EVALUATION OF IMCI IN THE DIAGNOSIS OF FEBRILE ILLNESS IN MAGU DISTRICT, MWANZA, TANZANIA

BY

YUSUF MANYONYI BWIRE, MD (Bulgaria)

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE UNIVERSITY OF DAR-ES-SALAAM

2001

MEDICAL LIBRARY
DAR ES SALAAM

CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by the University of Dar-es-Salaam a dissertation titled "EVALUATION OF IMCI IN THE DIAGNOSIS OF FEBRILE ILLNESS IN MAGU DISTRICT, MWANZA, TANZANIA" in partial fulfillment of the requirements for the degree of Master of Public Health

SUPERVISOR'S SIGNATURE: _____

Zul Premji [MD (Dar), DTM&H, MSc (London), PhD (Sweden)].

Date 20/09/2001

DECLARATION

I hereby solemnly declare that, this dissertation is my original work, and that it has never been submitted for a diploma or degree in any other university.

CANDIDATE'S SIGNATURE: _____

Y. M. Bwire, MD (Bulgaria)

Date 26.09.2001

STATEMENT OF 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".

ACKNOWLEDGEMENT

I would like to convey my sincere gratitude to the Ministry of Health (Tanzania), in collaboration with DFID, for their sponsorship, which enabled me to participate in this course.

I wish to thank all the academic staff of the Institute of Public Health, Muhimbili University College of Health Sciences, Dar-es-Salaam, Tanzania. It was from them, that the foundation of this work grew.

I take this opportunity to express my sincere gratitude to my supervisor, Dr. Zul Premji, head of the department of Parasitology and Medical Entomology, for his interest and commitment in providing invaluable advice and guidance in writing this dissertation. I have benefited immensely from his constructive criticisms. I am also indebted to Professor G. Msamanga, of the department of community health, for his tremendous remarks and advice during the development of the whole document.

I am also grateful to Mr. C. Makwaya for his guidance in the statistical part of this study.

I would also like to thank Mr. S.A. Maganga of the college library, for his commendable assistance in searching for relevant literature.

My heart-felt regards go to Mr. Mdaki, a laboratory technologist of Magu district hospital, who assisted me in the laboratory work, and to Mr. Lupande, a clinical officer, who provided me transport for the field trips, and to all the staff members of

Magu district hospital, health centres and dispensaries, who accorded me with an excellent co-operation and assistance during my study and stay in Magu.

Last but not least, I wish to pay very special tribute to my family: my beloved wife **Nyachiro**, for her love, moral support and understanding, and my loving children **Jaffar** and **Misca**, for tolerating my partial negligence of their care during the whole period of the MPH course.

It will not be easy to mention every individual by name for all those who contributed in one way or another to the success of this work. I say thanks to everybody who assisted.

MEDICAL LIBRARY
DAR ES SALAAM

DEDICATION

This work is dedicated to my parents:

My father, the late Manyonyi Myongo and

My mother, the late Nyanyonyi Mayagi.

ABSTRACT

A cross-sectional study was conducted during the period of June to July 2001, to evaluate the IMCI initiative in the diagnosis of febrile illness in Magu district, Mwanza, Tanzania. In this study, 23 clinicians and 375 underfive patients were studied.

The study revealed that the IMCI algorithms addressed most of the febrile problems presented by the caretakers of the sick children.

The study also found that most of the clinicians (96%), had adequate knowledge in IMCI but the knowledge they had did not go hand in hand with their practice. A history of cough was enquired in only about half of the children who presented with fever. History of convulsions, being one of the danger signs, was asked for in only 8% of the febrile children and respiratory rate was taken in only 43% of children who presented with cough. Body temperature was measured in 83% of the children with a history of fever.

Most of the health facilities had the required diagnostic tools.

The mean time clinicians spent with the sick children was very short (about 5 minutes) despite that the clinics were not busy. The mean workload of clinicians was about 20 patients per day.

The laboratory results helped in the diagnosis of malaria. It confirmed the absence of parasitaemia to some febrile children. Following the IMCI algorithms, all those

children were to be over treated with antimalarials. The findings showed that, the IMCI algorithms had a high sensitivity (88.1%), and a low specificity (24.7%), in the diagnosis of malaria.

It is suggested that the findings and recommendations of this study should be used to improve the diagnosis of febrile illness in primary health care facilities.

TABLE OF CONTENTS

PAGE

CERTIFICATION ..... **II**

DECLARATION ..... **III**

STATEMENT OF COPYRIGHT ..... **IV**

ACKNOWLEDGEMENT ..... **V**

DEDICATION ..... **VII**

ABSTRACT ..... **VIII**

TABLE OF CONTENTS ..... **X**

LIST OF TABLES ..... **XII**

LIST OF ABBREVIATIONS ..... **XIV**

1 INTRODUCTION **1**

1.1 GLOBAL SITUATION OF MALARIA 1
1.2 OTHER FEBRILE ILLNESSES 5
1.3 BACKGROUND OF IMCI STRATEGY 8
1.4 STATUS OF IMCI IMPLEMENTATION IN TANZANIA 13

2 REVIEW OF LITERATURE **15**

3 STATEMENT OF THE PROBLEM **20**

4 RATIONALE OF THE STUDY **21**

5 OBJECTIVES **23**

5.1 BROAD OBJECTIVE 23
5.2 SPECIFIC OBJECTIVES 23

6 METHODOLOGY **24**

6.1 DESCRIPTION OF THE STUDY AREA 24
6.2 STUDY POPULATION 25
6.3 STUDY DESIGN 25
6.4 SAMPLING AND SAMPLE SIZE 25
6.5 ETHICAL CONSIDERATIONS 27
6.6 DATA COLLECTION METHODS AND TOOLS 27
6.7 DATA PROCESSING AND ANALYSIS 30
6.8 STUDY LIMITATIONS 31

7 RESULTS **32**

8 DISCUSSION **47**

9 CONCLUSION AND RECOMMENDATIONS **51**

9.1 CONCLUSION 51

MEDICAL LIBRARY ★ DAR ES SALAAM ★

9.2 RECOMMENDATIONS....52

10 REFERENCES....53

11 APPENDICES....59

11.1 ALGORITHMS OF IMCI IN THE DIAGNOSIS OF FEBRILE ILLNESS....59
11.2 QUESTIONNAIRE....63
11.3 CHECKLISTS....71

LIST OF TABLES

Title	Page
Table 1. Clinicians in participatory observations with their qualifications	33
Table 2. Age groups and sex distribution of under fives	34
Table 3. Symptoms and signs and number of the children with the symptom or sign	35
Table 4. Frequency distribution of age groups in children with fever	36
Table 5. Clinicians with their qualifications and their level of knowledge in IMCI	37
Table 6. History of fever and temperature measuring practice among clinicians	38
Table 7. History of cough and breathing count practice among clinicians	39
Table 8. Enquiry of history of convulsions by clinicians in children with fever	40
Table 9. Enquiry of history of cough in children with fever	41
Table 10. Type of diagnostic tool and number of consultation rooms with the tool	42
Table 11. Number of children seen by one clinician per day	43
Table 12. Time clinicians spent with patients	44

Table 13. Fever status of the children and laboratory results for malaria parasites 45

LIST OF ABBREVIATIONS

AMO	Assistant Medical Officer
CHD	Director of Child Health Division
COTC	Clinical Officers' Training Centre
DFID	Department for International Development
EDP	Essential Drugs Programme
ETAT	Emergency Triage Assessment and Treatment
GTZ	Germany Technical Cooperation
HMIS	Health Management Information System
IMCI	Integrated Management of Childhood Illness
MOH	Ministry of Health
MPH	Master of Public Health
MUCHS	Muhimbili University College of Health Sciences
TEHIP	Tanzania Essential Health Interventions Programme
UNICEF	United Nations Children's Fund
USA	United States of America
WB	World Bank
WHO	World Health Organisation

1 INTRODUCTION

1.1 GLOBAL SITUATION OF MALARIA

The malaria situation around the world is serious and getting worse. The lives of 40% of the world's population are threatened by the disease (WHO, 1993). World Health Organization and UNICEF also report that malaria kills more than one million people annually, the majority of whom are young children. 90% of malaria cases in the world occur in Africa South of the Sahara. Children under 5 years of age and pregnant women are the most affected by the disease. Malaria causes severe maternal illness and anaemia during pregnancy. The disease is also associated with low birth weight among newborns. It is the leading risk factor for infant mortality. The World Health Organization and the World Bank rank malaria as the largest single component of the disease burden in Africa. The disease causes an annual loss of 35 million future life-years from disability and premature mortality. Twenty to thirty percent of all hospital admissions in Africa are due to Malaria. Out patient attendance due to malaria, accounts for about 30-50% of the total attendance (WB, 1993).

