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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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

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

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

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

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

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

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

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

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

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

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

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

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

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

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

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

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

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

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

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

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

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

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

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

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

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

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

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

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

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

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

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

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

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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ADHERENCE TO PHARMACOTHERAPY STANDARDS FOR CHRONIC CARDIOVASCULAR AND RESPIRATORY DISEASES AMONG PRIMARY CARE PHYSICIANS IN THE SAMARKAND REGION

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Abstract.

Background: Guideline-based pharmacotherapy for chronic cardiovascular diseases and chronic respiratory diseases is a key determinant of outcomes in primary care; however, adherence may vary across territories due to organizational factors and access to essential medicines.

Objective: To assess compliance with international clinical guidelines in the management of patients with chronic cardiovascular and respiratory diseases in primary care facilities of the Samarkand region and to compare prescribing patterns across urban, district, and rural settings.

Materials and Methods: This cross-sectional analytical study included 3,049 patients aged 40-75 years who had been followed for >=6 months. Actual diagnostic and therapeutic prescriptions were compared with ESC/ESH (2023) and ESH (2023) recommendations for hypertension, ESC guidance for chronic coronary syndromes, the ESC Focused Update on heart failure (2023), GINA (2023), and GOLD (2024). Between-setting differences were evaluated using Pearson's chi-square test in SPSS 13.0; $p < 0.05$ was considered statistically significant.

Results: Urban facilities more frequently prescribed combination antihypertensive therapy and standard secondary prevention regimens for ischemic heart disease, whereas district and rural facilities showed more frequent deviations from recommended treatment patterns, particularly for chronic heart failure, bronchial asthma, and chronic obstructive pulmonary disease, where symptomatic and outdated approaches were more common. Because multivariable adjustment was not performed, the observed differences should be interpreted as territorial associations rather than evidence of an independent effect of facility type.

Conclusion: Primary care in the Samarkand region demonstrates pronounced territorial variation in adherence to clinical guidelines, with the most critical reduction in compliance observed for chronic heart failure and for asthma/COPD management in rural facilities. Improving quality of care requires: (1) strengthening continuing medical education, (2) optimizing access to essential medicines, and (3) standardizing patient referral and follow-up pathways.

Key words. Guideline adherence, primary care, pharmacotherapy, arterial hypertension, chronic coronary syndrome, chronic heart failure, bronchial asthma, chronic obstructive pulmonary disease, territorial differences.

Introduction.

Chronic cardiovascular diseases (CVDs) continue to rank among the leading causes of disability and mortality worldwide. According to analyses from the Global Burden of Disease (GBD) study, arterial hypertension, coronary artery disease, and heart failure remain key drivers of myocardial infarction, stroke, and premature death [1]. Annual statistical reports from the American Heart Association likewise demonstrate the high prevalence of CVDs and their substantial contribution to mortality and loss of work capacity, particularly in older age groups [2]. At the same time, chronic respiratory diseases, including chronic obstructive pulmonary disease (COPD) and bronchial asthma, markedly impair quality of life and are associated with progressive declines in ventilatory function. GBD analyses indicate that COPD mortality is several-fold higher than asthma mortality, while the overall disease burden (DALYs) remains considerable in many regions of the world [3]. Bronchial asthma, in turn, remains one of the most common chronic non-communicable diseases, characterized by pronounced heterogeneity of phenotypes and exacerbation risk, necessitating long-term control and individualized therapy selection [4].

Current international guidelines define medication choice, stepwise therapeutic decision-making, and criteria for disease control: the ESH (2023) guideline for hypertension management [5], ESC (2023) guidance for Chronic Coronary Syndromes [6] and the ESC Focused Update (2023) for heart failure [7], as well as GINA (2023) for asthma [8] and GOLD (2024) for COPD [9]. However, real-world evidence suggests that adherence to guideline-recommended care in primary healthcare remains variable. For COPD, a persistent proportion of prescriptions not aligned with GOLD recommendations has been reported, which may be associated with suboptimal disease control [10].

