of Kinondoni, Ilala and Temeke in Dar es Salaam region.

In the three Districts, there is a total of 52 primary health care facilities` which include 5 health centres and 47 dispensaries. Altogether there are about 214 health care workers serving the majority of a population of about 3 million people of whom 18% (540,000) are children less than 5 years of age. The survey was done from January 1st to 31st March 1999.

4.2 Enrolment:

The inclusion criteria for enrolment of health care workers into the study was any clinician attending children with ARI during the study period at the ear-marked primary health care facilities who was willing to participate in the study.

The inclusion criteria for the exit interviews of the mothers/caretakers was that a child aged less than 5 years had complaints of ARI and willingness to participate in the study.

During the study period 11 primary health care facilities which are under the Administration of the Dar-es Salaam City Commission were visited during the official working days (Monday to Friday) from 8.00 a.m. to 12.00 noon. These included 3 urban health centres (Kigamboni, Magomeni and Sinza) and 8 dispensaries (Mburahati, Tandale, Kimara, Mbezi, Vingunguti, Tandika, Pugu and Mbagala).

These health facilities were selected randomly from the total number by picking the names of some facilities from the names of all health facilities, which were placed in a container.

4.3 Data collection

Sitting in a corner of the consultation room, the ARI management process was followed closely, starting with the history through the physical examination and the assessment as conducted by the health care workers, and counter-checked the correctness of the finding using a checklist of the salient points of ARI case management as a reference. The performance was considered satisfactory if the health care worker correctly managed cases of ARI according to a correct classification as ascertained by the author on the basis of ARI programme indicators.

In total, 78 health care workers managing patients with ARI were observed. The health care workers observed were of the following cadre: Four Medical Officers, 6 Assistant Medical Officers, 30 Clinical Officers and 38 Assistant Clinical Officers.

After the clinical assessment, exit interview was conducted among mothers/caretakers whose children had ARI to collect information regarding their knowledge and treatment seeking behaviour and whether they had received adequate counselling on home care of children with ARI during the current visit.

Information was therefore obtained though 1) observing health care workers managing children with ARI, 2) doing physical examination and 3) by exit interview of the mothers/caretakers.

4.3.1 Observation of health care workers performance

4.3.1.1 Performance in history taking

The health care worker was observed while assessing a child with respiratory symptoms to ascertain whether he/she asked for the presenting symptoms i.e. cough or difficult breathing and ear problems, whether assessment for danger signs was done, and how the illness was classified. It was also noted if the health care worker asked about the symptoms of cough or difficult breathing and ear problems if they were not the initial presenting symptoms. The identified treatment was assessed to determine if it was appropriate to the assigned classification. Also assessment of how the counselling of the actual drug administration by mothers/caretakers including dose, frequency of administration and duration of treatment, and when to bring the child back to the health facility was done i.e. immediately if the child becomes sicker, unable to drink or breast-feed, breathing becomes difficult or fast and in 2 days for routine follow up for pneumonia.

4.3.1.2 Performance on physical examination and treatment

Observation was done to determine if the health care workers did a complete physical examination in all sick children enrolled into the study in order to identify if there were other medical problems, and complimented this observation by examining the patients and cross-check with the findings of the health care worker.

The observed physical parameters were counting of the respiratory rate, looking for chest indrawing, looking and listening for stridor, and the classification of the illness. Then the health care worker was assessed on how he/she identified treatment and treated the

patients. The assessment of the health care worker was considered correct if it concurred with the findings of the author, and his/her classification and treatment concurred with WHO guidelines on ARI case management.

Any misjudgements of signs by the health care workers were discussed immediately as soon as the assessment of the performance of the health care worker was completed in order to provide feed-back and facilitate correct management of each patient.

4.3.2 Exit interviews of mothers/caretakers

Exit interviews were conducted among mothers/caretakers of children suffering from ARI in order to obtain particulars relating to age, marital status, level of education and occupation of both the father and the mother/caretaker.

Information was obtained regarding on how to give the medicines to the child i.e. the dose, frequency and the duration of treatment; how to give home care in particular increased fluid intake, continued feeding the child during illness, soothing the throat with a safe remedy and when to come back to the health facility for review.

Information regarding the symptoms and signs of ARI and what was the response to the illness, especially when was medical advice sought was collected. Some questions on perceived risk factors for ARI were also administered.

The symptoms of ARI considered were cough or difficult breathing and fast breathing, The risk factors considered were household pollutants such as wood smoke or smoke from kerosene stoves, cigarette smoke exposure, overcrowding in the sleeping rooms, or environmental pollution. Non-leading questions were used so as not to give any hints regarding the symptoms and the risk factors so that they would mention them

unprompted. The data obtained was recorded on a questionnaire developed for this purpose.

4.4 Sample Size:

The prevalence of ARI among outpatient attendances is about 20%. The sample size for mothers was calculated from the formula $N=z^2\ p\ q\ /\ d^2$ where: N is the sample size and z is the percentage point of the normal distribution corresponding to the significance level.[46] Assuming 95% confidence, then z = 1.96.

p is the prevalence of ARI among outpatient attendances, q is 1 - p and d is the maximum likely error. d = 0.05

The sample size required was therefore 246.

The sample size for the health care workers was estimated having on the assumption that the frequency of poor performance in ARI case management is 40% - 50% and assuming a precision of 4% and power 80%, a sample size of 70 – 85 health care workers would be required as a representative sample from the 214 health care workers.

4.5 Statistical Analysis

The data on the performance of health care workers was analysed manually to determine their performance in each variable and the result of each cadre of health care workers was grouped separately. The percentage of correctness in each parameter was calculated using simple frequencies.

The data on exit interviews of mothers/caretakers knowledge and practice pertaining to ARI management was analysed to determine the results in their practice basing on ARI

programme indicators. Pertinent features such as the time interval between the onset of illness and treatment seeking was noted. X^2 test was used to compare differences in health seeking behaviour in different socio-economic groups and analysis was done using SPSS computer programme. p-value less than 0.05 was regarded as significant.