In Tanzania, malaria contributes the largest proportion of both morbidity and mortality. Malaria is the major cause of maternal deaths, abortions, premature deliveries, stillbirths and low birth weights.

Health data from all health facilities reported by the Ministry of Health for the year 1997 show that, malaria is leading for all outpatient consultations for children under five years of age. The disease accounts for 37.7% of all consultations for under fives.

The same data also show that malaria is leading for all outpatient consultations in above five years of age, which is 32.2% of outpatient consultation in all ages. Of all hospital admissions for under fives, 44% are due to non-cerebral malaria (MOH, 1997).

The Ministry of Health further reports that 27% of all deaths, which occur in under fives, are due to non-cerebral malaria. Malaria parasites are transmitted by female Anopheles mosquitoes. In Tanzania, the *Anopheles gambiae* complex is the most widely spread. It breeds in a collection of fresh, unshaded water. It is present almost throughout the year. The other specie, *Anopheles funestus* prefers the shaded and permanent sites like swamps, lakes, and rivers, which are slow moving, and is mostly found during the dry season.

Four major malaria parasites exist in Tanzania.

These are: -

Plasmodium falciparum, which makes about 90% of all malaria causing parasites. *Plasmodium falciparum* is also responsible for the most severe forms of malaria.

Plasmodium malariae, which is responsible for about 7% of the cases.

Plasmodium vivax together with *Plasmadium ovale* accounts for less than 5% of all the cases (Clyde, 1967).

Clinical diagnosis of malaria

Symptoms and signs of all the four forms of malaria include:

Fever

Headache

Nausea

Muscle and joint pains

Splenomegally

Pallor.

In a study done by Premji *et al* (1995), the main features observed in children were history of fever (88%), enlarged spleen (32%) and conjunctiva pallor (12%). Unfortunately the clinical signs and symptoms of malaria are non-specific. They mimic many other acute febrile illnesses like meningitis, acute respiratory infections, urinary tract infections and hepatitis. Thus, health care workers have difficulty in differentiating malaria from other febrile illnesses.

A study conducted in Tanzania showed that 41% of children were over diagnosed when the diagnosis of malaria was based on history of fever alone (Rooth and Bjorkman, 1992). Another study in Nigeria showed that 50% of the presumptive diagnoses established by the clinicians were wrong, even during the highest period of transmission. In the dry season the rate may be as high as 90% especially in children aged 0-3 months. Over 60% of all presumptive diagnosis in older infants was wrong (Sowunmi *et. al.*, 1993).

Although fever is the characteristic sign of malaria, many *Plasmodium falciparum* malaria cases in endemic areas do not present with temperature elevation (Smith *et.*

al., 1995). A study done by Basset *et al* (1991) in Zimbabwe showed that the most common presenting symptoms in patients with malaria were headache, body weakness and fever. However in their final analysis they concluded that clinical history alone would not improve the diagnosis of malaria. They also noted that the symptoms commonly associated with malaria such as headache, joint pains and fever were not useful in improving diagnosis. In areas of low endemicity and in the dry season, 90% of all anti-malarial drugs may be given to patients who do not need them. This is a waste of resources and facilitates the spread of drug resistant parasite (Greenwood, 1999).

Laboratory diagnosis of malaria

The laboratory diagnosis of malaria is based on the presence of asexual forms in blood. This is determined mainly by preparation of thick and or thin blood films and the subsequent recognition of the parasite.

The definitive diagnosis of human malaria should be based on clinical criteria supported by laboratory confirmation of parasitaemia (WHO MAL/95,1072). Negative blood films however do not necessarily rule out the presence of malaria (Manson *et. al.*, 1987). You may have malaria without parasitaemia as you may have parasitaemia without signs and symptoms of malaria especially in high malaria-endemic areas with a large number of carriers. However diagnostic accuracy will be improved by the use of microscopy (Greenwood, 1999).

The examination of 100 microscope fields represents only 1/200-to 1/300 µl blood. The laboratory technician is likely to miss a positive diagnosis if the parasite density

is below 200/µl especially if only the thin film is being examined. A study conducted by Earle *et al* (1939) showed that in highly malaria-endemic areas thick smears are usually positive regardless of the clinical context. Therefore, the simple positivity or negativity of thick smear is not an adequate criterion for distinguishing malaria from other causes of fever. Good quality of microscopic examination depends on a well-prepared blood film, good staining and good quality of a microscope, a well-trained microscopist and parasite sequestration.

1.2 OTHER FEBRILE ILLNESSES

Acute respiratory infections especially pneumonia, measles and pertusis are major causes of death throughout the world. At least 2 million children die of respiratory infections every year. The urban child both in the tropics and non-tropics suffer an average of 5 to 8 episodes of acute respiratory infections every year. In children aged 1-4 years, the risk of death from pneumonia in the tropics is 50 times greater as compared to the USA and Canada (Manson's Tropical Diseases, 1996, pp 83-84). Malnourished children are even more vulnerable. In a study done in Costa Rica the mortality due to acute respiratory infections was 12 times higher in malnourished children than in those of normal weight. Upper respiratory infections are usually viral. Usually they may progress to viral pneumonia or they may be complicated by bacterial pneumonia. *Measles virus*, Respiratory *syncytial virus and influenza virus* are numerically the most important. The most common bacteria causing pneumonia are *streptococci pneumoniae, Haemophilus influenzae and staphylococci.* Acute respiratory infections in children present with cough and difficult in breathing.

The difficult in breathing is characterized by chest indrawing, fast breathing or stridor in a calm child.

Measles has a worldwide distribution. It is one of the most prevalent infectious diseases of the tropics. Measles is also one of the most contagious infections. Approximately 90% of susceptible individuals will conduct the disease after contact with an infected case (Cook, 1996). The disease is not often recognised as a major cause of lower respiratory tract infections morbidity or mortality, and there are a number of factors that may contribute to this under assessment of the true disease burden (Markowitz et. al., 1991)

The association of cough, conjunctivitis, runny nose and a skin rash is usually diagnostic, but other conditions such as tick borne and louse borne typhus and septicaemia due to meningitis are also associated with rashes and have often been mistaken for measles.

In the IMCI algorithm, acute measles is detected based on fever with a generalized rash plus red eyes, runny nose or cough.

Improved case management can reduce measles morbidity and mortality. Despite substantial success in improving immunization coverage, many measles cases and deaths continue to occur in many developing countries. Some of the places in these countries still have low coverage of measles vaccination. In addition, measles vaccine has incomplete efficacy (Gove, 1997).

