

Frequency of Pneumonia in Children, Classified as Severe Pneumonia According to IMNCI Standards at Tertiary Care Hospital

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ABSTRACT

Objective: To determine the frequency of pneumonia in children, classified as severe pneumonia according to IMNCI standards at tertiary care hospital.

Study Design: Cross-Sectional Descriptive Study

Place and Duration of Study: This study was conducted at the CMC children hospital Larkana from November, 2017 to April, 2018.

Materials and Methods: In a cross-sectional descriptive study, children between 2 -59 months of age of either sex referred from IMNCI clinic classified as severe Pneumonia were enrolled after informed consent from November 2017 to April 2018 in CMC children hospital Larkana. Interviews using structured questionnaires were used for history of cough and examination for chest in drawing was taken, then Chest X ray done. The data was analyzed by 13 version SPSS.

Results: The mean age of enrolled participants was 16.5±13.3 months. 63 (60.6%) were male and 41 (39.4%) were female. Mean duration of cough was 7.8±4 days and mean duration of chest in drawing was 2.6±1.2 days. A total of 60 (57.7%) patients developed pneumonia. Of 60 patients of pneumonia 41 (68.3%) had infiltrations, 16 (26.7%) had consolidation and 10 (16.7%) had pleural effusion on chest x-rays.

Conclusion: It is concluded from this study that the frequency of radiological pneumonia is high in IMNCI classification of pneumonia as reported in the world so reduction of this burden of disease should be a national health priority. Chest X-ray is an important tool in diagnosing severe pneumonia, particularly in situations where other means of investigations are insufficient.

Key Words: Pneumonia, IMNCI, Chandka Medical college hospital

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INTRODUCTION

In children Pneumonia is a major killer disease especially under 5 years of age, and it causes 20% of death in the world. A report in 2006, by a UNICEF-WHO that over 2 million children die from pneumonia each year, accounting for approximately one in five under-5 deaths worldwide.¹ About 155 million episodes of pneumonia occur in children of less than 5 year of age per year.²

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The international medical community has a big challenge for the persistent high childhood mortality especially in the developing countries of the world.³

World Health Organization (WHO), respond to this challenge in collaboration with (UNICEF), by establishing acute respiratory infection (ARI) control program for early detection and referral of Pneumonia cases and other-single disease-based programs like control of diarrheal diseases (CDD).⁴

W.H.O formed a new strategy in the mid-1990s named as Integrated Management of Childhood Illness (IMCI), which covers the common childhood illness under one umbrella and assessing the child as a whole.⁴ As pneumonia is the leading cause of death in children <5 years of age, interventions to endorse the prevention and treatment of pneumonia are vital part of childhood survival efforts to achieve Millennium Development Goal.⁵ In June 1998 IMCI was introduced in Pakistan and implementation phase started in February 1999.⁶

A local study conducted at Karachi, by Nizami SQ, on severe pneumonia (12.5%) in relation to IMNCI standards and found radiological infection in 50.5% on

bases of x-ray findings.⁷In a study conducted by Puumalainen T, et al., in their study they found that only 33.6% of children were diagnosed as pneumonia on the basis of radiological findings as compared to this, 95% of patients were classified as severe pneumonia according to IMNCI classification.⁸

The rationale of my study is that as there is limited local data on such type of research on IMNCI classification, versus radiological findings suggestive of pneumonia, which is used by WHO at Primary Health facilities for the classification of Pneumonia. After this study if it is found that higher proportion of Pneumonia cases are diagnosed and picked earlier by this cost-effective method, which doesn't need any expertise (even without chest x-ray) then this IMNCI strategy encouraged and further promoted to apply in the Primary health facilities as to decrease the under 5 mortality in developing countries like Pakistan.

MATERIALS AND METHODS

Inclusion Criteria: The following patients were included in this study.

- Patients referred from IMNCI clinic (Chandka Medical College Children Hospital Outdoor Patient) classified as severe Pneumonia.
- Patient of either gender.
- Age group 2 months up to 5 year (2-59 months)

Exclusion Criteria: followings patients were excluded.

- Known Asthmatics.
- Known congenital heart disease.
- Patients on anti-Tuberculosis treatment.
- Cough more than one month.

