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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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RISK FACTORS OF IN-HOSPITAL INFECTIONS OCCURRENCE IN HEALTHCARE INSTITUTIONS IN UKRAINE AND EU COUNTRIES

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Abstract.

The rapid development of modern scientific medicine and practice (development of genetic engineering, coronary angiography, use of microprocessors (microminiature implant in eye retina, 3D-print of implants, prostheses) is connected with the scientific-technical progress in recent years, which gave impetus to introduction of extremely complex treatment and diagnostic methods. The use of high-tech medical equipment requires the implementation of modern sanitary and anti-epidemic measures of disinfection and sterilization after each manipulation to prevent in-hospital infection/infectious diseases which are related to the grant of medicare (IHI/IPNMD). Every year in the USA, up to 2 million patients who received medical services are registered with IHI/IPNMD cases. IHI/IPNMD is the cause of increased mortality, disability, lengthens stay period of patients in hospitals, increases the financial burden on both patients and healthcare system. According to WHO data mortality from IHI/IPNMD among adult patients ranges from 18.5% to 29.6% and in countries with low- and middle-income level fluctuate in the range of 8.8%-88.9%. Thus, the vital issue today is to strengthen the control system over IHI/IPNMD at all stages of its spread, namely: early detection of sick persons and carriers among patients and medical personnel, monitoring resistance to antibiotics and control over their use in patients treatment, expanding the range of scientific research in the development of new groups of antibacterial drugs, compliance with the sanitary-epidemic regime in hospitals, including the elaboration of modern disinfectants and sterilization agents.

Key words. In-hospital infections/infectious diseases which are related to the grant of medicare, nosocomial pathogens, healthcare institutions, microclimate, natural and artificial lighting, disinfectants.

Introduction.

Infections, associated with the provision of medical aid or nosocomial infections are high risk for patients receiving treatment in healthcare institutions (HCIs). Every year in the USA, 1.7 million hospitalized patients suffer from in-hospital infections/ infectious diseases which are related to the grant of medicare (IHI/IPNMD). This causes increased mortality, disability, lengthens stay period of patients in hospitals and increases the financial burden on both patients and healthcare system. In addition, IHI/IPNMD are associated with the development of pathogenic bacteria and fungi resistance to antimicrobial drugs. Medical staff and patients can be a source of infection in healthcare institutions, where they stay. Pathogens that carry the risk of IHI/IPNMD appearance tend to persist on the surface of patients' skin for a long time, so when the patient is discharged home, he may be an IHI/IPNMD carrier [1-3].

According to WHO data, mortality index from infectious diseases takes second place in the overall ranking of death causes. In the world, infectious diseases remain a medical, social, and economic burden. IHI/IPNMD in high-income countries according to the European Center for Disease Prevention and Control range from 5.7% to 19.1% with an overall prevalence of 10.1%. According to WHO data, mortality from IHI/IPNMD among adult patients ranges from 18.5% to 29.6% and in low- and middle-income countries it ranges from 8.8% to 88.9%. In Italy, the number of people infected with IHI/ IPNMD every year is between 450,000-700,000, while in 30% of cases the infections could have been prevented. In Ukraine, IHI/ IPNMD account for 40% due to low efficiency of medical and technical equipment in health care institutions. insufficient provision of health care institutions in the world and in Ukraine, in particular, with medical equipment, non-compliance with sanitary and technical, microclimate regulations, limitations in high-quality and permanent water supply, disruption of heat and energy supply lead to IHI/IPNMD emergence [4-6].

According to Cassini A, the burden of IHI/ IPNMD as compared to the other infectious diseases, such as influenza and tuberculosis, is a constant problem. According to the European Center for Disease Prevention and Control, each year in the European Union and the European Economic Area (EU/EEA), there are 2.6 million new cases of IHI/ IPNMD, which roughly corresponds to 2.5 million DALY (1 disability-adjusted life year), which is 261 DALY per 100 thousand population. This indicator combines the burden of mortality and morbidity. WHO uses DALY to quantify the cost-effectiveness of programs, prioritized in diseases fight, that exceed WHO indicators in different countries. These programs aim to develop preventive measures to reduce the burden impact. The most common IHIs are pneumonia, urinary tract infections, post-surgery infections, neonatal sepsis, primary bloodstream infection that may occur as a result of medical aid provision [7,8]. The data obtained by Duszynska W confirms that part of patients, who catched IHI during provision of medical care in a hospital was 18.6%, which increased to 17.5+2.56/1000 bed-days. The incidence rate of ventilator-associated pneumonia was 54.4%, central bloodstream infection – 36.0%, catheter-associated urinary tract infection – 9.6%. The most common pathogens were multiresistant Acinetobacter baumannii (31%) and Staphylococcus epidermidis (45%) [9].

