

GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 7-8 (376-377) Июль-Август 2026

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 ВИНТИ 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 ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

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. Корректур авторам не высылаются, 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 computer-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 საყურადღებო!

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, შემავსებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების 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 ფხიხლებში 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.

Nana Shavlakadze, Irine Phkhakadze, Ana Silagadze, Dali Kobuladze, Alina Pakhuridze. CHRONIC URTICARIA AND LEAD EXPOSURE: EVALUATION OF IMMUNOLOGICAL MARKERS.....	6-16
Jangirashvili T, Kikoria G, Tevdorashvili N, Kapanadze L, Odikadze N. PSYCHOLOGICAL WELL-BEING AMONG MEDICAL STUDENTS AT FIVE UNIVERSITIES IN TBILISI, GEORGIA: A CROSS-SECTIONAL STUDY OF PERCEIVED STRESS, ANXIETY, AND SLEEP QUALITY.....	17-23
Yueyue Lu, Yigao Wu. ADVANCES IN RESEARCH OF PSYCHOTHERAPY FOR SOCIAL ANXIETY DISORDER.....	24-31
Saburov Alisher, Kemelbekov Kanatzhan, Arybzhanov Dauranbek, Abdurakhmanov Babur, Huseinov Zafar, Saburova Saidakhon, Tuktibayeva Saule, Yernazarov Adlet, Alipbekova Sandugash. ROLE OF NEOADJUVANT THERAPY FOR PATIENTS WITH GASTRIC CANCER: MULTIDISCIPLINARY HOSPITAL WITH ONCOLOGY CENTER.....	32-37
David Tchkonია, Nino Gabashvili, Teona Mskhaladze, Tamari Kevlishvili, Mikolay Chkonia. EFFICACY OF ENDOBRONCHIAL VALVE PLACEMENT IN THE MANAGEMENT OF PULMONARY HEMORRHAGE: A COMPARATIVE STUDY.....	38-42
Baglan Kemelbekov, Ainur Amanzholykyz, Samat Saparbayev, Manarbek Askarov, Edgaras Stankevicius. IMPACT OF STEM CELL THERAPY ADDED TO GUIDELINE-DIRECTED MEDICAL THERAPY ON QUALITY OF LIFE IN PATIENTS WITH ISCHEMIC CARDIOMYOPATHY.....	43-50
Abramishvili T, Papava K, Mamisashvili M, Tkeshelashvili M, Tsinamdzgvrishvili B. CARDIAC STRAIN IN WOMEN WITH A DOCUMENTED HISTORY OF OVERT OR SUBCLINICAL HYPOTHYROIDISM: AN EXPLORATORY SPECKLE-TRACKING ECHOCARDIOGRAPHY STUDY.....	51-56
TEREZA Y. AZATYAN. FORMATION AND DISTRIBUTION PATTERNS OF FUNCTIONAL INTERHEMISPHERIC BRAIN ASYMMETRY IN CHILDREN WITH INTELLECTUAL DISABILITIES.....	57-63
Fai Twrki Althoini, Ebtehal Solaiman Almogbel. CARDIOMETABOLIC RISK PROFILES IN ADULTS WITH DIABETES: ASSOCIATIONS WITH GLYCEMIC CONTROL, DIABETES TYPE, AND DEMOGRAPHIC CHARACTERISTICS.....	64-77
Datumyan G.S, Shaboyan K.R, Muradyan A.A, Shaboyan E.K, Galstyan A.S, Badalyan A, Sargsyan M.V. IMPACT OF THE COVID-19 PANDEMIC ON THE SEVERITY AND OUTCOMES OF GUNSHOT INJURIES.....	78-84
Zhanar Kozhakhmetova, Nazym Yelemessova, Syzdykova Dinara, Abdullina Sayagul, Nagima Issatayeva, Assiya Turgambayeva, Gulnara Kamalbekova, Diana Zhumagaleyeva, Akmaral Mussakhanova. CRITICAL VALUES OF HEMOSTASIS PARAMETERS IN AN ONCOLOGY CENTER: A RETROSPECTIVE REGISTRY-BASED STUDY.....	85-92
Gradil G.I, Torianyk I.I, Yurko K.V, Shiyan D.M, Merkulova N.F, Mohylenets O.I, Tkachenko V.G, Karmazina I.S, Lantukh A.P, Hryhorov Y.B, Gargin V.V. ASSOCIATION OF PULMONARY AND CUTANEOUS CHANGES IN COVID-19-RELATED CONDITIONS.....	93-98
Alaa MA. Albayaty, Alaa M. Sadiq, Ali SJ. Al Qaissi. ASSOCIATION BETWEEN INFLAMMATORY MARKERS, LIVER ENZYMES, LIPID PROFILE, AND VITAMIN D STATUS IN ADULTS WITH OBESITY: A CROSS-SECTIONAL STUDY.....	99-104
Kenzhebaeva B, Baimuratova M, Kalmakhanov S, Budakoğlu I.I, Laktionova M, Abdulkalikova D. IMPACT OF CLINICAL, ORGANIZATIONAL, AND PSYCHOSOCIAL FACTORS ON THE QUALITY OF LIFE OF PATIENTS WITH DERMATOVENEREOLGICAL DISEASES.....	105-114
Obidov F. Kh, Shamsiev E. A, Samatov F. F, Naimov Dilshod Kayim ugli, Khalimova F. T, Marwan Ismail. BIOMARKER-ORIENTED REHABILITATION IN CHRONIC CEREBRAL ISCHEMIA.....	115-122
Raghad Alkhalify, Lina Almutairi, Fatimah Alghofaili, Wasan Alhawaish, Thekra Alhumidi. COMPARATIVE IN-VITRO QUALITY EVALUATION OF COMMERCIALLY AVAILABLE DICLOFENAC SODIUM TABLETS.....	123-131
Ali S. Jumaah, Ali A. Younis, Shamil H. Othman. EFFECTS OF CURCUMIN ON CLINICAL OUTCOMES AND INFLAMMATORY BIOMARKERS IN KNEE OSTEOARTHRITIS: A RANDOMIZED TRIAL.....	132-138
Ashot Markosyan, Diana Alaverdieva, Mark Danghyan, Ani Mkrtchyan, Lusine Balayan, Khachik Hakobyan, Arpine Geolchanyan, Tigran Soghomonyan, Volodya Mirzoyan. SYNTHESIS AND SOME BIOLOGICAL PROPERTIES OF DERIVATIVES OF 2,3-DISUBSTITUTED 5,5-DIMETHYL-BENZO[h]QUINAZOLIN-4(1H)-ONES.....	139-143