Data collection procedure: This cross-sectional descriptive study was conducted on indoor patients of Children Hospital CMC Larkana from 1st November 2017 to 30th April 2018 after getting approval from Hospital Ethical Review Committee of Chandka Medical College. A sample size of 104 patients was collected by nonprobability continuous sampling. The objectives were assessed on a structured Performa, which included a detailed questionnaire to assess the patients. The patients who fulfilled the inclusion criteria were enrolled in the study. The purpose, procedure risks and benefits were explained and informed consent was taken from the parents. History of cough and examination for chest in drawing was confirmed by resident 3 in the ward at tertiary care from these referred patients, then Chest X ray was advised in all the patients classified as severe Pneumonia, from the radiology department of Chandka Medical College Hospital Larkana. X-ray was reported by a radiologist having more than five years of experience. Presence of consolidation (non-homogeneous pacified shadow), infiltration (whitish linear or streaky shadows) or plural effusion (collection of fluid in plural cavity) as per operational definition was considered as Pneumonia.⁹

The data collected include age, gender, duration of cough, chest wall in drawing and Radiological findings of Pneumonia, was entered on the predesigned proforma by the researcher and patient will be managed further accordingly. The data collected in the study was analyzed by using the SPSS version 13. Categorical variables, such as patient's gender and Chest X ray findings of pneumonia in children classified as severe pneumonia according to IMNCI standards were expressed in frequencies and percentages, whereas numerical variables such as patient's age, duration of cough and chest in drawing were expressed in means and standard deviation.

Effect modifiers were controlled through stratification of age, gender and duration of symptoms, to see the effect of these on outcome.

RESULTS

A total of 104 patients were enrolled in this study during study period. Most of them were > 12 months 48, (46.2%) and mean age of enrolled participants was 16.5±13.3 months, ranging from 2 to 59 months and of that 63 (60.6%) were male and 41 (39.4%) were female with male to female ratio of 1.5:1. In most of patient cough was < 7 days 56, (53.8%) while 48, (46.2%) had >7 days and mean duration of cough was 7.8±4 days.

From 104 enrolled participants 58, (55.8%) had <2 days duration and mean duration of chest in drawing was 2.6±1.2 days. Of 104 enrolled participants 60 (57.7%) patients were confirmed pneumonia based on X-ray findings and from these 60 patients of pneumonia 41 (68.3%) had infiltrations, 16 (26.7%) had consolidation and 10 (16.7%) had pleural effusion on chest x-rays (Graph 1).

Stratified analysis of each outcome variable based on age, sex, duration of cough and duration of chest in drawing in tables 1-4.

Table No.1: Stratified Analysis of Pneumonia By Age

Pneumonia	Age groups		Total	P-value: <0.53
	<12 months	≥12 months		
Yes	32 (57.1%)	28 (58.3%)	60	
No	24 (42.9%)	20 (41.7%)	44	
Total	56	48	104	

Table No.2: Stratified Analysis of Pneumonia by Sex

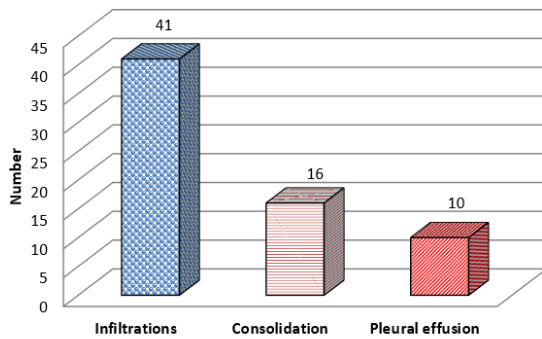
Pneumonia	Sex		Total	P-value: <0.15
	Male	Female		
Yes	40 (63.5%)	20 (48.8%)	60	
No	23 (36.5%)	21 (51.2%)	44	
Total	63	41	104	

Table No.3: Stratified Analysis of Pneumonia by Duration of Cough

Pneumonia	Duration of cough		Total	P-Value < 0.001
	<7 days	≥7 days		
Yes	21 (37.5%)	39 (81.3%)	60	
No	35 (62.5%)	9 (18.8%)	44	
Total	56	48	104	

Table No.4: Stratified Analysis of Pneumonia by Duration of Chest Indrawing

Pneumonia	Duration of chest indrawing		Total	P-Value < 0.001
	2 days	>2 days		
Yes	21 (36.2%)	39 (84.8%)	60	
No	37 (63.8%)	7 (15.2%)	44	
Total	58	46	104	



Graph No.1: Radiological Findings of Enrolled Participants with Pneumonia (n=60)

