

# Mortality in Infection Diseases, a Four Years Retrospective Study

Elda Qyra<sup>1</sup>, Edmond Puca<sup>2</sup>, Arjan Harxhi<sup>3</sup>, Najada Como<sup>4</sup>

<sup>1, 2, 3, 4</sup>Service of Infectious Disease, University Hospital Center, Tirana, Albania

**Abstract:** A disease is a pathological condition of a body organ or tissue that is characterized by a set of symptoms and signs. Infectious diseases are a group of diseases caused by microorganisms, bacteria, virus, fungus, and parasite. **Aim:** This study aimed to determine the prevalence of mortality during the period 2012-2015 in the Service of Infectious Disease Hospital of Tirana and risk factors. **Material and methods:** The study was retrospective. We studied all fatal cases from January 1, 2012 to December 31, 2015. Epidemiological data, clinical and age characteristics were analyzed. **Results:** In the infectious disease hospital at University hospital of Tirana, during the years 2012-2015, there were a high number of hospitalizations, because it is the only referred tertiary center in the country. The total number of hospitalizations was 10,682 patients. Hospital admission criteria are clinical and laboratory. The cases of death in this period of time in our hospital were 185 (1.73%) patients, of which 52 cases are non-infectious pathologies, while 133(1.25%) cases are related to infectious diseases. AIDS and hepatic failure from the hepatitis B virus were two of the most important pathologies leading the list of pathologies with fatal cases. **Conclusions:** Regardless of progress in the prevention and treatment of infectious diseases, they still remain a major cause of mortality in the world and still there are major challenges to face.

**Keywords:** Mortality rate, infection diseases, AIDS, Viral hepatitis

## 1. Introduction

Since the time when medical science began to identify cases and record them, infectious diseases have occupied a very important place. They are among the main causes of morbidity and mortality (1). Starting from the middle of the 19th century and after the 20th century, medical sciences received a great development, which was reflected not only in the better treatment of infectious diseases but also in more efficient policies for their prevention. Although in developed countries there is a downward trend for infectious diseases, in developing or underdeveloped countries they remain an important medical and epidemiological problem (2,3).

They remain a common cause of death in development and underdevelopment countries. So even now, regardless of progress, problems still exist. The improvement of the quality of life has led to an increase in the average age of people. Numerous studies have concluded that increasing age is a risk factor for acquiring infections, which serve as a source of morbidity and mortality at the same time (4–6). A study in Canada that assessed the temporal trend of salmonella infection found that the incidence of infection in the elderly could increase by 16% by 2018 (7). The progress of medical technology (invasive procedures, diagnostic methods), new methods of treatment has influenced that patients with chronic pathologies have an increase in life expectancy and therefore the probability of infections increases (8–10). Such are patients with malignant pathology who receive chemotherapy, patients with corticosteroid therapy, and chronic diseases such as diabetes mellitus.

Nosocomial infections are another cause of mortality in hospitalized patients, they are more often observed in intensive care unit, stroke center, and oncology wards. Application of vaccines and the discovery of some antiretroviral has made significant progress in modifying the map of fatal cases from some problematic infectious diseases and HIV/AIDS infection (10–15).

Infectious diseases should remain in the attention of clinicians and public health workers due to their appearance and reappearance. (16–19).

The purpose of this study is to provide an overview of mortality in patients hospitalized in the service of infectious diseases during a 4-year period, from 2012 to 2015, analyzing their age, gender and causes of mortality.

## 2. Methodology

The infectious diseases service, part of the University Hospital Center Tirana, is the only tertiary center for infectious diseases in our country. Only patients over the age of 14 are hospitalized in this service. The study included hospitalized cases from January 01, 2012 to December 31, 2015.

We excluded the fatal cases, which despite being registered in the infectious disease service, a significant relationship between an infectious pathogen and mortality was not possible to distinguish. We studied the fatal cases hospitalized during this period, their gender, age and the basic pathologies that lead to mortality. Data were extracted from electronic medical records, from the statistics service of the University Hospital Center, which included diagnoses of infectious diseases according to the ICD-10 system and codes.

