



## **HOSPITAL-ACQUIRED INFECTIONS AND POSTOPERATIVE COMPLICATIONS IN SURGICAL DEPARTMENTS**

**Abdukakharova Muattarhon Fakhritdinovna<sup>1</sup>, Bryantseva Yelena Vladimirovna<sup>2</sup>, Nematova Nigora Urakovna<sup>3</sup>**

Tashkent Medical Academy, Department of Epidemiology

Contact Information:

Abdukakharova M.F.1: +998 (97) 376 44 34, a.muattarxon270952@gmail.com

Bryantseva E.V.3: +998 (93) 588-17-44, Bryelena@mail.ru

Nematova N.U.2: +998 (99) 846 3139, nigoraepid70@mail.ru

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### **Abstract:**

#### **Objective of the Study:**

To investigate the factors and conditions that contribute to the spread of hospital-acquired infections (HAIs) in medical facilities with a surgical profile.

#### **Materials and Methods:**

The research was conducted in the surgical departments of hospitals in Tashkent. The study materials included statistical data and reports on hospital-acquired infections collected between 2012-2023 from the Sanitary-Epidemiological Welfare and Public Health Service of the Republic and Tashkent city. Epidemiological and statistical research methods were used.

#### **Results:**

The epidemiological analysis of hospital-acquired infections (HAIs) identified 38 different nosological forms, ranging from mild skin and subcutaneous tissue infections to severe septic forms. Over 50% of these were postoperative wound infections, known as surgical site infections (SSIs).

#### **Conclusion:**

Among hospital infections in surgical hospitals, purulent-septic infections (PSIs) are the most prevalent, accounting for 84%. Of these, surgical site infections (SSIs) make up 51%, other hospital-acquired purulent-septic infections constitute 33%, acute respiratory viral infections account for 15%, and acute intestinal infections represent 1%.

**Keywords:** hospital-acquired infections, hospital purulent-septic infections, surgical site infections, risk factors.

Despite the adoption of international and national programs to combat nosocomial infections, as well as organizational measures to improve the functioning of medical and preventive healthcare institutions (MPHI) and the implementation of modern methods and tools for the prevention, diagnosis, treatment, and neutralization of harmful factors in the hospital environment (HE), nosocomial infections remain a central concern for global health science and practice (1,6,7,8,9).

The challenge of preventing and treating nosocomial infections, particularly surgical infections, continues to be one of the most urgent issues in hospitals worldwide. The incidence of nosocomial infections varies between 5% and 20% (2,3,4,5,10,11).

A study on nosocomial infections conducted under the auspices of the WHO in 55 hospitals across 14 countries revealed that, on average, 8.7% of hospitalized patients had nosocomial infections. In European countries, this figure was 7.7%, in the U.S.

approximately 5%, and in Russia, the infection rate was 6.7% among hospitalized patients (4,6,9). According to reports from healthcare institutions in Uzbekistan, the frequency of nosocomial infections in hospitals is 2.2% (1,6,7).

The economic damage caused by nosocomial infections (NIs) annually amounts to \$7.7 billion in the United States, 800 thousand marks in Germany, and approximately 5 billion rubles in Russia (6,9,12).

In Uzbekistan, nosocomial infections have become one of the primary reasons for significantly increasing the cost of hospital treatment, which is particularly problematic given the limited budgetary funding (1).

According to various estimates, nosocomial infections affect 5-10% of hospitalized patients and rank tenth among the leading causes of mortality worldwide (12).

Considering the high incidence of nosocomial purulent-septic infections (PSIs) in departments of



various specialties and due to the fact that the epidemiological features of this issue have not been sufficiently studied in the Republic of Uzbekistan, we found it necessary to examine the significance of this pathology in surgical departments.