Another observation is that, although the current measles vaccine is recommended to be given at 9 months of age, immunization is often delayed. It has further been

observed that, many measles cases are seen at 6, 7 and 8 months of age, especially in urban and refugee populations. The above factors have led to an increased attention on measles case management. Measles infection damages the epithelial surfaces, the immune system and lowers Vitamin A levels. Deaths from measles may occur due to pneumonia, laryngotracheitis, diarrhoea, measles alone, and a few from encephalitis. Data from health facilities in Tanzania reported by the Ministry of Health for the year 1997 show a measles case fatality rate of 4.3%. (MOH, 1997)

Ear infection is not a substantial contributor to mortality, but it is a substantial source of disability and a common reason for children to be brought to a health facility (WHO, 1997). The diagnosis of ear infection is based on the medical history and physical examination including an otoscopy. Children with acute otitis media may have non-specific signs and symptoms including fever, headache, irritability, apathy and loss of appetite. Fever occurs in one-third to two-thirds of children with otitis media. High fever (over 40 0C) is unusual unless accompanied by bacteraemia (Bluestone et. al., 1995).

Ear pain is the most common complaint in children with acute otitis media. In infants, however, pulling at the ear or irritability, especially when associated with fever, may be the only sign of ear pain. Other common symptoms and signs are ear discharge, hearing loss elicited from older children and swelling about the ear.

Common complications are mastoiditis, characterized by a tender swelling behind the ear, and chronic ear infection.

1.3 BACKGROUND OF IMCI STRATEGY

Integrated Management of Childhood illness (IMCI) is a broad strategy encompassing interventions at home and in the health facility aiming at reducing childhood death, illness and disability. It also contributes to a large extent in improving growth and development of children (WHO/UNICEF, 1999).

World Health Organization reports that seven out of ten deaths in under fives are due to acute respiratory infections (mostly pneumonia), malaria, diarrhoea, measles or malnutrition, or a combination of these conditions. Most sick children present with signs and symptoms related to more than one of these conditions. As a result single diagnosis in most cases is not appropriate. There is therefore a need to address the overall health of a child and illness that he or she suffers at a point in time rather than single disease entity. For the above reasons there is a need for an integrated approach of management. World Health Organization and UNICEF have thus formulated generic case management guidelines, charts and related course materials which were developed and found to be appropriate in the majority of developing countries where infant mortality is higher than 40 per 1000 live births including where there is transmission of *Plasmodium falciparum* malaria. The generic materials cover mostly conditions that have the greatest contribution on overall mortality. Almost 70% of childhood mortality is due to acute respiratory infections (mostly pneumonia), malaria, measles, diarrhoea and malnutrition.

Implementation and global situation of IMCI

Implementation is carried out in phases, beginning with the introduction of IMCI, preparation for and implementation of initial activities in selected districts, and

finally, expansion. By May 1997, a total of 41 countries had begun discussions to implement IMCI or were in the various phases of implementation.

Fourteen countries were in the process of introduction, and nine had shown strong, interest but had not yet started activities. Seventeen countries (Bolivia, Brazil, Dominican Republic, Ecuador, Elsalvador, Ethiopia, Indonesia, Madagascar, Morocco, Nepal, Niger, Peru, Philippines, Sudan, United Republic of Tanzania, Vietnam and Zambia) had successfully introduced IMCI and had moved to early implementation phase. One country, Uganda, was in the expansion phase at that time.

The Introductory phase:

The introductory phase includes initiation of contact to provide information, holding orientation meetings, training key MOH staff in IMCI, establishment of an IMCI working group and obtaining endorsement from the MOH. Orientation must be comprehensive and thorough, and often more than one orientation meeting is needed. Issues such as drug availability, vaccine policies and supervision need to be considered early in the planning process.

The early implementation phase:

During this phase experience is gained with IMCI planning in selected districts. The tasks in this phase include selection of initial districts, adaptation of case management guidelines for major diseases of children and materials, training national and district level facilitators, preparation and planning at district level and training health workers, including follow up of trainees.

The expansion phase:

Activities in this phase include further strengthening of district level capacity, expansion of training coverage and follow up, improved drug availability and management, monitoring and measurement of outcome indicators. It also includes interventions at the referral, community and family levels.

Progress of IMCI in countries under early phase:

Indonesia commenced in 1995 with orientation of high-level decision makers, program managers, professional associations and representatives from major donor agencies. The first training course was successfully conducted in June 1997.

Nepal established a "working group for IMCI" chaired by the Director of the Child Health Division. Responsibility for implementing and monitoring IMCI at district level will rest with District Health officers.

Peru, the first country to have adapted and used the Spanish translation of the IMCI training materials, conducted an adaptation workshop in July 1996.

In October 1996, two courses were held to train national trainers, with the participation of senior paediatricians from neighbouring countries that were planning to introduce IMCI. In the Philippines, a national orientation and planning workshop was held in 1995. In February 1996 a national IMCI "Task Force" was established which took charge of the adaptation process. IMCI has also been included as a component of the Child Development project funded by the Asia Development Bank.

In Africa, Uganda established a broadly – based "Task Force" to steer IMCI implementation in Mid- 1995. Adaptation was completed in July 1996 and the first course for national – level trainers was conducted successfully in Mulago hospital in Kampala during August 1996. World Health Organization (WHO) has provided support for the development and introduction of tools for effective follow-up, which aims both to reinforce training and to monitor progress of the trainees, and supervisors were trained specifically for this purpose.

Uganda has begun to expand the training to more districts. IMCI activities have been initiated in several other countries, for example: Ethiopia, Madagascar, Vietnam and Zambia.

Overview of IMCI implementation in Tanzania:

In May 1995 - A field test of WHO/UNICEF Generic materials was done in Arusha.

September 1996 - IMCI was initiated in Tanzania.

Adaptation of the guidelines

Translation of generic materials to Kiswahili language

Training of master trainers

Early implementation phase: 1997 – June 1998: -

Early 1997 – Training of Health workers on IMCI in seven districts (Magu, Mpwapwa, Muheza, Korogwe, Morogoro rural, Rufiji and Igunga). This training was supported by UNICEF, WHO, GTZ, WB and TEHIP.

May 1998 – Desk Review and planning meeting:

Review of IMCI implementation

Development of five-year strategic plan

Development of a two-year plan of Action.

The status of IMCI after the early implementation phase:

Seven Districts were implementing IMCI, 355 health workers were trained and 60% of health workers were followed up at least once. 7.5% of health workers were followed up twice and at least 50% of health workers were trained in each district.

Expansion phase: July 1998 – To date:

Expansion within Districts

Expansion to other Districts in the same region

Expansion to new Districts in new Regions.

Expansion to Zanzibar.

Expansion to pre-service Institutions (October 1997)

Expansion to Refugee camps (included also Emergency Triage Assessment and Treatment (ETAT) and introduction of WHO guidelines on In-patient management

Training of non-clinicians

1.4 STATUS OF IMCI IMPLEMENTATION IN TANZANIA

First component

In service:

Thirty-one districts at different levels of implementation

Training of health workers in Refugee Camps

Over 1973 health workers trained

Over 70% followed up at least once

Pre service: -

Three clinical officer and two AMO schools teaching IMCI (Mbeya AMO, Bugando AMO, Kibaha COTC, Songea COTC and Mufindi COTC).

Tutors from other schools trained to teach in their respective schools (Mtwara, Sumbawanga, Lindi, Masasi, Kilosa, Ifakara COTCs and Tanga AMO school).

IMCI is incorporated into the Curriculum of medical students in the department of Paediatrics and Child Health at Muhimbili University College of Health Sciences.

Plans are on going to introduce IMCI in nursing schools.

Second component

Districts with indent system are to order drugs according to their needs.

In the EDP Kit for all dispensaries, Quinine and chloramphenicol injectable to be available up to dispensary level as pre-referral drugs.

Third component

Household survey has been done in seven districts to assess key child care practices in the country. Analysis has been done and communication strategies and tools have been developed.