## 3. Results

During our study there were hospitalized 10682 patients, of these 4821 (45.13%) were females and 5861 (54.88%) were males. They were admitted to the hospital based on clinical, laboratory and epidemiological data. From the age of 14.0 - 30 years were 17 cases or (9.18%); from the age of 31-50 years were 39 cases (21.0%); from the age of 51 - 70 years were 76 cases (41.08%) and over 71 years there were 52

cases or (28.1%). Out of 185 patients who lost their lives, 116 (62.7) turned out to be men. 52 patients were excluded from the study that had lost their lives as a result of non infectious diseases.

**Table 1: Rate mortality by years**

Year	Fatal cases	Percentage
2012	24	18.0
2013	43	32.3
2014	31	23.3
2015	35	26.3
Total	133	100

The patient with the lowest age of death in the hospital was 14.6 years old, a female diagnosed with HIV/AIDS infection.

**Table 2: Fatal cases caused by infectious diseases**

Fatal cases from infectious pathogen	Cases	Percentage
Sepsis	40	30.0
Infections of the Central Nervous System	22	16.5
AIDS	19	14.2
Acute liver failure from B and C hepatitis	16	12.0
Gastrointestinal infections	11	8.2
Leptospirosis	6	4.5
Febrile with multi organ failure	5	3.7
Flu/complicated with pneumonia and ARDS	3	2.2
Tetanus	3	2.2
Endocarditis	2	1.5
Urinary tract infection	2	1.5
Cutaneous infection in decompensate ethylic cirrhosis	1	0.75
Hemorrhagic fever	1	0.75
Visceral Leishmania	1	0.75
Malaria	1	0.75
Total	133	100%

As seen in the Tab 2, pathologies such as sepsis, infections of the central nervous system and AIDS make up the largest percentage of fatal causes in our study. Also, an important fact is that the fatal cases from hepatitis and hepatic failure resulted to be 16, both from Hepatitis C and B. The age group with highest mortality was between the ages 51-70 years.

#### 4. Discussion

Mortality in our patients hospitalized in the service of infectious disease during our study was 1.26%. It is a number that requires, which we will try to analyze below. The gender differences seem to mostly lean in favor of men and the most affected age is that of 51-70 years (6,20–22).

The Service of Infectious Disease, regardless of its name, cannot treat all infectious diseases. For instance, tuberculosis and infection of pulmonary system cannot be treated in our hospital. In our country we have a specialized hospital for these diseases. On the other hand, there are patients hospitalized in intensive care unit not part of our hospital. Also, still is present the home treatment for the elderly, who do not come to hospital, even in the terminal stage of disease.

Unfortunately, the mortality from HIV/AIDS infection still remains high in Albania. We still diagnose the patient at the late stage of the disease. Consequently, we are delayed for diagnosis and treatment of these patients. They are presented in advanced stages of the disease with accompanying pathology (malignancy, or opportunistic infections) (23,24,25). As mentioned before and hepatic failure from Hepatitis B and C remain important causes of mortality in our country. One reason is that before 90, vaccination for hepatitis was not done in Albania. Nowadays, it remains a problem for the workers of public health, regardless of the vaccinations campaigns (25–28). Tropical disease such as Leptospirosis and Leishmaniasis, are a common finding in the wide range of infectious diseases. In our clinic, Leptospirosis is a problematic pathology, especially when patients present late or with involvement of several organs. Also, cases of tetanus are not a rare occurrence (29–31). The only death that occurred as a result of malaria turns out to be imported from African countries (32). By that time, we had several cases with diagnosed with malaria they were workers who worked seasonally in New Guinea.

The limitations of this study are that it was focused only on the service of infectious diseases, in the University Hospital Center, Tirana. It does not include secondary services in districts where significant statistical data could be extracted for the mortality of infectious diseases. Intensive therapy or pneumology services are also not included in the study.

#### 5. Conclusions

Regardless of progress in the prevention and treatment of infectious diseases, they still remain a major cause of mortality in the world and still there are major challenges to face. It is constantly reported that infectious diseases spread faster and also new diseases are being discovered, increasing the number of pathogenic agents resistant to antimicrobials. Therefore, it is worth emphasizing that vaccination of the population is an important link. Even though the infectious diseases have suffered a gradual, sustainable decrease, they again occupy an important place in the morbidity and mortality of the world's diseases. Especially these are more evident in developing or less developed countries. It should be noted that the prevention of infectious diseases has made great progress in reducing their mortality. The vaccination process is one of its most important links.