J. Gobadze, M. Nagervadze, T. Gogitidze, N. Bejanidze, N. Zarnadze, K. Dolidze. IMPACT OF GESTATIONAL DIABETES MELLITUS ON NEONATAL BIRTH WEIGHT, LENGTH, AND GESTATIONAL AGE: A RETROSPECTIVE CASE-CONTROL STUDY	144-151
Liudmyla Bashkistrova, Iryna Romanova, Vitalii Yatsynovych, Oleksandr Zlobin, Artem Lanskoi. EVIDENCE-BASED PHARMACOTHERAPY FOR ANXIETY DISORDERS COMORBID WITH PTSD: A SYSTEMATIC REVIEW	152-163
Madina Makhmudova, Tolegen Kerimbekov, Zhaina Berikbayeva, Dinara Turebekova, Lyudmila Akhmaltdinova, Yefim Alisseiko, Olga Avdienko, Madina Rashova. IN VITRO INVESTIGATION OF THE POTENTIAL OF C60 FULLERENES AS ADJUVANTS OF NONSPECIFIC IMMUNITY	164-168
Tchernev G, Tchernev KG Jr, Kordeva S. DERMATOLOGIC SURGERY ROUNDS: THE LIMBERG FLAP AND V-TO-T CLOSURE FOR CUTANEOUS/ MUCOCUTANEOUS DEFECTS FOLLOWING SKIN CANCER EXCISION IN HIGH-RISK FACIAL REGIONS	169-174
Nino Nadiradze, Zurab Ckhaidze. SELF-RATED HEALTH IN THE POPULATION OF MEDICAL WORKERS IN GEORGIA	175-180
Argjend Shala, Nexhmedin Shala, Fisnik Jashari, Blert Jashari, Rushit Jashari. SPORADIC CREUTZFELDT-JAKOB DISEASE: CLINICAL FEATURES, DIAGNOSIS AND THERAPEUTIC HORIZONS	181-189
Omar S. Salman, Adeeb A. Al-Zubaidy. ACEBROPHYLLINE REPROGRAMS INFLAMMATORY AND REDOX SIGNALLING IN EXPERIMENTAL ULCERATIVE COLITIS: A DOSE-DEPENDENT STUDY	190-199
Eib K. Eibov, Solikhabonu Khavaskhonova, Kamshat S. Taubay, Karlygash Zh. Sadykova. CALCULATED WHOLE BLOOD VISCOSITY IS SPECIFICALLY ASSOCIATED WITH ABDOMINAL OBESITY, BUT NOT WITH OTHER COMPONENTS OF METABOLIC SYNDROME: A CROSS-SECTIONAL STUDY IN A CENTRAL ASIAN ADULT COHORT	200-208
Shqiponje Gashi, Erza Voca Mulaj, Naser Rugova, Suzana Dvojakovska, Filip Koneski. MANAGEMENT OF PERIOPERATIVE BLEEDING IN PATIENTS WITH PLATELET HYPOAGGREGABILITY DURING DENTOALVEOLAR SURGERY: CLINICAL OUTCOMES AND THERAPEUTIC APPROACHES	209-214
Alina Articulo, Rigor Rey Cuevas, Hani Al-Najjar, Rahaf Alkhuraif, Rasha Aburmeishan, Abdulaziz Almatrody. EXPLORING THE SATISFACTION OF NEWLY HIRED NURSES USING AN EVIDENCE-BASED, PERSONALIZED ONBOARDING PROGRAM: A CROSS-SECTIONAL ANALYSIS	215-222
Nagima Issatayeva, Samal Duisekova, Meruert Saberbekova, Roza Tumanova, Larisa Guruleva, Sholpan Mukanova. APPLICATION OF THE FAILURE MODE AND EFFECTS ANALYSIS METHOD IN HEALTHCARE: A CASE STUDY OF A UNIVERSITY MEDICAL CENTER IN KAZAKHSTAN	223-237
Hisham R. Ezzat, Ibrahim M. Faisal. CARDIOPROTECTIVE EFFECTS OF SILYMARIN AND VITAMIN E AGAINST DOXORUBICIN-INDUCED CARDIOTOXICITY IN RATS: EVIDENCE FROM OXIDATIVE STRESS MARKERS AND HISTOPATHOLOGICAL ANALYSIS	238-245
Shishniashvili D.S, Bedinashvili Z.J, Tsomaia K.B, Svanadze L.M, Chkhikvishvili N.M, Durglishvili G.A. FIRST-VOID URINE VERSUS URETHRAL SWAB FOR MOLECULAR DETECTION OF SEXUALLY TRANSMITTED INFECTIONS IN MEN WITH MULTIPLE SEXUAL PARTNERS	246-252
Chekhovska G.S, Pustova N.O, Syzon O.O, Chaplyk-Chyzho I.O, Dashko M.O, Vozniak I.Ya, Volbyn S.V, Ivaniushko-Nazarko N.V, Zhemela O.D, Gargin V.V. NAIL PLATE DAMAGE INDEX IN DERMATOSCOPIC EXAMINATION OF PATIENTS WITH ONYCHOMYCOSIS	253-258
Meng-Yun Zhou, Shi-qi Yu, Shao-jie Zhu, Xiang Kong, Xin-Ming Yao. A NOVEL KCNJ5 GENE MUTATION ASSOCIATED WITH FAMILIAL ALDOSTERONISM TYPE III WITHOUT HYPERTENSION	259-265
Koba Kamashidze, Tina Beruchashvili, Irina Nakashidze, Sarfraz Ahmad, Tamar Peshkova. BRIDGING THE COVERAGE-PARTICIPATION GAP: BEHAVIORAL DETERMINANTS OF CERVICAL CANCER SCREENING AMONG WOMEN IN ADJARA, GEORGIA	266-273
T.N. Kosayeva, A.T. Amiraslanov, H.K. Muradov, A.Y. Gaziyeu, B.E. Abbasov. PD-L1 EXPRESSION AND SERUM CA125: CLINICOPATHOLOGICAL CORRELATIONS IN HIGH-GRADE SEROUS OVARIAN CARCINOMA	274-280
Ruziyeva Amira Asrorovna, Khamidov Obid Abdurakhmanovich, Murodqosimov Saidolim, Doniyorov Bakhridin Baxrom ugli, Khalimova F.T, Marwan Ismail. ACE I/D AND NOS3 G894T POLYMORPHISMS AND CARDIOVASCULAR ADAPTATION PROFILES IN ADOLESCENT FOOTBALL PLAYERS	281-288