Aim of the study: to assess adherence of primary care physicians to pharmacotherapy standards for chronic cardiovascular and respiratory diseases across different territorial zones of the Samarkand region.

Methodology.

The study was designed as a cross-sectional analytical observational investigation and was conducted in healthcare facilities of the Samarkand region during 2022-2024. A total of 3,049 patients receiving follow-up care from primary care physicians in rural, district, and urban medical organizations were included. Urban facilities were defined as polyclinics and family polyclinics located within the administrative boundaries of Samarkand city and other cities of the region; district facilities referred to institutions in district administrative centers; and rural facilities included medical posts, rural family polyclinics, and other primary care organizations primarily

serving rural populations outside urban and district centers. This territorial classification was used as an operational definition for comparing groups. The mean age of participants was 58.3 +/- 4.22 years; 1,369 (44.9%) were men and 1,680 (55.1%) were women.

Territorial classification of primary care facilities (operational definition).

To ensure reproducibility of comparisons, primary care facilities were categorized into urban, district, and rural groups using a prespecified administrative-geographic operational definition. Classification was based on the facility's registered address and administrative jurisdiction in official records. Urban facilities were defined as polyclinics and family polyclinics located within the official administrative boundaries of Samarkand city and other cities of the Samarkand region. District facilities were defined as primary care institutions located in district administrative centers (rayon capitals). Rural facilities were defined as medical posts/health posts and rural family polyclinics, as well as other primary care organizations serving predominantly rural populations outside city limits and district administrative centers.

Diagnostic criteria:

Diagnoses were established according to approved clinical protocols and international recommendations: arterial hypertension - ESH (2023); ischemic heart disease - aligned with ESC approaches for chronic coronary syndromes; chronic heart failure - ESC Focused Update (2023); bronchial asthma - GINA (2023); and chronic obstructive pulmonary disease - GOLD (2024). Patients were eligible for inclusion if the diagnosis was confirmed and outpatient follow-up duration was at least 6 months.

Inclusion criteria:

Age 40-75 years; confirmed diagnosis of at least one of the target chronic conditions (hypertension, ischemic heart disease, chronic heart failure, asthma, COPD); availability of outpatient medical records including prescribed pharmacotherapy; follow-up in primary care for >=6 months; and signed written informed consent.

Exclusion criteria:

Acute cardiovascular events (acute coronary syndrome or stroke) within 3 months prior to enrollment; NYHA class IV chronic heart failure; severe psychiatric disorders or cognitive impairment precluding cooperation; active malignancy; refusal to participate; or incomplete medical documentation.

Pharmacotherapy assessment:

We assessed the prescribing frequency of the following drug classes: angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs), beta-adrenergic blockers, calcium channel blockers, diuretics, mineralocorticoid receptor antagonists (MRAs), inhaled corticosteroids (ICS), short- and long-acting beta2-agonists, antimuscarinic agents, and methylxanthines. Prescriptions were compared with national standards and the above international guideline recommendations.

Statistical analysis:

Data were analyzed using SPSS version 13.0. Categorical variables are presented as percentages (%). Between-group differences were assessed using Pearson's chi-square test. A p-value < 0.05 was considered statistically significant. Because the analysis relied on available outpatient chart data and did not include standardized information on all potential confounders (e.g., age, sex, disease severity, comorbidities), multivariable logistic regression was not performed in this version of the study; therefore, territorial differences are interpreted as descriptive associations.

Ethical considerations:

The study was conducted in accordance with the Declaration of Helsinki (2013) and current regulations of the Ministry of Health of the Republic of Uzbekistan. The protocol was approved by the Local Ethics Committee of Samarkand State Medical University (Protocol No. 12, May 02, 2022). All participants provided written informed consent. Personal data were anonymized and handled confidentially.

Results.

A total of 3,049 patients were included in the study and were followed in primary healthcare facilities of the Samarkand region for at least 6 months. Women predominated among participants - 1,680 (55.1%), while men accounted for 1,369 (44.9%). The mean age was 58.3 ± 4.22 years.

