PREVALENCE OF CHEST X RAY FINDING OF PATIENTS WITH SEVERE PNEUMONIA A PROSPECTIVE STUDY.

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ACRONYMS

TASH - **Tikur Ambesa Specialised Hospital**

WHO - **World Health Organization**

RCP - **radiologically-confirmed pneumonia**

AIDS - -**Acquired Immunodeficiency syndrome**

ICU -**intensive care unit**

AAU- - **Addis Ababa university**

RR -respiratory rate

PR -pulse rate

BP -blood pressure

RUL -right upper lobe

RML -right middle lobe

RLL -right lower lobe

LUL -left upper lobe

LLL -left lower lobe

HX -history

Operational definition

Pneumonia = Acute inflammation of lung parenchyma

community acquired pneumonia= defined as an acute infection of the pulmonary parenchyma in a patient who has acquired the infection in the community or out side the hospital.

consolidation = Inflammatory infiltrate in the alveoli

End point consolidation= a dense or fluffy opacity that occupies portion or whole lobe or enter lung often containing air bronchogram and or with plural effusion.

pleural effusion = accumulation of fluid in the pleural space

Lobar pneumonia- **=** consolidation confined to segmental boundaries**.**

Bronchopneumonia- = more widespread or ill defined consolidation

Atelectasis = collapse or loss of lung volume

Interstitial pneumonia = is characterized by an ongoing and progressive process with variable distribution of interstitial changes within the lung.

Severe pneumonia = If the child has cough or fast breathing if you count…

(2 months to 12 months old 50 breaths or more per minute

12 months to 5 years old 40 breaths or more per minute)

Above 5 yrs 30 breaths or more

with at least one of the following = in ability to feed and drink

= Lower chest wall in drawing a

=Grunting ,Cyanosis, lethargy

Abstract

Background: Respiratory diseases are a major cause of mortality and morbidity worldwide especially in most developing countries . Amongst these respiratory diseases, pneumonia is the leading cause of death in children worldwide . In developing countries childhood pneumonias are diagnosed using clinical parameters, usually based on presence of cough and raised respiratory rate. The simple chest radiograph has been an important investigative tool in the diagnoses of respiratory infection and pneumonia.

Objective: is to know the prevalence of of chest x ray finding of patients with severe pneumonia

Methods: A prospective cross sectional study of 162 patients with severe pneumonia who were admitted at causality and emergency ward of paediatric and child health in TASH . All children had chest radiography on the bases of clinical decision by paediatricians.

Expected Outcomes ; the prevalence of chest x ray finding of patients with severe pneumonia was(48%) ,and the commonest site was on the right side74(78.7%) of this RUL is commonly affected and commonest type of chest x-ray finding was consolidation(27%).chest x-ray has strong association with late presentation and underlying medical illness .

Analysis: descriptive and analytic statistics as applicable. Statistically significant associations is when P-value of <0.05.

Key words: pneumonia ,chest x ray, TAH-causality and emergency ward,

INTRODUCTION

Pneumonia is the leading killer of children worldwide. It kills more children than any other illness i.e AIDS, malaria and measles–accounting for 29 per cent of all under-five deaths.

It is estimated that more than 150 million episodes of pneumonia occur every year among children under five in developing countries, accounting for more than 95 per cent of all new cases worldwide Between 11 million and 20 million children with pneumonia will require hospitalization and accounts more than 3 million or an estimated 29% of all deaths, among children younger than 5 yr worldwide.

In Ethiopia under-five mortality is 88 deaths per 1,000 live births(2011),and the plan is to decrease to 66 deaths per 1000 live births by 2015 according to Millennium Development Goals. and pneumonia is leading cause of death in these age group.

In developing countries childhood pneumonias are diagnosed using clinical parameters, usually based on presence of cough and raised respiratory rate . Although this is cheap, sensitive and maximizes the number of children identified and treated empirically, it is also nonspecific and highly dependent on the context in which it is being applied

So the simple chest radiograph has been an important investigative tool in the diagnoses of diseases, since the discovery of X-rays in late nineteenth century. Chest radiograph is frequently used in the management of acute lower respiratory infection in children and still considered to be the gold standard for diagnosing respiratory infection and pneumonia.

The use of chest radiography in the initial assessment of acute lower respiratory infection rests on the assumptions that; (i) clinical assessment plus radiography results in a more accurate diagnosis than clinical assessment alone; (ii) this leads to changes in clinical management; and (iii) the changes benefit the patient.

The standard test for diagnosis of patients is a 2 view plain chest radiograph. To provide an objective end point WHO established standard categorization for radiological case definition of pneumonia. , classified as:

1) Alveolar pneumonia: i.e. end point consolidation, which may be fluffy of part for whole lobe or enter lung often containing air bronchogram and or with plural effusion

2) Non alveolar (i.e. other consolidation or infiltrate) . The presence of other infiltrates as defined above in the absence of plural effusion as well as other non end point (i. e. linear, interstitial, pre-bronchial thickening, multiple areas of atelectases. When more than one radiological signs were present condition is designed as severe radiological pneumonia .From the above types chest x ray finding alveolar type the commonest one reported from many research's.

There are studies which shows the incidence of chest x ray finding of patients with severe pneumonia one study .reports 53.2% of patients with severe pneumonia have chest x ray findings(1) and also other study shows 50% of chest X-rays were positive(2). Other two reports were 42.4% (3) and *34%. (4)* .there is some variation but not significant.

