GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 6 (339) Июнь 2023

ТБИЛИСИ - NEW YORK

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press. Published since 1994. Distributed in NIS, EU and USA.

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.

GEORGIAN MEDICAL NEWS
No 6 (339) 2023

Содержание:

Tsitsino Abakelia, Ketevan Lashkhi, Sophio Kakhadze.
BRIDGING GAP BETWEEN PRE AND POSTOPERATIVE PROSTATE BIOPSIES: PI RADS CORRELATION WITH FINAL HISTOPATHOLOGICAL DATA……6-12

Sopio Gvazava, Vladimer Margvelashvili, Nino Chikhladze, Diana Dulf, Corinne Peek-Asa.
A RETROSPECTIVE STUDY OF THE MAXILLOFACIAL INJURIES IN TWO EMERGENCY DEPARTMENTS IN TBILISI, GEORGIA……13-19

Eraliyeva B.A, Paizova.M.K, Almakhanova A.N, Erkinbekova G.B, Nurgazieva G.Y, Tyndybay S.S.
EXPENDITURE ON MEDICINES IN A MULTIDISCIPLINARY HOSPITAL IN ALMATY BASED ON ABC /VEN ANALYSIS……..20-23

Tchernev G.
NITROSOGENESIS OF SKIN CANCER: THE NITROSAMINE CONTAMINATION IN THE CALCIUM CHANNEL BLOCKERS (AMLODIPINE), BETA BLOCKERS (BISOPROLOL), SARTANS (VALSARTAN/LOSARTAN), ACE INHIBITORS (PERINDOPRIL/ ENALAPRIL), TRICYCLIC ANTIDEPRESSANTS (MELITRACEN), SSRIS (PAROXETINE), SNRIS (VENLAFAXINE) AND METFORMIN: THE MOST PROBABLE EXPLANATION FOR THE RISING SKIN CANCER INCIDENCE……24-32

Kachanov D.A, Karabanova A.V, Knyazeva M.B, Vedzizheva H.Kh, Makhtamerzaeva H.S, Ulikhanian E.G, Gukoyan A. A, Galdobina V.A, Dimakov D.A, Shakirianova A.V.
INFLUENCE OF PROFICIENCY OF SYNTHETIC FOLIC ACID ON THE NEUROLOGICAL SYMPTOMS OF RATS……..33-36

Zamzam AR. Aziz, Entedhar R. Sarhat, Zaidan J. Zaidan.
ESTIMATION OF SERUM FERROPORTIN AND LIVER ENZYMES IN BREAST CANCER PATIENTS…..37-41

Tereza Azatyan.
THE RHEOENCEPHALOGRAPHIC STUDY OF THE INTERHEMISPHERIC ASYMMETRY OF CEREBRAL BLOOD FLOW IN HEALTHY AND MENTALLY RETARDED CHILDREN……42-46

Ahmed T. Jihad, Entedhar R. Sarhat.
ALTERED LEVELS OF ANTI-MULLERIAN HORMONE AND HEPCIDIN AS POTENTIAL BIOMARKERS FOR POLYCYSTIC OVARY SYNDROME……47-51

L.V. Darbinyan, K.V. Simonyan, L.P. Manukyan, L.E. Hambardzumyan.
EFFECTS OF DIMETHYL SULFOXIDE ON HIPPOCAMPAL ACTIVITY IN A ROTENONE-INDUCED RAT MODEL OF PARKINSON'S DISEASE……..52-56

Labeeb H. Al-Alsadoon, Ghada A. Taqa, Maha T. AL-Saffar.
EVALUATION OF PAIN-KILLING ACTION OF ACETYLSALICYLIC ACID NANOPARTICLES ON THERMAL NOCICEPTION IN MICE……57-61

Olesia Kornus, Anatolii Kornus, Olha Skyba, Iryna Mazhak, Svitlana Budnik.
FORECASTING THE POPULATION MORTALITY RATE FROM CARDIOVASCULAR DISEASES AS A CONDITION OF THE ECONOMIC SECURITY OF THE STATE……62-66

Saif K. Yahya, Haiman A. Tawfiq, Yasir Saber.
STIMULATION OF B3-RECEPTOR-INDUCED CENTRAL NEUROGENIC EDEMA AND VITIATED ELECTROLYTE HOMEOSTASIS IN EXPERIMENTAL RODENT MODEL……..67-70

