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Magnitude of Community Acquired Pneumonia among Hospital Treated Adults in Tigray, Ethiopia: A Hospital Based Retrospective Study

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Abstract
Background: Of the total respiratory system infections worldwide, pneumonia accounts 2-3% and community-acquired pneumonia takes the majority albeit little is known about the problem among adults in Ethiopia. **Objective**: To determine the magnitude of community acquired pneumonia among hospital treated adults in Tigray, Ethiopia. **Methods**: A retrospective patient record review was used. Charts of all pneumonia patients treated from July, 2013 to June, 2015 in zonal and tertiary hospitals of Tigray were included in the study. Data were collected using a checklist and entered into Epi info 2002 and analysed using SPSS Version 20. **Results:** During the study period, there were 36,005 patients of all types of pneumonia & 5877 community acquired pneumonia cases. Hence, the magnitude of community acquired pneumonia was 16%, with proportions for males (16%) and females (17%). The mean age of the study participants was 37.5 (±16.65).The proportion of admitted patients due to community acquired pneumonia was 9.8% with a mean admission length of 6 (±5.59) days.**Conclusion:** The study revealed that the magnitude of community acquired pneumonia among the study participants in the study area was significant and most prevalent among younger population. Hence, prevention strategies should be designed and implemented to minimize the problem.
Keywords: Magnitude, CAP, Adults, Tigray, Ethiopia

Introduction

Respiratory system infections are widely spread around the world, accounting for 25% of the total number of physician consultations, of which pneumonia accounts for 2-3%; and majority of these are cases of community-acquired pneumonia (Rossi GP etal,1998). Its estimated incidence varies between countries and by age and gender. In the United States alone, 4 million adults are affected each year of which 20% need hospitalization for management (Deshpande A,2012**).**

Community-acquired pneumonia (CAP) is an acute disease which represents a common cause of hospital admission and mortality in developed and developing countries and hence consumes a great proportion of health care budgets **(**(CDC,2003),(Jokinen J, Scott JA,2010)**).**

The magnitude of community acquired pneumonia differs in different countries. Results from Canada showed that the proportion of community acquired pneumonia was 63% **(**Chow C etal,1995**).** Likewise, a study conducted in 55 hospitals in Italy concluded that 61.6% of all pneumonia patients admitted in the hospitals had community-acquired pneumonia (Mario Venditti etal,2009). Another study from Japanese community hospital revealed almost similar results of 62% of community acquired pneumonia among the total pneumonia patients **(**Yuichiro Shindo etal.2009**)**. On the other hand, a study in USA showed lower proportion of CAP (32.6%) than reported from the studies mentioned above **(**Scott T. Micek etal.2007**).** However, there are no available literature that shows the level of community acquired pneumonia among hospital treated adults in Ethiopian and other sub-Saharan Africa countries.

Thus, the aim of this study was to determine the magnitude of community acquired pneumonia among hospital treated adults of 18 years and above in Tigray, Ethiopia that can be important for decisions of prevention, treatment and promotion.

Methods

Institutional based medical records review was conducted in Tigray region. The region has an estimated total population of 4,314,456, of which 2,124,853 males and 2,189,603 females. The region is predominantly of Tigrian ethinic group accounting for 96.55% of the population. About 95.6% of the population are followers of Ethiopian Orthodox Christianity. There are 712 health posts, 201 health centres and 15 hospitals (6 zonal or general hospitals, one referral and the remaining are primary hospitals) in the region **(**(CSA,2007), (FMoH,2007)**).**

All pneumonia patients that occurred during the period July, 2013 and June, 2015 aged 18 years and above treated in all zonal hospitals of Tigray and Ayder referral hospital were included in this study. If pneumonia was not the main reason for admission, if the patients had history of hospital admission in the last 14

days, if the pneumonia was developed 48 hrs following admission, patients with tuberculosis (TB) or previous chest X-ray which may conflict with diagnosis of CAP, chronically debilitated patients, patients with lung cancer and asthma were excluded from the study.

Data were collected using a checklist which was adapted from relevant literatures. Socio-demographic characteristics of the patients, diagnosis, treatment given and any other management provided were collected from the medical records in each hospital.