The age-group distribution (Figure 1) showed that the largest proportion of patients fell within the 50-59-year interval (42.1%). Patients aged 60-69 years accounted for 35.4%, those aged 40-49 years for 14.6%, and the proportion of individuals aged 70 -75 years was relatively small (7.9%).

According to the structure of chronic diseases (Figure 2), arterial hypertension (AH) ranked first, affecting 58.6% of the observed patients. Coronary artery disease (CAD) was diagnosed in 31.8% of cases, and chronic heart failure (CHF) in 20.7%. Among respiratory diseases, bronchial asthma (BA) was present in 13.3% of patients, while chronic obstructive pulmonary disease (COPD) was identified in 11.6%.

The duration of outpatient follow-up was distributed as follows: 6-11 months - 26.7%, 12-23 months - 48.5%, and 24 months or longer - 24.8%.

Adherence of prescribed pharmacotherapy to clinical guidelines in cardiovascular diseases (CVDs).

Arterial hypertension (AH) (Figure 4).

Among patients with arterial hypertension, angiotensin-converting enzyme inhibitors were prescribed in 62% of cases (Table 1), while angiotensin II receptor blockers were used in 27%. Thus, the overall proportion of patients receiving renin-angiotensin-aldosterone system (RAAS)-modulating therapy reached 89%, which is broadly consistent with the core principles of recommended first-line treatment for hypertension. Calcium channel blockers (CCBs) were used in 41% of cases, and diuretics in 33%. The rate of combination therapy, recommended by the ESC/ESH (2023) guideline as the preferred strategy at early stages of treatment, was 38%, indicating insufficient implementation of combination regimens in routine outpatient practice.