M.A. Babakhanyan, V.A. Chavushyan, K.V. Simonyan, L.M. Ghalachyan, L.V.Darbinyan, A.G. Ghukasyan, Sh.S. Zaqaryan, L.E. Hovhannisyan.
PRODUCTIVITY AND SELENIUM ENRICHMENT OF STEVIA IN HYDROPONIC AND SOIL CULTIVATION SYSTEMS IN THE ARARAT VALLEY……71-76

Ezzuldin Yaseen Aljumaily, Ali R. Al-Khatib.
HARDNESS AND ELASTIC MODULUS ASSESSMENT FOR TWO ALIGNER MATERIALS BEFORE AND AFTER THERMOCYCLING: A COMPARATIVE STUDY……77-82

Tchernev G.
NITROSOGENESIS OF CUTANEOUS MELANOMA: SIMULTANEOUSLY DEVELOPMENT OF PRIMARY CUTANEOUS THICK MELANOMA OF THE BREAST, THIN MELANOMA/ DYSPLASTIC MOLE OF THE BACK DURING PARALLEL INTAKE OF BISOPROLOL, AMLODIPINE AND VALSARTAN/ HCT: NITROSAMINE POLYCONTAMINATION IN THE MULTIMEDICATION AS THE MOST POWERFUL SKIN CANCER TRIGGER……83-88

Manish Tyagi, Uzma Noor Shah, Geetika Patel M, Varun Toshniwal, Rakesh AshokraoBhongade, Pravesh Kumar Sharma.
THE IMPACT OF SLEEP ON PHYSICAL AND MENTAL HEALTH: IMPORTANCE OF HEALTHY SLEEP HABITS…..89-94

Musayev S.A, Gurbanov E.F.
DYNAMICS OF THE MECHANICAL FUNCTION OF THE LEFT ATRIUM IN PATIENTS WITH ISCHEMIC MITRAL VALVE REGURGITATION……95-98

Abrahamovych Orest, Abrahamovych Uliana, Chemes Viktoriia, Tsyhanyk Liliya, Mariia Ferko.
INDICATORS OF BONE METABOLISM IN PATIENTS WITH RHEUMATOID ARTHRITIS WITH IMPAIRED BONE MINERAL DENSITY: CHARACTERISTICS, THEIR FEATURES AND DIAGNOSTIC VALUE…….....…….…99-104

Jagdish Kumar Arun, Ashok Kumar Singh, Shashidhar ES, Geetika M. Patel, Yogita Verma, Samir Sapcota.
THE ROLE OF IMMUNOTHERAPY IN CANCER TREATMENT: CHECKPOINT INHIBITORS, CAR-T CELLS, AND VACCINES.....105-112

L.G. Buinov, L.A. Sorokina, S.N. Proshin, N.A. Fedorov, M.N. Magradze, A.B. Shangin, S.V. Alekseev, T.V. Kot, P.A. Torkunov.
A METHOD FOR IMPROVING THE PROFESSIONAL PERFORMANCE AND RELIABILITY OF PERSONS DRIVING HIGH-SPEED VEHICLES…….....……113-116

Bhupesh Goyal, Sandeep Bishnoi, Suphiya Parveen, Devanshu Patel J, Yasmeen, Anupama Nanasaheb Tarekar.
MANAGING ARTHRITIS PAIN: MEDICATIONS AND LIFESTYLE CHANGES…….....…….117-122

Sergienko Ruslan, Vovchenko Anna, Kravchuk Lyudmila, Zinchenko Vitaliy, Ivanovska Olha.
ANALYSIS THE RESULTS OF SURGICAL TREATMENT AND EARLY REHABILITATION OF PATIENTS WITH MASSIVE TEARS THE ROTATOR CUFF THE SHOULDER…….....…123-128

Gulyaeva K.V, Fokin M.S, Kachanov D.A, Karabanova A.V, Dzhanbekova K.R, Zablotskaya P.Yu, Magomedov Sh. A, Gadzhiev M.B, Alilov A.A, Idiatullin R.M.
NEURODEGENERATION AND NMDA…….....……129-136