Several studies have found the pattern of radiologic features could not accurately distinguish a bacterial etiology from a viral etiology , although unilateral and or lobar infiltrates are often seen in bacterial pneumonia and some chest x ray findings shows diseases severity . one study shows that radiological findings such as multifocal bilateral distribution, the simultaneous involvement of at least three sites and right hilar consolidation are associated with severe CAP in otherwise healthy children, and could be considered markers of disease severity . (5)

The studies regarding to incidence of chest x ray finding of patients with severe pneumonia in Africa are scarce. To our search for literatures in Ethiopia, I couldn't find one. In TASH at causality and emergency ward of paediatric and child health department sever pneumonia is

the commonest cause of emergency admissions .In order to diagnose pneumonia we are using clinical parameters according to WHO classification and also chest x ray which is the gold standard and most commonly utilized tool for paediatricians in diagnosing pneumonia and other respiratory conditions. Patients can have chest x ray before admission or after stabilization of the patient as much as possible in the same day of admission. and interpreted by radiology residents with under supervision of senior radiologist. But there are no studies which shows prevalence of chest x ray findings of patients.

Hence, this study evaluates the prevalence of chest x ray findings of patients with severe community acquired pneumonia in our hospital.

STETEMENT OF THE PROBLEM

In developing countries childhood pneumonias are diagnosed using clinical parameters, usually based on presence of cough and raised respiratory rate . Although this is cheap, sensitive and maximizes the number of children identified and treated empirically, it is also nonspecific and highly dependent on the context in which it is being applied

In order to make a definite diagnosis of clinical pneumonia you might need invasive procedure, which make more difficulties in identifying the causative organisms . Blood culture is not acceptable way to identify bacterial pneumonia and specimens from interstitial tissue is technically difficult and need experience personnel and it is risky procedure . Therefore, chest X-ray can give useful information about the presence of pneumonia . But we have to select patients who need x-rays to avoid unnecessary exposure to radiation and wastage of time and money for all patients with pneumonia . So this research will help us to avoid dilemmas selecting patients who needs x-ray for the next future and try to asses correlation between chest x-ray with their clinical presentation , duration of illness and other related underlying illnesses.

Literature Review

Radiography has been an important tool in the investigation of chest infection since its invention in the late 19th century. Plain radiographs remain the most commonly used radiological tool 1. Pediatric respiratory disease remains an important cause of morbidity in both developed and developing countries. Chest radiograph is frequently used in the management of acute lower respiratory infection in children and still considered to be the gold standard for diagnosing respiratory infection and pneumonia .

Chest x ray positivity ranging from as low 34% to as high as 53.2%. A prospective study by *Ali Salih KEM,* et al(2012)Khartoum Sudan. on 156 patients age between 2 month and 5 yr X-ray finding of pneumonia were present in 83 (53.2%) children with alveolar pneumonia accounting for 47 (30.12%), and non alveolar pneumonia for 36 (23.10%) cases, while X-ray showed normal findings in 46.8%. It was observed that 29 (34.9%) chest X-ray showed severe radiological pneumonia. All children with severe pneumonia presented with fever (100%),

followed by shortness of breath (88.5%) , cough (81.4%) and running nose (78.2%), while grunting in two third of the cases.(1)

Other study which was done retrospectively by Njeze et al (2012), Nigeria on 100 children aged 0-16years out of these Thirty seven (37%) of the radiographs were in agreement with clinical diagnosis of pneumonia while 63 %radiographs had no evidence of pneumonia. The commonest finding was lobar consolidation.(2)

Mulholland et al reports 34% patients with pneumonia had chest x ray findings, which is the first research done in suva, Fiji, Australia.2005. retrospectively in 248 children age between 1 month and 5 yrs who are admitted with diagnosis of LRTI , but chest x ray was found for only 174 patients . case fatality rate was 2.8% in LRTI and higher in chest x ray confirmed pneumonia which was 6.8%. (3)

Other prospective clinical study by *Salwa Ahmad Al-Najjar* 356 children age b/n 2 month and 10 year were admitted at Raparin hospital in Erbil city, Iraq (2013) , to determine the relationship between clinical and chest X-ray findings of pediatric patients. All children had signs and symptoms of respiratory infections for instance, fever (87.4%), shortness of breath (99.5 %),cough (98%), tachypnea (73.5%), wheezes (93.3%), chest retraction (80%), crepitations (82%) and***, 42.4% of*** chest X-rays showed focal infiltrations. Three clinical parameters related to pneumonia diagnosed by chest X-ray these were, chest retraction with sensitivity of 80%, and specificity of 88.29%), tachypnea with sensitivity of 73.5% and specificity of 56.59% fever with sensitivity of 87.42% and specificity of 60.98%.(4)

Patria et al. Italian Journal of Paediatrics 2013, 39:56 study which was done prospectively on 335 children to assess radiographic findings in children with CAP of different severity in order to evaluate whether some parameters are associated with severe CAP .Of theses 22% were sever pneumonia patients..

