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Clinical Diagnosis of Severe Diseases According to IMCI among Children in a Tertiary Care Hospital- A Cross-Sectional Study

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Abstract **Original Research Article**

Introduction: IMCI is a systemic approach to children's health which focuses not only on curative care but also on prevention of disease. The objectives of the strategy are to reduce death and the frequency and severity of illness and disability. The IMCI integrates management of five most important causes of childhood deaths, namely acute respiratory infections, diarrhoeal diseases, measles, malaria and malnutrition. IMCI is based on clinical assessment and classification of illness that is independent of laboratory assistance. ***Aim of the study:*** The aim of this study was to find out the clinical diagnosis of very severe diseases according to IMCI from 2 months to 5 years old children. ***Methods:*** This was a cross-sectional study and was conducted in the Department of Paediatrics of Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the period from February, 2014 to July, 2014. We included 100 children having any general danger signs with cough or difficult breathing in our study. ***Result:*** In our study we found the mean age was 15.7 months. Most of 57% were male and 43% were female. Most 55(81.81%) of the patients have two or more co-existent general danger sign as per IMCI algorithm. The patients having any general danger sign along with cough or difficult breathing IMCI classified them severe pneumonia but physicians diagnosed them as bronchopneumonia 5%, bronchopneumonia with impending heart failure 6%, bronchopneumonia with heart failure 6%, acute bronchiolitis 1%, pleural effusion 1%, pulmonary TB 1%, pneumonic consolidation 1%. The patients having fever with danger sign IMCI classify them as very severe diseases but physicians clinically diagnosed them as febrile convulsion 30%, meningitis 25%, encephalitis 13%, septicaemia 5%, seizure disorder 3%, meningoencephalitis 2%. ***Conclusion:*** IMCI approach has been developed for field and primary care facilities to systematically evaluate and treat patients or identify those requiring higher level of health care and refer them accordingly. In this study we see that there is a low concordance between physician and IMCI algorithmic diagnosis and very severe diseases is not a diagnosis made by the physicians. The IMCI algorithms have to be refined for appropriate management of these conditions.

Keywords: IMCI, Severe diseases, Clinical diagnosis.

INTRODUCTION

Every day, millions of parents seek health care for their sick children, taking them to hospital, health centres, pharmacists, doctors and traditional healers. Surveys reveal that many sick children are not properly assessed and treated by these health care providers, and that their parents are poorly advised. At first-level health facilities in low-income countries, diagnostic supports such as radiology and laboratory services are minimal or non-existent, and drugs and equipment are often scarce limited supplies and, combined with an irregular flow of patients, leave health workers at this level with few opportunities to practice complicated clinical procedures. Instead they often rely on history

and signs and symptoms to determine a course of management that makes the best use of the available resources. These factors make providing quality care to sick children a serious challenge. WHO and UNICEF have addressed this challenge by developing a strategy called the IMCI [1].

Most of the global child deaths occur in the world's poorest countries of sub-Saharan Africa and South-Asia and the major causes are pneumonia, diarrhoea, neonatal illness, malnutrition and accidents particularly drowning. In addition malaria and HIV infections contribute in many areas of the world. To combat this challenge, WHO and UINCEF developed IMCI. It is an evidence based syndromic approach that identifies and categorizes the major illnesses responsible for under 5 deaths and what action to be taken. The approach is designed to classify the severity of the illnesses rather than making a diagnosis. In addition to curative care, the strategy also addresses aspect of nutrition, immunization and other elements of disease prevention and health promotion [2-7].

IMCI is a systemic approach to children's health which focuses on the whole child. This means not only focusing on curative care but also on prevention of disease. The objectives of the strategy are to reduce death and the frequency and severity of illness and disability, and to contribute to improved growth and development. The IMCI integrates management of five most important causes of childhood deaths, namely acute respiratory infections, diarrhoeal diseases, measles, malaria and malnutrition. IMCI approach is based on clinical assessment and classification of illness that is independent of laboratory assistance. It has identified four general danger signs that require referral for hospitalization [8]. The IMCI clinical guidelines target children less than 5 years old; the age group that bears the highest burden of deaths from common childhood diseases. India has adopted this strategy after adding the neonatal component which was missing in the original strategy. So, in India it is known as integrated management of neonatal and childhood illnesses (IMNCI) [9]. In Tanzania, IMCI is the national policy for the treatment of childhood illness [10]. There are not so many studies done in Bangladesh in this perspective. This study aims to compare physician's diagnosis with IMCI algorithm generated classifications in hospitalized children aged 2 months to 5 years, in different pediatric units of Rajshahi Medical College Hospital.