Dilshad Ahmad Usmani, Kavina Ganapathy, Devanshu Patel J, Anchal Saini, Jaya Gupta, Shalini Dixit.
THE ROLE OF EXERCISE IN PREVENTING CHRONIC DISEASES: CURRENT EVIDENCE AND RECOMMENDATIONS……...137-142

Tchernev G.
Controversies and paradoxes in melanoma surgery: consolidating two surgical sessions into one and sparing the sentinel lymph node- a possible guarantee of recurrence-free survival…….....……143-146

GEORGIAN MEDICAL NEWS
No 6 (339) 2023

EXPENDITURE ON MEDICINES IN A MULTIDISCIPLINARY HOSPITAL IN ALMATY BASED ON ABC /VEN ANALYSIS

Eraliyeva B.A[1], Paizova.M.K[1], Almakhanova A.N[2], Erkinbekova G.B[1], Nurgazieva G.Y[1], Tyndybay S.S[1].

[1]*JSC Kazakh National Medical University after S.D. Asfendiyarova, Almaty, Kazakhstan*

[2]*Kazakh-Russian Medical University, Almaty, Kazakhstan.*

Abstract.

One of the main problems in modern pharmacotherapy is the irrational use of medicines. An essential role in this practice is played by the unjustified prescribing of antibiotics in medical organizations (MO), both in polyclinics and in hospitals.

Medicines that are not included in the list of the Kazakhstan National Formulary (KNF), which increases the cost of Medicines (M) in the Medical Organization (MO), play a very important role.

Pharmacoeconomics is a science that compares the costs of medicines and their effectiveness when choosing a treatment tactic for a patient. It helps to determine the best use of budgetary funds.

Currently, the question of the rational use of medicines in practical healthcare is being raised, using the methods of pharmacoeconomical analysis (FEA). Research in this field is important for the patient, the state, and also for the pharmaceutical market.

Due to the increasing need of the state to assess the effectiveness of the budget spent on various methods of treatment, the demand for conducting pharmaceutical research in Kazakhstan is increasing.

This article demonstrates a retrospective research method for evaluating expenditure on medicines using ABC /VEN analysis.

Key words. Pharmacoeconomics, ABC/VEN analysis, antibacterial medicines, wasteful medicines.

Introduction.

With the advent of new drugs on the market, the need to determine the relationship between the cost and effectiveness of the drug has increased. The issue of the efficiency of spending budget funds of the Ministry of Defense, conducting pharmacoeconomical research has become important. The objectives of MO inventory control were: 1) improving the rational approach when choosing medicines, taking into account both international and national recommendations (KNF); 2) reducing the cost of funds of secondary importance; with priority on the stock of vital medicines with a high level of sales.

Ranking according to the ABC system ("Always Better Control") ABC is used to study the structure of medical care costs and determine the most expensive drugs that "eating up" a significant share of the budget. Since the control of the most expensive drugs should bring the greatest contribution to the management of expenses in general.

VEN analysis allows you to assess the expediency of spending resources by dividing all the medicines into three categories: V (from vital), E (essential), N (non-essential)

The classification criteria of VEN determined after a discussion with the team of health professions at the hospital, which are clinical pharmacologists, senior pharmacists, and a senior physician, also taking into account the KNF(Kazakhstan National Formulary).

As a result of the final analysis of the combination of ABC and VEN analyses, each group "A", "B" and "C" is divided into categories V, E and N. The absence of category N among group A is considered the most acceptable, which makes it possible to assess the loss of MO on drugs without proven effectiveness.

Control measures for drugs of secondary importance in the Clinical Hospital in Almaty led to savings with a difference of 2 million Kazakh tenge. Of all the inventory control systems, ABC and VED matrix are the most suitable for MO [1-10].

Goal. Optimizing the rationality and validity of medicines prescriptions in a multidisciplinary hospital in Almaty.

Research objectives. To study the use of medicines in a hospital using ABC / VEN analysis.

The study was conducted in 2 stages. In Stage 1 of the process, we will calculate the total amount of medicine consumed in the first half of 2021. We will then use this information to determine the cumulative percentage of each source material based on the ABC system for expenditure on medicines. Finally, we will allocate medicines by priority according to the VEN analysis. By completing these steps, we can better understand and manage our medicine inventory for the remainder of the year. A comparison was made to see how much total expenditure changed by 2022.

Materials and methods.