A total of 21 data collectors and 7 supervisors (nurses and health officers) were recruited for data collection. Training was given for the data collectors and supervisors for three days on the objective of the study, data collection checklist and procedure to ensure consistency of the data collection and high-quality data.

Once the data was collected it was handled confidentially, coded, and double entered into Epi info 2002. Data checking was done to verify the consistency and backup was saved. Data cleaning was conducted for errors and implausible values and exported to SPSS Version 20. Frequency distributions, proportions and measures of central tendency had been calculated.

Pre-test was conducted on 10% of the total charts to evaluate the completeness and consistency of the checklist. Accordingly, appropriate modifications and adjustments was made. Data was collected using trained nurses/health officers with at least some years of work experience on data collection and research with supervision. At the end of every data collection day each questionnaire was examined and pertinent feedback was given to the data collectors and supervisors. Data entry was carried out by an experienced data entry clerk with close supervision by the principal investigator. Data cleaning was conducted out exclusively by the principal investigator, and finalized check list was stored in a well secured cabinet.

Ethical clearance was obtained from Institutional Review Board of Addis-Ababa University, College of Health Sciences. Letter of agreement was secured from Tigray regional health bureau. and additional consent was obtained from the hospital administrators after explaining the purpose of the study.

Any document used in this research was kept private and confidential (data was password protected and filled checklist was kept locked in a cabinet). No information other than for the purpose of this study was collected from the patients' charts.

Results

There were a total of 36,005 patients (20764 males and 15241 females) aged 15 years and above with all types of pneumonia treated during the study period between July, 2013 and June, 2015 in the six zonal hospitals and one referral hospital of Tigray regional state. In this study, we reviewed 5877 medical records of adult community acquired pneumonia cases, making the proportion of community acquired pneumonia 16%, with male to female ratio of 0.94 to 1 (16 and 17% for males and females, respectively). The mean age of community acquired pneumonia cases treated in the hospitals was 37.5 (±16.65) ranging from 18 to 92 years. Five hundred four (9.5%) of the patients treated at inpatient department were aged below 65 years and of the patients treated as in patient, 70 (12%) were above 65 years old. About 3322 (56.5%) were males among which 393(11.8%) were inpatients. About 3029 (51.5%) were farmers, of whom 326 (10.8%) treated at the inpatient department. Overall, patients treated at inpatient department accounted for 9.8% (Table 1).

Table 1. Socio-demographic characteristics of the study participants versus site of treatment, 2016 (n=5877)

Characteristics	Department patients treated		Total No (%)
	Inpatient No (%)	Outpatient No (%)	
Age			
Below 65	504 (9.5)	4789 (90.5)	5293 (90.1)
65 and above	70 (12.0)	514 (84.0)	584 (9.9)
Mean (SD)			37.5(±16.65)
Sex			
Male	393(11.8)	2929(88.2)	3322(56.5)
Female	181(7.1)	2374(92.9)	2555(43.5)
Occupation			
Farmer	326(10.8)	2703(89.2)	3029(51.5)
Student	121(8,5)	1297(91.5)	1420(24.2)
Civil Servant	44(6,7)	606(93.3)	653(11.1)
House wife	56(11.6)	428(88.4)	484(8.2)
Private employee	25(8.6)	266(91.4)	291(5.0)
Total No (%)	574(9.8)	4603(90.2)	5877

One thousand four hundred eleven (24%) community acquired pneumonia patients were treated in Adigrat hospital, of whom 91% were treated as outpatients. Higher proportion of cases were treated at the

inpatient departments of Suhul and Kahsay Abera hospitals (29 and 18%, respectively) as compared to the other public hospitals which had less than 10% of inpatient treatments. For the total 574 admitted patients due to community acquired pneumonia, the mean length of hospital stay was 6 days with SD of 5.59 days. **(Table_2)**.

