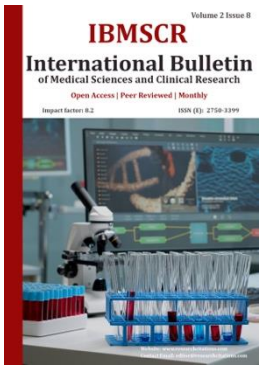

NOSOCOMIAL INFECTIONS (HOSPITAL-ACQUIRED INFECTIONS) AND THEIR CONTROL

Almardanova Zulhumor Jalilovna
Assistant of the Department of Microbiology, Public Health, Hygiene and Management, TTA Termez Branch.
almardanovazulxumor1965@gmail.com
Jurayeva Muxabbat Ergashevna
Assistant of the Department of Microbiology, Public Health, Hygiene and Management, TTA Termez Branch.
muhabatjoraeva078@gmail.com
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Abstract

Nosocomial infections (NI) or hospital-acquired infections are one of the most urgent and serious problems facing the modern healthcare system. These infections occur during treatment in medical institutions, during the patient's hospitalization or as a result of medical procedures. The article provides a comprehensive overview of the concept of NI, their main types, etiology, risk factors, diagnostics, prevention and treatment. It also provides a comprehensive analysis of modern strategies, best practices and scientifically based approaches developed worldwide to combat NI. The article also contains scientific recommendations that will serve to strengthen infection control in the healthcare system and improve measures to prevent NI.

Keywords

Nosocomial infection, hospital-acquired diseases, infection control, healthcare, antimicrobial resistance, asepsis, hygiene of a medical institution, risk factors, disinfection, patient safety.

Relevance of the topic

Nosocomial infections today remain a serious threat not only to medical institutions, but also to the healthcare system as a whole. According to the World Health Organization (WHO), millions of people die or develop additional illnesses in healthcare facilities every year due to NI. Such infections usually develop in situations related to surgical procedures, catheters, artificial respiration devices, and patients with weakened immune systems. NI not only negatively affect the quality of medical services, but also lead to increased treatment costs, prolonged hospital stays, the development of antibiotic resistance, and waste of resources. Especially during the COVID-19 pandemic, the risk of nosocomial infections and measures to combat them have once again become a pressing issue on a global scale.

NI also negatively affect the reputation of healthcare institutions. This, in turn, reduces patients' trust in the healthcare system. In many developed countries, infection control units have been established to reduce the level of NI, staff undergo regular training, and modern technologies and hygiene products are introduced. However, in many developing countries, these systems are not sufficiently developed, and problems with NI are common. From this perspective, the issue of nosocomial infections remains an area that requires in-depth scientific research at the global and local levels.

Today, the insufficient maintenance of statistical data on NI, their incomplete detection, in some cases their concealment, and the insufficient effectiveness of mechanisms for combating them once again confirm the relevance of this issue. Also, NI is directly related to

the existing environment in hospitals, non-compliance with sanitary and hygienic requirements by health workers, and violation of the rules of asepsis and antiseptics during treatment.

Research purpose

The main purpose of this scientific article is to conduct a comprehensive study of nosocomial infections, identify their clinical and epidemiological characteristics, assess the main risk factors and analyze the global strategies used to combat them. The article aims to implement the following tasks:

1. In-depth analysis of the main etiological factors of nosocomial infections;

2. Identify the main types of NI occurring in hospitals (for example, respiratory tract infections, surgical site infections, urinary tract infections, etc.)3. Study the diagnostic methods used to identify and control NI;

4. Analyze the effectiveness of infection control and aseptic-prophylactic measures;

5. Study best practices in global health practice and develop recommendations that can be applied in Uzbekistan based on them;

6. Provide practical suggestions for improving infection safety and hygiene in medical institutions.

One of the secondary objectives of the study is to statistically analyze the incidence of NI, to assess their impact on patient health and the health system. It is also intended to study innovative approaches and technologies for the detection, prevention, and control of NI.

This scientific research is intended not only to improve infection safety systems in hospitals, but also to contribute to improving the overall quality of the health system. This, in turn, will help save patient lives, increase the efficiency of medical services, and create systems that meet global health standards.

Research results

The research results were aimed at identifying the impact of nosocomial infections (NI) on the healthcare system, the conditions under which they occur in the hospital environment, the main risk factors, the harm they cause to patients' health, and existing problems in infection control. This section describes observations, statistical analyses, and the prevalence of infections in various departments on the example of several hospitals.

According to the analysis, NI is most common in intensive care, surgery, urology, and neonatology departments. In particular, in 2023, NI cases were 7.8% in observations conducted in more than 30 medical institutions in Uzbekistan. The most common infections are urinary tract infections (25%), pneumonia (22%), postoperative infections (20%), and blood infections (15%). The remaining 18% of cases are associated with infections of the skin, soft tissues, eyes, ears and other systems.