ABC analysis is a method of management accounting that allows you to determine the main costs of providing medicines. The method is based on the Paretto principle, known as the «20 to 80» rule: 20% of the factors determine 80% of the success. In this case, the technique should significantly reduce both the cost of non-unreasonable prescribing by doctors and the cost of the hospital as a whole.

To conduct the ABC analysis, it was necessary to divide medicines into three classes according to the level of costs: «A» — the most expensive medicines, for which 80% of the costs are spent, «B» — less expensive, for which 15% of the costs are spent, «C» — the least expensive (5% of the costs).To rank in ABC groups, it is required to determine a cumulative percentage equal to % of the total amount for a particular technology. As a result, the amount of costs for the ABC group is determined and appropriate measures are taken to improve the use of medicines, with the involvement of the administration of the MO.

For reliable pharmacological supervision, a VEN analysis is used together to determine the rationality of spending MO resources, by dividing the medicines or products used into categories: V (от vital) , E (essential) , N (non-essential) .

ABC -the analysis was carried out for international non-proprietary names (INN). The total number of medicines analyses (Table 1) was 403 (2021), of which 55 medicines (13.6%) were included in group «A», 85 medicines (21.1%)

Table 1. *Comparative ABC - analysis of medicines use in the amount for 01.01 - 24.05.2021 and 2022.*

	A	B	C	Итог
2021	**55**	**85**	**263**	**403**
2022	**56**	**82**	**244**	**382**

Table 2. *ABC- VEN- analysis of medicine consumption by amount for 01.01 – 24.05 2021 and 2022.*

	Expenses in Kazakh tenge for 2021	**Expenses in Kazakh tenge for 2022**
«A» - 80%	**324 631 324,15**	**318 639 457,45**
«B» - 15%	**60 759 102,22**	**59 922 099,22**
«C» - 5%	**20 554 105,93**	**20 091 899,60**
Overall	**405 944 532,30**	**398 653 456,27**

in group «B» and 263 medicines (65.5%) in group «C». The total expenditure on medicines in the analysed list (Table 2) was 405,944,532.30 Kazakh tenge. The three most expensive medicines were in group «A»: Hepasan (Sodium Heparin) 5000ED 5ml, Catenox 4000 anti-Ha / 0.4ml (Sodium Enoxiparin), Albunorm 20% 100 ml (Human Albumin), which amounted to 24,418,356 Kazakh tenge. Group «B» included medicines such as: Arduan 4mg (Pipecuronium bromide), Isotroy 250 ml (Isoflurane), Fentanyl 0.005%-2ml, for which the hospital spent 4,073,599.26 Kazakh tenge. The cheapest group «C» included Mannitol 15% 200ml, Potassium Chloride Solution extemporal 7.45% - 200ml, Aminocaproic acid 5% 100.0, Glucose 10% 200 ml, Dexmedetomidine 100 mcg/ml 2 ml. for these medicines 1,171,803.86 Kazakh tenge was spent.

In 2022, the number of medicines used was 385. Group A included 56 medicines, of which the most expensive: Darzalex concentrate.to prepare an infusion solution (Daratummab), Velkozomib 3.5 mg (Bortezomib), 200 ml, Vigexol (Yogexol) 300mg of iodine / ml, which is 90,412,422.3 Kazakh tenge. In the group of «B» 82 medicines: in the top three were Jakavi 15 mg (Ruxolitinib), Actemra 200 mg /10 ml 10 ml (Tocilizumab), Propofol-Lipuro 1% 10mg / ml 50ml. Group «C» covered 244 medicines. The three expensive medicines of group «C» included: Magnesium sulfate 25% 5 ml, extemporaneous solution of potassium chloride 7.45% - 200ml, RinGlar 100ED / ml, 3.0 ml each (Insulin Glargine).

Results.

Analyzing this table, we can say that there is no significant difference in costs.

The VEN analysis was carried out based on the recommendations of the World Health Organization (WHO) and the Kazakhstan National Formulary. The medicines used in this MO were divided into three groups (Table 1): Vital (Vital, V), Essential (Essential, E), Secondary (Non-essential, N).

