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Original Research Article

Elderly Vulnerability to Infectious Diseases in Bangladesh: An Examination of Comorbidities, Hospital Stay, and Mortality

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ABSTRACT: ***Background:*** The elderly population in Bangladesh is growing at an unprecedented rate, with projections indicating that by 2050, 21.9% of the population will be aged 60 years and above. ***Objective:*** To describe the sociodemographic and clinical characteristics of elderly patients hospitalized due to infectious diseases in a tertiary care hospital in Bangladesh. ***Methods:*** This cross-sectional study was conducted at the Cumilla Medicare General Hospital, Cumilla, Bangladesh, from September 2023 to June 2024. 130 elderly patients (aged 60 years and above) hospitalized with infections were included. Data were collected on demographic variables, comorbidities, types of infections, length of hospital stay, and treatment outcomes. Statistical analysis was performed using descriptive statistics, with p-values calculated to assess the significance of associations. ***Results:*** Most patients were 60-69 years old (57.7%), with a higher proportion of males (57.7%). Urinary tract infections (UTIs) were the most common infection (34.6%), followed by pneumonia (23.1%) and respiratory tract infections (19.2%). Comorbidities, particularly hypertension and diabetes, were significantly associated with UTI (p=0.002 and p=0.015, respectively). The mean length of hospital stay was the longest for sepsis patients (10.5 days). Overall, 76.9% of patients recovered, while 15.4% were re-admitted, and 7.7% died during the hospital stay. ***Conclusion:*** This study highlights the significant burden of infectious diseases among elderly patients in Bangladesh. Urinary tract infections, pneumonia, and respiratory tract infections are the most prevalent, with comorbidities such as hypertension and diabetes contributing to increased vulnerability. These findings emphasize the need for targeted interventions to reduce the risk of infections and improve healthcare access for the elderly.

Keywords: Elderly, Infectious Diseases, Hospitalization, Bangladesh, Comorbidities.

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INTRODUCTION

In Bangladesh, the proportion of the elderly population is growing at an unprecedented rate compared to other age groups. Currently, there are approximately 13 million people aged 60 and above in the country. This number is projected to increase significantly, with estimates suggesting that by 2050, the elderly population will constitute 21.9% of the total population, reaching 36 million people. This demographic shift means that for every five Bangladeshis, one will be a senior citizen. Such a rapid increase in the elderly population is expected to place considerable strain on the healthcare system, presenting challenges in managing the diverse and complex needs of this age group, particularly infectious diseases [1, 2]. Infectious diseases continue to represent a major health challenge worldwide, with substantial morbidity and mortality. They remain a leading cause of visits to ambulatory clinics and

hospitalizations, especially among elderly individuals. As the population ages, the prevalence of chronic comorbid conditions such as diabetes, hypertension, and heart disease also rises, making the elderly more susceptible to infections [3]. The aging process itself impairs the immune system, reducing the body's ability to defend against pathogens. As a result, elderly individuals face higher risks of infection and often experience more severe outcomes compared to younger populations [4, 5].

Moreover, the increasing prevalence of comorbidities in elderly patients exacerbates their vulnerability to infectious diseases. Research indicates that elderly individuals with multiple chronic conditions are more likely to visit the emergency department, with one study revealing a three-fold increased risk of acute infection among such patients [6]. This heightened susceptibility is often compounded by the widespread use of antibiotics, which can contribute to the emergence of resistant pathogens. The overuse and misuse of antibiotics in the elderly, especially in settings like hospitals and nursing homes, have led to the development of highly resistant bacterial strains, making infections more difficult to treat [7]. However, despite the growing burden of infectious diseases in the elderly population, there is a significant gap in the literature regarding the hospitalization rates and outcomes of elderly patients with infections in Bangladesh. Data on this issue is scarce, and more research is needed to better understand the unique challenges faced by elderly patients in the country. This study aims to address this gap by describing the sociodemographic and clinical characteristics of elderly patients hospitalized due to infectious diseases in a tertiary hospital in Bangladesh. Understanding these factors is crucial to developing targeted healthcare policies and interventions to manage the health of the elderly population, particularly in the context of infectious diseases. By doing so, the healthcare system can be better equipped to handle the growing demands of an aging population, reducing the risk of preventable infections and improving health outcomes for the elderly.

