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Prevalence of Community-Acquired Pneumonia in Diabetic Patients in a Tertiary Care Hospital of Bangladesh

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Abstract

Background: For nearly two centuries, pneumonia has been recognized as a frequent and sometimes fatal illness. Community-acquired pneumonia and diabetes mellitus are frequently associated, and this relationship bears the burden of both diseases. Objective: The present study was conducted to access the Prevalence of community acquired pneumonia in diabetic patients in a tertiary care hospital in Bangladesh. **Material & Methods:** This study was conducted among 110 controlled diabetic and 70 uncontrolled diabetic patients who were admitted to the Department of Medicine of Sher-E-Bangla Medical College Hospital in the period between January 2021 and June 2021. The data were analyzed using the SPSS version 25.0. **Results:** In this study of 110 controlled diabetic patients, 45% were men and 55 % were women. There were 57 % males and 43 % females among 70 uncontrolled diabetic patients. Controlled diabetic patients were 52% older than 60 years old, while uncontrolled diabetic patients were roughly 50 %older than 60 years old. . CAP associated with uncontrolled DM cases showed significantly more fever, RBS, ESR, pleural effusion and hospitalization days. There was no significant difference between controlled diabetic and uncontrolled diabetic CAP patients regarding cough, fever, chest pain, and pulse. The prevalence of CAP among 70 uncontrolled patients was 48% and among controlled diabetic patients was 45%. **Conclusions:** Specific care for diabetes patients with community-acquired pneumonia, as well as close monitoring for its control, will result in a reduction in infection exposure and, if any infection occurs, will a milder infection.

Keywords:- Pneumonia, controlled diabetes, uncontrolled diabetes.

INTRODUCTION

For nearly two centuries, pneumonia has been recognized as a frequent and sometimes fatal illness.[1] The illness of the lower respiratory tract acquired outside of a hospital or long-term health care institution is known as community acquired pneumonia (CAP). It's diagnosed in the community or within the first 48 hours of being admitted to the hospital.[2] Patients are more susceptible to community-acquired pneumonia if they have underlying illnesses.[3] Some comorbidities have also been documented to influence the spectrum of causative agents, facilitating rare and more aggressive germs; on the other hand, common infections may show specific patterns of

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antibiotic resistance.[4,5,6] Without a doubt, understanding these microbiological traits is crucial and serves as the foundation for empirical therapy. Furthermore, major concomitant disorders have been found as modifying variables of pneumonia severity in various studies.[4,5,6,7,8] Droplet infection is the most common way to get CAP. An inflammatory response occurs once organisms have settled in the alveoli. Congestion, red and grey hepatisation, and finally resolution with little or no scarring are all stages of the traditional pathological reaction. Death rates for hospitalized patients range from 5 to 10%, but can reach 50% in cases of severe illness.[9] Diabetes mellitus (DM) is a collection of metabolic disorders marked by a persistent state of hyperglycemia caused by a deficiency in insulin secretion, insulin action, or both. Its widespread presence poses a major threat to the entire world's population.[10] The microangiopathic process and non-enzymatic glycosylation of tissue protein are both key long-term consequences of DM. In DM, neutrophil and macrophage function is reduced across the board. Chemotaxis, adhesion, phagocytosis, and the ability to destroy the phagocytosed pathogen are all examples. The respiratory burst, which is a reduction in the intracellular killing of bacteria with free radicals, superoxides, and hydrogen peroxide, is also hampered.[10] In affluent countries, community-acquired pneumonia (CAP) is one of the most prevalent infectious infections requiring hospitalization. Hospitalizations have previously been advised in the case of DM and CAP. However, data on the combined burden and outcomes of CAP in patients with DM, particularly its link to hospitalization and mortality risk, is currently scarce.[11] The American Diabetic Association has classified Diabetes Mellitus patients as uncontrolled diabetic patients whose HbA1c level is maintained more than 7% and as controlled diabetic patients whose HbA1c level is maintained less than 7% based on the levels of Glycosylated Haemoglobin (HbA1c) in the blood.[12] The objective of the study is to assess the Prevalence of community acquired pneumonia in diabetic patients in a tertiary care hospital in Bangladesh.