The most frequent radiological presentation was focally distributed parenchyma densities (212, 63.3%), whereas 123 patients (36.7%)showed mumultifocal consolidations, predominantly bilaterally (85/123, 69.1%). Atelectasis and pleural effusions were detected in respectively 30 (8.9%) and 33 patients (9.8%), and only five radiographs (1.5%) showed interstitial changes. Parenchyma densities were more prevalent in the right than the left lung (263 vs 179), and consolidations were more frequent in the middle lung than in the lower and upper areas (247 vs 176 and 19). The most frequently affected locations were the right lower lobe (75, 22.4%), the right para cardiac field (65,19.4%), the left lower lobe (63, 18.8%), and the right hilum (61, 18.2%). From the above findings multifocal bilateral distribution, the simultaneous involvement of at least three sites, and right hilar consolidation are associated with severe CAP .(5)

KEY, et al. (2011 ,Brazil)reports chest x ray findings on 301 children who were admitted .research was done prospectively. among whom pulmonary infiltrate and consolidation were

described in 161 (54%) and 119 (40%), respectively. Chest X-ray was read normal for 140 cases. Overall, the median age was 17 months (mean 20±14, range 12 days 59 months). Pulmonary infiltrate was less frequently described among patients aged under 1 year (41.3% vs59.9%,) and hyperinflation was significantly more frequent in this age group.(6)

Grafakou et al(Pediatr Pulmonol. 2004; 38:465–469 Athens, Greece,) investigate whether chest radiographic findings could be used as predictors of severity of childhood pneumonia on 167 children, aged more than 12 months who were hospitalized with unilateral lobar or segmental pneumonia. The result was consolidation was right-sided in 109 cases and left sided in 58. The majority of children with left sided pneumonia more commonly had the lower lobe affected (lower lobe, 45/58, 77.5%; upper lobe, 11/58, 19.1%;upper and lower lobe, 2/58, 3.4%), while in right-sided pneumonia, the upper lobe was more commonly affected (upper lobe, 54/109, 49.5%; lower lobe, 35/109, 32.1%;middle lobe, 16/109, 14.7%; and more than one lobe, 4/109, 3.6%)and other finding was pleural effusion which was lower in patients with right-sided pneumonia (12/109, 11%) compared to those with left-sided (23/58, 39.6%) (P<0.001), mainly found in lower lobe pneumonia, as it was identified in 21/47 (45%) patients with the left lower lobe affected compared to 2/11 (18.1%) of those with pneumonia of the left upper lobe. Finally he demonstrates that right lung pneumonia is more common, with the upper lobe more frequently affected, while in left-sided pneumonia the lower lobe is preferably involved. It was also found that left-sided pneumonia was more severe compared to right sided, as indicated by the increased risk for the development of complications and delayed response to treatment .(7)

2008 Puumalainen et al; This analysed among 821 children (60%) boys) who were hospitalised at the Bohol Regional Hospital. According to the WHO pneumonia severity classification algorithm, 290 episodes (24%) were non severe pneumonia , 785 (66%) were severe pneumonia 120 (10%) were very severe pneumonia .A blood culture was obtained in 90% of episodes. They detected 13 (1.1% of episodes) invasive bacterial infections.

The most common bacterial pathogens included *Staphylococcus aureus, Streptococcus pneumoniae* and *Salmonella* Typhi According to the retrospective review of clinical,laboratory and radiographic data, 402 episodes (33.6%) had radiographically confirmed pneumonia as the major cause of hospitalisation . Bacteriologically confirmed bacterial pneumonia or probable bacterial pneumonia was the diagnosis in 8.6%, 11.5% and 15.9% of episodes in nonsevere, severe and very severe WHO pneumonia categories,respectively. (8)

In a study which was done in 2012,china by M Sheng et al to assess the radiological presentations of210 confirmed cases of viral pneumonia in children and reported that most common cause of viral pneumonia was influenza A infection (81 out of a total of 210 patients). remaining 129 patient were RSV (n-38), PIFV-3 (n=28),adenovirus (n-27), influenza B (n-18) and PIFV-1 (n-18). Findings in chest radiograph were bilateral patchy areas of consolidation in 133 patients, interstitial lung disease in 33 patients, diffuse areas of air space consolidation in 29 patients and lobar consolidation in 15 patients. Lower lobes were

the most common site for abnormal radiographic abnormalities. And were bilateral in 195patients and unilateral in the remaining 15 cases.(9)

A.G. Falade et al 1995, Gambia.. Evaluted 487 malnourished children aged 2 months to 5 years in developing countries and 255 well nourished children who presented with a cough or breathing difficulty. Of these radiological pneumonia was present in 145 (30%) of the malnourished children and 68 (26%) of the well nourished children.(10)

Xavier-Souza et a(l2013)Brazil. conducted a prospective study to assesses the inter-observer agreement in the interpretation of several radiographic features in the chest radiographs (CXR) of 773 children aged 2–59 months with non-severe acute lower respiratory tract infection (ALRI). The overall agreement was 78.7% (normal CXR [n =385, 60.9%], pneumonia [n =222, 35.1%], other radiological diagnosis [n = 22, 3.5%], inappropriate for reading [n = 3, 0.5%]). The most frequent symptoms and findings were cough (97.4%), fever (92.0%), difficult breathing (62.3%), vomiting (44.7%) and rales (64.9%), tachypnea (44.5%), crackles (44.1%.). The most frequent findings were atelectasis , peri bronchial thickening, hyperinflation .But abscess, pneumatocele, and pneumothorax were not described (.11)

Koya Ariyoshi, central Vietnam (April 2007-March 2010) determines the incidence of radiologically-confirmed pneumonia (RCP) prospectively , among children < 5 years of age hospitalized with acute respiratory infection. The overall incidence of RCP for children < 5 years of age was 3.3 (2.3-3.8) per 1000 children, and the highest incidence, 8.3 (3.8-10.5) per 1000 children, was observed in the 12- to 23-month age group. This incidence is lower than those in the previous studies from other developing countries. A 5-6 times higher annual RCP incidence was reported in Brazil (1-35 months: 36.2/1000 children) 15 and the Northern Territory Indigenous (1 month-5years; 26.6 per 1000, 1-11 months: 57.5/1000, 12-23 months: 38.3/1000 children).16 Studies from the Philippines and Indonesia also had reported higher annual RCP incidences of 13.5/1000 and 8.9/1000 per children (1.5-23months respectively.17,18 A slightly higher annual RCP incidence of 4.3/1000 children (1-59 months) also was reported in Fiji.