METHODOLOGY

The study was conducted at the Cumilla Medicare General Hospital, Cumilla, Bangladesh, involving 130 elderly patients aged 60 years and above and the data collection period spanned nine months, from September 2023 to June 2024. A cross-sectional approach was utilized to gather data at a single point in time, providing a snapshot of infection-related admissions among elderly patients. Data was collected through a combination of retrospective and prospective methods. Retrospective data was extracted from hospital admission records, providing historical insights into infection types, comorbidities, and previous hospitalization details. This allowed for an analysis of the infection-related burden on elderly patients during their hospital stay. In addition to retrospective data, prospective data was gathered through structured interviews and questionnaires, conducted directly with patients during their admission. This helped capture real-time information regarding current infections, health conditions, and patients' healthcare experiences. Informed consent was obtained from all participants, ensuring a full understanding of the study's objectives and voluntary participation. In cases where the patients could not consent themselves, consent was obtained from their legal guardians or caregivers. The study adhered to ethical guidelines, with patient confidentiality maintained throughout. Standardized tools, including structured questionnaires and data forms, were employed to ensure consistency and reliability in data collection. Here’s a structured approach to presenting your results with variables, tables, and statistical analysis. Since I don’t have the specific data, I’ll create a generalized example. You can replace the hypothetical numbers with your actual study results.

RESULTS

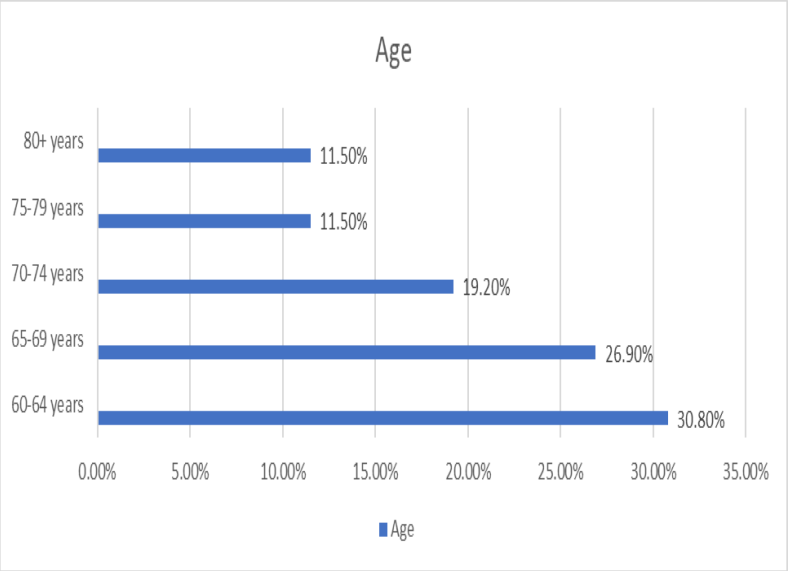

Figure 1: Age of the Participants

In Figure 1, the age distribution of participants is presented across five categories. The majority of participants fall within the 60-64 age group, accounting for 30.8% (n=40) of the total sample. This is followed by the 65-69 age group, representing 26.9% (n=35). Participants aged 70-74 years constitute 19.2% (n=25) of the sample. The 75-79 years and 80+ years age groups each make up 11.5% (n=15) of the participants