DISCUSSION

The Integrated Management of Childhood Illness (IMCI) strategy is the primary child-care approach of choice for developing countries.^{10,11} In 1996, IMCI was introduced into Asia by WHO and UNICEF. Since then, 8695 health workers have been trained in IMCI which includes mainly primary health care nurse practitioners, primary care doctors and pediatricians. IMCI mainly focuses on illnesses that cause the majority of mortality in children under-5 years of age, many of those are preventable or readily treatable using simple interventions: These are pneumonia, diarrhea, meningitis, malaria, malnutrition, anemia and HIV/AIDS. This is known as a “child survival” approach.¹² Pneumonia is a world’s most important cause of childhood mortality,¹¹ and over the past decade has concerned extremely little attention. There has been very little research on the Pneumonia disease, apart from trials of pneumococcal and Haemophilus influenzae type b (Hib) vaccines, particularly estimation of the impact of these vaccines on pneumonia,¹¹⁻¹⁴ while few studies on the case management of pneumonia.¹⁵⁻¹⁸ The Integrated Management of Childhood Illness (IMCI) strategy, which includes standardized case management of suspected pneumonia cases while Country-level efforts for prevention of pneumonia mortality have been limited to pneumonia management.¹⁹ A recent analysis of donor spending money on maternal and child health in developing countries displayed that hardly 1% was

allocated to IMCI.²⁰ In comparison to this, new pneumococcal conjugate vaccines, probably having similar life-saving potential is to that of IMCI, have attracted a great deal of consideration by the GAVI Alliance and through innovative funding mechanisms such as the Advanced Market Commitment (AMC) and the International Finance Facility for Immunization (IFFIm) and for support this, the large amount of money being allocated. There was a substantial increase in international awareness about pneumonia in 2006, with the help of publication report by the United Nations Children’s Fund (UNICEF) and WHO.²¹ There are promising signal that this awareness will lead to increased financial support for both control program and research activity. When new funds become available in a particular plain, it is not uncommon to see special stake groups competing for them, claiming that their scheme or product is superior to others and should therefore receive most of the new resource.²²

In this study the frequency of radiologically proven pneumonia was 57.7%, in contrast to that study by Puumalainen T, et al, they found only 33.6% of children were diagnosed as pneumonia on the basis of X-ray findings as compared to this 95% of patients were classified as severe pneumonia based on IMNCI classification.⁸ However frequency of radiological proven pneumonia was higher in our study because we have taken all patients with clinical pneumonia.

On other hand a local study conducted by Nizami SQ et al, reported that of 12.5% children with severe pneumonia in relation to IMNCI standards and found radiological infection in 50.5% on bases of x-ray findings.⁷

This study was subject to some limitations. Variation in radiograph interpretation is unavoidable because of lack of any standardized reporting format. Inconsistency particularly regarding definition of infiltration is natural in between clinician, which may or may not suggest infective process. This aspect is quite obvious in this study as most of radiographs had only infiltrations, no definite consolidation and only half of the radiograph suggest diagnosis of infection had clinical pneumonia. Though act of radiogram done in children with upper respiratory infection s (URTI) was not high but some movement is seen in these cases. Therefore, a normal report of chest radiogram does not prescript out infection and presence of infiltrations does not stand for infective process. This detail is further validated from deficiency of relationship between reports of chest radiograph and clinical findings i.e., tachypnea, chest in drawing or isolation of organisms. Though it may be claimed that the radiographs were not obtained at appropriate time to have significant findings but in a symptomatic child this argument is not justifiable. Presence of symptoms and signs of infection is a good time to take a chest radiograph therefore in this study

chest radiograph were obtained within 24 hours of clinical presentation.

CONCLUSION

It was concluded from this study that the IMNCI definition for severe pneumonia that's indicate high specificity for acute lower respiratory infection and provides a device to compare the total burden of lower respiratory infections indifferent settings. The IMNCI classification of non-severe, severe and very severe pneumonia interconnected very well with disease severity, but inadequately with the probability of x-rays finding or bacterial etiology for infection. Therefore, category of severe pneumonia presenting with chest in drawing showed high specificity for lower respiratory infection, and might be used when compare the burden of respiratory infections in resource poor countries. The rates of pneumonia by X-rays findings in CMC children hospital are among the highest reported in the world so reduction of this disease burden should be a national priority. Chest X-ray is an important tool in diagnosing severe pneumonia. It also helps in deciding the severity of the disease. It is highly recommended for diagnosis of pneumonia particularly in low-income countries where other tools of investigations are insufficient. Ongoing surveillance programs incorporating an etiological studies and innovative interventions are urgently required.

Author's Contribution:

Concept & Design of Study: Dellijan Mugheri
 Drafting: Shankar Lal, Saeed Nazir Puno
 Data Analysis: Vija Kumar Gemnani, Kaleemullah Abro and Aijaz Ali Tunio
 Revisiting Critically: Dellijan Mugheri, Shankar Lal
 Final Approval of version: Dellijan Mugheri

Conflict of Interest: The study has no conflict of interest to declare by any author.

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