Materials and methods.

Retrospective analysis of the Ministry of Health of Ukraine form No. 18 "Report on the control over the environmental factors,

affecting the population health" of the Government Institution "Vinnytsia Regional Laboratory Center of the Ministry of Health of Ukraine" for the period of 2019-2021 was carried out. The total number of measurements according to form № 18 was 1473.The paper used content analysis of domestic and foreign scientific sources, as well as bibliosemantic (to analyze the use of regulatory and legal regulations), theoretical (retrospective use of scientific research data based on scientific literature, electronic resources) and analytical methods of research.

Statistical processing of the research results was performed in the licensed standardized package "Statistica 13.3 for Windows" and included the nature of characteristics distribution analysis using the Shapiro-Wilk's W test and the analysis of discrepancies, using the Mann-Whitney test.

Results and Discussion.

The results of laboratory monitoring of natural and artificial lighting, microclimate in medical-preventive institutions (MPI) of Vinnytsia region indicate deviations from hygienic standards in some part of checked MPI.

The level of natural lighting in Vinnytsia region hospital wards met the sanitary-hygienic requirements according to DLF indicator (DLF) and was at the level of 1.0-1.5%. According to the data (Figure 1), it was established that the highest rate of workplaces mismatch in medical-preventive institutions of Vinnytsia region was 10.7% in 2019, and the lowest in 2021 was 5.3%. The workplaces discrepancy in medical-preventive institutions leads to an increase in errors frequency (needle injections, cuts, etc.) on the part of medical workers during medical manipulations and increases IHI risks.

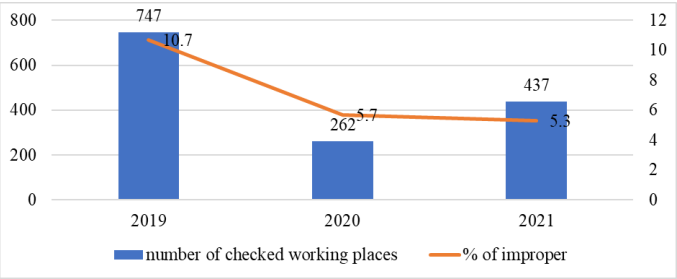

Figure 1. *Indicators of artificial lighting in medical-preventive institutions of Vinnytsia region during 2019-2021,%.*

Investigations conducted by Stockwell R (2019), Mousavi M.S (2019), Dai R (2021) and the others showed in a systematic review and meta-analysis during 2000-2020 that the average total bioaerosol concentrations in various hospitals were the highest in inpatient institutions. Hospital premises with natural ventilation had the highest indicators of bioaerosols total concentration (bacterial load), and the use of high-tech mechanical ventilation systems in hospital premises helped to improve air quality and reduce the risk of airborne IHI/ IPNMD. Environmental parameters can be related to source of generation, survival, dispersion, and sedimentation rate of microorganisms. Bacterial load in health care institutions depends on many factors: temperature, humidity, speed of air movement, mechanical ventilation system. The obtained data of scientists confirm the importance of controlling ventilation systems and microclimate parameters to reduce the risk of IHI/ IPNMD [10-13].

The obtained data of Yousefzadeh A (2022), Hiwar W (2022) confirm the importance of controlling ventilation and parameters of environment, microclimate, bacterial air load, density, and diversity of bioaerosols in hospital premises to reduce the risk of air and medical surfaces contamination in hospital environment [14,15].

During the study period, in all HCFs of Vinnytsia Oblast, the inconsistency of microclimate parameters with hygienic requirements fluctuated at 9.5% in 2019 and was characterized by a decrease in the proportion of non-compliant workplaces – 4.4-4.2% (2020-2021) according to DSTU 3.36.042-99 «Sanitary norms of microclimate of industrial premises» (2020-2021) (Figure 2).