2 REVIEW OF LITERATURE

Infant and young child mortality remains unacceptably high in developing countries with about 12 million deaths occurring annually in under 5 year old children (WHO, 1997). Febrile illness including malaria, acute respiratory infections and measles are among the top five causes of the high mortality in children. The other two causes are malnutrition and diarrhoeal diseases. Pneumonia is one of the leading causes of childhood mortality in most developing countries but in regions where there is significant transmission of *Plasmodium falciparum,* deaths due to malaria rival those due to pneumonia (O'Dempsey *et. al.,* 1993).

The IMCI guidelines use a common algorithm to cover the management of all the common major childhood illness (Gove, 1997). The algorithm recommends that in malaria endemic areas, all children with fever or who have a history of fever and no other obvious cause for the fever should be treated with anti-malarial drugs. This is the safe approach, which will ensure that all children who have malaria are treated effectively (Greenwood, 1999).

The final version of IMCI algorithm classifies fever as malaria if the axillary temperature is $\geq 37.5^{0}$C in the clinic or the child feels hot on palpation, with no runny nose, no measles, no other cause of fever. The general danger signs include:

History of convulsions

Inability to drink or breast-feed

Vomiting everything he or she drinks

Being lethargic or unconscious

The presence of one or more of the danger signs indicates the presence of a very severe febrile illness and necessitates urgent referral (Gove *et al.*, 1997).

Clinical signs of malaria

There is a need for increased specificity in the clinical signs leading to a classification of malaria in settings with low malaria prevalence. In high malaria risk settings without microscopy, the IMCI guidelines recommend presumptive treatment for malaria of all children with fever upon presentation at the health facility or a history of fever during the current illness.

In low malaria risk settings, an adequate solution to reduce the use of antimalarials without microscopy has not yet been identified. Research is ongoing to improve the performance of the guidelines in low malaria risk settings (WHO, 1997). A study by Luxemburger *et al* (1998) showed a significant predictive value for many of the features of malaria but did not consider that any of these feature associations were strong enough to be clinically useful in malaria diagnosis.

Studies conducted by O'Dempsey *et al* (1993) and Luxemburger *et al* (1998) showed that although clinical malaria typically presented with fever, chills and general malaise, the symptoms were not malaria specific. Viral and bacterial infections can present with similar clinical signs. Basset *et al* (1991) concluded that clinical diagnosis of malaria has a poor diagnostic accuracy and a low positive predictive value.

Clinical signs of pneumonia

The diagnosis of pneumonia in IMCI guidelines is based on the presence of cough or difficult in breathing. It is a non-severe pneumonia if there is only fast breathing without any general danger sign, chest indrawing or stridor in a calm child. Fast breathing is 50 or more breaths per minute if the child is 2 months up to 12 months old, or $\geq$ 40 breaths per minute if the child is 12 months to 5 years old. (Gove, 1997).

Lower chest wall indrawing

Lower chest wall indrawing is defined as the inward movement of the bony structures of the lower chest wall during inspiration (Simoes *et. al.*, 1997). The WHO guidelines for the management of acute respiratory infections were changed in 1989 to specify lower chest wall indrawing as the clinical sign of severe pneumonia thereby excluding children with only intercostal indrawing. A study done in Gambia showed that a large proportion of non-severe pneumonia cases have intercostal indrawing (Campbell et. al., 1988).

A study done in Manila (Philippines) by Muholland (1992) showed that, lower chest wall indrawing was a more specific predictor of a paediatrician's diagnosis of severe pneumonia than intercostal indrawing.

Chest indrawing is one of the more difficult clinical signs to teach and repeated clinical practice is needed to identify its presence or absence. Several studies reported difficulties with health workers identification of lower chest wall indrawing and with referral discussions based on this clinical sign (WHO, 1997).

A study done by Kalter *et al* (1997) in Bangladesh showed that, the IMCI algorithms has low to moderate specificity for correctly identifying and not referring young infants and children who do not require hospitalization in the judgment of a paediatrician. The specificity of chest indrawing in children aged 2 months to 5 years varied by age, being lowest (49%) in 2-5 month old infants, moderate (72%) in 6-11 months olds, and highest (85%) in children from 12 to 59 months of age (Kalter *et al.*, 1997).

Shann *et al* (1984) in Papua New Guinea studied children with crepitations (50 admitted to hospital and 67 treated as outpatients) and found that chest indrawing had 100% sensitivity and 94% specificity. However, the criteria for hospital admission were not stated and may have included the presence of indrawing.

In an analysis combining data from the Philippines and Swaziland, lower chest wall indrawing had a positive predictive value for paediatrician – defined severe pneumonia of 53%, while only 8% of those with intercostal retractions alone had severe pneumonia.

Campbell *et al* (1988) in the Gambia showed that, while intercostal retractions did not identify lower respiratory infection without lobar consolidation (specificity = 39%), the specificity of severe retractions was 94%. In a study by Kalter *et al* (1997) the specificity of chest indrawing for a provisional diagnosis of pneumonia requiring admission was only 14% in young infants and 35% in older children.

Case management guidelines such as IMCI are purposely designed to be sensitive to increase the likelihood that sick children receive the care they need. This strategy is likely to result in relatively low specificity and for conditions with low to moderate prevalence, low positive predictive value (Kalter *et al.*, 1997). Study findings show that the IMCI guidelines could potentially over burden hospitals and other health centers with unnecessary referrals. A study done in Africa found that 10-11% of children presenting at a rural health center with acute respiratory infection were severely ill and that 6% needed urgent referral to hospital. Even if 10% had actually required admission, data suggest that if the IMCI algorithm had been used in this setting to identify the children needing referral, 79-84% of those referred would have been judged by a paediatrician not to need admission.

If the child has measles or a history of measles within the last 3 months plus any general danger sign, clouding of the cornea or deep, extensive mouth ulcers then severe complicated measles is diagnosed and the child is referred urgently.

Acute ear infection is diagnosed following a history of pus draining from the ear and discharge for less than 14 days, or a history of ear pain. If the above symptoms last for 14 days or more then the disease is considered to be chronic with a different treatment plan from the acute type. Referral in ear infection is indicated when there is mastoiditis, justified by the presence of a tender swelling behind the ear (Gove *et. al.*, 1997).

3 STATEMENT OF THE PROBLEM

Since potentially fatal illnesses in children are often brought to the attention of health workers at first level (primary) health care facilities, the initial focus of the integrated management of childhood illness has been on improving their performance through training in order to reduce mortality or to avert significant disability. Through this training the health workers are also able to identify severely ill children and refer them to hospital. Integrated management of childhood illness initiative addresses the problem of childhood illness holistically and the management of the illnesses is based on the clinical manifestations. However, IMCI being a new intervention initiative in the health sector, there are still a number of initial obstacles in its implementation. These include the prevailing shortage of resources in terms of personnel, materials, financial and time.

Various people engaged in the implementation of IMCI had formal training in colleges, coming out with a rather classical way of diagnosis of diseases as opposed to the integrated approach. The formal training may have a negative influence on IMCI implementation. Some workers, apart from the IMCI duties also have other several health care responsibilities. Time constraints may make such workers unable to concentrate on IMCI guidelines. Shortage or lack of diagnostic tools like thermometers may make the clinical diagnosis of febrile illness difficult.

The spread of chloroquine resistant *Plasmodium falciparum* has led to the need for new drugs and treatment schedules, which are more expensive and potentially have severe adverse effects than chloroquine. Under these circumstances, practical

guidelines on the management of febrile illness should be more specific. This will limit false positive cases and anti-malarial treatments to the patients with "true" malaria attacks.

A study conducted by Gove *et al* (1997) showed that 50% of the clinically diagnosed as malaria cases, the diagnosis was wrong. Clinical diagnosis is non-specific and can be very imprecise. Studies done in Tropical Africa showed that, of the patients treated as malaria cases, only about 46% of patients so diagnosed were actually suffering from the disease and 54% of the cases were wrongly treated with anti-malarials (Baudon *et. al.*, 1986). This shows that clinical diagnosis of malaria has a poor diagnostic accuracy and a low positive predictive value.