Several factors might be responsible for the lower RCP incidence in Vietnam, which include availability of free health care for children < 6 years of age, implementation of Integrated Management of Childhood Illnesses guidelines for treatment of pneumonia in primary health care level, widespread use of antibiotics, improving social-economic status,and better access to medical care in Vietnam.(12)

M. Javadi et al.(2005 Thiland)Reports 166 (86%)patients with pneumonia had chest x ray finding which was done on the 192 radiographs from patients with clinical pneumonia,and. Seventy-eight (47%) of the pneumonias had alveolar consolidation and 80(48%) had Interstitial pattern only and the rest have other evidence of pneumonia even though not specified.(13)

Another prospective study which was done by *Castro-Rodriguez JA et al.* 2008 in Santiago, Chile;— *and he* assessed the risk factors for radio logically confirmed pneumonia during the first year of life in a birth-cohort of infants from a low-income community. only newborn babies who were 36 or more weeks of gestation and with a normal respiratory condition during the following 10 days after delivery ,were considered eligible for entry into the study

From the whole cohort (188 infants), 163 (86.7%)never had pneumonia and 25 (13.3 %) had pneumonia in the first year of life. Of these 32 % were having severe pneumonia and required hospitalization. He also reported that infants who have one or more wheezing episodes during the first 3 months of life have greater than7-fold increased risk of developing pneumonia and infants who were exclusively breastfed during the first 4 months were far less likely to develop pneumonia(14)

Nacul LC et al 2005 . Northeast Brazil did research on 472 children, aged 6-59 months, with clinically-diagnosed pneumonia who were either admitted to or treated as out patients and the out come was A confirmatory infiltrate on the chest X-ray was present in 389 (86.1%) of 452 patients and in 228(92.7%) of 246 admitted to the hospital. An alveolar non-lobar infiltrate (non-peri-hilar) was the most common radiological finding.(221, 56.8%). Lung complications were present in 56 (11.9%) , Pleural effusion(34 8.7%).commonest one. He also reports causes of pneumonia i .e bacteria were identified in 26.7% of the cases, while viruses and mixed infections accounted for 8.4% and 2.7% respectively. *Haemophilus influenzae* (18.9%), *Streptococcus pneumonia* (6.4%), and respiratory syncytial virus (5.0%) were most often identified. (15)

Objective

General -to know the prevalence of chest x ray finding of patients with severe community acquired pneumonia who are diagnosed according the WHO criteria .

Specific

- to examine the role of chest radiography in diagnosis of pneumonia in children

-to identify types of chest x ray finding of patients with severe pneumonia

-to know clinical correlation with chest x ray finding

Materials and Methods

Setting- The study was done at Addis Ababa University, Department of Pediatrics and child Health, Causality and emergency ward, which is located in the capital of Ethiopia, Addis Ababa as part of Addis Ababa University Medical faculty. The department has six major wings: Causality and emergency admission services, neonatal ICU, Pediatric ICU, under five admission unit, over five years admission unit and pediatric haematology and oncology admission unit. There are a total of 215 patient beds; 50 in Causality and emergency ward , 4 in PICU and 161 in other patient wards. The number of patients per room varies 4-10 on average. Patients of all categories of diseases are admitted and treated; infection taking the Lion's share.

Causality and emergency ward of the University Hospital is the largest in the country with a very high patient turnover of an average of five discharges and admissions per day.

At Causality and emergency ward an average 1-2patients admitted daily as case severe pneumonia and usually associated with congenital heart disease and other associated anomalies.

Source Population- all children with severe pneumonia living in addis abeba and near by catchment area of black lion hospital.

Study population-all paediatric patients age between 2 month and 14yrs who were admitted to Causality and emergency ward of TASH with diagnosis of severe community acquired pneumonia.

Design- Prospective cross sectional study at Causality and emergency ward of Tikur Anbessa Hospital from December 2013 to May 2014.

Sample Size- A total of 196patients were enrolled from patients admitted with diagnosis of severe community acquired pneumonia who are diagnosed according the WHO criteria were included.This sample size was calculated after literature review (15) and considering the frequency of admissions at Causality and emergency ward which is approximately 1-2 cases admitted daily (review of the registration book of Causality and emergency ward of Tikur Anbessa Hospital over six months- unpublished data)., and by calculating the prevalence of sever community acquired pneumonia admission at Causality and

emergency ward of Tikur Anbessa Hospital over 6 months which is 15%and then my sample size is calculated using the following formula with. (CI -95% and margin of error or desired precision is –5%)

$$n = \frac{z^2 \cdot pq}{d^2}$$ =

n =(1.96)(1.96)(0.15)(0.85)/(0.05)(0.05)=196 This sample size is comparable with other studies which was done in Sudan i.e **156** and greater than from Nigerian study which was **100.**

Inclusion criteria - age between 2 month and 14yrs and who were admitted at Causality and emergency ward of Tikur Anbessa Hospital with diagnosis of severe community acquired pneumonia.

