



PNEUMONIA SEVERITY INDEX (PSI);

ASSESSMENT OF PATIENT'S PROFILES AND THE LENGTH OF STAY IN HOSPITALIZED COMMUNITY ACQUIRED PNEUMONIA PATIENT IN DIFFERENT HOSPITAL SETTING IN KARACHI

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ABSTRACT... Morbidity and mortality due to community acquired pneumonia has been increased in our country. Children and old age patients are mostly effected due to community acquired pneumonia **Study design:** Cross sectional study. **Setting:** Patients hospitalized for Community acquired pneumonia in four different hospitals located at different areas were studied. **Period:** Three years period from August 2011 to August 2014. **Objectives:** To assess demographic profile, pneumonia severity index and length of stay of community acquired pneumonia patients hospitalized at different hospitals in Karachi. **Method:** 800 patients both male and females patients were included in this study. **Results:** It was found that 480 (60%) were males and 320 (40%) were females, males were significantly more frequent ($\chi^2=0.48$, $p<0.05$) than the females patients. There was a significance difference in numbers of different age group patients. According to the age distribution, there were 222(27.75%) from 1-5 years, which was the highest among the patients and there were 44(5.5%) from 81-90 years of age group patients, which was least among the different age group patients. According to the comorbidity most of the patients were found without comorbidity there were 456(57%) patients possess no comorbidity. Patients with comorbidity were 344(43%), and comorbidity was found in patients with hypertension were 131(16.4%) and patients with diabetes were 105(13.1%) these were the two most commonly comorbidity disease found. According to the socioeconomic status (SES) status there were 482(60.25%) patients from lower SES class, 270(33.8%) patient from middle SES class and 54(6.8%) patients from high Socioeconomic class. patient with low SES were much higher at hospital C and hospital D. ($\chi^2=127.88$, $p<0.05$). CAP is more frequent in married patients, married patients status were much higher at hospital C and hospital D ($\chi^2=60.31$, $p<0.05$). According to the PSI segregation there were 424(53%) patients from PSI class I, 168(21%) were from PSI class II, 128(16%) patients were from PSI class III, 44(5.5%) were from class IV and 36(4.5%) were from PSI class V. Mean length of stay (LOS) was greater at hospital C and D as compare to other two hospitals. **Conclusion:** CAP is frequent among males, low socio-economic, hypertensive individuals and patients from 1-5 years of age. The shortest mean length found was 3.6days at hospital A and the longest mean length of stay found was 7.6 days at hospital D.

Key Words: Community acquired pneumonia, Pneumonia severity index (PSI), length of stay (LOS), Comorbidity, socioeconomic status (SES).

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INTRODUCTION

Community-acquired pneumonia (CAP) is thought to be most spreading disease of the modern world.¹ According to world health organization, lower respiratory tract infections are thought to be the major reason of death with respect to infectious disease and third most common reason of death overall.²

Community-acquired pneumonia (CAP) is one of the leading severe disease requiring hospitalization and results an extensive clinical and economic burden.³ (CAP) is the reason for hospital admission for 3–5 cases for every 1000 adults every year and with a death rate of 5–15%. Pneumonia is the infectious ailment with the highest expense of health.⁴ The condition is defined as pneumonia not acquired in a hospital

or a long term care facility. In spite of accessibility of effective antimicrobials and useful vaccine, a calculated 5.6 million cases of CAP resulted yearly in the United States.⁵

In elderly adults, the prevalence of CAP and the related hospital admission and mortality increases steadily with respect to the age. Over all annual expense of health care for CAP in USA is 8.4 billion US dollars.⁶ Therefore, financial and logical management of CAP should focus on discharge of patients as soon as possible before reaching to worsening or recurrent infection.