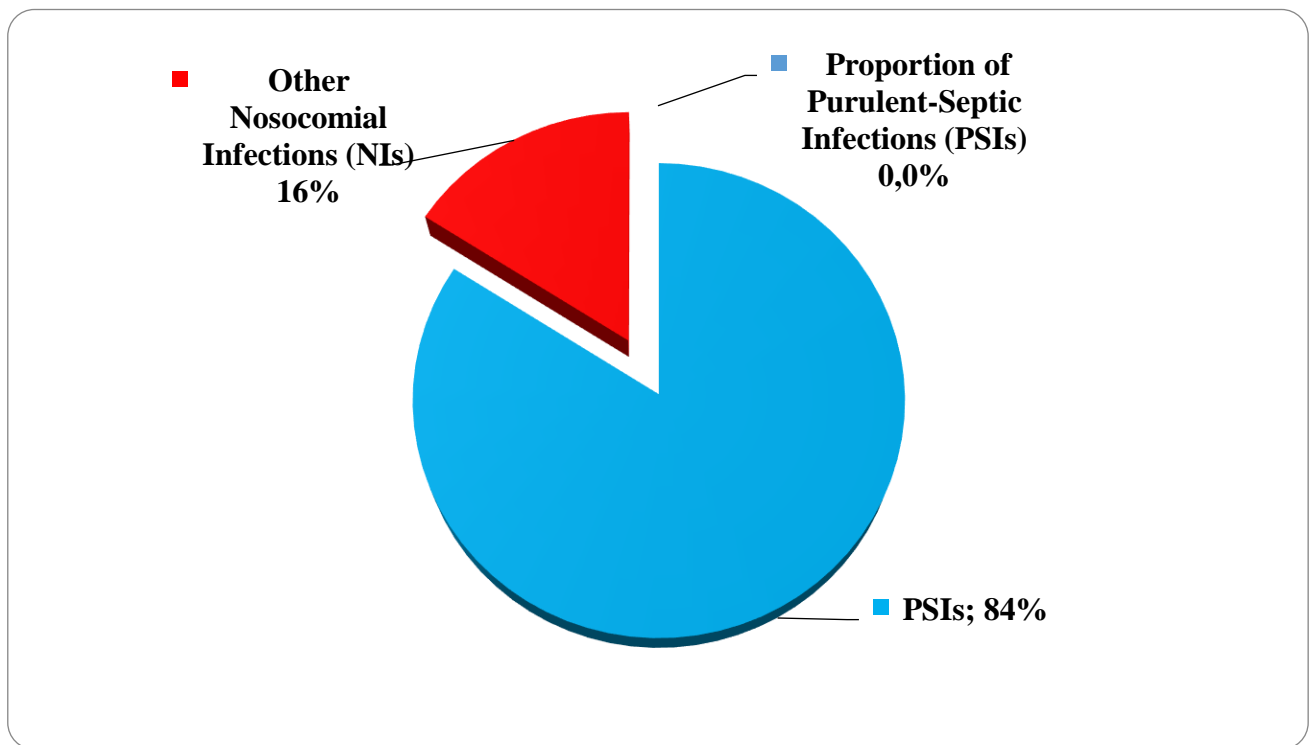
**OBJECTIVE OF THE STUDY:** To investigate the factors and conditions contributing to the spread of nosocomial infections in surgical healthcare facilities.

**MATERIALS AND METHODS:** The study was conducted based on the surgical departments of hospitals in Tashkent. The research materials included statistical data from the Republican Service of Sanitary and Epidemiological Well-being and Public Health (SES

and PH) on nosocomial infections from 2002 to 2022. Epidemiological and statistical methods were employed in the study.

**RESULTS AND DISCUSSION:**

Epidemiological analysis of nosocomial infections revealed 38 nosological units of nosocomial infections (NI). The rate of NI in the Republic of Uzbekistan is 2.2%. In the observed hospitals, the infection rate was 21.6% per 100 operated patients. Among nosocomial infections in surgical departments, purulent-septic infections (PSIs) accounted for the majority at 84% (Fig. 1).