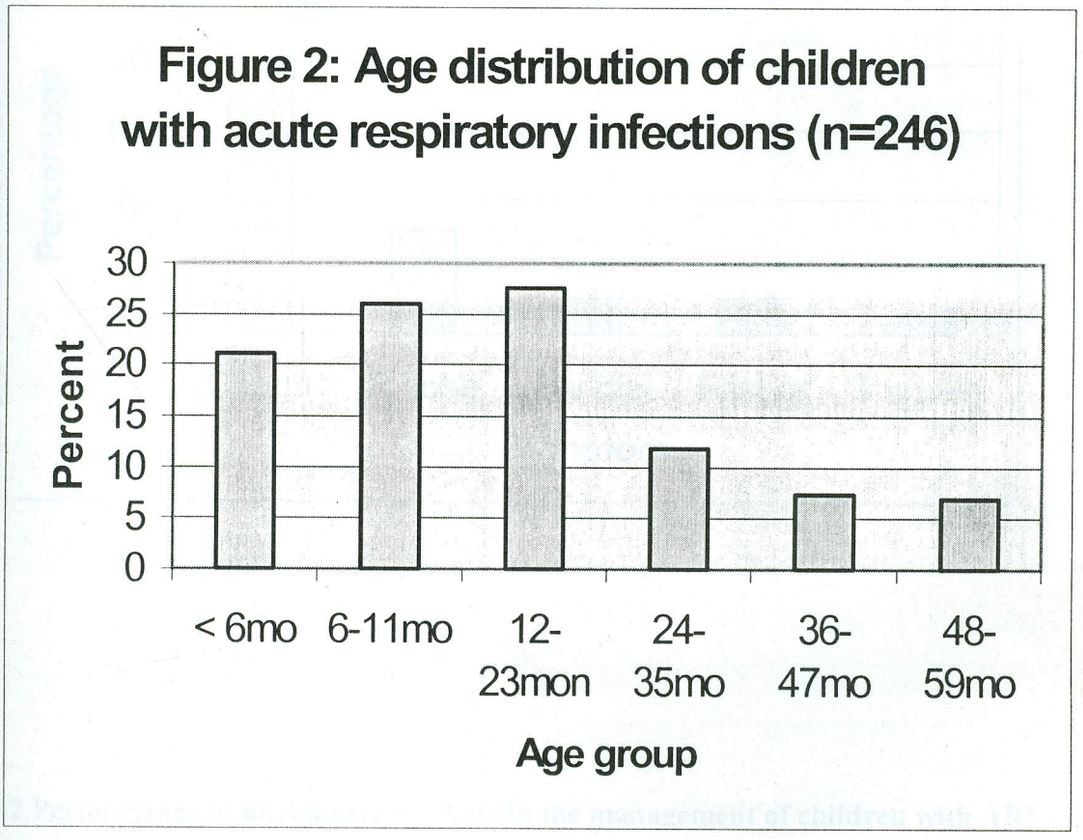
4.6 Ethical Consideration

Ethical clearance for the study was obtained from the College Higher Degrees and Publications Committee of the Muhimbili University College of Health Sciences. Permission to carry out the study was also obtained from the Dar es Salaam City Commission. Informed consent to participate in the study was obtained from both the health care workers and the mothers/caretakers. During the study appropriate treatment was assured in all patients by having an immediate feedback discussion with the health care worker after the assessment has been accomplished.

5.0 RESULTS

5.1 Demographic characteristics of patients with ARI

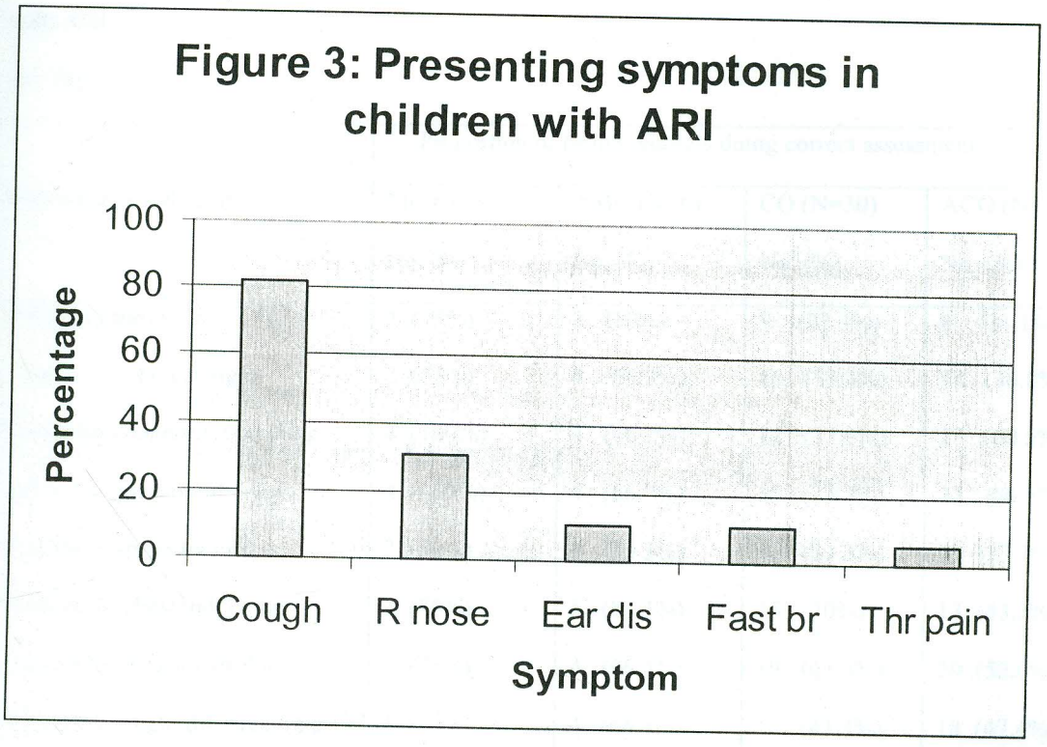
During the study period 246 children aged less than 5 years with complaints of ARI accompanied by their mothers/caretakers were enrolled into the study. The mean age of these children was 12 months (range 1 to 59 months). The majority of children with ARI were less than two years – 184 of 246 (75%). The age distribution, (sex combined) is shown in Figure 2. The male to female ratio was 1.1:1 (129 males to 117 females).



Of the 246 children, 116 (47.2%) had normal nutritional status, 107 (43.5%) were underweight and 23 (9.3%) had marasmus according to their weight for age.

