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It is our great pleasure to present this Supplement Issue on “*Macedonian Pharmaceutical Bulletin*” to the scientific and professional community. This supplement includes the short communications from the *Sixth Congress of Pharmacy in Macedonia with International participation*, as the largest gathering for the pharmacy profession held in the Republic of Macedonia. The main theme of the Congress was “Modern pharmacist - bridging science with practice”.

A broad spectrum of topics within the pharmaceutical sciences and practice carefully selected for this special occasion in order to build up a highly interesting and comprehensive program were covered. The contributions submitted to the Congress included 6 plenary lectures, 84 section lectures, and more than 240 posters. This Congress, followed the excellent international tradition, was attended by close to 1000 domestic and foreign participants. We received 326 short paper submissions from more than 25 countries. These numbers show that our Congress is aiming for the highest scientific standards, and that it can be considered a well-established venue for researchers in the broad fields of Pharmaceutical sciences and practice.

We would like to thank all internationally prominent researchers for their contribution to reinforcing the overall quality of the Congress. They give the state of the art of the recent advances in the field of pharmacy research.

Sincere thanks to the hosts of the Sixth Congress of Pharmacy in Macedonia with International participation, Macedonian Pharmaceutical Association and Faculty of Pharmacy, Ss Cyril and Methodius University in Skopje for their vision and commitments.

We acknowledge the sponsoring companies: the platinum sponsor AD ALKALOID, Skopje, the golden sponsor PLIVA, the silver sponsor EUROFARM and the bronze sponsor SEPTIMA, for the permanent support to our efforts during the organization.

We would also like to thank our members of the Scientific Committee for their volunteer time and dedication to the critical peer review process and in the organization of the program. We also wish to thank all the members of the Organizing Committee, whose work and commitment was invaluable.

On behalf of the Advisory and Scientific Committees, we would like to especially thank the authors, whose work was the essential part of the congress and contributed to a very successful event. Besides the many academic staff and professionals who contributed to the success of the Congress, we are grateful to the students who participated with oral presentations and posters.

The pharmaceutical sciences continue to grow as dynamic scientific interdisciplinary fields. We believe that published short communications will be an excellent source of scientific material in the fast evolving fields in Pharmaceutical sciences and practice.

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The present issue of *Macedonian Pharmaceutical Bulletin* is a special issue of the 6th Congress of Pharmacy in Macedonia with international participation.

This issue of *Macedonian Pharmaceutical Bulletin* contains short papers accepted by the scientific committee for the presentation at the Congress.

The authors are fully responsible for the contents of their short papers.

All reviewers that were involved in the short papers revision process are sincerely acknowledged.

Quantity of disinfectants and antiseptics used in general hospital in Gevgelija in relation to appearance of intra-hospital infections

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Introduction

A number of chemical preparations in recent years are used as disinfectants and antiseptics. Disinfectants are chemicals that act as microbicides or microbiostatics of objects and the environment. They are present on the market as finished industrial products obtained in different concentrations and forms depending of its purpose. In the composition of disinfectants enter a wide variety of active chemical agents (biocides). According to their chemical composition they represent alcohols, aldehydes, anilides, biguanides, diamines, halogen release agents, silver compounds, peroxides, phenols, bis-phenols, halophenols, quaternary ammonium compounds, volatile compounds for sterilization. Biocide is a general term describing a chemical agent, usually with a broad spectrum of activity that inactivates microorganisms. The biocide activity is within the antimicrobial activity, but depending on the circumstances may have "static" activity directed to agents that inhibit growth (bacteriostatic, fungistatic and sporostatic), and also "cidal" activity directed to agents that completely destroy all microorganisms present (bactericidal, sporocidal, fungicidal). The antiseptics are chemicals that are safely used for disinfection of skin and mucous membrane contact (McDonnell and Russell, 1999).

Intra-hospital or nosocomial infections are caused by organisms acquired during hospitalization of the patients and clinically manifest from 48 to 72 hours after their administration (Rutala et al., 2008).