Mukhriddin Umbarov Ochilovich, Shamsutdinova Maksuda Ilyasovna, Abdullayev Ravshanbek Babajonovich, Rokhila Bakhriiddinovna Mengliyeva. ASSOCIATIONS OF CYTOKINE PROFILE AND EXOCRINE PANCREATIC FUNCTION WITH A SYMPTOM-BASED DEHYDRATION CATEGORY AND SEASON OF PRESENTATION IN CHRONIC PANCREATITIS: A RETROSPECTIVE STUDY.....	289-297
Saeed H. Hussein, Hiba M. Ahmed, Ahmed A. Ahmed. DETECTION OF HEPATITIS B AND C VIRAL INFECTION AMONG CHILDREN WITH ACUTE LEUKAEMIA.....	298-302
Davit Kobuladze, Ahishtan Febrian Nishanthan, Nino Kedelidze, Rusudan Vadatchkoria, Magda Davitashvili, Lamara Zuroshvili, Darejan Margalitashvili, Nani Gvarishvili, Nazi Turmanidze, Tamar Peshkova, Naman Chauhan, Teona Gogitidze, Nameera Parveen Shaikh, Aleena Parveen Shaikh, Abeshana Febrian Nishanthan, Irina Nakashidze. SELECTED LABORATORY PARAMETERS IN PEDIATRIC PATIENTS WITH COVID-19 STRATIFIED BY WHITE BLOOD CELL AND PLATELET PROFILES.....	303-309
Rawan Waleed, Abrar Fadlalla, Jana Abdullah, Marwan Ismail, Mohammed Ibrahim Saeed, Ahmad Luay Osman Hashim, Abdelgadir Elamin Eltom. IMPACT OF HELICOBACTER PYLORI INFECTION ON VITAMIN B12 DEFICIENCY LEVELS: A RETROSPECTIVE STUDY.....	310-315
T.A. Asgarova, K.M. Rahimli, G.A. Valiyeva, Sh.I. Hasanova, F.E. Guliyeva, Kh.R. Mammadova. SOME HEREDITARY DISEASES PREVALENT IN THE REPUBLIC OF AZERBAIJAN.....	316-319
Sahadete Shala, Ferdita Haxhiu Derguti. PSOAS MUSCLE ABSCESS FOLLOWING CESAREAN SECTION: A CASE REPORT.....	320-322
N. Kajaia, L. Gabunia, M. Mantskava, S. Kalmakhelidze, G. Ormotsadze, S. Turabelidze-Robaqidze, T. Sanikidze. PRO-INFLAMMATORY INTERLEUKINS AND OXIDATIVE IMBALANCE IN L-NAME-INDUCED HYPERTENSION: COMPARATIVE EFFECTS OF β -BLOCKERS.....	323-330
Hussein Fadhil Abdulameer, Raed Aziz Badeia. COMPARATIVE EVALUATION OF TWO HERBAL MOUTHWASHES AND CHLORHEXIDINE ON CALPROTECTIN IN GINGIVITIS PATIENTS: A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL.....	331-340
J. Gobadze, M. Nagervadze, T. Gogitidze, N. Bejanidze, T. Koiava. SOME BIOLOGICAL CHARACTERISTICS ASSOCIATED WITH GESTATIONAL DIABETES.....	341-348
Yurevych N. O, Sazonova O. N, Kachailo I.A, Hnidyk Yu. V, Pokotylo P. B, Podolyuk M.V, Blyshak N. B, Mykhalevych M. M, Zherebkin V. V, Kosynskyi O. V, Aliksieieva V. V. THREE-DIMENSIONAL CT-BASED MORPHOMETRIC ASSESSMENT OF THE MAXILLARY SINUS.....	349-355
Simbarashe Magaisa. PERCEPTIONS AND PRACTICES OF HEALTHCARE PROVIDERS IN MATERNAL MORTALITY AND STILLBIRTH PREVENTION AND MANAGEMENT: INSIGHTS FROM LEJWELEPUTSWA DISTRICT.....	356-363
Akezhan Rustemuly Astrakhanov, Ainur Amanzholkyzy, Samat Sagatovich Saparbayev, Meirambek Sagnaevich Kurmangazin, Aigerim Iskakova, Gulzhanat Nurlanova. THE ROLE OF CELL THERAPY IN THE COMPREHENSIVE TREATMENT OF CHRONIC HEPATITIS C-RELATED LIVER CIRRHOSIS.....	364-370
Miranda Shervashidze, Khatia Dolidze, Tamar Bakhtadze, Tamar Shervashidze. PREVENTING EXERCISE-RELATED SUDDEN CARDIAC DEATH THROUGH SYSTEMATIC PREPARTICIPATION CARDIOVASCULAR SCREENING: A TWO-YEAR REGIONAL COHORT STUDY OF PEDIATRIC ATHLETES IN ADJARA, GEORGIA.....	371-380
Waseem Hashim Alkhaffaf, Muhammad A. Alkataan. COMPARATIVE EFFICACY OF 200 UNITS VERSUS 155 UNITS OF ONABOTULINUMTOXIN A FOR CHRONIC MIGRAINE.....	381-388
K. Tovar Calderón, J. Orozco Pilco, C. Calderón Cabezas, K. Caiza Cuello. ETHNIC DISPARITIES IN BIRTH WEIGHT AND PRENATAL CARE UTILIZATION IN ECUADOR, 2024.....	389-394
Gaukhar Issakova, Suriya Yessentayeva, Daniyar Amangaliyev, Askhat Bralov, Assiya M. Issayeva, Yestay Abzalbek, Marat Akhetov. INDICATIONS FOR REMOVAL OF A PORT SYSTEM IN A PATIENT WITH SUSPECTED SEPTICEMIA IN THE ABSENCE OF OTHER LOCAL SOURCES OF INFECTION.....	395-398
Mohammed A. Hayawi, Duaa M. Al-Nafoly. PREDOMINANCE OF FOLLICULAR ADENOMA AND PAPILLARY CARCINOMA IN THYROID NEOPLASMS.....	399-403
Nino Buadze, Nata Kazakhashvili. POPULATION KNOWLEDGE, RISK PERCEPTION, GOVERNANCE AND PUBLIC HEALTH DETERMINANTS OF COVID-19 IN GEORGIA: A NATIONAL CROSS-SECTIONAL STUDY.....	404-422

Alaa H. Alfarhan, Bahir S. Allawi, Mohammed A. Aljodah, Ahmed Jawad. MINIMALLY INVASIVE FAT TRANSPOSITION IN LOWER BLEPHAROPLASTY	423-427
Ospanova Meruyert, Ospanova Saniya, Yernazarov Adilet, Amanbaev Rauan, Rakhmankulov Umarali. LOW-FREQUENCY ULTRASOUND AND OZONE/NO TECHNOLOGIES IN THE COMBINED TREATMENT OF EXUDATIVE HEMISINUSITIS USING THE YAMIK-3 SINUS CATHETER.....	428-432
Sodikjon Mashraf Ugli Makhmatkulov, Ibragimova Malika Shavkatovna, Khasanov Alisher Yurevich, Mavlyanova Zilola Farkhadovna, Khalimova F.T, Marwan Ismail. COMBINED BOTULINUM TOXIN THERAPY AND PERCUTANEOUS TIBIAL NERVE STIMULATION IN THE REHABILITATION OF WOMEN WITH URGENCY URINARY INCONTINENCE ASSOCIATED WITH DIABETES MELLITUS.....	433-444
Nellia Veretova, Alfiya Samigullina, Aigul Baialieva, Ruslan Abdyldaev, Begimai Muratbekova. PSYCHONEUROLOGICAL THERAPY FOR POST-COVID SYNDROME: A COMPREHENSIVE REVIEW OF METHODS AND CLINICAL EFFECTIVENESS.....	445-451
Azhar Giniyat, Natalya Slivkina, Viktor Tkachev, Gulbana Khussainova, Ayan Baigaliyev, Sara Kubekova, Aizat Seidakhmetova, Zilola Mavlyanova, Mirbanu Aikhodzheyeva, Raikhan Burumbaeva, Larissa Pavlovets, Raikhan Tleulinova, Raushan Baigenzheyeva, Mereke Alaidarova, Joseph Almazan, Aizhan Altynbekova, Bakyt Zhangabulova, Zinugul Baissova, Manzura Kankina, Parida Pirmanova, Magira Shaizadinova, Aliya Utenova, Zhansaya Raiymkul. DEVELOPMENT AND EVALUATION OF A NURSE-LED SELF-DIRECTED PEDIATRIC REHABILITATION MODEL: COMPARATIVE ANALYSIS OF INTERNATIONAL PRACTICES.....	452-465
Florina Sahiti, Argjira Veseli, Marija Peeva Petreska, Shera Kosumi, Nora Berisha, Enis Veseli, Kaltrina Veseli. BIOMARKERS OF BONE REMODELING AND INFLAMMATION IN CHRONIC PERIAPICAL LESIONS: A NARRATIVE REVIEW	466-473