Exclusion criteria -patients with foreign body aspiration

- if parents or guardians don't agree to participate was excluded.

Significance of study -to know the importance chest x ray for the diagnoses of pneumonia and to assess the correlation between clinical severity and chest x ray findings of pneumonia in children ,and after this research finally we will decide to determine the type of patients who need chest x ray and to avoid unnecessary x rays in children.

Recording and Data collection

All children had chest radiography on the bases of clinical decision by evaluating physicians . Routine management was timely initiated A questionnaire was designed to include personal data, medical, nutritional and past history as well as clinical examination which will be filled by trained nurses. clinical data was collected and chest x ray was re read by one senior radiologist without informing clinical presentation of the patient and classified according to WHO standardize criteria for chest x ray confirmed pneumonia. and chest x ray was returned back to patients.

Data analysis and interpretation

After the data was collected and compiled and analysed using SPSS. The results were expressed in description, rate and tables and association was made And finally conclusion and recommendation was forwarded; final paper will be submitted to the department.

Variables

independent	*dependent*
-age	*- types of chest x ray findings*
- sex	*-severe pneumonia*
-race	*- auscultator findings*
- address	

Ethical Clearance

This proposal was submitted to research committee of paediatric and child health department of Tikur Ambesa Specialized Hospital, Then after approved by the committee,the study was conducted after obtaining ethical clearance from the Ethical committee/IRB of Addis Ababa University, Medical Faculty. . Verbal and written consent was obtained from the respondents and confidentiality was assured. . Detailed descriptions of the purpose of the study was explained to the participant before they enrolled and agree to participate. Participant who was not volunteer to participate was got the routine services that have been provided and this does not affect their individual right of getting services in anyway .

Plan for Dissemination

Formal report will submitted to all the concerned bodies. And finally the research findings will be published in International or national Journal.

Results

Socio-demographic characteristics

Distribution by sex and age

One hundred and ninty six patients were admitted to at causality and emergency ward of paediatric and child health in TASH during the study period and among those majority or 103(52.6%) were male and 93(47.4%) were female.

When we come to age of patients 113 (57.7%) of the patients were infants, 38(19.4%) of the patients were in the age range of 1 -2years, 21(10.7 %) of patiets were in the age rang of 2-5yrs ,16(8.2%) of patients were in the age range of 5 -10 years and 8(4.1%) were above 10 yrs old

age	No. of patients	Percent
<1 yr	113	57.7%
1-2yr	38	19%
2-5yr	21	10.7%

5-10yr	16	8.2%
>= 10yr	8	4.1%
Total	196	100%

Table 1. Distribution of patients by Age TASH, AA, Ethiopia, 2014.

Distribution by address of patients

Hundred forty three(73%) of patients were from the AA city, and the rest 53 (27%) out of the city.

Complaints of patients up on presentation to emergency ward and duration of ilness

From one hundred ninety six patients 111(56.6 %) of patients were presented with fast breathing, cough 47 (24%) ,fever 34 (17.3%)and 4 (2%) were having grunting and other complaints and 111(56.6%) were presented within three days of compliant, 72(36.7%) presented after three days but within seven days and 13 (6.6%)presented after one week of their illness.

Similar illness in the past

Fifty five(28.1%)of patients admitted with sever pneumonia were having previous admission with same compliant. out of this 34(61.8%) having only once, 11(20%) has twice, eight (14.5%) three times,0ne (1%) have four times and the rest one patient was having six previous admission because of his chest wall deformity . of this41(74 .4%) were having cardiac problem,6 (10.6%)were having rickets and 4(7%) patients were having no medical illness, the rest 3(5%) having different illness.

Commonest underlying medical illness

From one hundred ninety six 139(69.9%) were having underlying medical illness. Of this 59(42.14%) were having cardiac illness, and from which 38(64.4%) were having acyanotic cardiovascular heart disease and was the commonest one, cyanotic heart disease 12(20.3%),rheumatoid heart disease 7(11.8%) and the rest 2(3.3%) were having hypertrophic cardiomyopathy. Other associated underlying medical illness was sever acute malnutrition being 24(17.2%). 20(14.3%) were having hyper reactive air way disease ,18(12.9%) patients were down syndrome patients, 12(8%) having measles,11(7%) patients rickets, 6(4%) malignancy, 5(3%) were the HIV infected , 5 (3%) had tuberculosis and rest 21 patients were having different medical and surgical illness. and 36 patients were having more than one underling illnesses.

	no.patients	Percent(%)
Chief compliant		
cough	47	24
fever	34	17.3
Fast breathing	111	56.6
Duration of illness		
Within3days	111	56.6
4to 7 days	72	36.7
>7days	13	6.61
Previous hx same illness	55	28.1
Only once	34	61.8
twice	11	20

Three times	8	14.5
Four times	1	1.8
Six times	1	1.8

Table 2.duration of their compliant, previous illness and chief compliant of patients

Type and site of chest findings of patients

Of one hundred ninety six patients only 59(30.1%) had no chest finding, where as 137(69.9%)were having auscultator chest finding .the commonest type of chest finding was crepitation which was found in 105(76.6%) and then followed by BBS 13 (9.4%),wheez10 (7.2%) ,decreased air entry 6(4.3%) the remaining three patients were having both crepitation and wheeze.