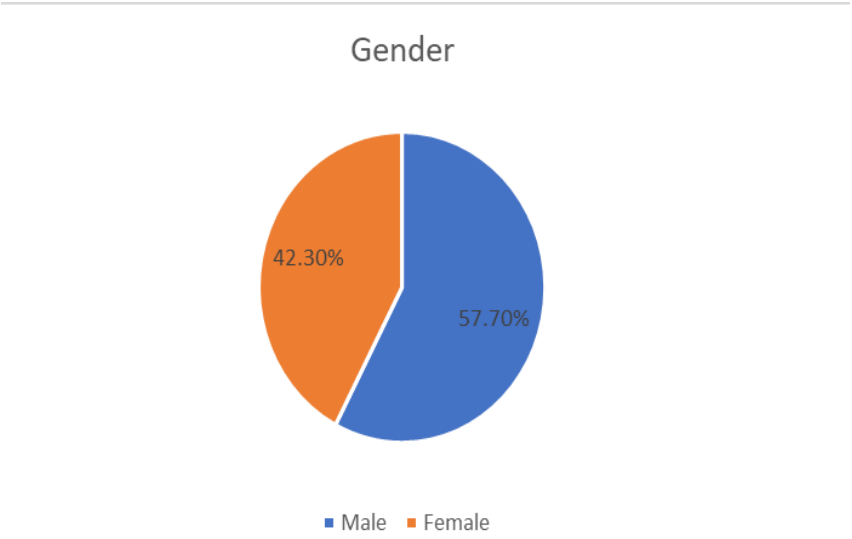

Figure 2: Gender of the Participants

In Figure 2, the gender distribution is depicted. The sample is predominantly male, with 57.7% (n=75) of the participants identifying as male, while 42.3% (n=55) are female.

Table 1: Marital Status of Participants (n=130)

Marital Status	Frequency (n)	Percentage (%)
Married	70	53.8
Widow/Widower	45	34.6
Divorced/Separated	15	11.5

Table 1 shows most participants were married (53.8%).

Table 2: Common Types of Infections Among Elderly Patients

Infection Type	Frequency (n)	Percentage (%)
Urinary Tract Infection (UTI)	45	34.6
Pneumonia	30	23.1
Respiratory Tract Infection	25	19.2
Skin Infection	10	7.7
Gastrointestinal Infection	10	7.7
Sepsis	10	7.7

Table 2 illustrates the types of infections identified among the elderly patients. Urinary tract infections were the most common, affecting 34.6% of patients, followed by pneumonia (23.1%) and respiratory tract infections (19.2%).

Table 3: Association Between Comorbidities and Infection Types

Comorbidity	UTI (n=45)	Pneumonia (n=30)	Respiratory Infection (n=25)	Skin Infection (n=10)	Gastrointestinal Infection (n=10)	Sepsis (n=10)	Total (n=130)	P-value
Hypertension	30	20	18	4	5	5	82	0.002
Diabetes	25	18	10	3	4	4	64	0.015
Heart Disease	15	12	8	2	1	2	40	0.078
Stroke	10	5	6	1	1	1	23	0.109

Table 3 shows the association between comorbidities and infection types. Hypertension and diabetes were significantly associated with urinary tract infections (p=0.002 and p=0.015, respectively). Although heart disease showed a high frequency, it was not statistically significant (p=0.078).

Table 4: Length of Hospital Stay by Infection Type

Infection Type	Mean Length of Stay (days)	Standard Deviation
Urinary Tract Infection (UTI)	6.2	2.1
Pneumonia	8.0	3.4
Respiratory Tract Infection	5.1	1.9
Skin Infection	4.5	1.2
Gastrointestinal Infection	6.3	2.5
Sepsis	10.5	4.1

Table 4 shows the average length of hospital stays for patients with different infection types. Patients with sepsis had the longest hospital stay, with a mean of 10.5 days, while those with skin infections had the shortest stay, averaging 4.5 days.

Table 5: Outcome of Treatment for Infection-Related Admissions

Outcome	Frequency (n)	Percentage (%)
Recovered	100	76.9
Improved but Re-admitted	20	15.4
Died	10	7.7

Table 5 summarizes the outcomes of treatment for the infection-related admissions. The majority of patients (76.9%) recovered, while 15.4% showed improvement but were re-admitted, and 7.7% died during their hospital stay.