NAIL PLATE DAMAGE INDEX IN DERMATOSCOPIC EXAMINATION OF PATIENTS WITH ONYCHOMYCOSIS

Chekhovska G.S¹, Pustova N.O², Syzon O.O³, Chaplyk-Chyzho I.O³, Dashko M.O³, Vozniak I.Ya³, Volbyn S.V³, Ivaniushko-Nazarko N.V³, Zhemela O.D⁴, Gargin V.V^{2,4,5}.

¹Private Institution of higher education "Kharkiv Institute of Medicine and Biomedical Sciences", Kharkiv, Ukraine.

²Kharkiv National Medical University, Kharkiv, Ukraine.

³Danylo Halytsky Lviv National Medical University, Lviv, Ukraine.

⁴Private Institution of Higher Education «Kharkiv International Medical University», Kharkiv, Ukraine.

⁵Karazin Kharkiv National University, Kharkiv, Ukraine.

Abstract.

Introduction: The lack of uniform criteria for assessing the degree of damage to the nail plates of patients with onychomycosis does not allow for an objective assessment of the effectiveness of therapy and a comparative assessment of the results of treatment using different methods. In modern medicine, the use of instrumental methods of diagnosis and treatment is becoming more widespread. In particular, one of the options for obtaining information about the state of lesions is nail plate damage index (NPDI). However, the correspondence of the macroscopic appearance to the actual condition remains unclear.

Aim: The aim of our study was to determine the objectivity of nail plate damage index by comparing it with the degree of contamination with fungal structures.

Materials and methods: Patients with onychomycosis were examined with nail plate damage index (NPDI), Scoring Clinical Index of Onychomycosis (SCIO), and Onychomycosis Severity Index (OSI). To assess the degree of fungal contamination, scraping microscopy was performed. After assessing the degree of damage using NPDI, SCIO, OSI compared their results with the data of microscopic examination.

Results: When comparing the data of microscopic examination and external examination, it was found that, as a rule, with microscopic damage to 25% of the area, macroscopically observed change in nail color is observed, white or yellow spots/stripes appear (often near the free edge or on the sides), while the thickness of the nail is almost not disturbed. With damage from 25% to 50% of the area, the nail becomes dull, noticeably thickens, deforms and begins to crumble. Subungual hyperkeratosis (accumulation of horny masses) often occurs. With damage to more than 50% of the area, changes reach the matrix (nail growth zone). The nail plate collapses, exfoliates from the bed (onycholysis) or becomes thin and softened.

Conclusions: Definition of nail plate damage index at onychomycosis is an informative indicator with a high correlation with the area of contamination ($r=0.81$) and can be recommended for both diagnosis and monitoring of the treatment process.

Key words. Onychomycosis, dermatoscopy, microscopy, morphology, nail plate, pathology.

Introduction.

Infectious diseases are among the leading causes of severe conditions [1,2]. They control and management could significantly improve epidemiological indicators [3,4]. With

a normal objective examination, it is quite easy to suspect the presence of a fungal infection in the nails of patients, especially when changes in the nail plates are accompanied by mycotic lesions of the skin of the feet or hands, the presence of rubromycosis of smooth skin or candidiasis of large folds [5,6]. When the above diseases are absent or are in remission after antifungal treatment or permanent use of topical antifungal ointments by patients, the diagnosis becomes much more complicated. A slight deformation of the nail plates, a change in its color, the patient, and sometimes the doctor, may take for dystrophic changes due to a previous nail injury or wearing narrow shoes, but not for a fungal infection [7,8]. Differential diagnosis of onychomycosis presents some difficulties due to the fact that similar changes in the nail plates can be observed in patients with chronic dermatoses, such as psoriasis, eczema, lichen planus, lupus erythematosus, scleroderma, lichen planus, bullous dermatoses, etc., in which structural changes in the nail plates are observed [9,10].

The lack of uniform criteria for assessing the degree of damage to the nail plates of patients with onychomycosis does not allow for an objective assessment of the effectiveness of therapy and a comparative assessment of the results of treatment using different methods. In modern medicine, the use of instrumental methods of diagnosis and treatment is becoming more widespread [11,12]. Artificial intelligence tools are increasingly being introduced. In this case, digital images are often the basis for the use of AI [13,14]. But for AI, intelligence must receive objective criteria for the success and validity of its conclusions. One of the ways to implement AI in dermatology can be the analysis of digital images of affected areas, in particular nail plates. In particular, one of the options for obtaining information about the state of lesions is nail plate damage index (NPDI). However, the correspondence of the macroscopic appearance to the actual condition remains unclear. In addition, images for digital analysis can be obtained by epiluminescence microscopy, which allows to see at high magnification (from 10 to 50 times) structural changes in the nail plates that are not visible to the naked eye.

The aim of our study was to determine the objectivity of nail plate damage index by comparing it with the degree of contamination with fungal structures.

Materials and Methods.

Patients with onychomycosis who participated in the study (138 patients) underwent dermatoscopic examination of the nail

plates of the hands and feet before the start of treatment and an assessment of nail plate damage was made. Diagnosis was confirmed by microscopic examination and PCR. Mycological examination of patients for diagnostic confirmation method of onychomycosis included microscopic examination of pathological material (pieces of nail fragments) and culture. PCR was performed using a reagent kit with primers to determine the presence of DNA specific to *Trichophyton rubrum*, and PCR with panfungal primers.

