

Research Paper

An Epidemiological Study of the Infectious Diseases of Older Adults Hospitalized in Hospitals Affiliated to Birjand University of Medical Sciences, in 2016



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**ABSTRACT**

**Objectives** Older adulthood refers to 65 years or older. In Iran, older people account for 8.5% of the whole population totaling 4.5 million people. Because of the disorders in the immune system, older adults catch infection diseases more frequently. Also, the initial presentation of infectious diseases is atypical in this age group. We performed an epidemiological investigation of infectious diseases in older adults hospitalized in hospitals affiliated to Birjand University of Medical Sciences during 2016.

**Methods & Materials** This descriptive-analytic study included all the older patients (>65 y) hospitalized in the Infectious Diseases Ward of Valiasr Hospital from April to December 2016. The study objectives were explained to the participants, who then gave their informed consent for study participation. A trained nurse completed a specific form for each patient based on his/her medical record. The form consisted of five sections: Risk factors, clinical manifestations, paraclinical and radiology tests taken, internal and surgical interventions performed, and complications and outcomes. The data were analyzed in SPSS (version 19) using descriptive statistical tests and the Chi-square test. The significant level was set at  $\alpha=0.05$ .

**Results** A total of 227 patients with a Mean $\pm$ SD age of 76.71 $\pm$ 7.6 years (range: 65-97 y) participated in the study. Women accounted for 58.1% of the participants. Results showed that 8.8% of the subjects were smokers and 30.8% drug abusers, of whom 82.9% were oral abusers. Furthermore, their most common underlying diseases were hypertension (36.1%), diabetes (11.5%), heart problems (11%), and chronic pulmonary diseases (9.7%). The final diagnoses in hospitalized patients were pneumonia (52.4%), urinary tract infections (15%), septicemia (13.7%), influenza (9.7%), gastroenteritis (7.9%), and other diseases (1.3%). The most common organisms found in the patients' cultures were *S. aureus* from blood cultures and *E. coli* from urine cultures.

**Conclusion** most frequent infectious disease was pulmonary infection; therefore, it is suggested to observe individualistic health issues to prevent it.

**Extended Abstract**

**1. Introduction**

A

According to the World Health Organization, older people are those aged 65 years and

over, who are susceptible to a variety of infections for various reasons [1]. Pneumonia is the most common infectious disease in the elderly, which accounts for 20% to 25% of infections, followed by sepsis with 15% [1]. Risk factors for pulmonary infection in the elderly are inactivity, accumulation of pulmonary-dementia secretions, or Alzheimer disease. These factors

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decrease the level of consciousness and aspiration [2]. Urinary tract infections are also one of the most common infections in older people after respiratory infections. More than 10% of women over 65 years catch at least one infection per year. This study aimed to evaluate the epidemiology of infectious diseases in the elderly hospitalized in university hospitals located in Birjand City, Iran.

## 2. Materials and Methods

This research is a descriptive-analytical, cross-sectional study. The study population consisted of all people aged over 65 years admitted to the infectious diseases ward of Vali Asr Hospital in Birjand City from March to December 2016 (N=227). We explained the study objectives to them or their children, and they provided their informed consent. We surveyed all clinical symptoms at the onset and end of disease, including remission, complication, treatment, mortality, as well as the test results and CT scans. The survey form included: 1. Demographic information (age, gender, occupation, and place of residence); 2. Risk factors and underlying diseases (heart, lung, liver, kidney, malignancy, and drug/cigarette addiction); 3. Early signs and symptoms of the disease; 4. Paraclinical and radiological results; 5. Internal and surgical treatments, and 6. complications of the disease. Those who were freely discharged or transferred to another ward before testing and diagnosis, in addition to those, who were unwilling to participate in the study or had taken any antibiotics in the past 72 hours, were excluded from the study. The above data were recorded based on information in the patient's file and the disease code according to the tenth revision of the International Classification of Diseases (ICD-10). The data were then analyzed by SPSS V. 18, using descriptive statistics (frequency and percentage) and the Chi-squared test at a significance level of less than 0.05.