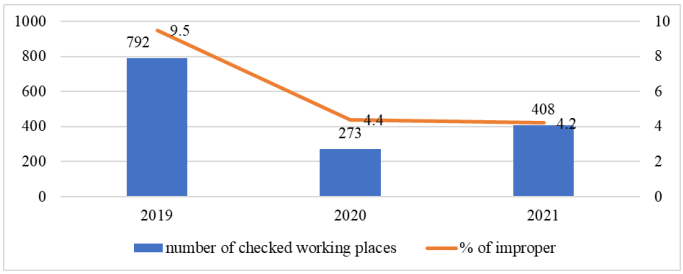

Figure 2. *Indicators of meteorological factors in medical-preventive institutions of Vinnytsia region in 2019-2021,%.*

Changes in microclimate and air environment parameters significantly affect the sanitary-hygienic and anti-epidemic regime of medical-preventive institutions. Creation of sanitary-hygienic conditions in hospitals is an important factor in IHI/IPNMD prevention, optimizing hospital environment, improving the working conditions of medical personnel and also rapid patients' recovery. One of the most important sanitary and hygienic requirements in hospitals (in wards, doctors' offices, dining rooms, and other premises) is to create silence, i.e., the noise level in these premises should not exceed 30 dB.

According to the analysis of Form No. 18, 2693 measurements were made over the years. In all the HCFs of Vinnytsia Oblast during the study period, the discrepancy between noise parameters (equivalent sound level) and hygienic requirements was 3.7% (2019) and 3.17% (2020), while the rest met the parameters.

The data obtained by Yousefzadeh A (2022), Hiwar W (2022), Gizaw Z (2016) confirm the importance of controlling ventilation and environmental parameters, microclimate, bacterial load of air, density and diversity of bioaerosols in hospital premises to reduce the risk of air and medical surfaces infection in the hospital environment [16-18].

Research by Napolitano N.A (2015), Ontario H.Q (2018) confirmed the effectiveness of ultraviolet radiation for environment disinfection in healthcare institutions. Decrease in IHI/IPNMD incidence by 34.2% and reduction in bed-days of patients, undergoing treatment were established [19,20].

IHI/ IPNMD spread is often carried out by air, through household items, medical instruments (video laryngoscope, elastic gastroscope, rectoscope, surgical instruments,

intravascular catheters, insulin pumps, etc.), contact with biomaterial, as well as through contaminated hands skin and hair of medical workers. Weber D (2010) established that the main source of nosocomial pathogens is the endogenous patient's flora and 20-40% of IHI/IPNMD is associated with cross-contamination through hands of medical personnel, which were contaminated by direct contact with patient or indirectly by touching contaminated medical surfaces. Kabała M and the other data (2019) confirm that Clostridium difficile spores are present not only on infected patients underwear, but also on medical equipment and medical personnel hands, that is a potential source of danger for the other participants of treatment process [21]. These bacteria proved to be the most resistant to the most common means for surfaces disinfection and anhydrous alcohol-based antiseptics [22]. Implementation of appropriate hand hygiene procedures, as well as disinfection of hospital surfaces will reduce the appearance of spores in the hospital environment and prevent their further spread.

According to scientific research, up to 22.2% of IHI/IPNMD outbreaks are registered in intensive care and resuscitation units in pediatric hospitals: 21.5% – pediatric oncology, 17.7%-18.6% – pediatric neurosurgery, 11.0%-11.2% – pediatric cardiology. In intensive care and resuscitation units for adults, IHI/ IPNMD was detected in 45% of patients, among whom up to 47% were diagnosed with pneumonia, 18% with lower respiratory tract infections, 18% with urinary tract infections and 12% with bloodstream infections. In obstetric hospitals, IHI/ IPNMD fluctuate from 5 to 18% among newborns and 6-8% – among women in labor. Most often, the causative agent of IHI is Staphylococcus aureus and the ways of transmission can be contact-household, airborne or fecal-oral. On average, IHI/IPNMD in general-surgical departments makes up to 40% of postoperative mortality. The rate of urinary tract infections in urological departments is 22-40% due to invasive medical and diagnostic manipulations, violations of the sanitary and anti-epidemic regime during endoscopic equipment, intravascular and urethral catheters finish, use of massive antibiotic therapy and formation of hospital associations of microorganism's strains. According to Rudhart S data (2021) flexible endoscopes after manipulation were contaminated with 916.7 CFU (±1057 CFU) and only after refinishing by ultraviolet radiation, the contamination level decreased to 2.8 CFU (±1.6 CFU). Research by Vianna P.G (2016) confirmed the effectiveness of non-contact disinfection such as UV radiation, hydrogen peroxide vapors and other automated non-contact technologies to reduce the level of IHI/IPNMD in intensive care units after routine cleaning [23,24].

