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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.

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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.

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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 საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ 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 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.

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THE MOST COMMONLY PRESCRIBED MEDICATIONS BY PEDIATRICIANS IN MOSUL CITY

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Abstract.

Background: Pediatric diseases and thus their medications are described as rarely occurring, moderately occurring, and frequently occurring. The purpose of this study is to identify the most frequently prescribed categories of pediatric medications by pediatric specialists in the city of Mosul.

Methods: 100 medical prescriptions written by pediatric specialists in their private clinics from various locations in the city of Mosul. Upon receiving a prescription from one of these doctors, the research member would copy the prescription and keep it. When 100 prescriptions were collected, each prescription was examined, and the prescribed medications were classified into groups according to their pharmacological effect.

Results: The highest frequency of prescribed drug categories by pediatric specialists in Mosul was antibiotics, with a usage rate of 27.77%, followed by gastrointestinal drugs at 22.22%, then analgesics and antipyretics at 18.88%, then antihistamines at 14.44%, followed by vitamins and nutritional supplements at 8.88%, and lastly respiratory system drugs at 7.77%.

Conclusion: The results of the current study show that the most prescribed drug class by pediatricians in Mosul city are the antibiotics. Also, the types of antibiotics prescribed differ significantly in all three countries, and this depends on the protocol of treatment in each country. Other classes of drugs in the other studies show some similarity, as in Mosul City and sometimes show significant differences from Mosul City, and this depends on different factors and on different climates.

Key words. Pediatrics, antibiotics, prescription, dispensing, drug misuse.

Introduction.

Globally, pediatric diseases remain a major public health concern [1]. According to the World Health Organisation (WHO), over 5 million children under the age of five died in 2019, with the majority of deaths occurring in low- and middle-income countries [2]. The leading causes include pneumonia, diarrhoea, malaria, and neonatal complications [3]. In Iraq and neighbouring regions, pediatric healthcare faces additional challenges such as limited access to specialised care, shortages of essential medications, and under-resourced facilities [4]. Early diagnosis and intervention are critical in pediatric medicine, and conditions such as congenital heart defects [5], metabolic disorders [6], and developmental delays can be managed effectively if identified early. Multidisciplinary care involving pediatricians, nurses, nutritionists, and social workers is essential to address the complex needs of children and their families [7]. Preventive strategies—such as immunisation, breastfeeding promotion, and hygiene education—play a vital

role in reducing disease burden and improving outcomes [8].

Pediatric healthcare systems vary widely across regions [9]. In high-income countries, children benefit from routine screenings, advanced diagnostics, and comprehensive insurance coverage [10,11]. In contrast, many developing nations struggle with fragmented services, inadequate training, and cultural barriers to care [12,13]. Pharmacological treatment in pediatric populations requires a nuanced understanding of developmental physiology, age-specific drug metabolism, and regional healthcare realities [14,15]. Unlike adults, children undergo rapid changes in organ function, body composition, and receptor sensitivity, all of which influence how medications are absorbed, distributed, metabolised, and excreted [8]. The aim of this study is to know the classes of drugs usually prescribed by pediatricians in Mosul city, the ranking of these classes and the percentage of prescribing of each class, and to compare with that in other countries.

Materials and Methods.

Specimens: A collection of prescriptions was obtained from different areas where the private clinics of pediatricians in Mosul City during October 2025. Each prescription was written by the pediatrician himself after clinical examination and may be after complete assistance of any extra diagnostic tool, e.g. laboratory investigations, Ultrasound (US), Computed Tomography (CT), MRI, etc. The number of prescriptions collected was 100 prescriptions, each may contain one, two or any number of the available drugs that are approved by the official authorities in Iraq. The total number of items prescribed was 450 items of drugs.

Methods: This study was performed by a student's research group as a graduating project. This group consisted of 5 members under the guidance of one of the teaching staff of the pharmacy College at Alnoor University. One or more members of the research group were present in any pharmacy in Mosul City, where a private clinic was nearby. When any prescription was edited by the pediatrician and received by the pharmacist, the researcher member acts to copy that prescription using a copying device. Usually, the researcher will collect no more than 10 prescriptions from that pediatrician.