To assess the degree of nail plate damage by onychomycosis, the nail plate damage index (NPDI) was used according to the method described in detail by us earlier [15]. The number of points in the range from 0 to 3 was awarded to the selected signs. NPDI was calculated according to seven clinical criteria: a scratched surface, a change in the free edge, nail hyperkeratosis, uneven nail color, the presence of cavities, the presence of tunnels, nail atrophy. The index value in patients with onychomycosis with different degrees of severity of the process was divided into the minimum NPDI – from 1 to 4 points; moderate NPDI – from 5 to 10 points; pronounced degree NPDI – from 11 to 21 points [15]. Inter-rater reliability of dermatoscopic assessments was provided by three examiners in a study where results were obtained by consensus. Epiluminescence surface microscopy of affected nail plates was performed using a DermLite II Pro HR dermatoscope (USA) and an Omnivision video dermatoscope (Korea). Dermatoscopy photographs were taken using a Sony α -58 digital camera, which was connected to the dermatoscope with an adapter ring and a Sony photo adapter. During the study, a total of 2583 dermatoscopic images of nail plates were taken, of which 1943 images of nail plates affected by mycelium and 640 images of nails without fungal infection were analyzed. As comparison methods, we used Scoring Clinical Index of Onychomycosis (SCIO) and Onychomycosis Severity Index (OSI) scoring, which are common enough for taking into account the area of infection and the depth of penetration in fungal lesions [16]. OSI is calculated by multiplying the score for the area of the lesion (range 0-5) by the score for the proximity of the disease to the matrix (range 1-5). Ten points are added for the presence of a longitudinal stripe or spot (dermatophytoma) or for subungual hyperkeratosis greater than 2 mm. Mild onychomycosis corresponds to a score of 1 to 5; moderate - from 6 to 15; and severe - from 16 to 35 [17]. SCIO is used to determine treatment tactics, in particular, with a score of 1–3, local treatment is recommended (in combination with scraping/cutting off the affected edges); 3–6 points - local treatment can be used, but for nails that grow more slowly, systemic therapy is recommended; 6–12 points recommend systemic antifungal therapy (e.g., pulse-dosing of oral antifungal drugs) depending on whether it is a fingernail or a toenail. Scores of 12–20 suggest systemic therapy with possible combined approaches (adding local measures or keratinolytic therapy) [18].

To assess the degree of fungal contamination, scraping microscopy was performed. Sections were stained with Romanowski-Giemza and morphometry was performed according to previously published recommendations [13]. To quantify the degree of fungal damage, the area of the surface occupied by hyphae was measured; this value in percent reflects the proportion occupied by hyphae relative to the total surface. In

the areas occupied by hyphae, the volumetric density parameter (%) was also determined. This parameter reflects the spread and range of mycelium penetration and corresponds to the number and size of hyphae. Depending on the area of damage, during microscopic examination, the initial (mild) form was distinguished - the damage occupies up to 25% of the field of view, average (moderate) - 25% to 50% of the area is affected, and severe (advanced) - more than 50% of the area is affected. Total damage with 100% replacement by elements of the fungal structure was not observed in our study. After assessing the degree of damage using NPDI, SCIO, OSI compared their results with the data of microscopic examination.

The study was performed in accordance with the principles of the Helsinki Declaration of the World Medical Association "Ethical Principles of Medical Research Concerning Human Subjects" (2013) with written informed consent. Statistical processing of the data was performed using the Statistica for Windows 8.0 software package. Methods of descriptive statistics (determination of numerical characteristics of variables - arithmetic mean (M), mean sampling error (m), determination of the reliability of differences (p), which were tested via the Student-Fisher t-test in representative samples) were used. Correlation between indicators was assessed using Spearman's correlation coefficient (r). The difference in values between comparative indicators was considered significant at $p < 0.05$.

Results.

Of these, 138 patients with onychomycosis in whom the diagnosis was confirmed by microscopic examination and PCR, the distribution by gender was as follows. There were 79 women (57.2%), 59 men (42.8%). Using the method of examining nail plates developed by us, out of 138 patients, 35 patients (25.4%) showed only the initial manifestations of the introduction of fungal infection into the nail plate, 10 patients (7.2%) already had signs of total damage with matrix involvement, 38 (27.5%) patients had signs of total damage without matrix involvement, and 55 (39.9%) patients constituted the main percentage with distal-lateral damage. A significant percentage of patients (21.5%) considered their nails healthy before seeking medical attention. We paid special attention to dermatoscopy to patients with mycoses of the hands and feet, rubromycosis of smooth skin, since they are mostly at risk of spreading mycotic infection from the skin to the nail plates. Therefore, using dermatoscopy in 13 patients of this group, we confirmed the first changes in the nails, when the microscopic examination was still negative, which remained unnoticed by doctors during visual examination of the nail plates.

According to the clinical sign, we obtained a characteristic dermatoscopic picture. Each examined patient with onychomycosis had certain and characteristic clinical changes of the nail plates only for him. The doctor assessed these changes and assigned points, then summed them up. The number of points obtained determined the NPDI value, and accordingly the severity of onychomycosis with visualisation on figures 1-7. Thus, in the range from 1 to 21 points, onychomycosis of any severity can be calculated (Figures 1-7).

A high NPDI index was observed in 41 patients (29.7%), moderate – in 78 (56.5%) patients, and the smallest number of

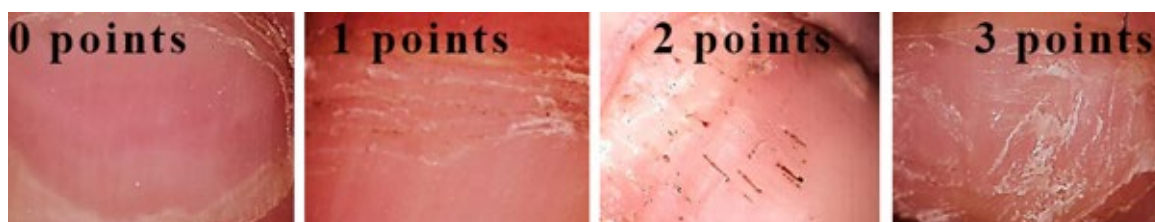


Figure 1. Unevenly outlined surface of the nail plate.

0 points There is no sign of unevenly outlined nail plate surface.

1 points The unevenly outlined surface occupies up to 30% of the nail plate in the form of longitudinal white and yellow wavy lines with brown dots in the structure and scales.

2 points The unevenly outlined surface occupies more than 30% of the nail plate in the form of brown, tan, and white longitudinal and transverse lines with multiple dots.

3 points The unevenly outlined surface occupies the entire nail plate in the form of oblique, longitudinal and transverse white lines.

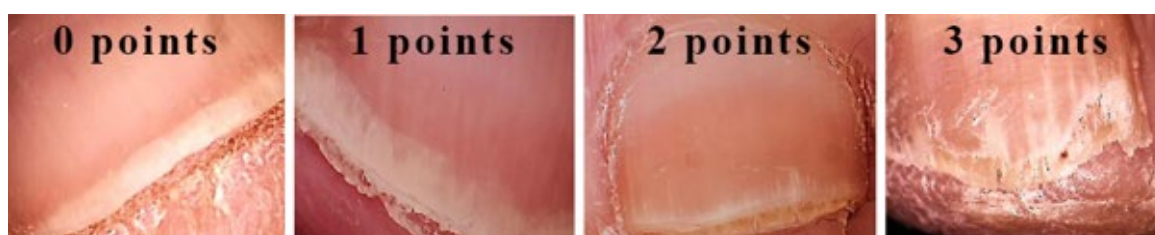


Figure 2. Free edge change.