4 RATIONALE OF THE STUDY

Since the overall aim of IMCI is to reduce childhood mortality, the correct evaluation of IMCI should be based on reduction of childhood mortality over a time period. However this would be a major undertaking and many confounding factors will need to be considered. As an alternative, surrogate markers such as process indicators and performance indicators can be used in the short term to evaluate the successful implementation of the strategy. The study tries to fulfill this task.

The findings of this study will provide evidence to the health care providers on the practices and effectiveness of the IMCI approach in the diagnosis of febrile illness. It will also provide evidence to the council Health Management Teams, being the

key people in the supervision, monitoring and evaluation of health care activities in their districts. The study will help to identify the critical steps and give recommendations where to improve in the diagnosis of febrile illness in children.

5 OBJECTIVES

5.1 BROAD OBJECTIVE

To evaluate the health provider's knowledge, practices and effectiveness, in the diagnosis of febrile illness in Magu district, Mwanza region.

5.2 SPECIFIC OBJECTIVES

1. To assess the knowledge of health care providers regarding IMCI.
2. To determine the workload of IMCI implementers in health care facilities.
3. To determine the availability of tools and equipments, that are used in the diagnosis of febrile illness
4. To compare blood slide results with the clinical diagnosis of malaria as regard to IMCI algorithms.

6 METHODOLOGY

6.1 DESCRIPTION OF THE STUDY AREA

The study was conducted in Magu district, Mwanza region. The region is located northwest on the southern shores of Lake Victoria. It has a total surface area of 35,187 square kilometers of which 15,092 square kilometers are covered by water i.e. Lake Victoria. The population of Mwanza region is estimated to be 2,307,606 (1988 Census), with the annual average population growth of 2.6%. Mwanza city is the second largest from Dar es Salaam. Major tribes in the region are Wasukuma, Wanyantuzu, Wakerewe and Wazinza. Other tribes include Wajita, Wakara and Wahaya.

The climatic conditions are; a long dry season from May to October and a rainy season from November to April. The annual average rainfall is about 980mm and the average temperature is 31^0C. Agriculture plays a key role in the economy of the region. Major food crops grown are rice, maize, cassava, sweet potatoes, groundnuts and millet. The cash crop is mainly cotton. Magu district is one of the seven districts in Mwanza region. Other districts are; Geita, Sengerema, Kwimba, Ukerewe, Misungwi and Mwanza urban and rural. The district is located east of Mwanza city. It also borders the southern coastline of Lake Victoria. It has a population of about 311,909 people (1988 census) among whom 152,866 are males and 159,043 are females.

Magu district was selected for this study for the reason that it is one of the districts where training of IMCI has been conducted to at least 50% of the clinicians.

It is also an endemic area for malaria. The district has two hospitals (one government and one private), four health centers (all govt.) and 37 dispensaries (35 govt. and 2 private).

6.2 STUDY POPULATION

The study comprised of 2 study populations: -

1. Health workers
2. Children under five years of age.

6.3 STUDY DESIGN

This was a cross-sectional survey. Quantitative methods using questionnaires and checklists were used in the study to obtain the information needed.

6.4 SAMPLING AND SAMPLE SIZE

The option of the study area was one among the seven districts where training of the health workers on IMCI was done during the early implementation phase in 1997/98, and at least 50% of the clinicians have been trained. The seven districts as mentioned earlier are: Magu, Mpwapwa, Muheza, Korogwe, Morogoro rural, Rufiji and Igunga. The selection of the district was based on simple random sampling method. The names of the seven districts were written, each on a separate piece of paper. A colleague was then asked to pick one among the seven papers and Magu was randomly picked.

A total of 11 clinicians from the district hospital were included in the study. The 4 clinicians found from all the rural health centres were all included in the study.

Simple random sampling procedure was used to select two out of the dispensaries served by each rural health centre, hence to have a total of eight dispensaries. Each selected dispensary had only one clinician. A total of 23 clinicians in the district were therefore included in the study.

.

Sample size of children:

The sample size of children was calculated using the formula: -

$n = (1.96)^2 \quad P(100 - P)/\varepsilon^2$

Where,

n is the sample size

p is the estimated sensitivity of the IMCI algorithm in the diagnosis of malaria, which is 70% ± 5% (IMCI: A WHO/UNICEF INITIATIVE, 1997)

ε is the margin of error on P, which is 0.05.

$\mathbf{n} = (1.96)^2 \quad 70(100\text{-}70)/_{25} = 323$ children.

A total of 375 children were seen in the study and a blood slide for malaria parasites was taken from each. Children who happened to attend the health facility on the day the researcher was visiting the facility, were included in the study.

6.5 ETHICAL CONSIDERATIONS

The research clearance was obtained from MUCHS, Institute of Public Health.

Before proceeding with data collection, permission from the district medical officer was sought and granted. Researchers were introduced to the in- charges of the studied health facilities. The in-charges were also informed about the aim of the study and how it was to be conducted.

Names of the participants in the study did not appear on the questionnaires and check lists. Numbers were used instead.

An informed consent was obtained from the caretaker of the child before a blood slide was taken.

All patients who appeared to have a positive blood slide for malaria parasite were treated with antimalarials regardless of the clinical diagnosis.

6.6 DATA COLLECTION METHODS AND TOOLS

Data collection was done by the investigator and one research assistant. The research assistant was the district laboratory technologist. He took and read the blood slides on the field site. The investigator trained him on data collection before data collection started. The investigator did pre testing of the questionnaires at three health facilities in the district. The health facilities were not among the study units.

Questions in the questionnaires were reformulated where necessary, after pre testing, for clarity. The investigator did the participatory observations. He also supervised the whole process of data collection. During the period of data collection, the investigator together with the research assistant, to ensure correctness and

completeness of the data, did auditing of the data filled in the questionnaires and checklists

Laboratory procedure

For every child included in the study, a thick blood film was prepared in the field. The blood slides were then stained by Giemsa stain and examined.

Equipments

Microscope

Blood slides

Micro lancet prickers

Cotton wool

Methylated spirit

Giemsa stock solution

Oil immersion

Blood slide staining

1.The thick films were dried

2.The staining solution was prepared by mixing concentrated Giemsa solution and tap water at a ratio of 1:9 respectively, to make a 10% solution of Giemsa.

3.The dried slides were put horizontally on glass rods and the stain was poured on them.

4.After 30 minutes the slides were flushed with tap water and left to dry

5.Examination for malaria parasites was done under oil immersion.

6.Cross checking after every 10 blood slides was done by a laboratory technician at MUCHS, department of parasitology.

Knowledge and practice

Knowledge was evaluated according to what each clinician was supposed to know concerning IMCI. A self-administered questionnaire was used. Excellent knowledge meant answering more than 75% of the questions correctly. Moderate knowledge meant answering 50% to 75% of the questions correctly and poor knowledge meant answering less than 50% of the questions correctly.

Practice was studied using a checklist, by observing interactions between clinicians and the sick children or their caretakers.

Availability of diagnostic tools

An observation checklist was used to determine the availability of different tools used in the diagnosis of childhood illness, in the consultation rooms. The investigator had to see the tool to confirm that it was available. Tools included thermometer, stethoscope, otoscope, weighing scale and timing device or watch.

Workload of clinicians

This was determined by getting the total number of children attended in the previous month and dividing this to the number of the worked days in that month. This was done to every health facility and the mean number of children attended per day was determined.

6.7 DATA PROCESSING AND ANALYSIS

The investigator arranged and assigned serial numbers on the questionnaire. Thereafter, the responses of the open-ended questions were reviewed and categorized. The other questions had pre-coded responses categorized. Data were entered into the computer using Epi Info 6.Data were then cleaned and analysis was done.