OBJECTIVE OF THE STUDY

The main objective of the study was to find out the clinical diagnosis of very severe diseases according to IMCI from 2 months to 5 years old children.

METHODOLOGY & MATERIALS

This was a cross-sectional study and was conducted in the Department of Paediatrics of Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the period from February, 2014 to July, 2014. We included 100 children having any general danger signs with cough or difficult breathing in our study.

These are the following criteria to be eligible for the enrollment as our study participants: a) Patients aged 2 months to 5 years ; b)Patients with any general danger signs like not able to drink or breast feed, lethargic or unconscious, vomiting, convulsions ; c) Patients with cough or difficult breathing were included in the study And a) Patients with past H/O febrile convulsion; b) Patients with seizure disorder ; c) Patients with any diagnosed systemic diseases; d) Patients with severe malnutrition; e) Patients with diarrhoea & severe dehydration ;f) Patients with H/O measles within the last 3 months were excluded from our study.

Patients were selected according to inclusion criteria from pediatric words of Rajshahi medical college hospital. Detail clinical history was taken and physical examination was done by the researcher for all cases. Data was recorded in data collection sheet. Then the patients were classifying according to IMCI. All patients were managed as existing protocol. Necessary investigations such as CBC, Urine RME, blood culture, CSF study, X-ray chest were done according to patients' clinical condition. All serological investigations were done from the department of pathology and microbiology, RMC and x-ray, MRI from the department of Radiology, RMCH. All patients were following up twice in a day and when necessary. Finally, the patients were diagnosed clinically according to their sign symptoms and with their supporting investigations.

Statistical Analysis

All data were recorded systematically in preformed data collection form and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Statistical analysis was performed by using SPSS 16 (Statistical Package for Social Sciences) for windows version 10. Probability value <0.05 was considered as level of significance. The study was approved by Ethical Review Committee of Rajshahi Medical College Hospital, Rajshahi, Bangladesh.

RESULTS

Table 1: Age distribution of the study patients (n=100)

Age in months	Number	Percentage
2 months – 12 months	46	46.0
13 months – 59 months	54	54.0
Mean ± SD (Range)	15.7±12.6 (2.6 – 48)	

Table 2: Sex distribution among the study patients (n=100)

Sex	Number	Percentage
Male	57	57.0
Female	43	43.0
Total	100	100.0

Table 3: Distribution of the study patients according to clinical presentations (n = 100)

Clinical presentations	Number	%
Weight (kg)	8.9±4.0	
Duration of illness (days)	5.4±2.5	
Presenting complaints		
Cough	41	41.0
Convulsion	74	74.0
Alter level of consciousness Lethargy	54	54.0
Coma	18	18.0
Reluctant to feed	73	73.0
Vomiting	14	14.0

Table 4: Distribution of the study patients according to physical findings (n=100)

Physical findings	Number	Percentage
Anaemia	17	17.0
Fontanels		
Normal	43	43.0
Bulge	15	15.0
Depressed	42	42.0
Signs of Meningeal irritation	5	5.0
Signs of heart failure	12	12.0
Lungs		
Breath sound	22	22.0
Added sound	29	29.0
Abdomen		
Soft	96	96.0
Tense	1	1.0
Distended	3	3.0
Liver		
Enlarged	27	27.0
Not enlarged	73	73.0

Table 5: Distribution of the study patients according to general danger signs & no. of general danger signs by IMCI classifications

General danger signs	Number	Percentage
Not able to drink or breast feed	50	50.0
Lethargic or unconscious	47	47.0
Vomiting	3	3.0
Convulsions	74	74.0
Number of general danger signs		
1 (One)	45	45.0
2 (Two)	34	34.0