0 points There are no changes in the free edge in the presence of subungual hyperkeratosis and significant changes in the distal nail bed: multiple cracks and layers of white scales, the capillary pattern is not visualized.

1 points Partial delamination of the free edge with preservation of the normotrophic structure of the nail plate.

2 points Delamination along the entire length of the nail plate in the form of transverse whitish and gray-yellow stripes with brown inclusions.

3 points Absence of a free edge in the total form of the lesion.

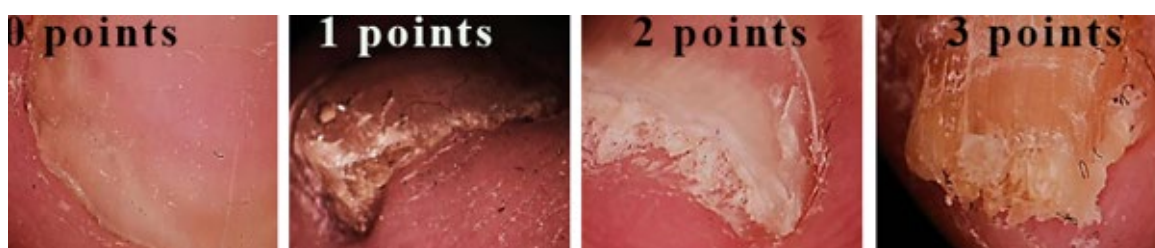


Figure 3. Nail plate hyperkeratosis.

0 points There is no sign of hyperkeratosis of the nail plate, but there are: a change in the color of the nail, the presence of a free edge and partial longitudinal striation with no parallelism of the gray stripes.

1 points Hyperkeratosis covers up to 30% of the nail plate.

2 points Hyperkeratosis occupies more than 30% of the nail plate and the process of nail destruction begins from the free edge.

3 points Hyperkeratosis covers the entire nail plate, the color is yellow-brown with significantly pronounced signs of surface damage, eponychia.

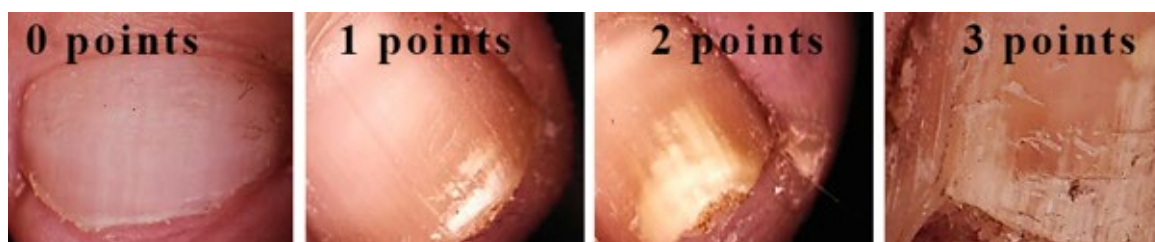


Figure 4. Uneven nail plate color.

0 points There is no unevenness in the color of the nail plate.

1 points Minor focal pigmentation of the nail plate in the form of white and yellow spots that occupy a small portion of the nail plate surface.

2 points Pronounced uneven coloration of the nail plate, occupying half of the surface of the nail plate.

3 points Multi-colored discoloration of the nail plate in the form of white, yellow and brown spots with significant surface destruction.

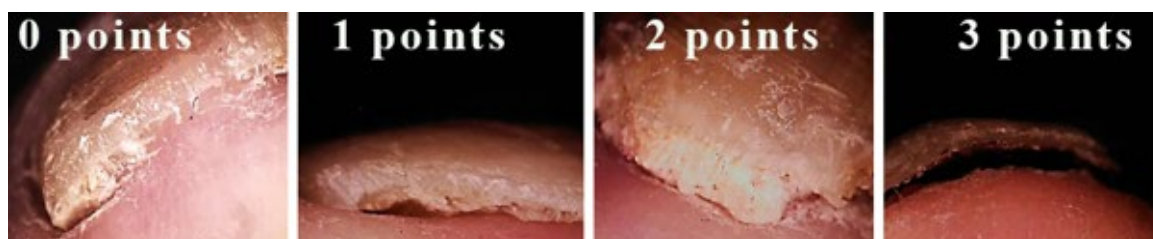


Figure 5. Cavities between the nail plate and the nail bed.

0 points Absence of cavities between the nail plate and the nail bed with the presence of other manifestations of nail onychomycosis.

1 points One small cavity between the nail plate and the nail bed.

2 points Two or more cavities between the nail plate and the nail bed are observed from the side of the lateral ridges.

3 points Complete detachment of the nail plate from the nail bed and held only in the proximal part of the nail.

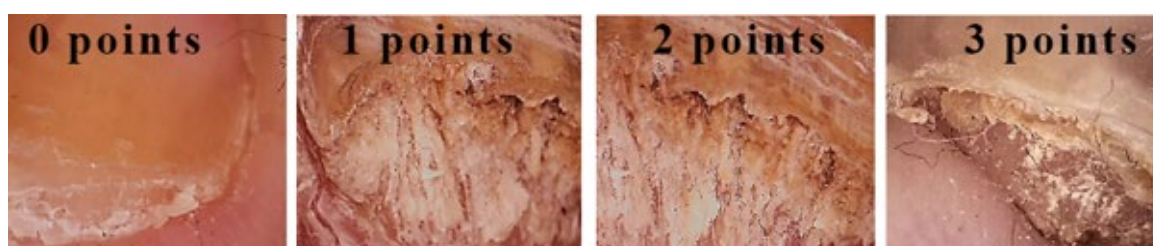


Figure 6. Tunnels in the thickness of the nail plate.

0 points There are no tunnels in the thickness of the nail plate in the presence of its thickening.

1 points The presence of up to two tunnels in the thickness of the nail plate in the form of longitudinal and transverse cavities in the thickness of the nail.

2 points The presence of three or more tunnels in the thickness of the nail plate.

3 points Complete detachment of the nail plate.

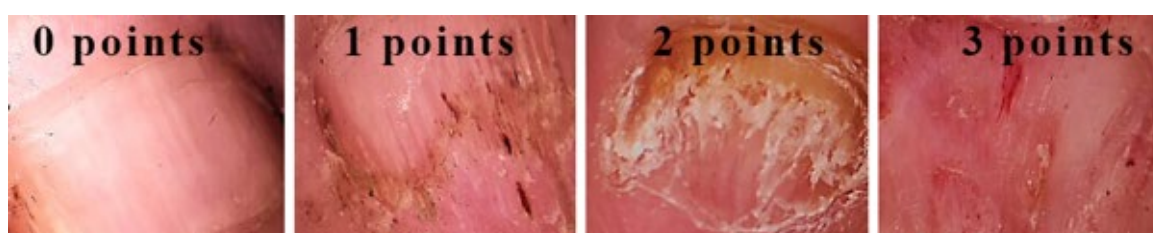


Figure 7. Nail plate atrophy.