Figure 3 shows the presenting symptoms among the 246 children with ARI. The figure shows that cough or difficult breathing was the most common presenting symptom

presented by 202 (82.1%) children while throat pain was the least. Fever (not on figure) although not a specific symptom, was present in 70% of all children with ARI.



5.2 Performance of health care workers in the management of children with ARI

5.2.1 Overall performance of health care workers

During assessment of the health care workers' performance, 129 episodes of ARI case management were observed been managed by 78 health care workers which comprised of 4 medical officers, 6 assistant medical officers, 30 clinical officers, and 38 assistant

clinical officers. The overall performance of each cadre of health care workers is as shown in Table I.

Table 1: Overall performance of each cadre of health care workers in the management of children with ARI

(N=78)

Performance indicator	Proportion of health workers doing correct assessment			
	MO (N=4) No. (%)	AMO (N=6) No. (%)	CO (N=30) No. (%)	ACO (N=38) No. (%)
Weighing the child	3 (75%)	3 (50%)	7 (23.3%)	8 (21.1%)
Looked for danger signs	3 (75%)	4 (66.7%)	16 (53.5%)	14 (36.8%)
Asked for cough/dif. breathing	4 (100%)	4 (66.7%)	22 (73.3%)	23 (60.5%)
Asked for duration of cough	4 (100%)	4 (66.7%)	22 (73.3%)	23 (60.5%)
Counted respiratory rate	2 (50%)	2 (33.3%)	10 (33.3%)	9 (23.7%)
Looked for chest indrawing	3 (75%)	5 (83.3%)	15 (50%)	13 (43.3%)
Looked/listened for stridor	3 (75%)	4 (66.7%)	19 (63.3%)	20 (52.6%)
Classified cough/ dif. breathing	4 (100%)	4 (66.7%)	13 (43.3%)	18 (47.4%)
Identified treatment correctly	4 (100%)	4 (66.7%)	20 (66.7%)	21 (55.3%)
Provided treatment correctly	4 (100%)	3 (50.0%)	18 (60.0%)	18 (47.4%)
Counselled about home care	2 (50.0%)	3 (50.0%)	9 (30.0%)	2 (5.3%)

The Table shows that the performance of medical officers was satisfactory i.e. managed cases of ARI correctly while the performance of the clinical officers and assistant clinical officers was not satisfactory as many of them could not correctly manage cases of ARI. Details of the performance of the health care workers in each parameter observed are presented below.

5.2.2 Performance in history taking

All health care workers asked for the particulars of the patient such as name, age and sex of the child, the presenting symptoms and duration of the illness. Only 53 (67.9%) asked for the main symptom of cough or difficult breathing if it was not the presenting symptom by the mother/caretaker. All health care workers asked about the fever even if it was not one of the presenting symptoms.

The health care workers did not ask for the other common symptoms of ARI such as ear discharge or pain systematically in all cases unless they were among the presenting symptoms by the mother/caretaker.

5.2.3 Performance on physical examination

Among the 78 primary health care workers, 21(27%) weighed the child and used the weight to calculate the dose of drugs.

Also 47 (60.2%) either looked for the recent weight recorded on the MCH card if the mother had one, or asked the mother if she could remember the last month's weight of the child. If the recent weight was available on the MCH card or if the mother could remember the last month's weight of the child, the health worker used this information in calculating the dose. However, only a few mothers/caretakers carried their MCH cards, and very few could remember the weights of their children.

The remaining 10 (12.8%) health care workers neither checked for nor asked the weight of the child.

Overall, 37 (47.4%) of the 78 health care workers looked for one or more danger signs. However, the tendency to look for danger signs decreased as the basic training of the

health care worker also decreased. The danger signs that were looked for by the health care workers are presented on Table 2.

From this Table it was found that history of convulsions in the child was the general danger sign that was least looked for by the health care worker, while assessment of the level of consciousness was performed most.

Table 2: Health workers performance in assessing for danger signs

Danger sign	No. of health workers assessed (N = 78)	(Percentage)
Not able to drink or breastfeed	30	(38.5)
History of convulsions	25	(32.1)
Lethargy or unconsciousness	35	(44.9)

With regards to counting of the respiratory rate, only 23 (29.5%) health care workers counted the respiratory rate. The rate counted by the health care worker did not vary from that counted by the author. However, there were problems in the interpretation of the respiratory rate as to whether the child had fast breathing or not.

For those who counted the respiratory rate, 15 (65.2%) were in agreement with the author about the rate, and 8 (34.8%) either made a wrong interpretation of the rate or could not make a decision as to whether the child had fast breathing or not.

With regard to lower chest indrawing, 36 (42.2%) primary health care workers looked for it and of these 24 (66.7%) were in agreement with the author's assessment.

Regarding stridor, more than 50% of the health care workers of all cadres looked and listened for it correctly.

Overall 46 (59.0%) health care workers looked and listened for stridor and of these 32 (69.6%) were in agreement with the author's assessment.

5.2.4 Performance on classification of cough or difficult breathing

Overall only 50% of the health care workers observed were able to classify cough or difficult breathing correctly. The classifications made by the health care workers as compared to that by the author are presented on Table 3.

Table 3: Performance on classification of cough or difficult breathing by health care workers viz classifications by the author.

Classification category	By health worker (N = 129)		By author (N = 129)		% classified correctly by health worker
	No	(%)	No	(%)	
No pneumonia: cough or cold	17	(13.2)	28	(21.7)	60.7
Pneumonia	69	(53.5)	64	(49.6)	92.8
Severe pneumonia	36	(27.9)	30	(23.3)	86.0
Very severe disease	7	(5.4)	7	(5.4)	100

All the medical officers and the majority of the assistant medical officers classified cough or difficult breathing correctly, while less than 50% of the clinical officers and assistant clinical officers classified correctly. Table 3 shows that the health care workers had problems in arriving at the correct classification of the illness. There was a tendency of missing the classification of severe pneumonia because of misjudgement of the clinical sign of lower chest indrawing.

With regard to referral of patients, 36 children who were classified by the health care workers as having severe pneumonia needed referral but only 26 were referred to a health care facility with inpatient care for further management. All these children needed pre-referral treatment but this was prescribed to only 20 (77%) of the 26 children. The treatment given was parenteral benzyl penicillin and paracetamol for those who had fever. In 8 children, the health care worker did not prescribe pre-referral treatment. The referred patients were however told to find their own means of transport to the referral centre. Ten patients who needed referral were not referred by the health care worker and instead were prescribed antibiotics and sent back home. Also the health care worker referred 9 patients with pneumonia who needed no referral.