3 (Three)	19	19.0
4 (Four)	2	2.0

Table 6: Clinical diagnosis of the study patients by Physicians (n = 100)

Clinical diagnosis	Number	Percentage
Febrile convulsion	30	30.0
Meningitis	25	25.0
Encephalitis	13	13.0
Bronchopneumonia with heart failure	6	6.0
Bronchopneumonia with impending heart failure	6	6.0
Septicaemia	5	5.0
Bronchopneumonia	5	5.0
Seizure disorder	3	3.0
Meningo encephalitis	2	2.0
Acute bronchiolitis	1	1.0
Pulmonary TB	1	1.0
Pleural effusion	1	1.0
Pneumaric consolidation	1	1.0
CP with seizure disorder with bronchopneumonia	1	1.0

Table 1 shows the age distribution of the study patients. 46% and 54% patients belonged to 2-12 months age and 13-59 months age respectively. The mean age was found 15.7±12.6 years of the study patients. The study patient's age range was 2.6 months to 48 months.

In Table 2 we found 57 (57%) patients were male and 43 (43%) patients were female. The male female ratio was 1.3:1 in this study.

In Table 3 the mean weight was observed 8.9±4.0 kg of the study patients. The duration of illness was observed 5.4±2.5 days of the study patients. We found that 41% patients complained with cough, 79% patients with convulsion, in alter level of consciousness lethargy 54%, coma 18%, reluctant to feed 73% and 14% patients complained of being vomiting.

Table 4 shows the physical findings of the study patients. Among the study patients, anaemia was found 17%. Among fontanels it was observed that 43% normal, 15% bulge and 42% depressed. 5% patients were found meningeal irritation. 12% patients had heart failure. Among lungs it was observed that 22% and 29% patients had breath sound and added sound respectively. Among abdomen 96%, 1% and 3% were observed soft, tense and distended respectively. 27% patients had liver enlarged and 73% patients had normal.

Table 5 shows the general danger signs & number of general danger signs of the study patients by IMCI classifications. Among the patients 79% patients were classified as convulsions followed by 50% as not able to drink or breast feed, 47% as lethargic or unconscious and only 3% being vomits everything. We found 45% patients were classified having one general danger sign followed by 34% having two general danger signs, 19% having three general danger sings and only 2% having four general danger signs.

Table 6 demonstrates the clinical diagnosis of the study patients by physicians. 30% patients were diagnosed as febrile convulsions followed by 25% as meningitis, 13% as encephalitis, 6% as bronchopneumonia with heart failure and impending heart failure, 5% as septicaemia, 3% as seizure disorder, 2% as meningo encephalitis and remaining each diagnosis as acute bronchiolitis, pulmonary TB, pleural effusion, pneumonic consolidation and CP with seizure disorder with bronchopneumonia 1% of patients.

DISCUSSION

In this study, majority (54%) patients were 13-59 months. The mean age was 15.7±12.6 months. Most of patients (57.0%) were male and 43patients (43.0%) were female. Among the general danger sign 79% patients have convulsion, 50% have not able to drink or breast feed, 47% were lethargic or unconscious and 3% vomit everything. Among 100 patients physician clinically diagnosed the cases-as febrile convulsion (30%), meningitis (25%), encephalitis (13%), bronchopneumonia (17%), septicaemia (5%), seizure disorder (3%), meningo-encephalitis (2%) and others. The patients who came with any general danger sign mainly convulsion along with fever IMCI classify them as very severe diseases but physician clinically diagnosed them as febrile convulsion (30%), meningitis (25%), encephalitis (13%), septicaemia (5%), seizure disorder (3%),meningoencephalitis (2%). Those patients having cough or difficult breathing IMCI classify them as severe pneumonia but physicians clinically diagnosed them as bronchopneumonia (5%), bronchopneumonia with heart failure (6%), bronchopneumonia with impending heart failure(6%),acute bronchiolitis (1%),pleural effusion

(1%),pneumonic consolidation (1%),pulmonary TB (1%).