#### References

- [1] Straif-Bourgeois S, Ratard R, Kretzschmar M. Infectious Disease Epidemiology. Handb Epidemiol. 2014;2041–119.
- [2] Wolfe ND, Dunavan CP, Diamond J. Origins of major human infectious diseases. Nature. 2007 May;447(7142):279–83.
- [3] Nii-Trebi NI. Emerging and Neglected Infectious Diseases: Insights, Advances, and Challenges. BioMed Res Int. 2017 Feb 13;2017:e5245021.
- [4] Siegel JS. Health Inequalities, General Trends in Mortality and Morbidity, and Associated Factors. Demogr Epidemiol Hum Health Aging. 2011 Mar 7;271–361.

- [5] Kim BG, Kang M, Lim J, Lee J, Kang D, Kim M, et al. Comprehensive risk assessment for hospital-acquired pneumonia: sociodemographic, clinical, and hospital environmental factors associated with the incidence of hospital-acquired pneumonia. *BMC Pulm Med*. 2022 Jan 12;22(1):21.
- [6] Glynn JR, Moss PAH. Systematic analysis of infectious disease outcomes by age shows lowest severity in school-age children. *Sci Data*. 2020 Oct 15;7(1):329.
- [7] Turgeon P, Ng V, Murray R, Nesbitt A. Forecasting the incidence of salmonellosis in seniors in Canada: A trend analysis and the potential impact of the demographic shift. *PLoS One*. 2018;13(11):e0208124.
- [8] Weatherall D, Greenwood B, Chee HL, Wasi P. Science and Technology for Disease Control: Past, Present, and Future. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, et al., editors. *Disease Control Priorities in Developing Countries* [Internet]. 2nd ed. Washington (DC): World Bank; 2006: <http://www.ncbi.nlm.nih.gov/books/NBK11740/>
- [9] US Burden of Disease Collaborators, Mokdad AH, Ballestrós K, Echko M, Glenn S, Olsen HE, et al. The State of US Health, 1990-2016: Burden of Diseases, Injuries, and Risk Factors Among US States. *JAMA*. 2018 Apr 10;319(14):1444–72.
- [10] Rodrigues CMC, Plotkin SA. Impact of Vaccines; Health, Economic and Social Perspectives. *Front Microbiol*: <https://www.frontiersin.org/articles/10.3389/fmicb.2020.01526>
- [11] Tomczyk-Warunek A, Blicharski T, Blicharski R, Pluta R, Dobrowolski P, Muszyński S, et al. Retrospective Study of Nosocomial Infections in the Orthopaedic and Rehabilitation Clinic of the Medical University of Lublin in the Years 2018–2020. *J Clin Med*. 2021 Jul 19;10(14):3179.
- [12] Dasgupta S, Das S, Chawan NS, Hazra A. Nosocomial infections in the intensive care unit: Incidence, risk factors, outcome and associated pathogens in a public tertiary teaching hospital of Eastern India. *Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med*. 2015 Jan;19(1):14–20.
- [13] Geyik MF, Hoşoğlu S, Ayaz C, Çelen MK, Üstün C. © TÜBİTAK E-mail: [medsci@tubitak.gov.tr](mailto:medsci@tubitak.gov.tr). *Turk J Med Sci*. 2008;38(6):7.
- [14] Bekker LG, Alleyne G, Baral S, Cepeda J, Daskalakis D, Dowdy D, et al. Advancing global health and strengthening the HIV response in the era of the Sustainable Development Goals: the International AIDS Society—Lancet Commission. *Lancet Lond Engl*. 2018;392(10144):312–58.
- [15] Deeks SG, Archin N, Cannon P, Collins S, Jones RB, de Jong MAWP, et al. Research priorities for an HIV cure: International AIDS Society Global Scientific Strategy 2021. *Nat Med*. 2021 Dec;27(12):2085–98.