6.8 STUDY LIMITATIONS

1. Clinicians might have changed their routine behaviour of attending the patients, being aware that, the investigator was observing them. This led to some bias in the study.
2. During the period of data collection, some of the clinicians were on holidays. It was not possible to include them in the study. This minimized the number of the study units.
3. In the district hospital, clinicians do a one-week rotation for managing the children at the MCH clinic. It was not therefore possible to include all the clinicians in the observation of patient - clinician interaction. The investigator was able to observe only two clinicians in the district hospital.

7 RESULTS

Participatory observations

A total number of 13 clinicians were included in the participatory observations to examine their practice as regard to IMCI algorithms. A checklist that consisted of observation guidelines on history taking and physical examination was used. The qualification and sex distribution of the clinicians observed is shown in table 1 below.

Table 1: Clinicians in participatory observations with their qualifications

Health providers qualification	Number in the study				Total = 13	% n
	Males		Females			
	N	%	N %			
Clinical officers	5	(100)	0	(0)	5	(38.5)
Clinical assistants	6	(75)	2	(25)	8	(61.5)
Total	11	(84.6)	2	(15.4)	13	(100)

Table 1 above shows that, of the 13 clinicians included in the participatory observations, 84.6% were males. The study included 5 clinical officers and 8 clinical assistants, that is 38.5% and 61.5% respectively.

Age groups of under fives included in the study

A total of 375 children under 5 years of age were included in the study for comparison of clinical diagnosis of malaria and laboratory results for malaria parasites. This was 16.1% more than the expected minimum sample size of 323 children. Different age groups and their sex ratios were determined. The age groups and sex distribution of the children included in the study is shown in table 2 below.

Table 2: age and sex distribution of under fives

Age in months	Male		Female		Total	
	n	(%)	n	(%)	n	(%)
0 – 3	16	(55)	13	(45)	29	(7.7)
4 - 12	89	(56)	70	(44)	159	(42.4)
13 - 24	51	(49.5)	52	(50)	103	(27.5)
25 - 36	17	(40.5)	25	(59.5)	42	(11.2)

found to be higher in children of age between 4 months and 3 years old as shown in the table.

Major symptoms and signs elicited by clinicians in under fives

In every child included in the study for laboratory confirmation of malaria, the symptoms and signs were recorded at the consultation room. Table 3 below shows the common symptoms and signs elicited by clinicians in under-fives.

Table 3: Symptoms and signs and number of children with the symptom or sign

Symptoms and signs	Number of children	% n = 375
Fever	306	81.6
Cough	141	37.6
Diarrhoea	75	20
Vomiting	58	15.5
Eye discharge	12	3.2
Skin rashes	8	2.1
Ear discharge	7	1.9
Failure to suck	4	1.1
Oral sores	4	1.1
Convulsions	2	0.4

Table 3 shows that the most common presenting complaint was fever (81.6%), followed by cough (37.6%), diarrhoea (20%), and vomiting (15.5%).

LIBRARY DAR ES SALAAM

Age group most affected by febrile illness among children

Out of 375 under fives included in the study, 306 had fever. The different age groups of these and the respective number of children were determined. This is shown in table 4 below.

Table 4: Frequency distribution of age groups in children with fever

Age (months)	Number of children n = 306	%
0 – 3	18	5.9
4 – 12	132	43.1
13 – 24	84	27.5
25 – 36	35	11.4
37 - 48	20	6.5
49 - 60	17	5.6
Total	306	100

Table 4 above shows that, febrile illness was a major problem in children of the age between 4 months and 3 years old. The results are consistent with results in table 2 where the same age group carried the highest morbidity.

Knowledge of clinicians in IMCI

A total of 23 clinicians, all trained in IMCI, were interviewed to assess their knowledge in IMCI. A self-administered questionnaire was used and answers related to knowledge in IMCI were reviewed to each participant. Excellent meant answering more than 75% of the questions correctly, Good knowledge meant answering 50% to 75% of the questions correctly and poor knowledge meant answering less than 50% of the questions correctly. Table 5 below shows the clinicians with their qualifications and their knowledge in IMCI

Table 5: Clinicians with their qualifications and their level of knowledge in IMCI

Health provider's qualification	Excellent n (%)	Good n (%)	Poor n (%)	Total (%)
Assistant medical officer		1 (100)		1 (4.3)
Clinical officer	1 (7.1)	13 (92.9)	0	14 (60.9)
Clinical assistant	2 (25)	5 (62.5)	1 (12.5)	8 (34.8)
Total	3 (13)	19 (83)	1 (4)	23 (100)

Table 5 above shows that, of the 23 clinicians, 3 (13%) had above average (excellent) knowledge, 19 (83%) had average (good) knowledge and 1(4%) had below average (poor) knowledge. The study included one assistant medical officer, 14 clinical officers and 8 clinical assistants. No significant difference in knowledge

was observed when the clinical officers were put on one hand and the clinical assistants on the other.

Diagnosis practice of febrile illness by clinicians

During patient - clinician interactions, clinicians were observed on history taking and physical examination practice. Enquiry of symptoms and signs related to fever were included in the observation checklist. Tables 6 – 9 below shows the symptoms and signs, and the clinical diagnosis practice among clinicians.

Table 6: History of fever and temperature measuring practice among clinicians: -

History of fever	Temperature measuring practice among clinicians				Total	(%)
	Yes	(%)	No	(%)		
Positive	10	(83)	2	(17)	12	(92)
Negative	1		0		1	(8)
Total	11	(85)	2	(15)	13	(100)

p - value= 1.0000000

The table above shows that in participatory observations, a total of 13 clinicians were observed during patient – clinician interaction.

Of the 13 interactions, 12 children (92%), had fever as a complaint.

Temperature was measured in 83% of the children with fever.

There was no significant association between the temperature measuring practice among clinicians and history of fever given by caretakers of the sick children.

Table 7: History of cough and breathing count practice among clinicians

Coughing	Breathing count practice among clinicians				Total	(%)
	Yes	(%)	No	(%)		
Positive	3	(42.9)	4	(57.1)	7	(53.8)
Negative	0		6		6	(46.2)
Total	3	(23)	10	(77)	13	(100)

p-value = 0.1923077

Table 7 shows that among the 13 children attended, 7 (53.8%) had cough as a complaint.

Only about 43% of the clinicians counted the respiratory rate of the children they attended with a history of cough.

There was no significant difference (association) between breathing count practice among clinicians and the coughing status of the children

Table 8: Enquiry of h/o convulsions by clinicians in children with fever

Fever	Enquiry of h/o convulsions				Total	(%)
	Yes	(%)	No	(%)		
Positive	1	(8)	11	(92)	12	(92.3)
Negative	0		1		1	(7.7)
Total	1	(7.7)	12	(92.3)	13	(100)

p–value = 1.0000000

Table 8 shows that among the 12 interactions, only 8% of clinicians did enquire a history of convulsions in children with fever.

There was no significant association between enquiry of h/o convulsions by clinicians and fever status of the children

Table 9: Enquiry of h/o cough in children with fever

Fever	Enquiry of history of cough				Total	(%)
	Yes	(%)	No	(%)		
Positive	8	(66.7)	4	(33.3)	12	(92)
Negative	0		1		1	(8)
Total	8	(61.5)	5	(38.5)	13	(100)

p –value = 1.0000000

Table 9 above shows that, of the 12 clinicians who saw the children with fever, 8 (66.7%) enquired about a history of cough

There was no significant association between enquiry of h/o cough by clinicians and fever status of the children

Availability of diagnostic tools

A total of 13 health facilities (consultation rooms) in the district were included in the study to determine the type and number of diagnostic tools available as shown in table 10 below

Table 10:Type of diagnostic tool and number of consultation rooms having the tool

Diagnostic tool	Number of consultation rooms n = 13	%
Thermometer	11	83
Stethoscope	10	77
Weighing scale	12	92
Otoscope	1	7.7

The table above shows that most of the health facilities had the required diagnostic equipments. However, only one health facility had an otoscope.