Of the above findings 73(53.2%)were found on the right side of the chest,22 (16. %) on the left side chestand42(30.6%)were found bilaterally.

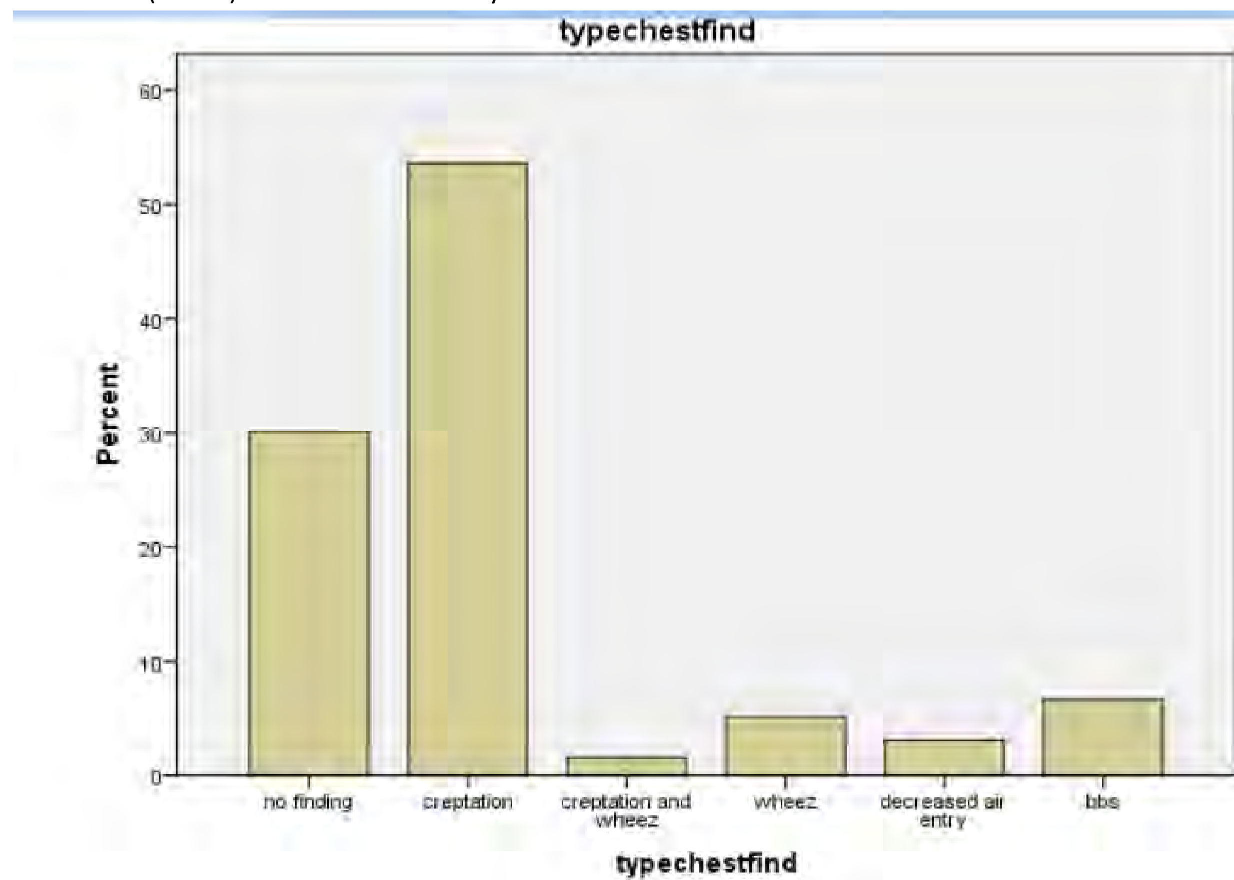

Figure 1. types of chest findings of patients with pneumonia TASH, AA, Ethiopia 2014.

Chest x-ray finding of patients

All patients who were admitted were having chest x ray for the confirmation of the diagnosis. From hundred ninty six patients 107(52%) were having normal chest x –ray where as 94(48%) patients were having abnormal chest x-ray . 0f this53 (27%) had consolidation,28(14,4%) had bronchopneumonia,7(3.6%) had interstitial pneumonia ,3(1.5%) pleural effusion and 3(1.5% had other

finding, that is fibrosis and hyperinflation . see figure. From 94 patients who have abnormal finding 74(78.7%) were seen on the right side of chest x- ray, 7(7.4%) seen on the left side and 20(13.8%) seen bilaterally.