- [16] ZANETTI AR, ZAPPA A. Emerging and re-emerging infections at the turn of the millennium. *Haemophilia*. 2010 Jan;16(Suppl 1):7–12.
- [17] Weiss RA, McMichael AJ. Social and environmental risk factors in the emergence of infectious diseases. *Nat Med*. 2004;10(Suppl 12):S70–6.
- [18] Heymann DL. Emerging Infections. *Encycl Microbiol*. 2009;321–8.
- [19] Rahman MT, Sobur MA, Islam MS, Ievy S, Hossain MJ, El Zowalaty ME, et al. Zoonotic Diseases: Etiology, Impact, and Control. *Microorganisms*. 2020 Sep;8(9):1405.
- [20] Liu Q, Jing W, Liu M, Liu J. Health disparity and mortality trends of infectious diseases in BRICS from 1990 to 2019. *J Glob Health*. 12:04028.
- [21] Hansen V, Oren E, Dennis LK, Brown HE. Infectious Disease Mortality Trends in the United States, 1980-2014. *JAMA*. 2016 Nov 22;316(20):2149–51.
- [22] Coyle JR, Freeland M, Eckel ST, Hart AL. Trends in Morbidity, Mortality, and Cost of Hospitalizations Associated With Infectious Disease Sequelae of the Opioid Epidemic. *J Infect Dis*. 2020 Oct 1;222(Supplement\_5):S451–7.
- [23] A clinical study of Kaposi Sarcoma among HIV/AIDS patients in Albania | Instituti i Shëndetit Publik: <https://www.ishp.gov.al/a-clinical-study-of-kaposi-sarcoma-among-hiv-aids-patients-in-albania/>
- [24] Gokengin D, Oprea C, Begovac J, Horban A, Zeka AN, Sedlacek D, et al. HIV care in Central and Eastern Europe: How close are we to the target? *Int J Infect Dis*. 2018 May 1;70:121–30.
- [25] Resuli B, Prifti S, Kraja B, Nurka T, Basho M, Sadiku E. Epidemiology of hepatitis B virus infection in Albania. *World J Gastroenterol WJG*. 2009 Feb 21;15(7):849–52.
- [26] Evaluation of the surveillance system for hepatitis B and C in Albania during 2013-2014 | Instituti i Shëndetit Publik: <https://www.ishp.gov.al/evaluation-of-the-surveillance-system-for-hepatitis-b-and-c-in-albania-during-2013-2014/>
- [27] Hepatitis B, C and Delta virus infections in Albanian patients: *European Journal of Gastroenterology & Hepatology*: [https://journals.lww.com/eurojgh/Abstract/2010/02000/Hepatitis\\_B,\\_C\\_and\\_Delta\\_virus\\_infections\\_in.7.aspx](https://journals.lww.com/eurojgh/Abstract/2010/02000/Hepatitis_B,_C_and_Delta_virus_infections_in.7.aspx)
- [28] Kondili LA, Ulqinaku D, Hajdini M, Basho M, Chionne P, Madonna E, et al. Hepatitis B Virus Infection in Health Care Workers in Albania: a Country still Highly Endemic for HBV Infection. *Infection*: <https://doi.org/10.1007/s15010-007-6076-1>
- [29] Puca E, Pipero P, Harxhi A, Abazaj E, Gega A, Puca E, et al. The role of gender in the prevalence of human leptospirosis in Albania. *J Infect Dev Ctries*. 2018 Mar 31;12(3):150–5.
- [30] Puca E, Abazaj E, Pipero P, Harxhi A, Ferizaj R, Como N, et al. A case with high bilirubinemia and hemolytic anemia during leptospirosis and a short review of similar cases. *Casp J Intern Med*. 2020;11(4):441–5.
- [31] Rista E, Puca E, Cadri V, Saliqaj K, Akshija I, Duraku A, et al. Acute kidney injury in leptospirosis: A country-level report. *Travel Med Infect Dis*. 2022 Oct; 49:102359.
- [32] Shkurti K, Vyshka G, Velo E, Boçari A, Kokici M, Kraja D. Imported malaria in Albania and the risk factors that could allow its reappearance. *Malar J*. 2013 Jun 12; 12(1):197.