All 7 children with a classification of very severe disease were referred by the health care worker. These were 3 young infants who were not able to breastfeed, 2 who had convulsions and 2 who had impaired level of consciousness.

The classification by the health care worker was however reviewed by the author and discussed with the health care worker so that appropriate treatment could be provided to the patient. Also patients who needed referral according to their classification but were not referred by the health care worker, were later referred after discussion with the health care worker, and appropriate pre-referral treatments were given to all referred patients.

5.2.5 Performance on treatment.

With regard to treatment, out of 129 children attended, 69 (53.5%) were classified to have had pneumonia by the health care worker. Appropriate treatment was prescribed by the health care worker in 49 cases (71%). These received one of the recommended first line

antibiotics which was ampicillin 21 (42.8%), amoxycillin 18 (36.7%) and co-trimoxazole 10 (20.5%). Second line antibiotics were used upon first contact in 10 patients (14.5%) with pneumonia who were given chloramphenicol or benzyl penicillin injections. The health care worker did not prescribe antibiotics to 10 patients (14.5%) who had pneumonia.The duration of treatment prescribed for pneumonia was 5 days in all the 49 cases, which was appropriate.

After th assessment, the author reviewed the treatment given, and after discussion with the health care worker, appropriate treatment was given to the 20 patients who were not correctly treated according to the ARI case management guidelines.

5.2.6 Performance on counselling about home care of ARI.

Of the 78 health care workers observed, 41 (51.7%) counselled the mothers/caretakers on when to bring back their children to the health facility for follow-up of the child's condition. However, only 9 health care workers (11.5%) counselled them to bring back their children who had pneumonia after 2 days, or immediately if the child develops any of the following: became sicker, unable to drink or breastfeed, fever (if had no fever) or difficult breathing. Seven health care workers (9%) counselled mothers/caretakers whose children had no pneumonia: cough or cold to bring back their children if they developed fast breathing. Therefore altogether only 16 (20.5%) of health care workers counselled the mothers/caretakers correctly on when to bring the child back to the health facility for follow-up of the child's condition.

Twenty five health care workers (31.1%) told the mothers/caretakers to bring back the child if there was no improvement upon completion of the treatment prescribed. Thirty

two health care workers (41.2%) did not counsel the mothers at all as to when to bring back the child to the health facility and 5 (7.1%) told them to go to a bigger health care facility if there was no improvement upon completion of the treatment given.

None of the primary health care workers counselled the mothers/caretakers on the importance of giving more fluids and continue feeding during the illness.

5.3 Knowledge and practice of mothers/caretakers on the management of children with ARI

5.3.1 Perception of the presenting symptoms of ARI in their children

From the results of exit interviews of the 246 mothers/caretakers of children with ARI, cough was the most frequent presenting symptom ARI presented by 202 (82.1%) of the children followed by runny nose. The mean duration of illness before initial treatment seeking at the health facility was 3.6 days (range 1 - 14 days).

The reasons for taking the child to the health facility at this particular point in time during the course of the illness are presented in Table 4. From this Table, majority of the mothers/caretakers 135 of 246 (54.9%) took their children to the health facility because they were getting sicker.

Table 4. Reasons for seeking medical care at the health facility for the child with ARI (N=246)

Reasons given by mother/caretaker	Frequency	(Percentage)
Child was getting sicker	135	(54.9)
Child had difficult breathing	38	(15.4)
Child was unable to drink	23	(9.3)
Unable to breastfeed	24	(9.8)
Persistent fever	15	(6.1)
Fast breathing	11	(4.5)

5.3.2 Mothers'/caretakers' knowledge on treatment and home care

Of the 246 mothers/caretakers interviewed, 103 (41.9%) indicated that they had been counselled by the health care worker on the child's problems and on how to give the prescribed medicines, including the dose, frequency of administration and the duration of treatment. The remaining 143 (58.1%) mothers/caretakers were neither informed of the diagnosis/problems the children had, nor how to give the prescribed medicines. The mothers/caretakers were simply told that further instructions would be provided at the health facility's pharmacy.

Regarding home care, it was noted that none of the mothers knew anything regarding giving more fluids and continuing feeding the child during illness, indicating that they had not been counselled by the health care worker on home care of a sick child with ARI.

With regard to as when to bring back the sick child to the health worker for follow-up, 96 mothers (39%) said they would do it if the child did not improve. However, only 10

mothers (10.4%) knew that they should bring back their children who had pneumonia after 2 days for follow-up, or immediately if they became sicker, were unable to drink or breastfeed, or if they developed convulsions, fast breathing or become abnormally sleepy.

5.3.3 Social economic characteristics of mothers/caretakers in relation to health care seeking behaviour.

The socio-economic characteristics of the families of the children with ARI in relation to health care seeking behaviour is presented in Table 5. Majority of the parents (68.7% of the mothers/caretakers and 76.8% of fathers) had primary education only. With regard to occupation and marital status, majority of the fathers (51.6%) were petty businessmen and most of the mothers/caretakers (73.6%) were housewives. A small proportion of the parents, 37 mothers (15%) and 59 fathers (24%) were government employees or employed in the private sector. Of the remaining mothers/caretakers, 23 (9.3%) were single, 23 (9.3%) were cohabiting, 17 (7%) divorced and 9 (3.7%) were widows.

Table 5. Socio-economic characteristics of the families in children with ARI (N=246)

Characteristic	Number.	(%)	Duration of symptoms	χ^2	*P* value
Maternal education					
No formal education	32	(32.0)	5.2		
Primary education	169	(68.7)	4.0		
Secondary and above	45	(18.3)	1.6	2.52	0.125 NS
Paternal education					
No formal education	5	(2.0)	8.0		
Primary education	189	(76.8)	1.6		
Secondary and above	52	(21.2)	1.2	4.0	0.041 S
Occupation of mother					
Unemployed	181	(73.6)	1.6		
Employed	37	(15.1)	3.0		
Business or other	28	(11.1)	6.2	3.0	0.058 NS
Occupation of father					
Employed	59	(24.0)	2.8		
Business	127	(51.6)	4.8		
Other	60	(24.4)	3.2	0.62	0.431 NS
Marital of status of mother					
Married	174	(70.7)	3.8		
Single	23	(9.3)	4.3		
Other	49	(20.0)	3.3	0.175	0.680 NS

S The difference is statistically significant

NS The difference is not statistically significant

Although educated mother, and those who are married seek medical care earlier than those in the other groups, the difference was statistically not significant ($p > 0.05$). However, with regard to the level of education of the father, there was a significant difference between the onset of illness and seeking medical care in that, in families where the father is educated, the time interval from onset of illness to seeking medical care was significantly shorter than in those where the father had no formal education ($p < 0.05$).