Mechanical cleaning before applying the disinfectant is essential. The mechanism of action of disinfectants is summarized in a number of papers published and available to the entire scientific community. For example, alcohols show quick action, and broad spectrum antimicro-

bial activity through denaturation of proteins, but do not act sporocidal. Aldehydes bind with amino groups of proteins, RNA and DNA. Oxidizing agents such as peroxides and halogen elements oxidize the protein thiol groups, and surface active agents act mainly on the cytoplasmic membrane of the bacterial cell. Phenols generally destroy the cell membrane (Block, 2001).

It is well known that the type and quantity of used disinfectant and the disinfection procedures is directly related to the effects of their use (Ducel et al., 2002).

The aim of this study was to review of the use of antiseptics and disinfectants in general hospital in Gevgelija in Republic of Macedonia over five years period, to make analysis of the amount of antiseptics and disinfectants consumed annually on each department in hospitals, to analyze of the total amount of consumed antiseptics and disinfectants in selected hospitals for five years and to compare the results to the data obtained from the microbiological evaluations conducted periodically in each department in selected hospitals for five years.

Materials and methods

The data were collected from the general hospital in Gevgelija over five years, from 2010 till 2014. The data from the annual reports for disinfectants and antiseptics (Bactosal, Ecosal 10%, Ecosal ultra, Dezintal, Betadine 10%, Betadine 7,5%, Hydrogen peroxide 30%, Formaldehyde 33%, Ethanol concentrate, Gigazyme, Deconex 36 Intensiv, Gigasept forte AF, Gigasept FF, Gigasept PAA, Deconex 54 Sporocide, Microzid AF liquid, Arcana alca combi, Plivasept, Arcana san, Arcana anti fat) used on the selected departments (gynecology, surgery, transfusion, treatment of infections, internal medicine etc.) were collected. The results of microbiological testing conducted by the public health center in Gevgelija over five years were

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collected and used. Routine testing period for microbiological controls in hospitals was 15 days.

Results and discussion

The obtained data are getting an overview of the disinfectants and antiseptics used in the departments each year. It can be concluded that the highest consumption is in the operating room. The reason for this is that there are used all cleaning tools for disinfection of surfaces and instruments and antiseptics. Reduction of use of disinfectants and antiseptics in surgery room would cause much higher risk for intra-hospital infections. The highest amount (227 l) in the operating room is wasted in 2012. The lowest consumed amount of antiseptics and disinfectants was in mental health center and center for addicts.

To determine the relationship between the amount of used antiseptics and disinfectants with the emergence of intra-hospital infections, in addition the data obtained by the microbiological analysis in public health center in Gevgelija were processed. In 2012 a total of 27 inspections were conducted, 156 swabs and sediments were taken, 147 were sterile and 9 conditionally pathogenic.

The reason for the reduced number of isolated pathogens was increased amount of antiseptics and disinfectants used during 2012. From children's department and neonatology, all taken swabs were sterile. From surgical operation room, 2 pathogen samples were detected. In the rest of the surgical department, 2 pathogenic bacteria are isolated: *Staphylococcus epidermidis*, and *Staphylococcus albus*, but they have been isolated from patient beds and hands which is normal findings. Comparing to 2011 when they were isolated 6 conditionally pathogenic samples at the gynecology department; in 2012 the number of conditionally pathogenic samples was reduced to 2. At dialysis, a total number of swabs taken was 16 and 3 of them were conditionally pathogenic.

It is detected that the number of conditionally pathogenic bacteria is reduced starting from 2012. The reduction of the quantity of disinfectant used is also noted from 2012. By appointment of Ministry of health in 2012 each hospital had been established the intra-hospital infection times.

The results indicate a significant reduction of contamination with conditionally pathogenic bacteria when disinfection is conducted according to the standardized procedures controlled by the intra-hospital infection times.

Conclusion

In general the disinfectants and antiseptics are used optimally and correctly according to the needs of the hospital investigated. The amount of disinfectants and antiseptics consumed comparing with the microbiological data indicates their rational utilization starting from 2012. Use of disinfectants according to the standardized procedures established by the intra-hospital infection time allows current daily care for patients and staff in the hospital investigated. The processed data from public health center confirm the above and point out the precautions to be taken when conditionally pathogenic bacteria have been detected.

It is pointed out the role of intra-hospital infection times in the hospitals as well as the role of hospital pharmacists. We would like to suggest the implementation of disinfection process validation as standardization measure as well as more often routine microbiological controls in the hospitals.

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