Patients with CAP frequent present with cough, fever, chills, fatigue, dyspnea, rigors and pleuritic chest pain. When a patient presents with suspected CAP, physicians should at first ascertain his need for hospitalization applying mortality prediction tools such as the pneumonia severity index combined with clinical judgment.⁵ Current management protocol strongly suggest discharging patients as early as they are medically stable, have no other active medical issue, and have a proper condition for continued care.⁷

The less severe patients hospitalized with community acquired pneumonia, stay in hospital for more than 5 days and most of them (48.4%) are females.⁸ CAP is routinely associated with hospital admission and mortality among elderly patients but the information is limited based on age and sex specific prevalence, pattern of care (intensive care unit admission and mechanical ventilation), resources use (length of stay and hospital costs) and outcome (mortality).⁹ Severe CAP is responsible for high mortality and morbidity worldwide, with estimated mortality rates ranging from 30% to 50%. Early start of rational antibiotic therapy is of significant importance due to the increased numbers of death of this disease.¹⁰

The objective of the present study was to study the patient's profiles and compare length of stay and patients admitted with different PSI scale at different hospital due to CAP and determine factors associated with LOS for patients admitted

with suspected CAP in Karachi.

PATIENTS AND METHOD

Study subjects

A prospective follow up study was performed in three private and one government hospital, these hospitals were denoted as hospital A, hospital B, hospital C and hospital D to maintain the privacy of the hospitals, of which two were teaching hospital one private and one public in Karachi. These were 1) one public hospital was referral (teaching hospital), leading tertiary care hospital with 1185 in patient facility and the hospital is denoted as hospital D with different physicians' specializing in lung diseases. 2) Other three hospitals were private hospitals, denoted as hospital A, hospital B and hospital C, Which consist of 200 bed, 120 bed and 300 bed hospitals. Among three private hospitals one was teaching hospital. Patients continuously admitted to the four hospitals. The study conducted during three years period from August 2011 to August 2014. Inclusive criteria were the presence of a chest radiograph with confirmation of infiltrate and indications compatible with CAP. Alternative diagnosis was avoided during the subsequent period. Patients with immunosuppression, including human immunodeficiency viral infection, patients who had been hospitalized in the past 15 days and those with tuberculosis were likewise rejected, just like those patients who got attention in the emergency unit.

Data Collection

A procedure was designed that looked for information on demographical characteristics, comorbidity, introductory assessment of the risk class as indicated by Fine¹¹, Length of stay (LOS) and result. Information was gathered as takes after. In the initial 24 h, the different variables that include the prognostic size were assessed furthermore; the patient was characterized in one of the five danger classes (range, I-V). Demographical qualities including age, gender, and income status were recorded. Particular comorbidity details included chronic obstructive pulmonary diseases (COPD), asthma,

cardiovascular illnesses, renal, hepatic disease, diabetes mellitus, with CAP. LOS was defined as the number of days between admission and discharge.

STATISTICAL ANALYSIS

All the data entered in the excel sheet and then converted to SPSS version 15. Analyse the descriptive analysis of the data through SPSS, Data was analyzed and results were compared using Chi-square test with the help of statistical software package (SPSS version 15). All P values of <0.05 were considered statistically significant.

ETHICAL APPROVAL

Ethical approval, permission was taken from the Board of Advance Study and Research (BASR) of the University of Karachi. Permission was obtained before conducting the study from the institutional review board and ethical committee of the institution. Informed consent was taken from the patients.

RESULTS

A total of 800 patients admitted with CAP were included in the study. Names of the hospitals mention with the alphabetical letters A, B, C and D. The demographical characteristics, co morbidity and Pneumonia severity index (PSI) in the four hospitals are summarized in Table-I and Table-II. Significance differences in distribution were found between the four hospitals with respect to age, gender, Socio economic status (SES). It was found that there were 480(60%) were males and 320(40%) were females, males were significantly more frequent ($\chi^2=0.48$, $p<0.05$) than the females patients. There was a significance difference in numbers of different age group patients. According to the age distribution, there were 222(27.75%) from 1-5 years, which was the highest among the patients and there were 44(5.5%) from 81-90years of age group patients. According to the comorbidity most of the patients were found without comorbidity there were 456(57%) patients possess no comorbidity, patients with hypertension were 131(16.4%) and patients with diabetes were 105(13.1%) these were the two most commonly comorbidity

diseases found. According to the socioeconomic status (SES) status there were 482(60.25%) patients from lower class, 270(33.8%) patient from middle SES class and 48(6%) patients from high Socioeconomic class. patient with SES were much higher at hospital C and hospital D. ($\chi^2=127.88$, $p<0.05$). CAP is more frequent in married patients. Patients with marital status, married and unmarried patients status were much higher at hospital C and hospital D ($\chi^2=60.31$, $p<0.05$). Based on marital status CAP is more frequently found in married individuals.