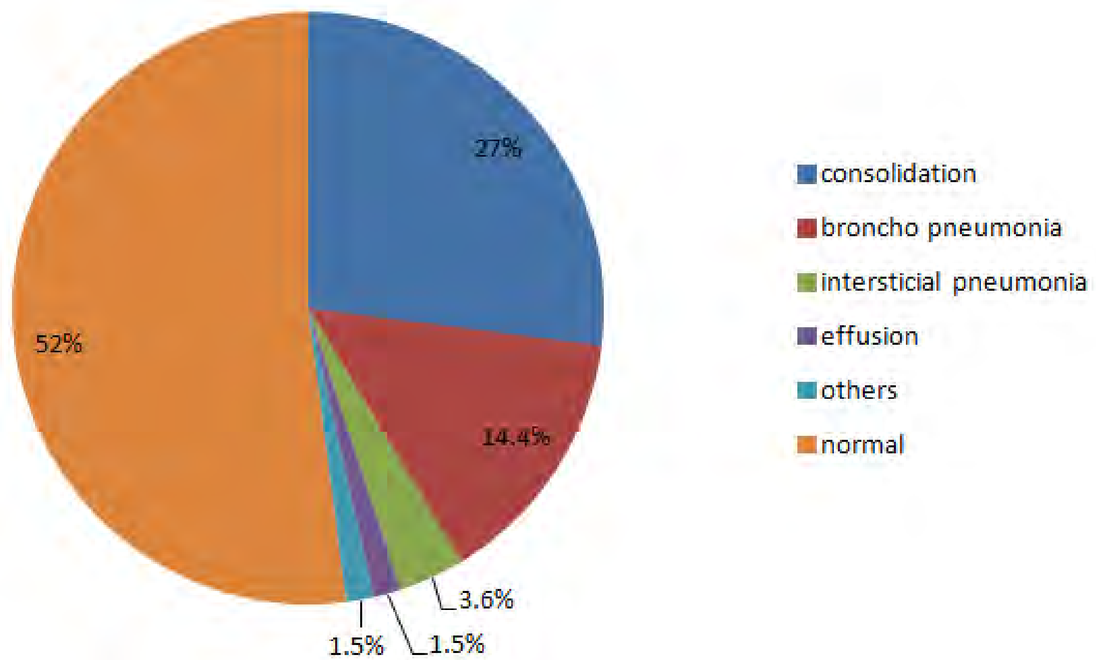

Figure 2. prevalence of type of chest x-ray findings of patients from total patients.

From ninty four x –rays of patiets, 53 (56%) were having consolidation,38(71.6%) were seen on the RUL,5(9.4%) on the RML , 4(7.5%) on the RLL,4 (7.5%) LLL ,2(3.7%) seen bilaterally. The other chest x ray finding was bronchopneumonia which was seen in 28(29.7%) patients and of this 15(53.5%) was seen on the RUL,3(10.7%) 0nthe RML,1(3%) on the RLL,2(7.1%) on the LUL ,7(25%) was seen bilaterally. Interstitial pneumonia was seen on 7(7.4%) patients and 5(71.4%) seen on the right side and 2(28.6%) seen bilaterally. Pleural effusion seen for three (3%)patients and 2(66.6%) RLL, 1 (33.3%)LLL . Two patients had hyper inflation , 1 patient had fibrosis on RUL . (see table 3)

proposal

Type of chest x-ray finding	No.of xray	Prevalence (%)	Site of chest x-ray finding					
			RUL	RML	RLL	LUL	LLL	bilateral
consolidation	53	56	38(71.6%)	5(9.4%)	4(7.5%)		4(7.5%)	2(3.7%)
Broncho-pneumonia	28	29.7	15(53.5%)	3(10.7%)	1(3%)	2(7.1%)		7(25%)
Interestisial pnumonia	7	7.4	5(71.4%)					2(28.6%)
pleuraleffusin	3	3.3			2(66.6%)		1(33.3%)	
Other type of finding	3	3.3						
1.Fibrosis	1		1					
2.Hyper-infilation	2							2
total	94	100	59	8	7	2	5	13

Table 3,type and site of chest x-ray finding

Duration of hospital stay and outcome Of hundred ninety six patients 53(27%) were stayed in the hospital less than 4 days ,of this only 7 (13%) were having cardiac problem. 92(46.9%) patients were stayed 4 up to 7 days , of this 31(33.6%) were having cardiac problem . 51(26%) patients stayed more than 7 days, of this 21(41.1%) were having cardiac illness. From one hundred ninety six admitted patients 184(93.9%) were discharged and 12(6.1%) were passed away.

Hospital stay	**N**	**%**
<4days	**53**	**27**
4to 7 days	**92**	**46.9**

>7 days	**51**	**26**
Discharged	**184**	**93.9**
Passed away	**12**	**6.1**

Table 4. patients hospital stay and outcome

Factors associated of chest x-ray finding

Chest x-ray finding has no association with sex ,age, address and with their compliant during presentation. but there is an association with other different factors .

factors	Sig(p value)	EXP(B)	95% CI
Duration of illness in days			
<4 days	o.oo7		
4to 7 days	0.016	2.092	1.145, 3.822
>7 days	0.015	5.271	1.37, 20.00
chest finding	0.000	5.111	2.53, 10.34
crepitation	0.000	4.78	2.28, 9.70
Decreased air entry	0.012	17.692	1.86, 165.22
Cardio vascular	0.007	2.36	1.26, 4.42
CRHD	0.948	1.058	.22, 4.88
CCHD	0.269	1.96	.59,6.50
ACCHD	0.004	3.04	1.41,6.52
Sever acute malnutrition	0.006	3.86	1.46,10.55
Hospital stay in days			
1to 3days	0.013		
4 to 7days	0.251	1.503	0.75,3.30
>7days	o.oo4	3.281	1.47,7.32
Previous hx of the same ilnes	0.000	3.393	1.474, 6.591

Table 5 . factors associated with chest x-ray finding.

Discussion

This study was done at Causality and emergency ward of Tikur Anbessa Hospital from December 2013 to May 2014. to know the prevalence of chest x ray finding of patients with severe community acquired pneumonia who are diagnosed according the WHO criteria .