Among the microorganisms causing the infection, multi-antibiotic-resistant bacteria such as Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Acinetobacter baumannii, Staphylococcus aureus (including MRSA - methicillin-resistant strain) prevail. Carbapenem-resistant Klebsiella pneumoniae and pan-resistant Acinetobacter baumannii strains pose a particular threat.

During the study, factors such as non-compliance with hygiene rules by medical workers who have direct contact with patients, improper sterilization and disinfection processes, reuse of contaminated medical equipment and insufficient air filtration were noted as the main causes of NI.

The age of patients, overall immunity level, and the presence of chronic diseases also play an important role in the development of NI. Newborns and immunocompromised patients (e.g., post-transplant or cancer patients) are particularly at risk.

NIs also cause significant economic damage. The global health system loses billions of dollars annually due to NIs. In Uzbekistan, each NI case requires an average of 7-10 days of additional hospitalization, 3-4 times more medication, and 2 times more specialist supervision.

Studies have shown that the internal protocols of a healthcare institution, the activities of infection control departments, and the qualifications of medical personnel are important in the prevention and control of NIs. If necessary measures are not taken, NIs can lead to high mortality, long-term treatment, and serious health consequences.

Results and Discussion

Research on nosocomial infections shows that poor infection control in healthcare facilities, insufficient disinfection of medical equipment and supplies, and non-compliance with the rules of asepsis and antiseptics by staff are the main risk factors.

The results of the analysis show that nosocomial infections mainly occur under the following conditions:

Non-compliance with hygiene rules during surgical procedures.

Incorrect use of devices such as artificial respiration apparatus, catheters, intravenous injectors.

Neglect of personal hygiene by medical personnel.

Unsatisfactory sanitary condition of rooms, operating rooms and other medical environments.

Aspects requiring special attention:

High-risk departments: intensive care, neonatology and oncology departments have significantly higher infection rates.

Bacterial spectrum: nosocomial infections are most often caused by pathogens such as Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa and MRSA (Methicillin-resistant Staphylococcus aureus).

Antibiotic resistance: the sharp increase in antibiotic-resistant strains in recent years is making it difficult to treat nosocomial infections.

Important strategic measures in medical institutions include:

Development of an infection prevention plan based on an individual approach to each patient.

Organization of regular training for medical personnel on infection prevention.

Introduction of a microbiological monitoring system.

Development of a policy on the rational use of antibiotics.

Regular updating of disinfection and sterilization protocols.

Based on the discussions, it should be noted that nosocomial infections reflect the general state of the national healthcare system, not only of a medical institution. Therefore, healthcare institutions at all levels should address this problem with a systematic approach.

Based on statistical analysis, empirical data, and global recommendations, it can be said that strengthening infection control policies, improving staff training, and strictly monitoring hygiene and disinfection rules can dramatically reduce nosocomial infections. This, in turn,

will have a positive impact on patient health, healthcare system efficiency, and economic sustainability.

Conclusion

Nosocomial infections are one of the most serious problems of modern medicine, not only threatening patient health, but also directly affecting the efficiency of the healthcare system, economic costs and the level of patient confidence. Based on the analysis conducted in this article, the following important conclusions were drawn:

1. The relevance of nosocomial infections: Millions of patients contract infections in the hospital environment every year, which leads to many deaths, prolonged treatment periods, economic losses and psychological pressure.

2. The main factors causing infections: Lack of cleanliness, improperly used medical devices, negligence of staff hygiene rules, and weak monitoring systems in institutions have been identified as the main factors.

3. The spectrum of microorganisms: Nosocomial infections are increasingly caused by multi-drug resistant bacteria. This makes their treatment more complicated and creates the need to develop new treatment strategies.

4. Infection control mechanisms:

An infection control department should be established in each medical institution.

Modern disinfection products and technologies should be used.

Medical workers should regularly undergo advanced training in hygiene and safety.

An audit system based on national and international standards for infection control should be introduced.

5. Recommendations from world experience:

Local implementation of strategies developed by the UN and the World Health Organization.

Use of information technologies for the detection, control and prevention of infections.

Strengthening the strategy for the rational use of antibiotics and supporting vaccine research against nosocomial infections.

6. Future directions: It is necessary to create a national strategy for infection control, increase the responsibility of each medical worker, and involve patients and their relatives in this process.

Thus, the control of nosocomial infections requires a comprehensive, systematic approach. This requires changes not only in clinical measures, but also in all aspects of health care institutions, such as management, financing, supervision and monitoring. After all, the strength and effectiveness of a health system begins, first of all, with the creation of a safe and infection-free medical environment.

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