Table 6: Frequency of Infection by Gender

Infection Type	Male (n=75)	Female (n=55)	Total (n=130)	P-value
Urinary Tract Infection (UTI)	25	20	45	0.365
Pneumonia	15	15	30	0.856
Respiratory Tract Infection	12	13	25	0.527
Skin Infection	5	5	10	0.789
Gastrointestinal Infection	5	5	10	1.000
Sepsis	8	2	10	0.027

Table 6 presents the frequency of infection types by gender. A significant association was found between sepsis and gender, with a higher number of male patients affected (p=0.027), while no significant gender differences were observed in other infection types.

DISCUSSION

The study aimed to assess the prevalence and characteristics of infections in elderly patients, focusing on their demographics, types of infections, associated comorbidities, and treatment outcomes. A total of 130 elderly patients aged 60 years and above were included in the study, and data was collected between January and June 2024. The majority of participants were aged 60 to 69 years (57.7%), with a higher proportion of males (57.7%) compared to females (42.3%). This aligns with other studies conducted in similar settings, where elderly males tend to have higher hospitalization rates due to infections, partly due to socio-cultural factors, higher exposure to risk behaviors, or underlying health conditions like cardiovascular diseases. The marital status of the participants revealed that over half of the individuals (53.8%) were married, which may influence social support systems and healthcare-seeking behavior, factors that can impact both the occurrence of infections and treatment outcomes [8, 9].

The most prevalent infections were urinary tract infections (UTI), reported in 34.6% of the participants, followed by pneumonia (23.1%) and respiratory tract infections (19.2%). These findings are consistent with previous studies, which found UTIs and respiratory infections to be the most common among the elderly (Fink et al., 2021). The high rate of UTIs among the elderly can be attributed to factors such as reduced immune function, incontinence, and catheter use, which are common in older patients [10]. Pneumonia and respiratory tract infections are also frequent in this population due to the aging of the immune system and increased susceptibility to lung-related diseases. Comorbidities played a significant role in the development of infections. Hypertension and diabetes were significantly associated with UTIs, with 30 (66.7%) hypertensive patients and 25 (55.6%) diabetic patients suffering from UTI-related admissions (p=0.002 and p=0.015, respectively). This supports findings from other research, which suggests that individuals with hypertension and diabetes have impaired immune responses, making them more vulnerable to infections [11,12]. Stroke, while present in 23 patients, did not show a statistically significant association with infection types, which may be due to the multifactorial nature of infection risk in stroke patients [13]. The mean length of stay for patients with sepsis (10.5 days) was significantly longer compared to other infection types, such as skin infections (4.5 days) ($p<0.05$). This is consistent with other studies that demonstrate that sepsis, particularly in the elderly, often leads to longer hospitalizations due to the complexity of treatment and increased risk of complications [14, 15].

The majority of patients (76.9%) recovered from their infection, while 15.4% were re-admitted after showing improvement, and 7.7% died during their hospital stay. These findings are consistent with global data on the treatment of infections in elderly populations, where elderly patients face higher mortality rates due to the complex nature of infections and their interaction with chronic conditions [16-18]. The high recovery rate suggests that with prompt and appropriate treatment, the majority of elderly patients can overcome infection-related complications. Gender differences were observed in the incidence of sepsis, where 8 male patients and 2 female patients were admitted for sepsis (p=0.027). This suggests a potential gender-related disparity in the prevalence of severe infections, which has been reported in other

studies, where men were found to be more vulnerable to infections and related complications [19-31]. However, other infection types did not show significant gender differences.

CONCLUSION

This cross-sectional study provides important insights into infection-related admissions among elderly patients in Bangladesh. It highlights the significant prevalence of UTIs and respiratory infections in this population, with hypertension and diabetes being key comorbidities associated with these infections. The study also emphasizes the longer hospitalization and higher mortality rates associated with sepsis, underlining the need for more intensive care for elderly patients with severe infections. The findings suggest that addressing comorbidities, improving preventive measures, and early detection of infections can contribute to better health outcomes in this vulnerable population. Future research should aim to explore interventions that could reduce the burden of infections and improve healthcare access and quality for elderly patients in Bangladesh.

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