Comorbidity of the patients

The comorbidity diseases with CAP were hypertension disease, COPD, diabetes, liver diseases, CNS diseases, pulmonary diseases and renal diseases. Patients with hypertension and diabetes were much higher at hospital C and hospital D. Patient with liver and renal disease were much higher at hospitals D as compare to other hospital. Patients of COPD were much higher at hospital D as compare to other hospitals. ($\chi^2= 90.244$, $p<0.05$). Hypertension was more frequent in CAP patients.

PNEUMONIA SEVERITY INDEX AND LENGTH OF STAY

The distribution of patients in the hospitals with respect to PSI were mention in Table-III. According to the PSI scale severity of disease patients were classified as PSI I, PSI II, PSI III, PSI IV and PSI V. According to the PSI segregation there were 424(53%) patients from PSI class I, 168(21%) were from PSI class II, 128(16%) patients were from PSI class III, 44(5.5%) were from class IV and 36(4.5%) were from PSI class V. significance difference in distribution. ($\chi^2= 82.799$, $p<0.05$) were found between four hospitals with respect to PSI. There were highest percentage 135(31.8%) patient with PSI class I at hospital C, 75(44.6%) was highest percentage of patients with PSI class II at hospital D, 69(53.9%) was highest percentage of patient with PSI class III at hospital D, 21(47.7%) was highest percentage of patients with PSI class IV at hospital D and 17(47.2%) were the highest percentage of the patients with PSI class V at hospital C. Mean length of stay was

greater at hospital C and D as compare to other two hospitals. The shortest mean LOS found

was 3.6 days at hospital A and the longest mean length of stay found was 7.6 days at hospital D.

Characteristics	Hospital A	Hospital B	Hospital C	Hospital D	Total
Patient numbers	142	114	258	286	800
Age 1-5 years	64	67	61	30	222
6-20 years	13	12	47	43	115
21-30 years	13	0	29	28	70
31-40 years	10	7	11	43	71
41-50 years	9	8	13	28	58
51-60 years	4	8	17	34	63
61-70 years	13	7	31	52	103
71-80 years	16	4	15	19	54
81-90 years	0	1	34	9	44
Sex M/F	85/57	65/49	171/87	159/127	480/320
SES low/middle/high	66/61/15	71/43/0	198/27/33	147//139/0	482/270/48
Maritus status Married/unmarried	61/81	34/80	123/135	196/90	414/386

Table-I. Demographic characteristics

M: male, F: female: SES: Socioeconomical status, P<0.05

Co morbidity	Hospital A	Hospital B	Hospital C	Hospital D	Total
Without comorbidity	104	84	141	127	456
Hypertension	14	7	58	52	131
Diabetes	19	14	33	39	105
Liver disease	2	2	3	15	22
Renal disease	2	3	3	11	19
Pulmonary disease	0	1	9	23	33
COPD	1	3	3	11	18
CNS	0	0	4	4	8
CVD	0	0	4	4	8
Total	142	114	258	286	800

Table-II. Comorbidities of CAP patients in different hospitals

COPD: chronic obstructive pulmonary diseases, CNS: central nervous system, CVS: cardiovascular diseases, P<0.05.

initial risk class (PSI)	hospital A	hospital B	hospital C	hospital D	Total
PSI I	101	83	135	105	424
PSI II	29	10	54	75	168
PSI III	11	13	35	69	128
PSI IV	1	5	17	21	44
PSI V	0	3	17	16	36
Total	142	114	258	286	800
Mean LOS	3.6	4.4	6.7	7.6	

Table-III. Pneumonia severity index and length of stay

LOS: length of stay, PSI: pneumonia severity index, P<0.05.