0 points There is no atrophy of the nail plate, the entire plate is preserved.

1 points One-third of the nail plate is missing and there are a large number of longitudinal red and brown lines and pieces of the nail plate.

2 points Two-thirds of the nail plate is missing and longitudinal pink looped lines and white scales are visible on the exposed nail bed.

3 points Complete absence of the nail plate and visualization of hemorrhages, cicatricial changes, and fragments of the nail plate.

Table 1. The severity of nail plate lesions assessed by different methods.

Severity level	Nail plate damage index (NPDI)	Scoring Clinical Index of Onychomycosis (SCIO)	Onychomycosis Severity Index (OSI)
easy	19 (13.8 %)	16 (11.6 %)	18 (13.0 %)
moderate	78 (56.5%)	75 (54.3 %)	77 (55.8 %)
Heavy	41 (29.7%)	45 (32.6%)	43 (31.2 %)
Comparison of severity (number of points) obtained with NPDI, SCIO, OSI and microscopic examination (r)	0.81	0.74	0.77

patients was with a minimum index – 19 (13.8%). The average NPDI of the examined patients with onychomycosis was (10.7 ± 0.3) points. It should be noted that despite the different numbers, the groups were compared according to the degree of certainty of clinical symptoms. With a minimum severity (1–4 points), we usually considered the appointment of systemic antifungal drugs not justified, as a rule, only external antifungal therapy was required. With a moderate severity (5–10 points), the number of

affected nail plates and the presence of concomitant pathology were necessarily assessed. After that, a conclusion was made about the optimal volume of treatment, in particular the need for the appointment of a systemic antifungal drug. In severe cases (11–21 points), we used combination therapy, which included systemic (in the absence of contraindications) and external antifungal therapy. The average NPDI of the examined patients with onychomycosis was equal to 10.7 ± 0.3 .

When comparing the data of microscopic examination and external examination, it was found that, as a rule, with microscopic damage to 25% of the area, macroscopically observed change in nail color is observed, white or yellow spots/stripes appear (often near the free edge or on the sides), while the thickness of the nail is almost not disturbed. With damage from 25% to 50% of the area, the nail becomes dull, noticeably thickens, deforms and begins to crumble. Subungual hyperkeratosis (accumulation of horny masses) often occurs. With damage to more than 50% of the area, changes reach the matrix (nail growth zone). The nail plate collapses, exfoliates from the bed (onycholysis) or becomes thin and softened.

The results of comparing the assessment of the severity of signs of fungal damage carried out by different methods and their relationship with the microscopic structure are presented in Table 1.

Discussion.

Comparison of direct smear, culture and histology for the diagnosis of onychomycosis proves that the most sensitive combination of tests, smear plus histology, has 97.8% sensitive with 98% negative predictive value [19,20]. But direct smear combined with histological examination needs time for obtaining final results. Dermatoscopic examination of the nail plates led us to identify the main pathological changes in the nails, which can be divided into: changes in the structure of the nail plates due to mechanical or chemical trauma; changes in the structure of the nail plates due to the presence of chronic dermatoses (psoriasis, lichen planus, eczema, scleroderma, etc.); changes in the structure of the nail plates when affected by a mycotic infection; change in the color of the nail plate (congenital pigmentation disorders, bacterial infection); the appearance of formations of melanocytic genesis (nevi, melanoma); the appearance of formations of non-melanocytic genesis, which include warts, pyogenic granuloma, myxoid pseudocyst; vascular changes in the form of hemorrhages and changes in the vessels of the nail rollers; changes in the nail plates due to acute somatic diseases [21,22].

The lack of uniform criteria for assessing the degree of damage to the nail plates of patients with onychomycosis makes it impossible to objectively assess the effectiveness of therapy and to conduct a comparative assessment of the results of treatment using different methods. Therefore, one of the most difficult problems in the diagnosis of onychomycosis is the selection of informative objective indicators that would fully characterize the pathological process. But no less problematic is the choice of quantitative assessment and the creation of an assessment scale that would allow giving the most complete quantitative description of qualitative indicators. Therefore, we set the goal of creating such an assessment scale that would allow objectively assessing the severity of the disease and, on this basis, making a decision on choosing a particular method of onychomycosis therapy. The severity of any pathological process is understood as the degree of severity of its subjective and objective symptoms. Both treatment tactics and prognosis depend on the correct interpretation of clinical indicators. Therefore, an accurate and correct assessment of the severity of any disease is an essential part of its treatment [23-25] as the transformation of clinical manifestations of common

pathological processes could be unexpected [26].

In the course of the study, using the developed method of dermatoscopic examination of nails, the main dermatoscopic signs of healthy nail plates were determined, and the main criteria for assessing the clinical form and severity of onychomycosis were identified with accordance to previously published work [27,28].

The use of epiluminescence microscopy in practice allows it to be used as a screening method and in the early stages of the disease to conduct an objective assessment of changes occurring in the nail plate, and to conduct differential diagnostics with other diseases that have nail pathology [29,30].

Dermatoscopic examination of affected nail plates allows you to assess the degree of need for systemic antifungals, select appropriate local therapy, and assess the effectiveness of the prescribed treatment in the process of sanogenesis and relative medical management [31,32] even in hard conditions [33] for adequate treatment [34,35]. At the same time, the proposed method allows calculating the damage not only when onychomycosis, but also in the listed pathological processes.

The authors of the manuscript acknowledge that the presented study has limitations due to its design and execution. The observational/retrospective and/or single-center nature does not provide grounds for causal conclusions and retains the risk of selection bias and residual confounding, despite the use of multivariate models, propensity matching, and other approaches to control for confounding factors. The sample size, lesion heterogeneity, and composition [N=138] limit the accuracy of the estimates and the portability of the results given the peculiarities of patient routing and care practices. To minimize the effects, measurements were standardized, raters were trained, blinded where possible, and sensitivity analyses were performed. The generalizability of the findings is limited by the context; confirmation requires prospective multicenter studies, reasonable power calculations, external validation, and adherence to Good Clinical Practice (GCP).

Conclusion.

Definition of nail plate damage index at onychomycosis is an informative indicator with a high correlation with the area of contamination ($r=0.81$) and can be recommended for both diagnosis and monitoring of the treatment process.

Funding.

This research received no external funding.

Conflict of interest statement.

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

REFERENCES

1. Yakovlev S, Bazilevych K, Chumachenko D, et al. The concept of developing a decision support system for the epidemic morbidity control. *Ceur Workshop Proceedings*. 2020;2753:265-274.
2. Savielieva N, Shelest M, Stoian O. Clinical features of generalized periodontitis of chronic course in patients with herpesvirus infection. *Kharkiv Dental Journal*. 2025;2:365-78.