However there was no significant difference in relation to the occupation of the father and health seeking behaviour.

5.3.4 Mothers/caretakers awareness of the risk factors for ARI.

The perception of mothers/caretakers regarding the risk factors for ARI in their children is presented in Table 6. Overall, 194 (78.9%) mothers/caretakers where able to mention at list one risk factor for ARI. None of the mothers mentioned malnutrition as a risk factor for ARI.

Table 6. Mothers/caretakers knowledge on the risk factors for ARI in children.

Risk factor for ARI mentioned*	Number of Mothers/caretakers	(Percentage)
Wood smoke	63	(25.6)
Cigarette smoke	54	(22.0)
Kerosene smoke	69	(28.0)
Pollution in air	132	(53.7)
Overcrowding in houses	57	(23.2)
Cold whether	141	(57.3)
Don't know any factor	52	(21.1)

* A mother could give more than one risk factor depending on her knowledge.

5.4 Self medications at home before seeking medical care from the health facility

Self-medication at home before taking the child to a health facility was practised in 186 cases (75.6%). The type of medications given to the children and the number of children given the medication is presented on Table 7. The most frequently given drugs were

paracetamol in 104 (55.9%) children, and cough syrups in 100 (53.8%) children. Antibiotics were rarely given in 22 (11.9%) children. All medicines were bought from medical stores or pharmacy without a prescription.

Also 12 children (6.5%) were given traditional medicines prior to seeking medical care.

Table 7. Self-medication given to children with ARI prior to health facility visit

Drug given	No. of children (n=186)	(Percentage)
Paracetamol	104	(55.9)
Cough syrups	100	(53.8)
Chloroquine	43	(17.5)
Aspirin	28	(15.1)
Co-trimoxazole	12	(6.5)
Traditional medicines	12	(6.5)
Ampicillin	10	(5.4)

It was found that some children were given more than one medicine before been taken to the health facility. For example, 54 children (22%) had been given two medicines and 14 (7.5%) had been given three medicines. Sixty children (24.4%) had received no medication at home prior to the seeking of medical advice in the health facility.

6.0 DISCUSSION

6.1 Epidemiological characteristics of the patients with ARI

The finding of this study that the majority of children with ARI were less than two years of age is consistent with other findings elsewhere. Other studies had also shown that ARI is more prevalent among children less than 5 years of age and even more so below two years. In this study, 75% of the children were less than 2 years age, a figure which is similar to that of Mtango et al in Bagamoyo in 1986, [41] Singh et al in Bombo Hospital Tanga in 1981,[47] and Johnson et al in Nigeria in 1992.[27] The sex distribution of found in this study is also similar to that reported in other studies.[23,27]

The finding in this study that cough was the main presenting symptom, and that fever was present in majority of the children is also consistent with the finding of Weber et al in The Gambia,[18] in which cough was the presenting symptom in 87%of ARI cases, and 84% of the them had fever. The mean duration from the onset of symptoms to seeking medical care was 3 days which is almost similar to the finding in this study.

6.2 Performance of health care workers in the management of ARI

The fact that only half of the health care workers observed were able to manage ARI cases correctly, underlines the importance of adequate training in ARI case management during either the basic training or through continues education. The WHO ARI control programme emphasises training as the main approach to improving the level of performance of health care workers in the management of ARI in children.[48,49] It seems half of the health care workers observed in this study had not been trained on the management guidelines for ARI or did not attach any importance to them.

It is important that the health care workers at the primary health care level are able to assess children with symptoms of ARI correctly in order to classify the illness correctly and provide correct treatment. ARI management guidelines are taught to students during their basic training in medical schools.

In this study only 47.4% of the health care workers assessed for danger signs and these were mainly medical officers and assistant medical officers. Although danger signs are non-specific, the presence of any one of them indicates that the patient has very serious disease that cannot be managed at the primary health care level, and therefore urgent referral is required to provide correct treatment.

In this study, a large proportion of the health care workers (67.9%) asked for the main symptom of cough or difficult breathing. This is a good practice because it facilitates early detection of ARI and initiation of treatment without delay. The effectiveness of appropriate ARI case management in reducing ARI associated morbidity and mortality has been demonstrated by Mtango et al in Bagamoyo, [41] and by Bang et al in India.[42]

The finding that only 29.5% of the health care workers actually counted the respiratory rate indicates that most primary health care workers do not consider respiratory rate as an important clinical sign in classifying cough or difficult breathing.

Even for those who counted the respiratory rate, one third of them could not make a correct interpretations of the respiratory rates, indicating that they did not know the cut-off points for normal respiratory rates in children of different age groups. This also leads to difficulty in classifying the illness, resulting into incorrect treatment or delay in starting appropriate treatment.

With regards to lower chest indrawing, 46.2% of the health care workers actually looked for chest indrawing and used the findings to classify the illness into severe pneumonia. As it was for the danger signs, it was mainly the medical officers and assistant medical officers who looked for chest indrawing and interpreted the findings correctly, indicating that these had a better basic training compared to clinical officers and assistant clinical officers.

6.3 Performance in treatment and counselling of mothers/caretakers on home care

The performance of primary health care workers in the treatment of ARI was sub-optimal. While the medical officers could provide correct treatment, only about half of the other cadres could identify correct treatment for the classification and treated the children appropriately. This could be due to their difficulty in assessing and classifying the cough or difficulty breathing. However, the number of medical officers was too small to conclude that they all performed well.

Some health care workers had problems to decide which patients to be referred. Some referred patients with pneumonia who should have not been referred, and left patients with severe pneumonia who should have been referred otherwise. This could have led to serious consequences. All children with very severe disease were referred and were given pre-referral treatment.