MATERIAL AND METHODS

The study was a cross-sectional study that was conducted among 110 controlled diabetic and 70 uncontrolled diabetic patients who were admitted to the Department of Medicine of Sher-E-Bangla Medical College Hospital in the period between January 2021 and June 2021. Physically active and mentally stable patients, patients with diabetes and CAP symptoms were included in the study. Maintaining all formalities face to face interviews was taken by using a pre-tested semi-structured questionnaire with some necessary laboratory investigation. The sample size was 180 (controlled diabetic-110, uncontrolled-70). The detail of the study was explained to each eligible respondent and consent was taken. After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variables to detect errors and to maintain consistency, relevancy and quality control. Collected data were edited and analyzed according to the objectives and variables by IBM software- Statistical Package for Social Science (SPSS 25) version. Ethical clearance was taken from the IRB of the institution.

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RESULTS

The American Diabetic Association has classified Diabetes Mellitus patients as uncontrolled diabetic patients whose HbA1c level is maintained more than 7% and as controlled diabetic patients whose HbA1c level is maintained less than 7% based on the levels of Glycosylated Haemoglobin (HbA1c) in the blood. [Table 1] shows among controlled diabetic patients 52% were aged more than 60 years and among uncontrolled diabetic patients, about 50% were aged more than60 years. [Table 2] shows among controlled diabetic and uncontrolled diabetic patients about 81.81% and 78.57% were from urban areas. [Table 3] shows among controlled diabetic patients 45.45% of respondents had monthly income had 40000-80000 tk. And among Uncontrolled diabetic patients, 50% of the respondent's family income had 20000-40000 tk. Table shows (mean±SD) ESR, pleural effusion, RBS, fever hospitalization days of controlled and uncontrolled diabetic patients were 30.5 ±9.3 and 40.5 ± 14.3; 9 ± 15.6 and 26 ± 2.3; 23.25 ± 10.49 and 86.47 ± 12.54; 37.97±0.72 and 40.06±1.17; 5.50±6.20 and 10.53±8.10 respectively. CAP associated with uncontrolled DM cases showed significantly more fever, RBS, ESR, pleural effusion and hospitalization days. There was no significant difference between controlled diabetic and uncontrolled diabetic CAP patients regarding cough, fever, chest pain, and pulse. The prevalence of CAP among 70 uncontrolled patients was 48% and among controlled diabetic patients was 45%.

Table 1: Distribution of the respondents by age of the patients.

Age	n=110	n=70	% (Controlled diabetic patients)	% (Uncontrolled diabetic patients)	P value
41-50	20	15	18.18	21.43	0.001
51-60	32	20	29.0	28.57	
More than 60	58	35	52.73	50.0	

Table 2: Distribution of the respondents by residence of the patients.

Residence	n=110	n=70	% (Controlled diabetic patients	% (Uncontrolled diabetic patients)	P value
Urban area	90	55	81.81	78.57	0.001
Rural area	20	15	18.18	28.57	

Table 3: Distribution of the respondents by monthly family income of the patients.

Monthly income	n=110	n=70	% (Controlled diabetic patients	%(Uncontrolled diabetic patients)	P value
10000-20000	10	25	9.0	35.71	0.001
20000-40000	40	35	36.36	50	
40000-80000	50	5	45.45	4.55	
>80000	10	5	9.0	4.55	

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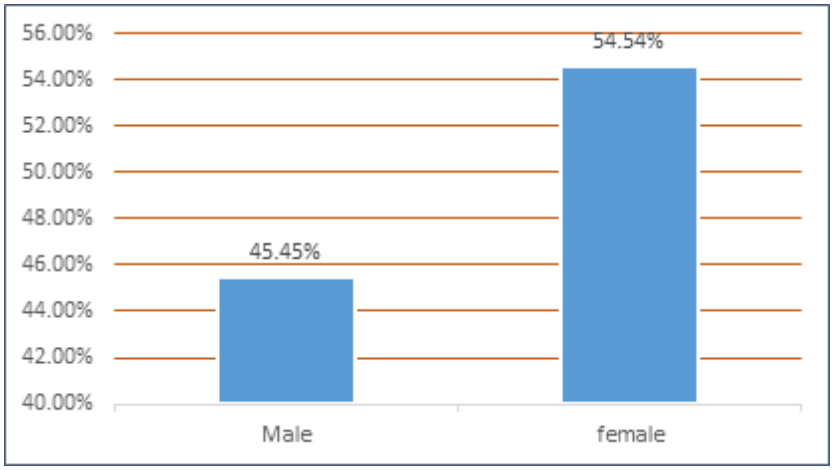

Figure 1: Distribution of the respondents by gender of the controlled diabetes patients (n=110).