## 3. Results

The Mean±SD age of the participants was 76.7±7.6 years (Range: 65-97 years). Of 227 participants, 132 (58.1%) were women, and most of them (70%) were living in urban areas. The prevalence of smoking was 8.8% (n=20) and the prevalence of substance use was 30.8% (n=70). Of these, 58 were taking the drug orally, 11 by inhalation, and 1 by injection. The most common comorbidities were hypertension (36.1%), diabetes (11.5%), cardiovascular disease (11%), and pulmonary disease (9.7%) (Figure 1). Of 29 samples with positive sputum test, 29 had infectious sputum, and 17 had bloody sputum. According to the results of the culture performed on samples, the infection was found in 39 (17.2%) of them. The Mean±SD hemoglobin level of the patients was 12.8±2.5, and the Mean±SD of hematocrit was 39.3±7.8. In samples with infections, 30% had leukocytosis more than 12000, 50% had leukocyte 9 to 11000, and 20% had leukopenia. The most common symptom was sputum (55.5%), followed by shortness of breath (47.6%), chills (36.1%), fever (27.3%), vomiting (19.8%), headache (10.6%), and diarrhea (7.6%) (Figure 2). The most common infection was pneumonia (52.4%), followed by urinary tract infection (15%), influenza (9.7%), gastroenteritis (7.9%), and other infections (1.3%) (Table 1). There was no significant difference in the type of infection between males and females (P=0.38) and between those aged 75 years and younger and over 75 years (P=0.84). The most common organism isolated from blood cultures was *Staphylococcus* spp. (42%) from a urine culture, *E. coli* (78%), followed by *Pseudomonas* spp. (31%). Furthermore, the mortality rate among samples was 12%, which accounted for 79.37% of all deaths. In this study, respiratory and urinary tract infections had a significant relationship with mortality and age (P<0.01); the prevalence of pneumonia in adults >80 and <80 years was 65% and 45%, respectively, and the difference between them was significant

**Table 1.** Frequency distribution of infection type in older people

Infection	No. (%)
Pneumonia	119 (52.4)
urinary tract infection	30 (15)
Septicemia	31 (13.7)
Flue	22 (9.7)
Gastroenteritis	18 (7.9)
Other	7 (1.3)
Total	227 (100)

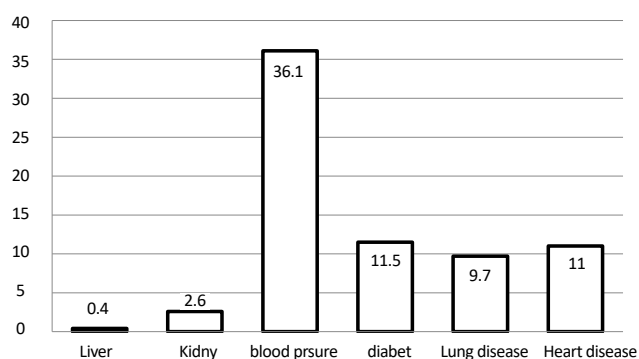


Figure 1. Prevalence of infectious diseases among the elderly hospitalized in the infectious ward of the studied hospitals

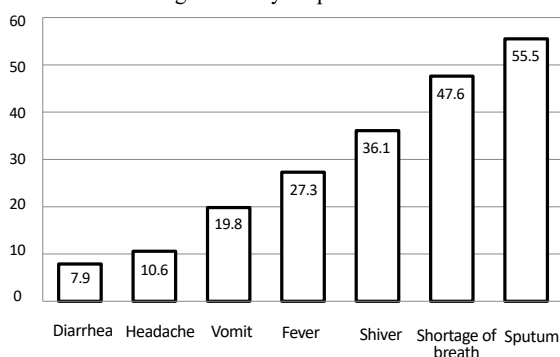


Figure 2. The culture performed

( $P < 0.01$ ). The urinary tract infection rate in the samples  $> 80$  years was two-fold higher than in those aged  $< 75$  years.

#### 4. Conclusion

In our study, in line with most studies, respiratory infection was the most common cause of hospitalization in older people. Risk factors for pulmonary infection in older people are inactivity, accumulation of pulmonary-dementia secretions, or Alzheimer disease, which decrease the level of consciousness and aspiration. In this study, respiratory and urinary tract infections had a significant relationship with mortality and age ( $P < 0.01$ ). The prevalence of pneumonia in adults  $> 80$  and  $< 80$  years was 65% and 45%, respectively, and the difference between them was significant ( $P < 0.01$ ). The urinary tract infection rate in the samples  $> 80$  years was two-fold higher than in those aged  $< 75$  years. In the study of Heravi et al. [21], 98% of the older hospitalized patients had complete remission, and 2% died during the study period, and mortality was significantly correlated with age. In our study, in line with most studies, older age is associated with an increase in infection, and the most common infectious disease resulting in hospitalization and death in the elderly was pneumonia, followed by urinary tract infection.

#### Ethical Considerations

##### Compliance with ethical guidelines

This study was obtained its ethical approval from the Research Ethics Committee of Birjand University of Medical Sciences (Code: IR.BUMS.REC.1395.107).

##### Funding

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##### Authors' contributions

Conceptualization by Mahbobeh Saljughi and Azadeh Ibrahimzadeh; Methodology by Gholamreza Sharifzadeh; validation by Khaironnesah Ramezanzadeh and Azadeh Ibrahimzadeh; Investigation, initial draft preparation and funding acquisition by Mahbobeh Saljughi, Khaironnesah Ramezanzadeh and Azadeh Ibrahimzadeh; Analysis, resources, editing and finalizing by Azadeh Ibrahimzadeh and Mitra Moodi; Visualization, supervision and project administration by Azadeh Ibrahimzadeh.

##### Conflicts of interest

The authors declared no conflict of interest.