According to the results of material and instruments for sterility monitoring in intensive care, surgical and maternity wards the highest rate of contamination was found in 2019 (0.72%), in 2020 (2.02%) in intensive care and resuscitation units of Vinnytsia region healthcare institutions in comparison with the other departments (Figure 3).

According to the data of bioaerosol quality study in different health care institutions in Portugal, Verde S (2015) found that in hospital premises air gram-positive cocci were dominating (up to 88%) of which Staphylococcus (51%), Micrococcus (37%) and among indoor fungi Penicillium (41%) and Aspergillus (24%) prevailed. Regular monitoring of hospital air is necessary [25].

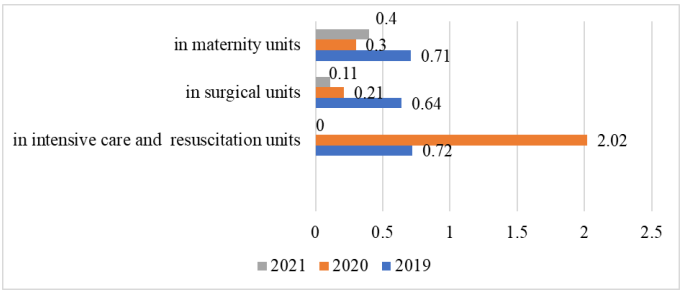

Figure 3. *Sanitary-microbiological examination of material and instruments for sterility in health care institutions of Vinnytsia region for 2019-2021,%.*

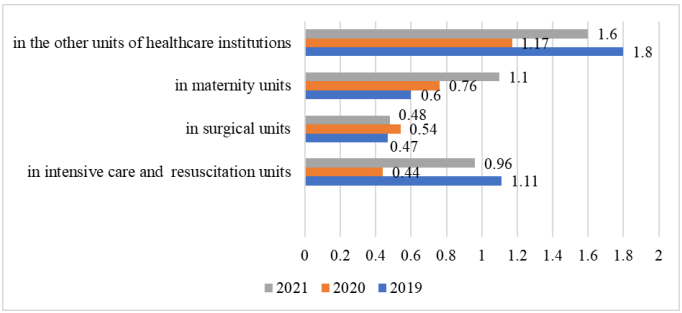

Figure 4. *Sanitary-bacteriological examination (inventory, equipment, hands, clothes) in health care institutions of Vinnytsia region for 2019-2021,%.*

Sanitary-bacteriological study in Vinnytsia region health care institutions recorded the highest rates of contamination of implements, equipment, medical personnel hands and clothes in intensive care and resuscitation units in 2019 (1.11%), in maternity units in 2021 (1.1%) and during 2019/2020/2021 – 1.8%/1.2%/1.6% respectively in other departments of region health care institutions.

American scientists conducted observations over four years (1980-1984) on postoperative complications. They found that postoperative UTIs were 6.1 per 1000 discharged patients. In the United States, 325 thousand cases of surgical wound infections are reported annually through the transmission of infection by hands/medical gloves, medical instruments/materials, or airborne (aerogenic) transmission. The losses incurred by the US economy from ІПНМД amount to 5-10 billion dollars annually [26,27].

The factors that cause IHI/ IPNMD outbreaks are non-compliance with the sanitary and anti-epidemic regime, namely: inadequate control over the sanitary and anti-epidemic regime in health care institutions: placement/capacity of patients, cyclical filling of wards, etc. Carry out the detection of bacterial carriers among medical personnel during preventive medical checkups and among patients, when admitted for treatment.

Each medical worker is obliged to conduct self-monitoring

of IHI/ IPNMD signs and symptoms, timely inform and self-isolate under the supervision of a family doctor.

To improve the sanitary and anti-epidemic regime and prevent IHI Querido M.M. (2019) suggested to use self-disinfecting surfaces, which play an important role in microorganism's reproduction, and which are often neglected during finishing [28]. Recently, much attention has been paid to the use of surfaces with anti-adhesive properties, embedded antimicrobial substances or modified biologically active metals.