In 2021, the number of medicines in group V was: 114, of which from group «A»: 19 (16.7%), from group «B»: 25 (21.9%), from group «C»: 70 (61.4%); Group «E» -243 of them: «A»: 34 (14%), «B»: 48 (20.6%); «C»: 161 (65.4%); Group N was 46 MD of which: Group «A» : 2 (3.8%), Group «B»: 12 (22.6%), Group «C»: 32 (73.6%);

In 2022, Group V was: 85 of them «A»: 14 (13.9%), «B»: 25 (26.2%), «C»: 46 (59.8%); Group «E» -266 of them: «A»: 39 (15.5%), «B»: 49 (19%); «C»: 178 (65.5%); Group N made up 31 medicines of which: Group «A»: 3 (8.3%), Group «B»: 8 (19.4%), Group «C»: 20 (72.3%).

ABC-VEN - analysis of medicines use by quantity.

With the increase in the growth of unknown, expensive medicines with unproven effectiveness in the Kazakhstan market, it became necessary to create a domestic KNF formulary, first approved on December 8, 2017. KNF was able to optimize the choice of medicines based on evidence-based medicine. To date, the national formulary is constantly updated, which indicates the integrity and openness of the work of the commission members.

However, the irrational use of medicines and budget differences in the comparative costs of providing medicines led to the need for ABC/VEN analysis in the MO.

The information obtained during the ABC/VEN analysis for 2021 indicates the irrational use of funds for the purchase of medicines in the clinical practice of the hospital.

In the second stage of ABC/VEN analysis, data for the first half of 2022 were used. A comparative analysis with 2021 revealed significant changes in the total amount of medicines consumed. The share of costs, in contrast to 2022, decreased to 7,291,076.03 Kazakh tenge, but the number of purchased antibacterial medicines increased in favor of antibiotics with a difference of 1,381,445.03 Kazakh tenge. One of the positive aspects of the relevant measures taken to irrationally prescribe antibacterial medicines is a shift in the indicators of frequently prescribed medicines, such as Bortezumab, Amoxiclav, Dorzalex from leading positions.

ABC-VEN matrix analysis.

The table shows the results of the ABC-VEN -matrix analysis. The ABC-VEN matrix reclassifies items based on the results of the ABC and VEN analyses. In the ABC-VEN matrix analysis, there are nine different subcategories (AV, BV, CV, AE, AN, BE, CE, BN, and CN), which in turn are grouped into three main categories, namely categories I, II, and III [7].

The medications [tab 5,6] in the I st category (127-150 items) were discovered to be necessary or costly. Their inventory level had a significant impact on the entire cost, thus they needed to be constantly monitored. The II-nd group (221-225 items) is made up of necessities. These medications were not as critical as the first group, but they required substantial management. The medications in Category III (20-32 products) are both inexpensive and desired. These medications should be obtained on a regular basis and given the lowest priority.

Discussion.

In order to implement a rational and economically justified prescription of medicines, we conducted a pharmacoeconomical analysis based on ABC-VEN analysis. Table No. 2 shows the consumption of drugs for the 2 half-years of 2021 and 2022, amounting to 405,944,532.30 Kazakh tenge for 2021 and 398,653,456.27 Kazakh tenge for 2022. At the same time, it should be noted that the clinical pharmacologist began working in the staff of the Ministry of Defense in 2022. The total number of drugs used for the 1st half of 2021 amounted to 403 drugs, for the 2nd half of 2022 382 drugs. See Table #1. With a difference of 21 drugs.

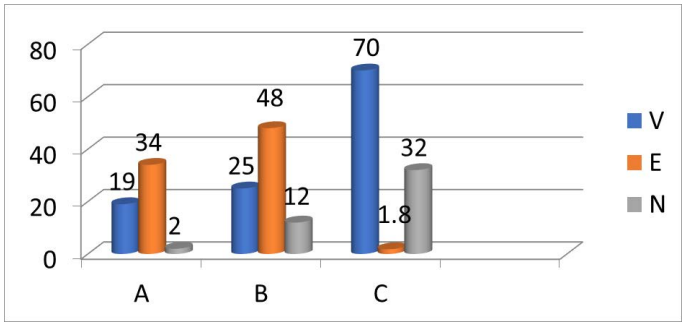

Figure 1. *ABC-VEN- medicines consumption analysis for the period from 01.01.2021 to 24.05.2021.*