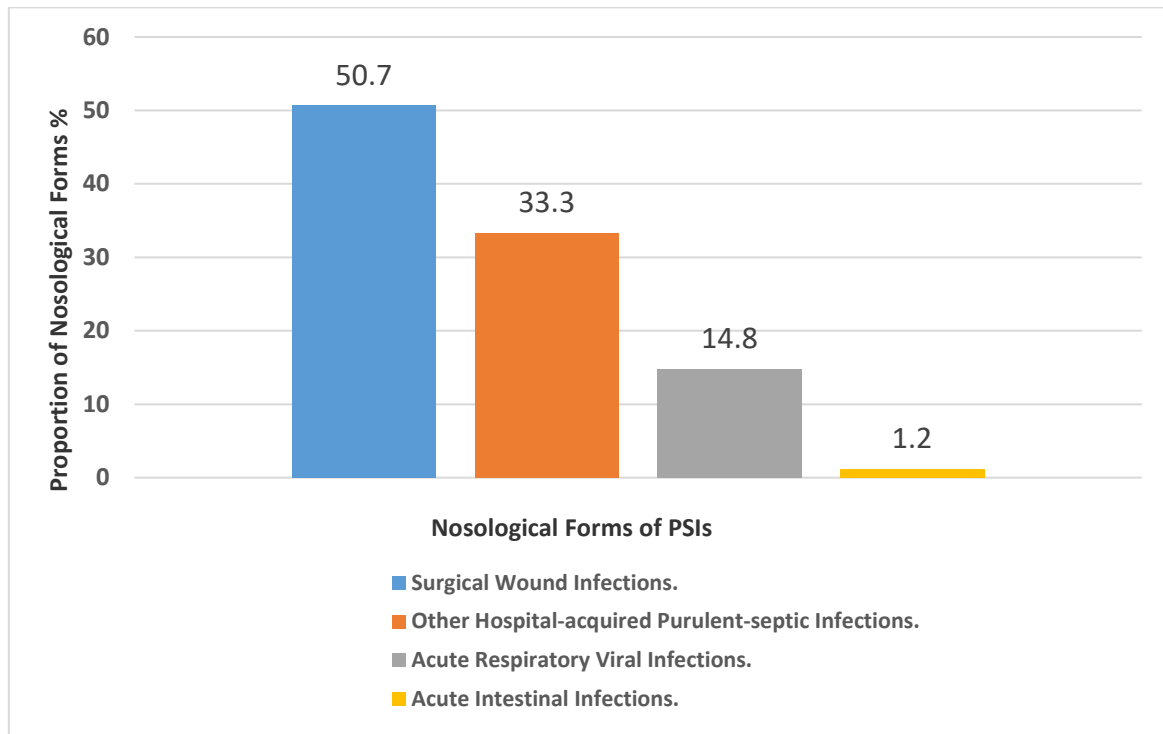


- PSIs
- Other NIs

**Figure 1. Proportion of Purulent-Septic Infections (PSIs) and Other Nosocomial Infections (NIs) in Surgery.**

Among the identified cases of nosocomial infections, 38 different nosological forms were registered (ranging from mild skin and subcutaneous tissue infections to severe septic lesions). In the structure of PSIs, surgical wound infections account for 50.7%, other hospital-acquired purulent-septic

infections account for 33.3%, acute respiratory viral infections account for 14.8%, and acute intestinal infections account for 1.2%. As shown, more than 50% of cases were classified as nosocomial postoperative wound infections, specifically surgical wound infections (SWIs) (Figure 2).



**Figure 2. Proportion of Nosological Forms of Purulent-Septic Infections (PSIs) (in %)**

Our study revealed that the incidence of surgical wound infections (SWIs) in the emergency surgery department was 3.3 times higher than in the elective surgery department. A significant difference was identified in the frequency of postoperative purulent complications, depending on the severity of the underlying disease and the complexity of the surgery performed. For example, in cases of severe acute appendicitis, the infection rate was 8.3 times higher than in milder forms of surgical disease. A similar pattern was observed in the elective surgery department, where the infection rate following reconstructive-plastic surgeries was 6 times higher than after other planned operations.

There was a notable increase in infection rates in both departments, rising by 3.1 to 7.5 times with longer operation durations.

The development of the SWI epidemic process varied between the emergency and elective surgery departments. In the emergency surgery department, 64% of patients with postoperative purulent complications developed these infections primarily within the early postoperative period, between the 5th and 8th days post-surgery. In contrast, in the elective surgery department, a delayed onset was observed, with 60.5% of surgical wound infections occurring after the 8th postoperative day. This delay is likely due to the prolonged hospital stay in the elective surgery department, where patients may continue to acquire

wound infections during dressing changes and other procedures.

In pediatric surgical departments, the length of stay before and after surgery also affected the incidence of SWIs. Patients who stayed less than 5 days had a 4.4% rate of postoperative wound infections, while those with longer stays had an infection rate of up to 25%, which is 5.7 times higher.

The frequency of infectious complications is undoubtedly influenced by the type of surgical procedure. The risk of postoperative complications is minimal for clean surgeries (less than 2–5%) and maximal for so-called dirty surgeries, where it can reach 30–40%.

The epidemiological analysis of nosocomial infection incidence has identified key risk factors contributing to the development and spread of nosocomial PSIs, particularly surgical wound infections (SWIs), in the surgical departments studied. These risk factors for postoperative complications include multiple causes related to the patient's condition, the surgical procedure, and the pathogenicity of microorganisms. The key factors are:

- Emergency nature of the surgical intervention;
- Severity of the underlying disease;
- Complexity of the surgical procedure;
- Duration of surgery exceeding 30 minutes;
- Prolonged hospitalization prior to surgery;



- Antibiotic therapy administered days before surgery;
- Length of the surgical procedure;
- Inadequate hemostasis;
- Surgical trauma;
- Postoperative stay in the intensive care unit (ICU);
- Presence of rubber drains in the surgical wound, increasing the risk of endogenous and exogenous wound infections;
- Postoperative hospital stay exceeding 5 days, which heightens the risk of infection;

The presence of these factors generally increases the likelihood of developing postoperative wound infections by 3.1 to 11.2 times.

Therefore, the primary focus in preventing nosocomial infections in surgical patients should be on minimizing the impact of these factors, which are common to surgical hospitals. These factors should be taken into account in the epidemiological surveillance system for nosocomial infections. The epidemiological analysis did not reveal any correlation between SWI incidence and patient age or the season during which surgery was performed. The occurrence of SWIs was sporadic in nature.

Additionally, in surgical hospital departments, there is a growing trend of bacteria developing resistance to antibiotics, antiseptics, and disinfectants. This resistance could significantly reduce the effectiveness of treatment and infection control measures. The frequency, levels, and spectrum of acquired resistance to antibiotics and antiseptics depend on the type of drug, the bacterial species and strain, and the specific type of surgical department.

#### **CONCLUSIONS:**

1. Among nosocomial infections in surgical hospital departments, purulent-septic infections (PSIs) account for the majority at 84%. The breakdown of PSIs is as follows: surgical wound infections make up 51%, other hospital-acquired purulent-septic infections comprise 33%, acute respiratory viral infections constitute 15%, and acute intestinal infections represent 1%.

2. The identified patterns of the epidemic process of nosocomial surgical wound infections (SWIs) in surgical hospitals provide a basis for developing proposals to improve the system of epidemiological surveillance and the main strategies for preventing these infections.

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