Considerable attention is also given to hand hygiene of medical personnel in terms of IHI/ IPNMD prevention. In healthcare institutions of the EU countries, medical staff monitors the results of patients questioning upon admission to the hospital and 1, 2, 3 months after discharge for control over IHI/ IPNMD in the institution. All data are transferred to infection prevention services of the EU countries. For this purpose, in healthcare institutions of the EU countries accessibility to hand washing stations: dispensers with alcohol-based disinfectants outside the wards, namely in corridors, next to manipulations room, is of great importance. Puto G. and the others (2020) indicate that despite the fact that about 90% of medical personnel have knowledge about hand hygiene, only 70% comply with these requirements [29].

Among the reasons of IHI/ IPNMD occurrence and spread the most common is the improper organization and conduct of medical staff mandatory preventive medical examinations in health care institutions.

Thus, among surgical departments medical staff, index of asymptomatic carriage ranges from 40-85.7% and is a threat to patients, who receive medical aid in health care institutions. Individuals, who are asymptomatic carriers can constantly release pathogens into the environment, that is a high risk for IHI/ IPNMD occurrence. According to Baron S.W. (2020), during the study of 220 patients 9.6% out of them were asymptomatic carriers of Clostridium difficile. For IHI/ IPNMD prevention and prophylaxis, it is necessary to conduct asymptomatic carriers screening both among medical workers and among patients [30].

Conclusion.

Thus, IHI/ IPNMD remains a significant medical, social, and economic burden for the global community. WHO and the European Center for Disease Prevention and Control are constantly working to reduce the impact of factors that contribute to IHI/ IPNMD occurrence and their consequences. Thus, the vital issue today is to strengthen the control system over IHI/ IPNMD at all stages of its spread, namely, early detection of sick persons and carriers among patients and medical personnel, monitoring resistance to antibiotics and control over their use in patients treatment, expanding the range of scientific research in the development of new groups of antibacterial drugs, compliance with the sanitary-epidemic regime in hospitals, including the elaboration of modern disinfectants and sterilization agents.

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РЕЗЮМЕ.

ФАКТОРЫ РИСКА ВОЗНИКНОВЕНИЯ ВНУТРИБОЛЬНИЧНЫХ ИНФЕКЦИЙ В ЗАВЕДЕНИЯХ ЗДРАВООХРАНЕНИЯ УКРАИНЫ И СТРАНАХ ЕС

Чорна В.В., Лотоцкая Л.Б., Каримулин Р.Ф., Губарь А.Н., Хлестова И.В.

Бурное развитие современной научной медицины и практики (развитие генной инженерии, коронарное стерновение, использование микропроцессоров (микроминиатюрный имплантат в сетчатку глаза, 3D-печать имплантатов, протезов)), которое связано с научно-техническим прогрессом за последние годы, дало толчок к введению чрезвычайно сложных лечебных и диагностических методов. Использование высокотехнологичного медицинского оборудования требует проведения современных санитарно-противоэпидемических мероприятий обеззараживание и стерилизация после каждой манипуляции для профилактики внутрибольничной инфекции (ВБИ). Случаи ВБИ ежегодно в США регистрируют до 2 млн. пациентов, которым оказывали медицинские услуги. ВБИ является причиной повышенной смертности, инвалидизации, продлевает сроки нахождения пациентов в стационаре, повышает финансовую нагрузку как на пациентов, так и на систему здравоохранения. Смертность от ВБИ за данным ВОЗ среди взрослых пациентов составляет от 18.5% до 29.6%, а в странах с низким и средним уровнем дохода колеблется в пределах от 8.8% до 88.9%. Таким образом, актуальным вопросом сегодняшнего дня является усиление системы контроля за ВБИ на всех этапах ее распространение, а именно, раннее выявление больных и носителей среди пациентов и медицинского персонала, мониторинг по устойчивости к антибиотикам и контроль за их использованием для лечение пациентов, расширение спектра научных исследований в направлении разработки новых групп антибактериальных препаратов, соблюдение санитарно-эпидемического режима в стационарах, в том числе разработка современных дезинфицирующих средств.

Ключевые слова: внутрибольничные инфекции, нозокомиальные патогены, учреждения охраны здоровья, микроклимат, естественное и искусственное освещение, дезинфицирующие средства.