Workload of clinicians

Number of children attended by each of the observed 13 clinicians per day was obtained.

Different ranges of number of children and their frequencies were determined as shown in table 11 below.

Table 11: Number of children seen by one clinician per day

Number of children	Frequency (n = 13)	%
10 – 20	7	53.8
21 – 30	5	38.5
31 – 40	0	0
41 - 50	1	7.7
Total	13	100

Mean = 21children Median = 18 children

The clinicians saw an average of 21 children per day

The table above shows that most of the clinicians (53.8%) saw between 10 to 20 children a day, with a median of 18 children. It was only in the district hospital where a clinician saw between 41 to 50 children a day. This explains why the mean was skewed to a greater value, (21).

Duration of interaction between patient and clinician was recorded during the participatory observations. This is shown in table 12 below.

Table 12: Time clinicians spent with patients

Time spent (minutes)	Frequency	%
0 –3	2	15.4
4 – 6	8	61.6
7 - 10	3	23
Total	13	100

Mean = 5.5 minutes Median = 5 minutes

Table 12 shows that most of the clinicians (61.6%) spent between 4 to 6 minutes with the sick children. This period was too short for a proper history and thorough physical examination.

Clinical diagnosis and laboratory results for malaria parasites

A blood slide for malaria parasite was taken in every child included in the study. Results were obtained and analysed in relation to fever status of the child. Table 13 below shows the laboratory confirmation of malaria parasites in children with or without fever.

Table 13: Fever status of the children and laboratory results for malaria parasites

	Laboratory results for malaria parasites				Total	(%)
Fever	Positive	(%)	Negative	(%)		
Positive	163	(53.3)	143	(46.7)	306	(81.6)
Negative	22	(32)	47	(68.1)	69	(18.4)
Total	185	(49.3)	190	(50.7)	375	(100)

$\chi 2 = 10.3$ P value = 0.04

Table 13 above shows that, out of 375 children who attended the clinic, 185 (49.3%) had malaria parasitaemia. A total of 306 (81.6%) children had fever. Out of the 306 children, 163 (53.3%) had blood slide for malaria parasite results positive.

A p-value of 0.035661 shows that, there was an association between fever status in children and laboratory results for malaria parasites.

Sensitivity of fever in the diagnosis of malaria was 88.1% and specificity was 24.7%.

Positive predictive value of fever for malaria was 53.3% and negative predictive value was 68.1%.

8 DISCUSSION

This study was conducted in one of the areas where clinicians have been trained in IMCI. The study was trying to examine the knowledge and diagnosis practice of febrile illness among clinicians in Magu district, Mwanza region, Tanzania.

In this study it was found that the IMCI algorithms addressed most of the febrile problems presented by the caretakers of the children. These included malaria, respiratory infections and ear infections. The main problems not covered were skin, eye and mouth complaints. Future versions of the charts may require modification to take into account these other common complaints.

The study found that most of the clinicians had adequate knowledge in IMCI but a discrepancy between knowledge and practice was observed. Although most of the clinicians (96%) had good to excellent knowledge in IMCI, a history of cough was enquired in only 50% of the children who had fever. A history of convulsions as a dangerous sign was asked in only 8% of the children with fever.

Regarding physical examination, body temperature was measured in 83% of the children who had fever. It is ideal, that temperature be measured in every child with fever. Respiratory rate was taken in only 43% of the children with cough.

Discrepancy between knowledge and practice among health workers has been observed in several other studies. A study done in Bagamoyo by Akim (1994) showed that 94.4% of the health providers had adequate knowledge on malaria

symptoms and management, but only 32.3% of the children seen during the study received proper treatment.

In another study done by Marero (2000) in Dar-es-salaam, it was observed that a history of cough was asked for in only 20% of the underfive children who attended the clinic. By using IMCI approach, clinicians do depend only on clinical diagnosis to manage the children. Since there is a marked overlapping of symptoms in a number of febrile illnesses, then a more exhaustive history taking and thorough physical examination is important. It would be very easy to diagnose malaria in a child with acute respiratory infection simply because the caretaker of the sick child did forget to report a history of cough and the clinician did not make efforts to enquire about it. This kind of practice will lead not only to failure to treat the current illness but also to unnecessary drug pressure to children. It may also lead to failure to detect some cases that may need referral to hospital.

When fever or a history of fever is used as the sole criterion for diagnosis of malaria, over diagnosis is frequently substantial, especially during periods of low malaria transmission (Olayeye *et. al.*, 1998).

When nearly all malaria parasites were sensitive to chloroquine, a cheap and safe drug, this was of little importance and it was reasonable to treat with this drug all patients with any suspicion of malaria. This is no longer the case with the current more expensive and potentially more toxic anti-malaria drugs. Accurate diagnosis is increasingly becoming more important.

Premji *et al* (1995) observed that, instituting a clinical protocol for proper history taking and thorough physical examination reduced the clinical diagnosis of malaria by 50%.

In this study it was observed that majority of children (77%), were seen between 3 to 6 minutes. The mean time clinicians spent with the children was about 5 minutes, despite that their clinics were not busy with a mean workload of about 20 patients per day. A period of 5 minutes was not adequate for following IMCI algorithm chart. The findings clearly showed that clinicians were not overworked. Based on this, there was no reason as to why they did not spend more time with patients.

Similar findings were also elicited in other studies. A study done by Akim (1994) showed that 55.4% of patients were seen for less than 5 minutes. Marero (2000) observed that 90% of patients were seen for less than 5 minutes despite the fact that each clinician saw about 20 patients only. The consultation time of less than 5 minutes in the two studies above were bit lower than the findings in this study.

Most of the health facilities had the required diagnostic equipments. The consultation room in the district hospital did not have a thermometer. Clinicians depended on touching children to measure the temperature. Though determining fever using hands is included in the components of IMCI algorithms, this should not be a frequent practice among clinicians especially at district level.

During this study it was observed that, clinicians did not use a stethoscope to diagnose chest problems in the sick children. Probably this is again because the use

LIBRARY DAR ES SALAAM

of a stethoscope is not a component of IMCI algorithms. This observation was noted even in the district hospital.

Otoscope was present in only one health facility, not the district hospital.

The non – use of a stethoscope and an otoscope may lead to substantial failure to diagnose chest problems and otitis media respectively.

Laboratory support

Laboratory results helped in the diagnosis of Malaria. It confirmed the absence of parasitaemia in some febrile children

The low specificity of the IMCI algorithm in the diagnosis of malaria shows that reliance on the algorithm to diagnose malaria would have led to massive over treatment with anti-malarials in patients who were not parasitaemic. Diagnosis of malaria in the absence of microscopy is difficult in children, particularly in areas where febrile illnesses are common. This is due to the overlapping of the symptoms.

Because of the difficulty of diagnosing malaria on the basis of signs and symptoms alone, microscopy should be used whenever possible. In situations where microscopy is not available, a simple antigen detection test, such as dipstick, might prove useful in a primary care setting (Weber *et. al.*, 1996).

9 CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

This study has found that the IMCI algorithms addressed most of the febrile illnesses presented by the caretakers of the sick children. A few common problems not addressed were skin infections, eye and mouth problems.

The algorithms supported in the diagnosis of malaria by 88.1%.

Deficiencies in practice were observed. Despite the adequate knowledge in IMCI among clinicians, their practice did not go hand in hand with the good knowledge they had.

The time spent by clinicians to see the sick children was very little despite that the workload was not big.