DISCUSSION

Community acquired pneumonia is a very serious respiratory illness occurring in developed and developing countries. CAP severity and frequency of disease varies with human demographic features. It was observed that frequency of CAP was much higher in the lower socioeconomic class CAP patients. It is consistent with a previous study as mentioned by Loeb MB.¹²

Who described the highest frequency of CAP among the lowest socio-economic class of patients. It is due to non-affordability of the costly treatment at an early stage due to extensive poverty prevailing in our region; which results high mortality and severity of CAP. It has been noted in our study that there were 480(60%) males patient dominating than that of females patients 320(40%). High frequency of CAP among male gender as mention in our study has been supported by other scientist Reechaipichitkul W¹³ who mention the similar results further two studies (Poulose V. and Jokinen C)^{10,14} have mention the same results the male dominance (59.15%) which is close to our finding.

In the present study the highest frequency 222(27.75%) of CAP among 1-5 years of age group patients were determined. It is supported by Jordan HT. He quoted the highest frequency of CAP among <5 years and >65 years age group this difference may be due to poverty, malnutrition in our region.¹⁵ However it is inconsistent with the other research literature stated by Izquierdo C which indicated that CAP has no association with poverty and income status.¹⁶

In the present study it was found that hypertensive patient were 131(16.4%) and patients with diabetes were 105(13.1%) coexisted with CAP. In our study we analyzed that hypertension and diabetes was predominantly found in community acquired pneumonia patients with the highest ratio as compared to other comorbid diseases. Comparing to other study Malic AS⁶ mention that Diabetes mellitus to be common among CAP patients and in a study conducted by Reechaipichitkul W¹³ who mentioned Diabetes

Mellitus to be common among CAP patients.

In the present study we found that the mean shortest length of stay was 3.6 days at hospital A and highest mean length of stay was 7.6 days at hospital D. Comparing to other studies S. Reyes Calzada¹⁷ determined the median LOS was 8 days and he determined LOS by hospitals, shorter stays were recorded in hospital D, with a median of 6 days. Another study conducted by Danny McCormick¹⁸ and determined mean hospital stay by hospitals shorter stays were recorded in hospital B 7. 8 days and highest length of stay was 9.8 days in hospital A.

In the present study the percentage distributions of patients in the teaching hospital with respect to PSI were 428, 168, 128, 44 and 36 with respect to class I, class II, class III, class IV and class V. This study analyzed that majority of the cases were related to severity class I and II and the Fine scale had been outlined and proved, originally, to estimate mortality but has since been proposed for decisions about hospitalization. For example, it is recommended that patients in low-risk classes I and II should be treated on an outpatient basis due to the low mortality risk¹⁹ this shows that unnecessary admission were recommended.

It is important to understand the reasons for prolong hospitalization which should be reduced by improving the efficiency of hospital care and the quality of the post discharge treatment plan further. It is essential to reduce mortality and morbidity due to CAP by giving proper attention to different demographic factors which influence upon these patients.

RECOMMENDATION

1. Awareness of health related education is important especially for males' patients to raise awareness for early treatment of CAP.
2. To increase the affordability of patient for early diagnosis and treatment of CAP to minimize morbidity and mortality
3. To control the comorbidity of the CAP patients like hypertension to avoid CAP complication

LIMITATION OF THE STUDY

1. Death rate of the patients could not be included
2. Nutritional condition of the patients has not been included
3. Profile effect on the resources used could not be included

These shortcomings and limitations emphasize that further studies should be conducted

CONCLUSION

This study concludes that among different associated comorbidities of community-acquired pneumonia patients like hypertension, diabetes, liver diseases, renal diseases, COPD, CAP is more frequent among hypertensive and married patients. CAP is frequent among males, low socio-economic, and patients from 1-5 years. The shortest mean length found was 3.6 days at hospital A and the longest mean length of stay found was 7.6 days at hospital D.

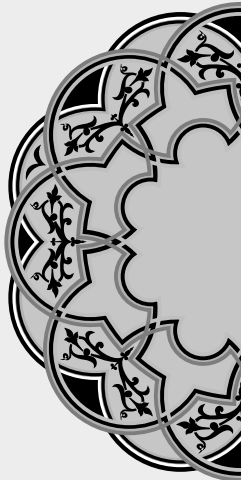
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“Most of our problems are because we act without thinking or we keep thinking without acting.”

Unknown

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