Table 2. Clinical characteristics of the study participants versus site of treatment, 2016 (n=5877)

Characteristics	Department patients treated		Total No(%)
	Inpatient No (%)	Outpatient No (%)	
Treatment Hospital			
Adigrat	124 (8.8)	1287 (91.2)	1411 (24.0)
Ayder	47 (10.9)	385 (89.1)	432 (7.4)
Kahsay Abera	39 (18.4)	173 (81.6)	212 (3.6)
L.Karl	57 (6.3)	887 (83.7)	944 (16.1)
Mekelle Hospital	50 (4.0)	1269 (96.0)	1319 (22.4)
St.Marry	57 (6.5)	811 (93.5)	873 (14.9)
Suhul	200 (29.2)	486 (71.8)	686 (11.7)
Referal status			
Reffered	204 (61.8)	126 (38.2)	330 (5.6)
Not referred	370 (6.7)	5177 (93.3)	5547 (94.4)
Length of hospital stay			
1-6 Days	424(74)	1	
≥7 Days	150(26)		
Mean(SD)	6(±5.59)		
Total No (%)	574 (9.8)	4603(90.2)	5877

Discussion

This study attempted to assess the magnitude of community acquired pneumonia among hospital treated adults (aged ≥18 years) in Tigray zonal and tertiary hospitals.

The mean age of the treated patients for CAP in the current study was 37.5 (±16.65) years , which is much lower than compared to studies conducted in Canada and Switzerland with mean ages of 64.4 years and 70.4 years respectively **(**(Chow C etal,1995), (Garbino J etal,2002)**).** Likewise, a study from Germany confirmed that the median age of community acquired pneumonia patients was 76 years **(**S Ewig etal,2009**).** Similar study from USA concluded that the median age of CAP patients was 57 years **(**S. Jain etal.2015**)**. Moreover, another study from USA confirmed that the mean age of admitted patients with pneumonia was 58.9 years **(**Scott T. Micek etal.2007**).** This difference could be because of the small number of elderly adults participated in our study and higher proportion of elderly adults in the developed nations in general.

The proportion of community acquired pneumonia in our study was 16% (16 and 17% for males and females, respectively). Our finding was much lower than previously conducted researches. Studies conducted in Canada, Italy and Japan reported that the proportion of community acquired pneumonia ranging between 62 and 63% **(**(Chow C etal,1995),(Mario Venditti etal,2009),(Yuichiro Shindo etal.2009)**), while** a study in USA among community acquired and health care associated pneumonia patients requiring hospital admission showed that the proportion of CAP was lower (32.6%) than the above reports **(**Scott T. Micek etal.2007**).** The variation might be justified as the difference in prevalence/distribution and/or difference in the diagnosis of community acquired pneumonia.

In the current study, of all the community acquired pneumonia patients in the study years, only 9.8% patients have been treated as in patients with a mean hospitalization of 6 days, which was shorter than studies conducted in different countries. A study from Canada confirmed that the average length of hospitalization in community acquired pneumonia patients was 17 days, a study from British hospitals revealed that hospital stay in survivors of community acquired patients averaged 10.8 days ((Chow C etal,1995), (BTS,1982)). Likewise, study from Switzerland concluded that the mean treatment duration of community acquired pneumonia patients was 12.1 days (Garbino J etal,2002), However, the mean lemgth of stay in our study was longer than a study conducted in one community and three university teaching hospitals in USA which showed that the adjusted inter hospital differences in mean length of stay ranged from 0.9 to 2.3 days (Danny McCormick etal,1999). This difference could be explained by the difference of the severity of the problem and pathogenic difference of the admitted patients. On the other hand due to the low availability of beds admission rates might differ from place to place in general and from hospital to hospital in particular.

In conclusion, the study revealed that the magnitude of community acquired pneumonia among adults in Tigray zonal and tertiary hospitals was 16%, Community acquired pneumonia was higher among younger population. Health care professionals should not undermine the prevalence of community acquired pneumonia

and get appropriate trainings that enable them diagnose and manage the problem properly. Moreover, prevention strategies like health education and immunization should be designed and implemented to minimize the magnitude of community acquired pneumonia among adults in Tigray, Ethiopia.

Abbreviations

CAP: Community Acquired Pneumonia, EDHS, Ethiopian demographic health survey,
SPSS, statistical package for social science, TB-Tuberculosis,

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Competing interests

The authors declare that we have no competing interests.

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