Most of the health facilities had the diagnostic tools recommended in IMCI algorithms.

9.2 RECOMMENDATIONS

1. Further work is needed to refine some of the IMCI modules. Other common febrile conditions in children such as skin infections, eye and mouth problems could be added and form another category in the algorithms
2. Clinicians should spend more time than (5 minutes), to take better history and physical examination, so as to better diagnose the IMCI conditions. More studies are needed to find out the source of the existing discrepancy between knowledge and practice among clinicians
3. There is a need to initiate the component of quality assurance so that with time the practice of IMCI does not decrease. More regular supervisory support by the DHMT is also needed to ensure better quality services
4. On job training should be encouraged, to impart more knowledge and skills to health providers. This can minimise the observed deficiencies in practice.
5. Efforts should be made by the ministry of health and the respective local governments to train clinicians to do laboratory procedures so that they can assist in the absence of a laboratory technician. This is extremely important in a holoendemic country for malaria like Tanzania.
6. The ministry of health should consider plans to make blood slide microscopy available in peripheral health facilities, to improve malaria diagnosis over the current practice, which mainly relies on clinical findings

10 REFERENCES

Akim, C.S. (1994). Management of malaria in underfives by Primary Health Care workers in Bagamoyo district. *Dissertation submitted for partial fulfillment for MSc. (TDC) the degree of Master of Science in Tropical Disease Control.*

Basset, M.T., Taylor P., Bvirakare, J., Chiteka, F., Govere, E. (1991). Clinical diagnosis of malaria. Can we improve. *Journal of Tropical Medicine and Hygiene*, 94, 65-69.

Baudon, D., Roux, J., Camevale, P. (1986). Systematic chemotherapy of febrile cases: a substitute strategy for malaria control in rural areas of Africa. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 80,164.

Bluestone, D., Klein, O., (1995). *Otitis media in infants and children*. 89-90

Campbell, H., Lamont, A., O'neill, P., Byass, P., Forgie, M., Lloyd-Evans, N., (1988). Assessment of clinical criteria for identification of severe acute lower respiratory infections in children. *Lancet*, 1: 297-299.

Clyde,D. F. (1967).*Malaria in Tanzania*,London,Oxford University Press.

Cook, G. (1996). Measles. *Manson's Tropical Diseases*. 746-747

Diagne, N., Rogier C., Cisse B. and Trappe J. F. (1997). Incidence of clinical malaria in pregnant women exposed to intense perennial transmission. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 91,166-170.

EarleW,.C., Perez M.Del Rio and Arzola C. (1939). Observations on the course of naturally acquired Malaria in Puerto Rico. *Puerto Rico Journal of Public Health and Tropical Medicine,* 14, 391-406.

Gove, S. (1997). Integrated management of childhood illness by outpatient workers: technical basis and overview. *Bulletin of the World Health Organization*, 75 (Supplement 1): 7-24.

Gove, S. (1997). Integrated management of childhood illness: conclusions. *Bulletin of the World Health Organization*, 75 (Supplement 1): 119-128.

Greenwood, B. M., Bradley, A. K., Byass, P., Jammeh, K., Marsh, K., Tulloch, S., Old field, F.S.J and Hayes, R. (1987). Mortality and Morbidity from malaria among children in a rural area of the Gambia West Africa. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 81,478-87.

Integrated management of childhood illness: field test on the WHO/UNICEF training course in Arusha, United Republic of Tanzania. *Bulletin of the World Health Organization*, 1997,75 (supplement 1): 55-64.

Kalter, H. D., Schillinger, J.A., Hossain, M., Burnham, G., Saha, S., de Wit V., Khan, N.Z., Schwartz, B. and Back, R.E. (1997). Identifying sick children requiring referral to hospital in Bangladesh. *Bulletin of the World Health Organization*, 75, (Supplement): 65-75.

Luxemburger, C., Nosten, F., Kyle, D.E., Kiricharoen, L., Chongsuphajaisiddhi, T., White, N.J. (1998). Clinical features cannot predict a diagnosis of malaria or differentiate the infecting species in children living in an area of low transmission. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 92, 45-49.

Marero, M.W. (2000). Malaria case management: Assessment of the existing diagnostic practices and implications in prioritising malaria control in Ilala municipal health plan.
A dissertation submitted in partial fulfillment of the requirements for the degree of Master of Public Health in the University of Dar-es-Salaam.

Markowitz, L., Nieburg, P. (1991). The burden of acute respiratory infections due to measles in developing countries and the potential impact of measles vaccine. *Rev. Infectious diseases:* 13 (supplement 6). 555-561.

Ministry of Health, (1999). *Health statistics abstract. Vol.1 Morbidity and Mortality statistics.*26-28, 51.

Muhe, L. (1996). Mothers' perceptions of signs and symptoms of acute respiratory infections in their children and their assessment of severity in an urban community of Ethiopia. *Annals of Tropical Paediatrics*, 16, 129-135.

Muholland, E.K. (1992). Standardised diagnosis of pneumonia in developing countries. *Paediatric and infectious disease journal*, 11:77-81.

O'Dempsey, T. J., McArdle, T.F., Lamont, A.C., Todd, J.E. and Greenwood, B.M. (1993). Overlap in the clinical features of pneumonia and malaria in African children. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 87, 662-665.

Olayeye, B. O., Williams, L. A., D'Alessandro, U., Webber, M.M., Muholland, K., Okorie, C., Langerock, P., Bennet, S. and Greenwood, B. M. (1998). Clinical predictors of malaria in the Gambian children with fever or a history of fever. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 92, 300-304.

Premji, Z., Olsson, L., Kevo, T., Fransson, A.S., Olsson, N., Bwijo, B., Minjas, J. N. and Bjorkman, A. (1995). Malaria diagnosis practices and effectiveness at different heath care levels in Tanzania. *The analytical report. Population census (1988). The population of Tanzania.*

Rooth, L., Bjorkman, A. (1992). Fever episodes in a holoendemic malaria area of Tanzania. Parasitological and clinical findings and diagnostic aspects related to

malaria. *Transactions of the Royal Society for Tropical Medicine and Hygiene*, 86: 479-82.

Shann, F., Hart, K., Thomas, D. (1984). Acute lower respiratory tract infections in children: possible criteria for selection of patients for antibiotic therapy and hospital admission. *Bulletin of the World Health Organisation*, 62: 749-753.

Simoes, E.A.F., Desta, T., Tessema, T., Gerbresellassie, T., Dagnew, M. and Gove, S. (1997). Performance of health workers after training in integrated management of childhood illness in Gondar, Ethiopia. *Bulletin of the World Health Organization*, 75 (supplement 1): 43-53.

Smith, T., Hurt N., Teuscher, I., Tanner, M: (1995). Is fever a good sign for clinical malaria in surveys of endemic communities. *American journal of Tropical Medicine and Hygiene*, 52: 306-10.

Sowunmi, A. and Akindele, J.A. (1993). Presumptive diagnosis of malaria in infants in an endemic area. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 87: 422.

Weber, M. W., Muholland, E.K., Jaffar, S., Troedson, H, Gove, S., Greenwood, B.M.E. (1996). Evaluation of an algorithm for the integrated management of childhood illness in an area with seasonal malaria in the Gambia. *Bulletin of the World Health Organisation*, 75 (supplement 1): 25-32

World Bank, (1993). *World development reports*. Investing in Health. Oxford University Press, New York, NY USA. P.329

World Health Organisation, (1993). *A global strategy for malaria control* Vol.71 No.6 pp.763-772

World Health Organisation, (1997). *World malaria situation. Revised in 1998*. Weekly Epidemiological record, 72, 269-274.

World Health Organisation/United Nations Children's Fund (1999). IMCI information. *Integrated Management of Childhood Illness*: Global status of implementation