A study was done in India with 222 subjects. They compared physicians and IMCI diagnosis of respiratory and diarrheal diseases, malnutrition, anemia and fever. Among those with cough or difficult breathing, 44 (19.8%) and 66(29.7%) were diagnosed as either severe pneumonia or mild to moderate pneumonia by physicians and IMCI algorithm, respectively (p=0.015). The diagnosis of 22 cases not diagnosed as pneumonia by physicians were bronchial asthma in 4/22 (18.2%), bronchiolitis in 9/22 (40.9%), tuberculosis in 6/22 (27.3%), empyema in 1/22 (4.5%) and laryngotracheobronchitis in 2/22 (9.1%). Among 146 patients presenting as fever, 144/146 (95.5%) were diagnosed as very severe febrile disease by the IMCI algorithm, while none of the physicians made this diagnosis. Physicians diagnosed this as either malaria in 10/146 (6.7%), pyogenic meningitis in 47/146 (32.2%), sepsis in 31/146 (21.3%), tuberculous meningitis in 17/146 (11.6%), encephalitis in 5/146 (3.4%), measles in 3/146 (2.1%) and others in 24/146 (16.4%) [11].

In a tertiary referral Centre, northern Tanzania, the children who living in low malaria transmission areas in sub-Saharan Africa identifying non-malarial severe illness need to evaluated to improve child out come. They identified febrile pediatric in patient, recorded data using IMCI criteria and collected diagnostic specimens. In result they found in a low malaria transmission setting, IMCI criteria performed well for predicting in patient death from non-malarial illness [12]. In Karachi, Pakistan study was done where the children were classified "no pneumonia", "pneumonia" and "severe pneumonia" as per IMCI guideline. To identify the causative organism, children with pneumonia and severe pneumonia were investigated with oropharyngeal swabs and blood culture. *Haemophilus influenzae*, *Strep. pneumoniae* and *Klebsiella pneumoniae* were isolated from 10.9%, 3.7% and 8.5% of oropharyngeal swabs respectively [13]. A study was done in outpatient department, children hospital, Pakistan Institute of Medical Sciences (PIMS). They were classifying "no pneumonia" according to IMCI; age range was 2 month to 59 months. On follow up after 2 days 112 (13.33%) patients were found to have developed pneumonia. Age less than 12 months clinically severe malnutrition and lack of breast feeding were found to be risk factors for development of pneumonia [14]. A study was conducted in the Bangladesh aimed to determine whether the fever module in the WHO/UNICEF guidelines for the integrated management of childhood illness (IMCI) identifies children with bacterial infections in an area of low malaria prevalence. IMCI guidelines had been used to evaluate the children, 78% of those with bacterial infections would have received antibiotics. The majorities of children with meningitis (100%), pneumonia (95%), otitis media (95%), and UTI (83%) and 50% or less of children with bacteraemia (50%), dysentery (48%) and skin infection (30%). In an area of low malaria prevalence, the IMCI guidelines provide antibiotics to the majority of children with bacterial infections, but improvements in the fever module are possible [15]. In Kenya it has been found that on comparing IMCI algorithms applied by minimally trained health care staff at first level facility with trained physicians, the algorithm had variable sensitivity and specificity for diagnosing specific diseases like pneumonia (97% sensitivity, 49% specificity), dehydration with diarrhea (51% sensitivity, 98% specificity), ear problem (98% sensitivity, 2% specificity), and nutritional status (96% sensitivity, 66% specificity) [16].

Limitations of the study

Our study was a single centre study. We took a small sample size due to our short study period. The short duration of the study may have limited ability to detect clinically significant results. In many studies varieties of confounding variables are considered. But we have not considered any confounding variable. We didn't follow up our patients for a long term.

CONCLUSION AND RECOMMENDATIONS

IMCI approach has been developed for field and primary care facilities to systematically evaluate and treat patients or identify those requiring higher level of health care and refer them accordingly. In this study we see that there is a low concordance between physician and IMCI algorithmic diagnosis and very severe diseases is not a diagnosis made by the physicians. The IMCI algorithms have to be refined for appropriate management of these conditions.

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