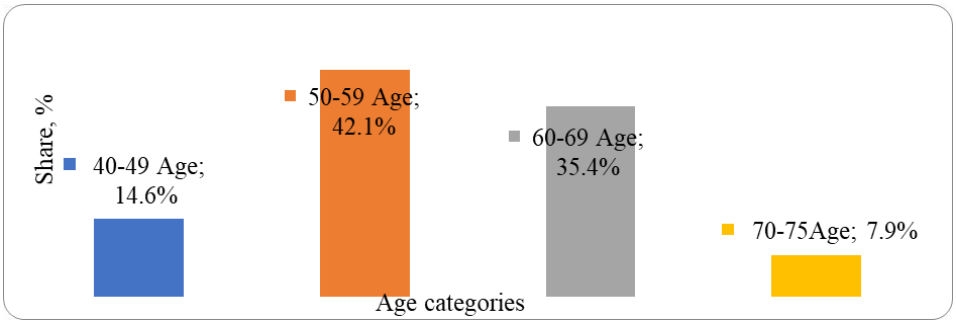

Figure 1. *Age-group distribution of the study participants.*

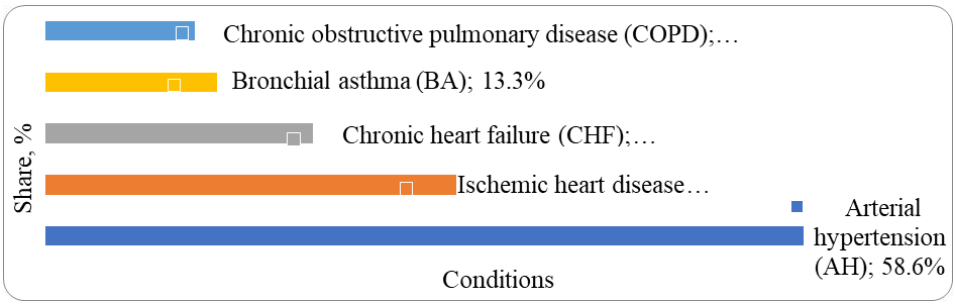

Figure 2. *Structure of chronic diseases among the study participants.*

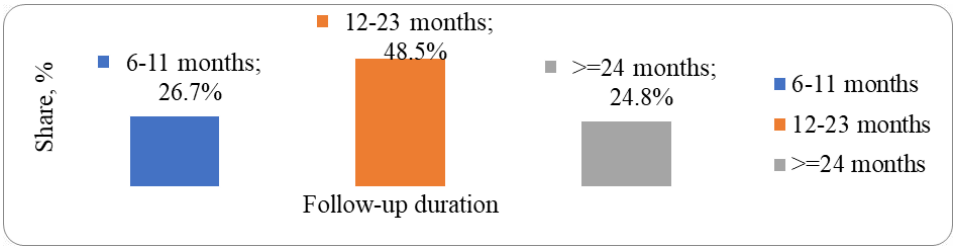

Figure 3. *Duration of outpatient follow-up.*

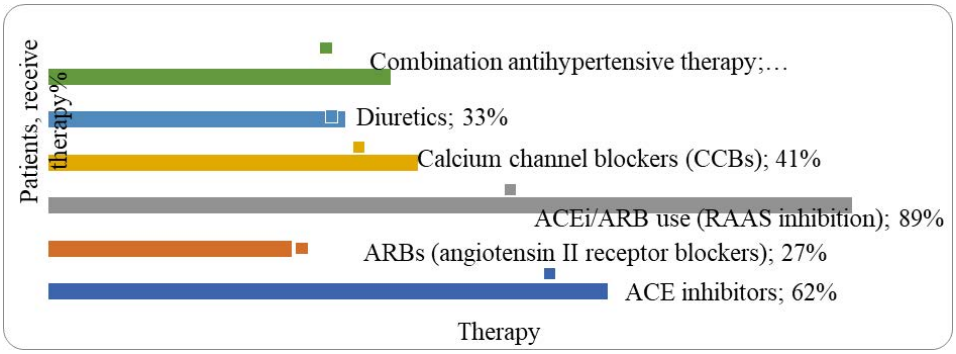

Figure 4. *Pharmacotherapy for arterial hypertension (AH).*

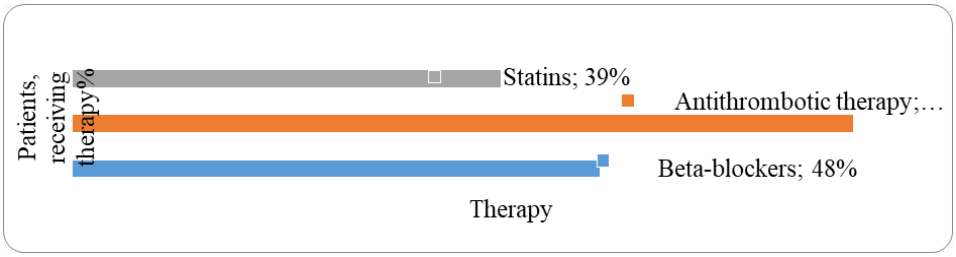

Figure 5. *Pharmacotherapy for coronary artery disease (CAD).*

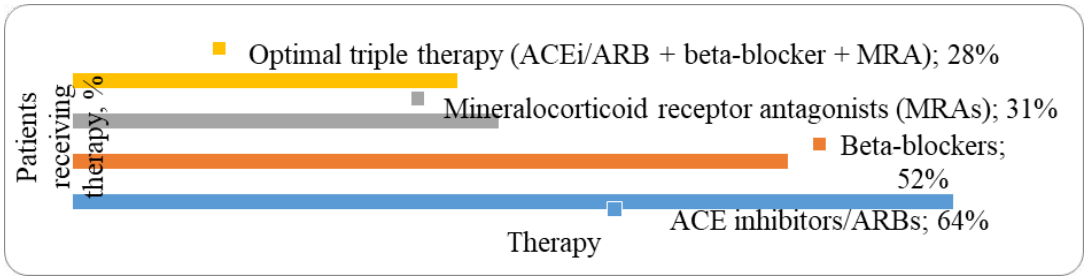

Figure 6. *Pharmacotherapy for chronic heart failure (CHF).*

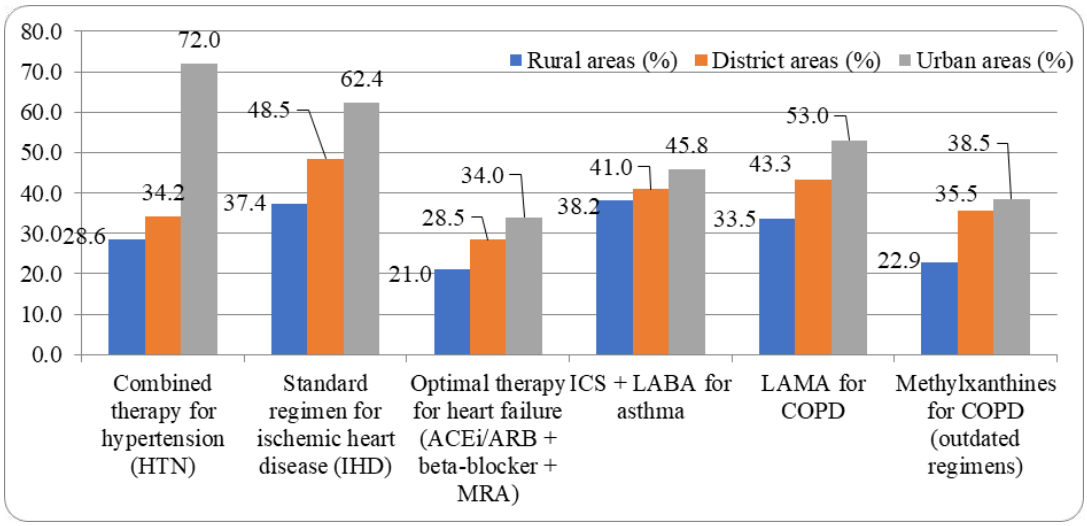

Figure 7. *Territorial differences in pharmacotherapy prescribing for cardiovascular and respiratory diseases.*

Note: *beta-blockers; MRA - mineralocorticoid receptor antagonists; ICS - inhaled corticosteroids; LABA - long-acting beta2-agonists; BA - bronchial asthma.*

Coronary artery disease (CAD) (Figure 5).

Beta-blockers were prescribed in 48% of patients with CAD, which is below the level expected for secondary prevention. Antithrombotic therapy (acetylsalicylic acid and its analogues) was provided in 71% of cases. Statins were used in 39%, suggesting suboptimal implementation of lipid-lowering strategies in a high cardiovascular-risk population.

Chronic heart failure (CHF) (Figure 6).

Among patients with CHF, ACEI/ARB therapy was prescribed in 64% of cases, beta-blockers in 52%, and mineralocorticoid receptor antagonists (MRAs) in 31%. The proportion of patients receiving optimal triple therapy (ACEI/ARB + beta-blocker + MRA) was 28%, indicating substantial room for improving pharmacotherapeutic management.