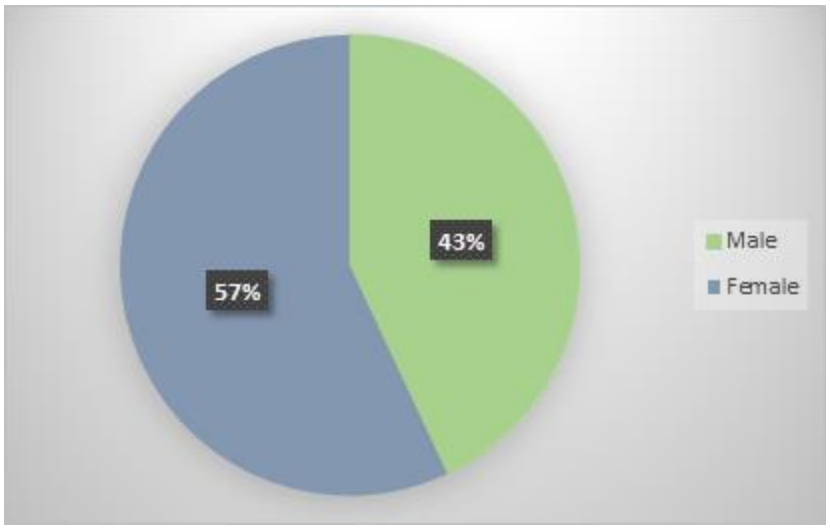

Figure 2: Distribution of the respondents by gender of the Uncontrolled diabetic patients (n=70)

Table 4: Distribution of the respondents by Clinical factors

Clinical factors	**Mean ± SD**		**P-value**
	Controlled diabetic patients	**Uncontrolled diabetic patients**	
Cough	28 ± 2.0	32 ± 1.15	0.210
Fever	37.97±0.72	40.06±1.17	0.05
Respiratory distress	31.71±8.35	34.57±7.92	0.015
Chest pain	10 ± 3.0	12.0 ± 8.1	0.010
Pulse	13.21±3.87	18.48±3.65	0.062
RBS	23.25 ± 10.49	86.47 ± 12.54	0.001
ESR	30.5 ±9.3	40.5 ± 14.3	0.000
Pleural effusion	9 ± 15.6	26 ± 2.3	0.001
Hospitalization days	5.50±6.20	10.53±8.10	0.001

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Table 5: Distribution of the respondents by prevalence of CAP

	Prevalence of CAP	**n=110 for Controlled diabetic patients; n=70 for Uncontrolled diabetic patients.**
Controlled Diabetes	45%	49
Uncontrolled Diabetes	48%	34

DISCUSSION

This was a cross-sectional study, which was carried out to assess the Prevalence of community-acquired pneumonia in diabetic patients in a tertiary care hospital of Bangladesh. There have been numerous investigations on diabetic individuals with CAP,[13,14,15] however our study covered both controlled and uncontrolled diabetic patients. In a recent study of 110 controlled diabetic patients, 45% were men and 55 % were women. There were 57 % males and 43 % females among 70 uncontrolled diabetic patients. Controlled diabetic patients were 52 % older than 60 years old, while uncontrolled diabetic patients were roughly 50 percent older than 60 years old. A prior study found that 65.7 percent of 108 CAP patients with a mean age of 51.2017.79 years and a range of 18-80 years were male.[2] In our study. The prevalence of CAP among 70 uncontrolled patients was 48% and among controlled diabetic patients was 45%, which is much more and reverse than a documented prevalence of diabetes mellitus type 2 in CAP about 15.6% of adult populations with aged 20 to 79 but it is in parallel and reverse with a study Khalil et al, whose study documented that 40.1% of CAP patients are with DM among Egyptian population.[16,17] The current work shows insignificant difference between both groups regarding cough, respiratory distress, chest pain, pulse. Our results revealed that uncontrolled diabetic CAP patients were presented with longer hospital stay, and more frequent complication like pleural effusion, the almost same findings was observed by Saibal et al, 2012.[18]

Limitations of the study

The small sample size was a limitation of the present study.

CONCLUSIONS

Community-acquired pneumonia and diabetes mellitus are frequently associated, and this relationship bears the burden of both diseases. This cross-sectional case study revealed that the prevalence of CAP among 70 uncontrolled patients was 48% and among controlled diabetic patients was 45%. Specific care for diabetes patients with community-acquired pneumonia, as well as close monitoring for its control, will result in a reduction in infection exposure and, if any infection occurs, will a milder infection.

Recommendation

This study can serve as a pilot to a much larger research involving multiple centers that can provide a nationwide picture.

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