ARI case management guidelines recommend that all children with very severe disease and severe pneumonia be referred to hospital for inpatient management (Appendix V, Table 9). These patients requires parenteral antibiotics, and those with very severe disease may need supportive care such as oxygen which cannot be provided at the primary health

care facility or at home. Also pre-referral treatment to seriously ill children could be life serving and should be given to all patients who are referred.[50]

The guidelines also require that all young infants under 2 months of age with any sign of pneumonia be referred to hospital (Appendix V, Table 10).

The choice of the antibiotic in the treatment of pneumonia should also follow the ARI case management guidelines, which require a standard antimicrobial agent, and the child be re-assessed after two days for improvement. Second line antibiotics are prescribed when the patient has not responded to the first line drugs after two days of treatment (Appendix V, Table 9).

In this study, it was found that some patients with pneumonia were prescribed the second line drugs, which was unnecessary. It was also observed that some health care workers prescribed antibiotics to children who had no pneumonia (cough or cold), which was not indicated. ARI case management guidelines require that children with only mild ARI i.e. no pneumonia: cough or cold be given supportive care such as continuing feeding and adequate hydration. These guidelines provide a basis for rationalised use of antibiotics and that if followed, antibiotic therapy will not be required for the majority of children with ARI.[50] A study done by Mtango et al in 1982 also observed excessive use of antibiotics in the treatment of all kinds of ARI.[51]

In most cases, the health care workers prescribed drugs based on the age rather than the weight of the child. This is not a good practice because the weight varies considerably with the nutritional status of the child and could lead to under-dosing or overdosing the patient. In this study, about 50% of the children had some degree of malnutrition and therefore their weight for age was below normal.

It was also found in this study that some of the children could not obtain the antibiotics from the health care facility, indicating that the health facilities are not well stocked with the antibiotics recommended for the treatment of pneumonia. Hence, the mothers/caretakers had to look for the drugs elsewhere from pharmacies, which delayed initiation of treatment.

Regarding counselling of mothers/caretakers, only 20.5% of the primary health care workers provided correct counselling as to when to bring back the child for follow-up. This means that many primary health care workers do not know when to do a follow-up of a child with pneumonia. This may be a contributing factor to a potentially high childhood morbidity and mortality in the community.

None of the health care workers counselled the mothers/caretakers regarding giving more fluids and to continue feeding the child at home during illness. Increasing fluid intake and feeding a child with ARI is important because children with pneumonia tend to hyperventilate and loose more fluids. This can lead to dehydration if the child is not given extra fluids. Increased feeding is also important to prevent malnutrition because of increased demand of nutrients during illness.[49] In this study it was found that 70% of the children with ARI had history of fever, and fever is known to cause a rise in basal metabolic rate (BMR). The BMR increases by 12% for each degree centigrade rise in body temperature, and this requires more nutrients.

The problem of not providing proper counselling could have been contributed mostly by lack of proper basic training. It could also be partly due to work overload, as it was observed that the health care workers attend so many patients that they may not have enough time to spend on one patient.

6.4 Knowledge and practice of mothers/caretakers in the management of children with ARI

Analysis of data on exit interviews of mothers/caretakers has shown that most of them did not know how to give the prescribed medicines or when to come back to the health care facility. Also they were not aware that they should give more fluids and continue feeding the child who is sick, indicating that the health care workers did not properly counsel them. Experience and studies have shown that it is possible to educate and counsel mothers on correct home care of children with ARI, including observation of the breathing of young children to determine fast breathing and take appropriate action in terms of early health seeking behaviour as shown in a study in Ethiopia.[43] Therefore, it is crucial to adequate management of ARI to improve the situation in heath education and counselling of mothers.

The data also showed that, the mean interval of time from the onset of the illness to attendance to a health facility was 3.6 days, and this is a significant delay in seeking medical advice, which could have a negative impact on outcome of the illness. Studies have established that many episodes of pneumonia lead to death within 3-5 days if not treated. Therefore, easy and quick access to antimicrobial therapy is a crucial factor in the reduction of mortality from pneumonia. Unlike diarrhoeal disease control programmes, which promote health care practices in the home that can by themselves reduce diarrhoea mortality, ARI control programmes require that caretakers know when to seek care outside the home. Many deaths from pneumonia occur because sick children are brought to a health worker for care too late, or not at all. For an effective case management programme, mothers should know how to recognize the signs of pneumonia, be

motivated to seek appropriate health care outside the home and comply with a full course of antimicrobials. The mother must not expect an immediate cure from the antimicrobial and should know that she must return to the health service if the child does not improve or worsen.[50]

Survival from ARI depends to a large extent on the adequacy of care provided by mothers in the community.[50]

Self-medication without prescription is a bad practice, for example some mothers (15.1%) gave aspirin to their children, which could result into serious side effects. Aspirin in children is known to cause hepatic injury and encephalopathy (Reyes syndrome), and could cause gastrointestinal bleeding because of prolongation of the bleeding time.[52]

Most cough syrups are of little value for the management of children with cough. Some can be harmful because they contain ingredients such as alcohol and codeine, which can be toxic for young infants and young children. Antibiotics without prescriptions of a doctor are also discouraged because mothers/caretakers cannot know what antibiotic to give and the dose. In this study, 53.8% and 11.9% of mothers/caretakers gave their children with cough or difficult breathing cough syrups and antibiotics respectively.

Believing in traditional medicines could also be a dangerous practice because the medicines have no dosage and can be toxic to children.

Self-medication could have also been responsible for the delay in seeking medical care as it was noted in this study, that mothers took their children to a health care facility on average 3.6 days after the onset of the illness. This delay in seeking medical care could be a major factor contributing to increased ARI associated morbidity and mortality in

children less than 5 years of age. In the study by Mtango et al in 1982, it was also noted that late presentation was among the causes of death in children with ARI.[51]

The implementation of the case management programme for ARI requires an effective health education programme to ensure that the community will utilise the health services available. A study done in India by Bang et al showed that mass education could improve health seeking behaviour of mothers and this significantly reduced mortality due to pneumonia. [42]

More than 70% of mothers/caretakers could identify at least one risk factor for ARI. This could be a good start for intervention strategies in the control of ARI in children in the areas where this study was done. However none of the mothers identified malnutrition as a risk factor, indicating that they might not have realised malnutrition as a major problem predisposing to infections. In a study in Ethiopia by Shamebo et al in 1990, it was also noted that most mothers could not recognise that their children were severely malnourished, or that malnutrition is a serious problem predisposing to infections including ARI.[43]

In Mtango's study in 1982, it was also found that children who died of ARI had poor nutritional status and more severe signs than those who survived.[51]

Malnutrition is associated with a significant impairment of the immune system and deficiency of minerals, trace elements and vitamins that predispose to infections.