Overall, primary care physicians demonstrated partial adherence to treatment standards for cardiovascular diseases (Table 1). The most notable deviations were the underuse of combination therapy for arterial hypertension, incomplete coverage with beta-blockers and statins in ischemic heart disease, and low prescribing rates of mineralocorticoid receptor antagonists and guideline-recommended optimal triple therapy in chronic heart failure.

Adherence of pharmacotherapy to clinical guidelines in respiratory diseases

Bronchial asthma (BA).

The analysis showed (Table 2) that short-acting selective beta2-agonists were prescribed to patients with bronchial asthma almost universally: 98.5% in rural facilities, 98.6% in district facilities, and 99.0% in urban facilities; the differences were not statistically significant ($p > 0.05$). In contrast, inhaled corticosteroids - the cornerstone of controller therapy according to GINA (2023) - were prescribed in only 53.3-53.6% of cases, indicating suboptimal implementation of maintenance treatment. The proportion of patients receiving an ICS + long-acting beta2-agonist (LABA) combination was 41.8%, which is below the level recommended by GINA 2023 (>60%). Overall, unjustified SABA monotherapy was observed in 33.9% of patients, with the highest rate in rural areas (38.1%). This was significantly higher than in urban settings (28.9%; $\chi^2 = 6.42$; $p < 0.05$).

Chronic obstructive pulmonary disease (COPD).