In this study a total of 196 patients were enrolled and 93(47.4%) were female and 103(52.6%) were male ,143(73%) were from addis ababa city 23(27%) were out of the city. the commonest age at presentation was less than 12 months. Most of this patients presented with fast breathing followed by cough, fever and grunting and other complaints (111(56.6 %),47 (24%) , 34 (17.3%), 4 (2%) respectively .This finding is consistent with study done in Iraq, fever (87.4%), shortness of breath (99.5 %),cough (98%),even though the figure is small because in this study one most compliant was selected . The commonest auscultator finding is crepitation(76.6%)which is comparable to Iraq study (82%). Followed by bronchial breath sound other additional finding we found that auscultator findings were found 73(53.2%) on the right side of the chest,22 (16. %) on the left side chest and 42(30.6%)were found bilaterally. (4)

In this study From hundred ninety six 94(48%) patients were having abnormal chest x-ray and 107(52%) were having normal chest x –ray ,and this finding is comparable with Sudan study 53.2% 46.8%respectively but it is greater than Iraq study**,** 42.4% , **(**57.3%) respectively , Nigeria (37%) , 63 % respectively , Australian reports 34% patients with pneumonia had chest x ray findings. All of the above study was done on patients who have pneumonia but our study was conducted on patients only who have sever pneumonia ,so we can explain the difference.(1,3,4)

In this study most of chest x-ray finding was on the right side74(78.7%), followed by bilaterally20(13.8%) and left side 7(7.4%).the commonest finding was consolidation 53(27%) then bronchopneumonia28(14.4%)and interstitial pneumonia7(3.6%).there were 3 patients who had pleural effusion as complication pneumonia. There was only one patient who had right upper lobe fibrosis with no strong evidence of tuberculosis or previous history of tuberculosis ,he was on medication for nephrotic syndrome treatment . The patient was discharged after he got improvement.

This study is similar with Italian study which showed that Parenchymal densities were more prevalent in the right than the left lung (263 vs 179 and the most frequent radiological presentation was focally distributed parenchymal densities (212, 63.3%), whereas 123 patients (36.7%) showed multifocal consolidations, predominantly bilaterally (85/123, 69.1%). and only five radiographs (1.5%) showed interstitial changes. And also consistent with Brazilian study which showed pulmonary infiltrate and consolidation were described in 161

(54%) and 119 (40%), respectively. In this stud interstitial pneumonia is the 3 type of of chest finding but only one study which was done Iraq study showed that it is as common as that of consolidation.(4,5,6)

The other finding is right upper lobe is more affected from other lobes RUR,RML,RLL,(59/94,8/94,7/94) respectively and the left lower side is affected than that of left upper lobe LLL,LUL(5/94,2/94) respectively, this is similar with Greece study which showed that from 167 x-rays the consolidation was right-sided in 109 cases and left sided in 58. The majority of children with left sided pneumonia more commonly had the lower lobe affected (lower lobe, 45/58, 77.5%; upper lobe, 11/58, 19.1%;upper and lower lobe, 2/58, 3.4%), while in right-sided pneumonia, the upper lobe was more commonly affected(upper lobe, 54/109, 49.5%; lower lobe, 35/109, 32.1%;middle lobe, 16/109, 14.7%; and more than one lobe, 4/109, 3.6%) . (7)

we have seen that there is an association between chest x-ray finding with patients who presented after 7 days of compliant (p=0.015) , patients who have previous admission with similar illness (p=000).patients who have crepitation and decreased air entry on auscultation have also an association with chest x –ray finding.(p=0.000,p<0.012 respectively).patients having acyanotic congenital heart disease ,sever acute malnutrition and patients who stayed in the hospital more than 7 days have association with chest x ray finding.(p<0.004,p<0.006,p<0.004 respectively). This is similar with Sudan study which showed that with X-ray severity of the disease has significant association with many factors e.g. hospital stay more than 4 days (p<0.001), presence of severe malnutrition (P <0.001), presence of other diseases(p<0.01).(1)

The mortality rate of pneumonia in this study is 6.1%. which is greater than Australian 2.8% this may be due to having associated medical and surgical illness(69.9%).(3)

conclusion

In this study we have seen that chest X-ray can give useful information about the presence of pneumonia more commonly in patients who complaining more than a week and who have underlying medical and surgical illnesses, so physicians should have to select patients who need x-rays to avoid unnecessary exposure to radiation and wastage of time and money for all patients with pneumonia.

Work Plan

Task	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep
Proposal dev't												
IRB approval												
Preparation(training)												
Data collection												
Analysis												
Presentation												
Publication												

Budget Break down

	Budget Category	**Unit Cost (in birr)**	**Multiplying factor**	**Total Cost (ETB)**
1	**Personnel Daily**	**Per diem**	**Number of staff , days**	
	Interpretation of chest x ray	70	1x196x70	13,720
	Data collectors (Two)	40	2 x40x196	15,680
	Subtotal		***Personnel total***	***29 ,400***
2	**Supplies**	**Cost per item**	**Number**	
	Questionnaire duplication	1.5/ question.	1.5x392	588
	Pencil	1.00	15	15
	Pen	4.00	10	40
	Eraser	1.00	3	3
	Sharper	3.00	4	12
	Printing paper (pack)	46	2	92
	Toner	1000	1	1000
	Binding	20	3	60
	Subtotal		***Supplies total***	***1810***
3	**Training for data collectors**	**Cost per**	**Number of days**	

		service		
	Tea/coffee	50	50x7days	350
	Subtotal		***Training total***	***350***
	Grand Total			***31,560ETB***

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