7.0 CONCLUSION.

1. The performance of primary health care workers in the case management of ARI in the health facilities studied was unsatisfactory. Less than 50% of the health care workers weighed the child, looked for danger signs or counted the respiratory rate and only about 50% were able to assess, classify and provide treatment correctly.
2. Performance of the primary health care workers in counselling mothers/caretakers on home care of a child with ARI was very unsatisfactory. While only 20.4% of them were able to correctly counsel the mothers/caretakers of children with ARI on when to bring back the child for follow-up, none of them counselled them with regard to giving more fluids and to continue feeding the child during illness.
3. On exit interview, only about 40% of the mothers/caretakers received some counselling regarding home care of the child with ARI with respect to administration of medicines. None of them was however counselled regarding giving more fluids and to continue feeding the child during illness. Also about 70% of the mothers/caretakers knew at least one risk factor for ARI but none of them identified malnutrition as a risk factor.
4. Treatment seeking was delayed by approximately three days in the majority of cases and this was not significantly associated with level of education, marital status or occupation of the mother/caretaker, but rather to the level of education of the father. Also self-medication with drugs bought without prescription, or traditional medicines was a common practice. More than 70% of mothers/caretakers gave various medicines to their children before seeking medical care.

8.0 RECOMMENDATIONS.

1. To provide in-service training of all health care workers in dispensaries and health centres in Dar es Salaam on standard case management of ARI. This will lead to improvement on their skills on case management of children with ARI, and ensure correct case management.
2. Health education to the community particularly to mothers/caretakers during their visits to the health facility to facilitate their awareness in the management of ARI in children through and to improve health seeking behaviour of the community. Such strategy could include community health education targeted towards assisting the community to recognise disease symptoms of the common childhood illnesses and when and where to seek for health.

9.0 STUDY LIMITATIONS

Discussion with health care worker about management of the children with ARI who were not managed correctly could have influenced his/her performance in the subsequent assessment and therefore influenced the results. To avoid this, health care workers who did not perform correctly in the management of ARI cases, i.e. in history taking, physical examination, assessment, classification and treatment in the first patient, were not re-assessed for a second time. In a few cases however, the discussion was postponed until he/she had finished a second patient and then discussed the two patients, and modified the management according to their correct classification.

10.0 REFERENCES

1. WHO. Module on management of the young child with an acute respiratory infection. Acute respiratory disease control programme. WHO; 1992.
2. WHO. Acute respiratory infections in children: Case management in small hospitals in developing countries. A manual for Doctors and other Senior Health Workers. WHO; 1990.
3. *Major K.* Long term sequelae of respiratory illnesses in infancy and childhood. Pediatr Clin N Am 1979; 76: 525-533.
4. *Wesley AG.* Prolonged after effects of pneumonia in children. S Afr Med J 1991; 79: 73-76.
5. *Johnston IDA, Strachan DP, Anderson HR.* Effect of pneumonia and whooping cough in childhood and adult lung function. N Engl J Med 1998; 338: 581-587.
6. *Murray CJL, Lopez AD,* editors. The global burden of diseases. Harvard School of Public Health. WHO; 1996.
7. *Ngallaba S, Kapiga SH, Ruyobya I, Boerma JT.* Tanzania: Demographic and Health Survey 1991/92. Bureau of Statistics Planning Commission. 1993; 92-93.
8. Government of Tanzania. Demographic and Health Survey 1996. Bureau of Statistics. Planning Commission.
9. Muhimbili Medical Centre, Dar es Salaam Tanzania. Department of Paediatrics and Child Health: Annual report 1991/92.
10. Muhimbili Medical Centre, Dar es Salaam Tanzania. Department of Paediatrics and Child Health: Annual report 1997/98.

11. *Garenne M, Ronsmans C, Campbell H.* The magnitude of mortality from acute respiratory infections in children under 5 years in Developing countries. World Health Stat Q 1992; 45:180-191.

12. *Robert GE. Max Klain, Anne Westey.* Pneumonia in young children - time for action. Editorial. S Afr Med J 1993; 83:632-633.

13. *Von Schirnding YER, Yach D, Klein M.* Acute respiratory infections as important cause of childhood deaths in South Africa. S Afr Med J 1991; 80:79-82.

14. Policy implications of adult morbidity and mortality: End of phase 1 report. Ministry of Health, Dar es Salaam, Tanzania August 1997.

15. *Pio A, Leowski A, Ten Dam HG.* The magnitude of the problem of acute respiratory infections in childhood. Pro Internat Workshop, Sydney; Aug 1984: 3 - 4. (From Wellcome Tropical Institute: Acute Respiratory Infections: A manual for distance learning; 1990).

16. *Tupasi TE, Velmonte MA, Sanvictires MEG, Abraham L, DeLeon LE, Tan SA, Miguel CA, Saniel MC.* Determinants of morbidity and mortality due to acute respiratory infections: Implications for intervention. J Infect Dis 1988; 157:615-623.

17. *Duff AL, Pomeranz ES, Gelber LE, Price W, Farris H, Hayden FG, Platts-Mills TAE, Heymann PW.* Risk factors for acute wheezing in infants and children: Viruses, passive smoke and IgE antibodies to inhalant allergens. Pediatr 1993; 92:535-340.

18. *Weber MW, Backour R, Usen S, Schneider G, Adegbok R, Cane P, Jaffar S, Milligan P, Greenwood BM, White H, Mullholland K.* The clinical spectrum of respiratory syncytial virus disease in the Gambia. Pediatr Infect Dis J 1998; 17: 224-230.

19. *Sung RYT, Cheng AFB, Chang RCK, Tam JS, Oppenheimer SJ.* Epidemiology and aetiology of pneumonia in children in Hongkong. Clin Infect Dis 1993; 894-896.

20. *Forgie IM, Campbell H, Lloyd-Evans N, Leinonen M, O'neill KP, Saikku P, White HC, Greenwood BM.* Aetiology of acute lower respiratory tract infections in children in a rural community in the Gambia. Pediatr Infect Dis J 1992; 11:466-473.