According to GOLD (2024), the baseline regimen for most patients includes LAMA and/or LABA therapy, with ICS

Table 1. *Frequency of prescribing major drug classes for chronic cardiovascular diseases (n = 3049).*

Nosological group / Pharmacotherapy	Patients receiving the drug, %	Note
Arterial hypertension (AH)		
ACE inhibitors (ACEIs)	62	Prescribed to the majority of patients with AH
Angiotensin II receptor blockers (ARBs)	27	Used as an alternative RAAS-targeting therapy
Combined ACEI/ARB use (RAAS blockade)	89	Consistent with the core principle of AH management
Calcium channel blockers (CCBs)	41	Used when additional blood pressure control was needed
Diuretics	33	Used predominantly as add-on therapy
Combination antihypertensive therapy	38	Insufficient frequency relative to clinical need
Coronary artery disease (CAD)		
Beta-blockers	48	Insufficient for optimal secondary prevention
Antithrombotic therapy	71	Prescribed to most patients
Statins	39	Underuse of lipid-lowering therapy
Chronic heart failure (CHF)		
ACEI/ARB	64	Core disease-modifying therapy not provided to all patients
Beta-blockers	52	Prescription rate below the optimal level
Mineralocorticoid receptor antagonists (MRAs)	31	Prescribed substantially less often than required
Optimal triple therapy (ACEI/ARB + beta-blocker + MRA)	28	Marked deficit of optimal therapy

Table 2. *Frequency of medication prescribing in bronchial asthma (BA) and COPD relative to GINA (2023) and GOLD (2024) recommendations.*

Indicator	Rural area (%)	District (%)	Urban area (%)	Mean (%)	Guideline adherence	p-value
Bronchial asthma (BA)						
SABA (short-acting)	98.5	98.6	99.0	98.7	Appropriate as “as-needed” reliever	> 0.05
ICS (controller therapy)	53.3	53.6	53.5	53.5	Insufficient; ≥70% required by GINA	> 0.05
ICS + LABA (controller therapy)	38.2	41.0	45.8	41.8	Below the recommended level (>60%)	< 0.05
Unjustified SABA monotherapy	38.1	34.6	28.9	33.9	Not recommended	< 0.05
COPD						
LAMA	33.5	43.3	53.0	43.2	Underuse in rural settings	< 0.001
LABA	53.2	58.5	72.0	61.2	Partially aligned with GOLD	< 0.001
ICS	40.5	47.5	55.0	47.7	Acceptable use (when indicated)	< 0.05
Triple therapy (ICS + LABA + LAMA)	22.4	26.1	34.0	27.4	Below the recommended level for frequent exacerbations	< 0.05
Methylxanthines	22.9	35.5	38.5	32.3	Outdated regimen; not recommended	< 0.01

Table 3. *Territorial differences in pharmacotherapy prescribing for cardiovascular and respiratory diseases.*

Indicator	Rural areas (%)	District areas (%)	Urban areas (%)	χ^2	p-value
Combination therapy for AH	28.6	34.2	72.0	46.81	<0.001
Standard regimen for CAD	37.4	48.5	62.4	22.94	<0.001
Optimal therapy for CHF (ACEI/ARB + beta-blocker + MRA)	21.0	28.5	34.0	6.87	<0.05
ICS + LABA for BA	38.2	41.0	45.8	5.12	0.077 (ns)
LAMA for COPD	33.5	43.3	53.0	16.22	<0.001
Methylxanthines for COPD (outdated regimens)	22.9	35.5	38.5	8.02	<0.01

Note: *Data are presented as percentages. Between-group differences (rural vs district vs urban) were assessed using Pearson's chi-square (χ^2) test. p-values < 0.05 were considered statistically significant. “ns” indicates a non-significant difference ($p \geq 0.05$). Abbreviations: AH - arterial hypertension; CAD - coronary artery disease; CHF - chronic heart failure; BA - bronchial asthma; COPD - chronic obstructive pulmonary disease; ACEI - angiotensin-converting enzyme inhibitor; ARB - angiotensin II receptor blocker; beta-blocker - beta-adrenergic blocker; MRA - mineralocorticoid receptor antagonist; ICS - inhaled corticosteroid; LABA - long-acting beta2-agonist; LAMA - long-acting muscarinic antagonist.*