3. Polyvianna Y, Chumachenko D, Chumachenko T. Computer aided system of time series analysis methods for forecasting the epidemics outbreaks. 2019 15th International Conference on the Experience of Designing and Application of CAD Systems. CADSM 2019:1-4.
4. Rzymiski P, Camargo CA Jr, Fal A, et al. COVID-19 Vaccine Boosters: The Good, the Bad, and the Ugly. *Vaccines (Basel)*. 2021;9:1299.
5. Brown GD, Ballou ER, Bates S, et al. The pathobiology of human fungal infections. *Nat Rev Microbiol*. 2024;22:687-704.
6. Nikonov A, Rusanova V, Breslavets N, et al. Preclinical evaluation of a gold nanoparticle-based suspension for the treatment of oral fungal infections. *Kharkiv Dental Journal*. 2025;2:657-69.
7. Gupta AK, Stec N, Summerbell RC, et al. Onychomycosis: a review. *J Eur Acad Dermatol Venereol*. 2020;34:1972-1990.
8. Nenoff P, Reinell D, Mayser P, et al. S1 Guideline onychomycosis. *J Dtsch Dermatol Ges*. 2023;21:678-692.
9. Gupta AK, Ricci MJ. Diagnosing onychomycosis. *Dermatol Clin*. 2006;24:365-369.
10. Lachaud L, Sasso M, Rispail P, et al. Diagnostic biologique des onychomycoses. Examen direct après coloration PAS simplifiée [Biological diagnosis of onychomycoses. Direct examination after simplified technique of PAS staining]. *J Mycol Med*. 2014;24:279-286.
11. Alekseeva V, Nechyporenko A, Frohme M, et al. Intelligent Decision Support System for Differential Diagnosis of Chronic Odontogenic Rhinosinusitis Based on U-Net Segmentation. *Electronics (Switzerland)*. 2023;12.
12. Krivenko S, Krylova O, Bataeva E, et al. Smart lossy compression of images based on distortion prediction. *Telecommunications and Radio Engineering (English translation of Elektrosvyaz and Radiotekhnika)*. 2018;77:1535-1554.
13. Gargin V, Radutny R, Titova G, et al. Application of the computer vision system for evaluation of pathomorphological images. 2020 IEEE 40th International Conference on Electronics and Nanotechnology, ELNANO 2020 - Proceedings; 2020:469-473.
14. Nechyporenko A, Frohme M, Strelchuk Y, et al. Galvanic Skin Response and Photoplethysmography for Stress Recognition Using Machine Learning and Wearable Sensors. *Applied Sciences*. 2024;14:11997.
15. Chekhovska G, Pustova N, Chaplyk-Chyzyho I, et al. Conceptual and theoretical exploration of treatment of patients with onychomycosis. *Georgian Med News*. 2025;363:158-166.
16. Zhong ZM, Yang YM, Zhou ST, et al. [Effect of 0.9-ms 1064-nm Nd:YAG laser combined with itraconazole for treatment of toenail onychomycosis]. *Nan Fang Yi Ke Da Xue Xue Bao*. 2018;38:358-362.
17. Carney C, Tosti A, Daniel R, et al. A new classification system for grading the severity of onychomycosis: Onychomycosis Severity Index. *Arch Dermatol*. 2011;147:1277-82.
18. Sergeev AY, Gupta AK, Sergeev YV. The Scoring Clinical Index for Onychomycosis (SCIO index). *Skin Therapy Lett*. 2002;7:6-7.
19. Karimzadegan-Nia M, Mir-Amin-Mohammadi A, Bouzari N, et al. Comparison of direct smear, culture and histology for the diagnosis of onychomycosis. *Australas J Dermatol*. 2007;48:18-21.
20. Yurko K, Chekhovska G, Gradil G, et al. Diagnostic management of patients with onychomycoses. *Georgian Med News*. 2025;358:129-133.
21. Niewerth M, Kortling HC. Management of onychomycoses. *Drugs*. 1999;58:283-296.
22. Shevchenko A, Shevchenko V, Pomogaybo K, et al. The system of risk factors for diseases in valeological disciplines. *Inter Collegas*. 2025;12:48-5.
23. Rubin AI. Onychomycosis. *JAMA Dermatol*. 2024;160:691.
24. Rai M, Sinkar S, Kon K. Combining essential oils with antibiotics and other antimicrobial agents as a way of coping with multidrug resistant bacteria. in *Fighting Multidrug Resistance with Herbal Extracts, Essential Oils and Their Components (Second Edition)*, Academic Press. 2025:245-270.
25. Kon K, Rai M. Antibiotic Resistance: Mechanisms and New Antimicrobial Approaches. *Antibiotic Resistance: Mechanisms and New Antimicrobial Approaches*; 2016:1-413.
26. Nikonov A, Shevchenko V, Shevchenko O, et al. Allergic and pseudoallergic reactions in dentistry. *Kharkiv Dental Journal*. 2026;3:181-202181-02.
27. Suleyman G, Alangaden GJ. Nosocomial Fungal Infections: Epidemiology, Infection Control, and Prevention. *Infect Dis Clin North Am*. 2021;35:1027-1053.
28. Trevisan F, Werner B, Pinheiro RL. Nail clipping in onychomycosis and comparison with normal nails and ungual psoriasis. *An Bras Dermatol*. 2019;94:344-347.
29. Velasquez-Agudelo V, Cardona-Arias JA. Meta-analysis of the utility of culture, biopsy, and direct KOH examination for the diagnosis of onychomycosis. *BMC Infect Dis*. 2017;17:166.
30. Woolever DR. Skin Infections and Outpatient Burn Management: Fungal and Viral Skin Infections. *FP Essent*. 2020;489:16-20.
31. Marakushyn D, Maslova N, Pandikidis N, et al. Modern methods of cognitive functions analysis (literature review, part 2). *Experimental and Clinical Medicine*. 2025;94.
32. Schenström A, Rönnerberg S, Bodlund O. Mindfulness-based cognitive attitude training for primary care staff: A pilot study. *Complement Health Pract Rev*. 2006;11:144-52.
33. Haque U, Bukhari MH, Fiedler N, et al. A Comparison of Ukrainian Hospital Services and Functions Before and During the Russia-Ukraine War. *JAMA Health Forum*. 2024;5:e240901.
34. Januzis G, Beleckas P, Statkevicius M, et al. Changes in the prevalence of antibiotic self-medication based on data from surveys conducted in 2014 and 2025. *Kharkiv Dental Journal*. 2026;3:75-87.
35. Cobianchi L, Piccolo D, Dal Mas F, et al. Surgeons' perspectives on artificial intelligence to support clinical decision-making in trauma and emergency contexts: results from an international survey. *World J Emerg Surg*. 2023;18:1.