21. *Chay OM, Hiew J, Tan CK, et al.* Etiology of acute lower respiratory tract infections in hospital based patients. South Asian J Trop Med Public Health 1992;23: 293-296.

22. WHO. Management of the child with a serious infection or severe malnutrition. Guidelines for care at the first-referral level in developing countries. Draft WHO: 1999.

23. *Chong CY, Lim WH, Heng JT, Chay OM.* Changing trend in the pattern of infective aetiologies in childhood acute lower respiratory infections. Acta Paediatr Jap 1997;39: 317-321.

24. *Media JWR, Florey C du V, Attman DG, Ans AV.* Association between gas cooking and respiratory diseases in children. Brit Med J 1977; 2:149-152.

25. *Ekwo EE, Weinberger MM, Lachenbruch PA.* Relationship of parental smoking and gas cooking to respiratory diseases in children. Chest 1983; 84:662-668.

26. *Kossove D.* Smoke filled rooms and respiratory diseases in infants. S Afr Med J 1982;61: 622-624.

27. *Abdul-Wahab BRJ, Wilson IA.* The association of household pollutants and socio-economic risk factors with short term outcome in hospitalised pre-school Nigerian children. Annals Trop Paediatr 1992; 12:421-432.

28. *Femi-Pearre D, Adeniyi-Jones A, Oke AB*. Respiratory symptoms and their relationship to cigarette smoking, dusty occupation and domestic air pollution: Studies in urban African population. W Afr Med J 1973; 22: 57-66.

29. *Morris K, Morganlander M, Coulehan JL, Gahagen S, Arena VC.* Wood burning stoves and lower respiratory tract infections in American Indian children. Am J Dis Child 1990; 144:105-108.

30. *Taylor B, Golding J, Wadaworth J, Butter N.* Breast feeding, bronchiectasis and admissions for lower respiratory illness and gastro-enteritis during the first five years. Lancet 1982; 1:1227-1229.

31. *Ehrlich RI.* Parental smoking and childhood asthma. Editorial. S Afr Med J 1982; 81: 443-444.

32. *Wright AL, Holberg C, Martinez FD, Taussig LM.* Relationship of parental smoking to wheezing and non-wheezing lower respiratory tract illnesses in infancy. J Paediatr 1991; 118: 207-214.

33. *Sponner V, Barker J, Tulloch S, et al.* Clinical signs and risk factors associated with pneumonia in children admitted to Goroka Hospital, Papua New Guinea. J Trop Paediatr 1989; 35:295-300.

34. *Adeghola RA, Falade AG, Sam BE, Aidro M, Baldeh I, Hazlett D, Wittle H, Greenwood BM, Mulholand EK.* The aetiology of pneumonia in malnourished and well nourished Gambian children. Paediatr Infect Dis J 1994; 13:975-982.

35. *World Health Organisation*. A programme for controlling acute respiratory I nfections in children; memorandum from a WHO meeting. Bull WHO 1984; 62: 45- 58.

36. *Weatherall DJ, Ledingham JGG, Warrell DA,* editors. Primary health care (Fauler GH). Oxford Textbook of Medicine 3rd edition, volume 1. Oxford University Press; New York 1996; 46-51.

37. *World Health Organisation* - Supervisory skills: Management of the young child with an acute respiratory infection. Geneva: WHO; 1991.

38. *Campbell H, Lamont AC, O'neill KP, Byass P, Forgie IM, Lloyed-Evans N, Greenwood BM.* Assessment of clinical criteria for identification of severe acute lower respiratory tract infections in children. Lancet 1989; 2:297-299.

39. *Shann F, Hart K, Thomas O.* Acute lower respiratory infections in children: possible criteria for selection of patients for antibiotic therapy and hospital admission. Bull WHO 1984; 62:749-753.

40. WHO. Antibiotics in the treatment of acute respiratory infections in young children. WHO; 1990.

41. *Mtango FDE, Neuvians D.* Acute respiratory infections in children under five years. Control project in Bagamoyo District in Tanzania. Trans R Soc Trop Med Hyg 1986; 80: 851-858.

42. *Bang AT, Bang RA, Tale O, Sontakke P, Solanki J, Wargantiwar R, Kelzarkar P.* Reduction in pneumonia mortality and total childhood mortality by means of community-based intervention trial in Gadchiroli, India. Lancet 1990; 336:201-206.

43. *Shamebo D, Muhe L, Freij L, Sandatrom A, Wall S.* The Butajira Rural Health project: Distribution of health needs and care - a case for improved and equitable services. Ethiop J Health Dev, Special Issue 1994; 8:iv.

44. *Muhe L.* Mothers' perception of signs and symptoms of acute respiratory infections in their children and their assessment of severity in an urban community of Ethiopia. Annals Trop Paediatr 1996; 16:129-135.

45. *Tupasi TE.* Health-seeking practices of mothers: Implications for ARI intervention. Technical Advisory Group for Acute Respiratory Infections. 3rd meeting. Document no. WHO/TRI/ARI.TAGIII/87.18 Geneva. World Health Organisation 1987.

46. David L. Katz, editor. Epidemiology, biostatistics and preventive medicine review. W.B.Saunders, First edition 1997; 97 – 105.

47. Singh M, Mawalla DG, Segundo RC. Review of childhood pneumonia in Bombo Hospital Tanga. Dar Med J 1981; 8: 88-91.

48. WHO. Technical Advisory Group on ARI. A programme for controlling ARI in children: memorandum from a WHO meeting. Bull WHO 1984; 62:47-48.

98. WHO. Division of Diarrhoeal and Acute Respiratory Disease Control. Interim report, WHO Geneva 1994.

50. WHO. Technical bases for the WHO recommendations on the management of pneumonia in children at first-level health facility. Programme for the Control of Acute Respiratory Infections. WHO Geneva 1991.

51. *Mtango FDE, Neuvians D, Korte R.* Magnitude, presentation, management and outcome of acute respiratory infections in children under the age of five in hospitals and rural health centres in Tanzania. Trop Med Parasitol 1989; 29:1168-1170.

52. *Gilman AG, Goodman LS, Rall TW, Murad F,* editors. Goodman and Gilman's The Pharmacological Basis of Therapeutics. Macmillan, seventh edition 1985; 680-685.