Table 4. *Potential factors associated with reduced adherence to recommended therapy.*

Factor	Potential mechanism of impact	Possible clinical consequences
Physician qualification	Limited uptake of ESC, GINA, and GOLD updates	Use of outdated regimens; reduced treatment effectiveness
Medication availability	Limited supply of LAMA, ICS, and MRAs in rural areas	Predominance of monotherapy and symptom-based regimens
Patient referral pathways	Low rate of specialist consultations and follow-up visits	Insufficient disease control and delayed therapy adjustment

added when indicated. Long-acting muscarinic antagonists (LAMAs) were prescribed less frequently in rural areas (33.5%) than in urban settings (53.0%); the difference was statistically significant ($\chi^2 = 16.22$; $p < 0.001$). Long-acting beta2-agonists (LABAs) were also used more often in cities (72.0%) compared with rural areas (53.2%), with a significant difference ($\chi^2 = 15.66$; $p < 0.001$). Triple inhaled therapy (ICS + LABA + LAMA), recommended for patients with frequent exacerbations, was used in only 27.4% of patients. The use of methylxanthines, which are considered outdated medications, remained high (22.9%-38.5%), particularly in urban settings (38.5%; $\chi^2 = 8.02$; $p < 0.01$), indicating delayed updating of therapeutic practice.

Thus, bronchial asthma management was characterized by an excessive reliance on symptomatic treatment with insufficient use of controller therapy, whereas in COPD, contemporary inhaled regimens were implemented more often in urban facilities, while district and rural organizations more frequently continued to use less preferred treatment patterns (Table 2).

Territorial differences in adherence to pharmacotherapy standards.

Comparative analysis revealed pronounced territorial differences in the implementation of contemporary clinical recommendations (Table 3). The prescribing rate of combination antihypertensive therapy was substantially higher in urban facilities (72.0%), whereas it was 34.2% in district and 28.6% in rural organizations (chi-square = 46.81; $p < 0.001$). A similar pattern was observed for ischemic heart disease: the standard secondary prevention regimen was prescribed in 37.4% of cases in rural outpatient clinics, 48.5% in district centers, and 62.4% in urban facilities (chi-square = 22.94; $p < 0.001$). Given the study design, these results should be interpreted as differences between territorial groups rather than evidence of an independent effect of facility type.

A comparable trend was noted for chronic heart failure. Guideline-recommended optimal triple therapy (ACEI/ARB + beta-blocker + mineralocorticoid receptor antagonist), considered a core strategy in CHF management, was prescribed infrequently across all settings: 21.0% in rural facilities, 28.5% in district facilities, and 34.0% in urban facilities (chi-square = 6.87; $p < 0.05$). This indicates substantial system-wide potential to improve pharmacotherapy across all types of primary care organizations.

Overall, the results indicate that prescribing in urban facilities more often aligned with international recommendations, whereas district and especially rural organizations demonstrated a higher proportion of simplified or less up-to-date regimens. This pattern may reflect a combination of organizational, educational, and resource-related factors; however, in the absence of multivariable analyses, these explanations should be considered interpretative rather than confirmatory.

The findings highlight the need to strengthen continuing medical education for physicians, improve the availability of key medicines, and implement regionally adapted referral and follow-up pathways to ensure timely treatment optimization.

Potential organizational drivers of the observed differences.

Additional analyses suggested that the least optimal treatment patterns were most frequently observed in chronic heart failure, bronchial asthma, and COPD. Interpretation of the underlying causes should be made with caution, as the study did not adjust for patient clinical characteristics or disease severity.

Reduced adherence to clinical recommendations is driven by three key factors (Table 4). First, insufficient physician training and infrequent updating of knowledge on current ESC/GINA/GOLD guidance contribute to the continued use of outdated regimens and, consequently, lower treatment effectiveness. Second, limited availability of essential medicines in rural settings (including LAMAs, ICS, and MRAs) promotes reliance on monotherapy and symptom-based regimens instead of optimal combinations. Third, weak referral and follow-up pathways (infrequent specialist consultations and control visits) lead to inadequate monitoring and delayed therapy adjustment, ultimately worsening clinical outcomes.