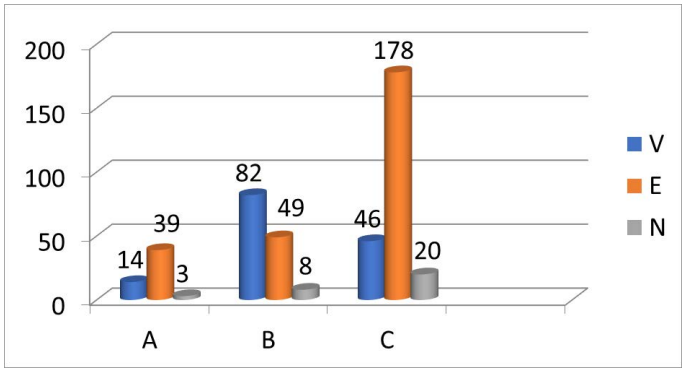

Figure 2. *ABC-VEN- medicines consumption analysis for the period from 01.01.2022 to 24.05.2022.*

Table 3. *ABC-VED Matrix Analysis for 2021.*

	No of Items	% of Items	% Expenditure
1st Category (AV+BV+CV+AE+AN)	150	37,220%	86,6%
2nd Category (BE+CE+BN)	221	54,838%	13,4%
3rd Category (CN)	32	7,94%	0,4%
Total	403	100%	100%

Table 4. *ABC-VED Matrix Analysis for 2022.*

	No of Items	% of Items	% Expenditure
1st Category (AV+BV+CV+AE+AN)	127	33,2460733%	85,9%
2nd Category (BE+CE+BN)	235	61,5183246%	13,9%
3rd Category (CN)	20	5,23560209%	0,1%
Total	382	100%	100%

The analysis of consumption for 2021 revealed the irrational use of drugs for group N drugs, amounting to 11.4%. A similar situation was observed in 2022. But with dynamics with a decrease of 3.2%. The total consumption of drugs from group N for 2021 amounted to 14,416,712.7 Kazakh tenge (Figure 1), for 2022 12,098,375,83Kazakh tenge (Figure 2). With a difference of 2,318,336.87 million Kazakh tenge . It should also be noted that many drugs from the list of residues for 2021 were included in the list of the material statement for 2022. Among the frequently prescribed and expendable antibiotics included: Meropenem, Ceftriaxone and Metranidazole. The list of expensive drugs includes radioconstrictive, anticoagulant, immunological drugs, and infusion solutions of 0.9% NaCl.

ABC analysis showed similar results in Dessie Referral Hospital, Ethiopia [10]:- antibiotics like ceftriaxone(CEF III) 1 g injection: fluids like sodium chloride 0.9% solution were located in a group (A).

The increase in the cost of saline solutions can be explained by the purchase and use of 0.9% NaCl in 200 ml, when in practice doctors often prescribe 100 ml. As a result, half of the solution could not be used, pouring out.

Based on this, measures should be taken to reduce unreasonable prescriptions and improve applications for the purchase of medicines, using the example of saline solution. After all, if we take into account the purchase of half of the saline solution in 100 ml, it could significantly save the state budget with a difference of 13 million Kazakh tenge for 2021 and 10 million Kazakh tenge for 2022. Thus, not only reduce unreasonable costs, but also take measures to use drugs with a more reliable evidence base.

Overall, 78 medication products (from 2021-2022) that fall into the subgroups of AV, AE, and BV of category I are included due to their necessary or vital character. These items should be in stock. Therefore, any medicine deficit in this category must be removed [6].

3-2 medication products (from 2021-2022) that make up subgroup AN must be regulated for economic order quality before being ordered. And should also be carefully examined before placing the order.

The items in category II (54,8% -61,5% of all items from 2021-2022) are not expensive or vital as I category, so, this group needs to be controlled periodically [7] and could be ordered once or twice a year without affecting patient care.

The category III (5,23-7,94% of all items from 2021-2022) consist sub-category namely, CN . These are the least necessary and affordable products in this group. This group does not need to be controlled periodically.

Our research detected:

1) prescribing antibiotics of the same group (Beta-lactam): Piperacillin Tazobactam+Meropenem, Ceftazidim+Meropenem

2) appointment of unprotected antibiotics after protected ones: Amoxicillin after Amoxiclav.

3) the appointment is not on the spectrum of action:The appointment of Amikacin (Gram-) Gram+

4)the wrong combination of antibiotics: Amikacin+Vancomycin

5) prescribing antibiotics immediately from the Reserve group, instead of from the Access, Watch group

Pathogens such as Pseudomonas aeruginosa, Enterobacteriaceae (E.coli, Klebsiella pneumonia, Enterobacter spp) have proven resistant to many antibacterial drugs.

Of those sensitive to antibacterial therapy, only Colistin (Polymyxin) turned out to be, which was not in the MO's Medical Formulary.

We offered to purchase this drug, after which an improvement was noted and later included in the Medical Formulary.

Conclusion.

During this ABC/VEN analysis, we could answer three important questions:

1. How are funds for medicines spent in the Ministry of Defence? (mainly on which medicines from the ABC and VEN group).

2. What measures should be taken to rationalize medicine procurement?

3. Which medicines should be considered first (for inclusion/ exclusion)?

This method indicates a positive response to measures to improve the quality of treatment and the rationality of prescribed medicines, helping to make treatment more effective, safe and economically justified. [1]

A comparison analysis between ABC and VEN (Vital, Essential, and Non-Essential) methods was conducted in a multidisciplinary hospital. The results showed that the efficient and rational use of medications improved during the period of six months in 2021-2022. This success was due to RILS activities that involved the provision of training seminars to healthcare professionals.

To date, resistance to antibacterial drugs is growing. Every day there are infections that cannot be treated and aggravate the already difficult situation in the world with the growth of resistance.

In addition, improper prescribing of antibiotics and improper dosing, improper use of antibiotics, the choice of antibiotics of a wider spectrum of action worsen the already existing problem in the world with an increase in mortality.

Our study revealed the irrational prescription of antibiotics such as: prescribing antibiotics of the same, appointment of unprotected antibiotics after protected ones, the wrong combination of antibiotics , prescribing antibiotics immediately from the Reserve group, instead of from the Access, Watch group.

To reduce the growth of resistance and increase the use of safer and more effective use of antibiotics in the conditions of the MO, the following work to improve and accelerate measures to combat the resistance of this MO, we propose to conduct an analysis on the validity of the use of antibacterial agents based on the classification of AWARE.

REFERENCES

1. Mori AT, Mnandi PE, Kagashe G, et al. ABC-VEN Analysis of Medicine Expenditure at Mwananyamala Regional Hospital in Tanzania. Modern Economy. 2021;12:1449-1462.

2. Deressa MB, Beressa TB, Jemal A. Analysis of Pharmaceuticals Inventory Management Using ABC-VEN Matrix Analysis in Selected Health Facilities of West Shewa Zone, Oromia Regional State, Ethiopia. Integr Pharm Res Pract. 2022;11:47-59.

3. Anand T, Ingle GK, Kishore J, et al. ABC-VED Analysis of a Drug Store in the Department of Community Medicine of a Medical College in Delhi. Indian J Pharm Sci. 2013;75:113-117.

4. Deressa MB, Beressa TB, Jemal A. Analysis of Pharmaceuticals Inventory Management Using ABC-VEN Matrix Analysis in Selected Health Facilities of West Shewa Zone, Oromia Regional State, Ethiopia. Integr Pharm Res Pract. 2022;11:47-59.

5. Gizaw T, Jemal A. How is Information from ABC-VED-FNS Matrix Analysis Used to Improve Operational Efficiency of Pharmaceuticals Inventory Management? A Cross-Sectional Case Analysis. Integr Pharm Res Pract. 2021;10:65-73.

6. Hazrati E, Paknejad B, Azarashk A, et al. ABC and VED Analysis of Imam Reza Educational Hospital Pharmacy. Ann Mil Health Sci Res. 2018;16:e86183.

7. GünerGören H, Dağdeviren O. An excel-based inventory control system based on ABC and VED analyses for pharmacy: a case study. Galore International Journal of Health Sciences & Research. 2017;2:11-17.

8. Kazakhstan National Medicinal Formulary, May 18, 2021.

9. Kumar S, Chakravarty A. ABC-VED analysis of expendable medical stores at a tertiary care hospital. Med J Armed Forces India. 2015;71:24-27.

10. Mohammed SA, Workneh BD. Critical Analysis of Pharmaceuticals Inventory Management Using the ABC-VEN Matrix in Dessie Referral Hospital, Ethiopia. Integr Pharm Res Pract. 2020;9:113-125.