Discussion.

The findings demonstrate pronounced territorial differences in the extent to which pharmacotherapy aligns with clinical guidelines among patients with chronic cardiovascular and respiratory diseases in the Samarkand region. Importantly, these differences represent associations observed within a cross-sectional study design and do not allow conclusions regarding an independent effect of facility territory or type.

Differences in hypertension management:

It was shown that rural and district polyclinics more often used less intensive antihypertensive regimens, whereas urban facilities more frequently prescribed combination therapy consistent with current ESH (2023) recommendations. This may reflect differences in medicine availability as well as variation in the extent to which updated clinical guidance has been implemented.

Adherence to standards in CAD and CHF:

For CAD, the proportion of patients receiving full secondary prevention therapy (ACEI/ARB + beta-blocker + antiplatelet agent + statin) was significantly higher in urban settings (62.4%; $p < 0.001$). In contrast, for CHF, optimal triple therapy was underutilized across all territories (21%-34%). This suggests a common issue: underestimation by primary care physicians of the importance of prognosis-modifying therapy. This observation is consistent with findings from the ESC-HFA Registry and SWEDE-HF, which reported that timely initiation of RAAS inhibitors, beta-blockers, and MRAs substantially reduces mortality and hospitalization rates.

Features of asthma and COPD therapy:

For BA, a systematic deviation from the GINA stepwise approach was identified. In rural settings, unjustified beta2-agonist monotherapy persists (38.1%; $p < 0.05$), increasing the risk of uncontrolled disease and exacerbations.

For COPD, the use of triple therapy (ICS + LABA + LAMA) was low outside urban areas (22.4%-26.1% vs 34.0%; $p < 0.01$), alongside continued prescribing of methylxanthines. These patterns may reflect limited access to modern inhaled therapies and the absence of standardized training programs on inhaler technique.

Practical implications:

The practical implications of these findings include the need for a systematic strengthening of primary care physicians' competencies through continuing education modules aligned with ESH, ESC, GINA, and GOLD guidance, refinement of regional medicine supply policies, and the development of standardized patient referral and follow-up algorithms with treatment effectiveness reviewed every 3-6 months.

Conclusion.

Pronounced territorial differences were identified in the extent to which pharmacotherapy aligns with clinical guidelines among patients with chronic cardiovascular and respiratory diseases in the Samarkand region. Urban facilities more frequently prescribed combination antihypertensive therapy, comprehensive secondary prevention regimens for ischemic heart disease, and contemporary inhaled treatment strategies for COPD, whereas district and rural organizations more often deviated from recommended approaches. At the same time, suboptimal use of guideline-recommended optimal triple therapy for chronic heart failure was observed across all territorial groups.

The most vulnerable areas were chronic heart failure management as well as asthma and COPD control in rural facilities, where symptomatic or less up-to-date treatment patterns were more commonly used. The findings support the need for educational and organizational interventions; however, they should be interpreted in light of the cross-sectional study design and the absence of multivariable adjustment.

Study limitations include the cross-sectional design, lack of multivariable adjustment for age, sex, disease severity, and comorbidities, and the inability to fully exclude the impact of differences in the availability of medicines and diagnostic resources across facilities. Therefore, further research should employ multifactorial models and standardized assessment of clinical outcomes.

Personalization perspective.

The observed territorial differences justify a shift from a "one-size-fits-all" approach toward personalized patient management. Treatment selection should be guided by the combination of diagnosis, disease severity, comorbidities, and medication availability, with mandatory regular assessment of disease control (blood pressure, symptoms, spirometry/peak expiratory flow) and stepwise treatment adjustment. Personalization in primary care should include ESC/ESH-ESC and GINA-GOLD clinical checklists, "step-up/step-down" algorithms for BA and COPD, and an individualized follow-up plan with fixed timelines for return visits and referral to a specialist in case of signs of inadequate disease control.

Conflict of interest.

The authors declare no conflict of interest.

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