After collecting the required number of prescriptions during October 2025, each prescription was scrutinised, and the prescribed medicine(s) of that prescription were classified into categories, e.g. Antibiotic, Analgesic, etc., and so on, according to their effects. The total number of prescribed medicines in all the prescriptions that can be classified as drugs used for treating pediatric disorders was counted. The percentage of each class of medicines was found by dividing the number of each class of medicines prescribed by the total number of prescribed

medicines, and the result was multiplied by 100. In addition, the number of each drug class was divided by the total number of prescriptions (100) to obtain the percentage of each drug class according to total prescriptions. The same procedure was used to obtain the percentage of Antibiotics per total drugs prescribed and per total number of prescriptions studied.

The following are the categories of the drug classes used in this study:

1. Antibiotics
2. Analgesics/Antipyretics
3. Respiratory medications
4. Antihistamines
5. GI medications (antiemetics+antidiarrheals)
6. Vitamins and supplements (medically mandated).
7. Anticonvulsants.

The following antibiotics (antimicrobials) are included in the prescription collected.

1. Amoxicillin
2. Ceftriaxone
3. Amoxicillin-Clavulanate
4. Macrolides (Azithromycin, Clarithromycin)
5. Cephalosporins (other)
6. Imipenem/Cilastatin
7. Others (e.g., metronidazole, gentamicin)

Statistical analysis: All the data were edited and analysed using the statistical package SPSS ver. 26 (SPSS inc., Chicago,

ILL). Proportion was used to describe and tabulate the data. The percentage difference between the Mosul series (V1) and the Western or Jordanian series (V2) was calculated using the following equation:

$$\text{percentage difference} = \{(V1-V2)/[(V1+V2)/2]\} \times 100.$$

The z score was calculated and associated with the value of comparing two population proportions using the following equation:

$$\frac{(\bar{p}_1 - \bar{p}_2) - 0}{\sqrt{\bar{p}(1 - \bar{p}) \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

A p-value less than 0.05 was considered statistically significant.

Results.

The total number of prescriptions collected was 100. The total number of all drugs prescribed in all the prescriptions was 450 drugs (Figure 1). The total number of Antibiotics (Antimicrobials) prescribed in all the prescriptions was 125 medicines of different types of antibiotics (Antimicrobials) (Figure 2).

Based on the comparison in Table 1, the overall drug class prescription profiles of pediatricians in Mosul City and Western countries differ significantly in three key areas. First, antibiotics constituted a considerably larger proportion of prescriptions

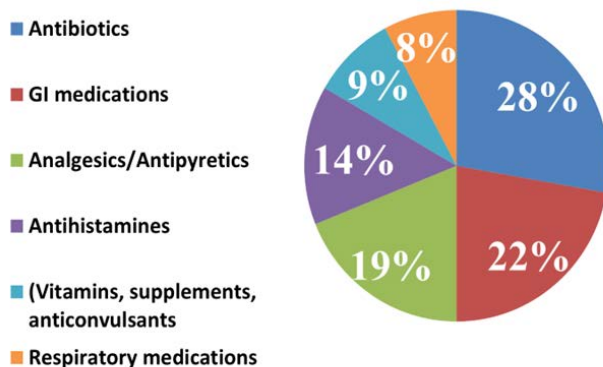


Figure 1. Pie showing the number of drugs prescribed by pediatricians in each drug class and their percentage in Mosul City.

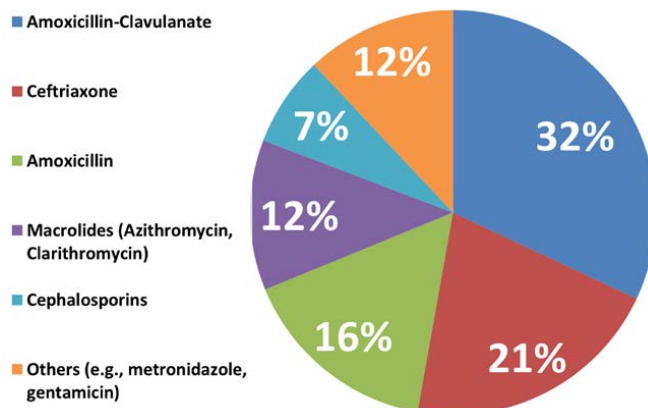


Figure 2. Pie showing the types of Antibiotics prescribed by pediatricians and their percentage in Mosul City.

in Mosul City (27.77%) compared to Western countries (21%). Second, the pattern was reversed for respiratory medications, which were prescribed much more frequently in Western settings (25.6%) than in Mosul City (7.77%). Third, gastrointestinal (GI) medications were prescribed over twice as often by pediatricians in Mosul City (22.22%) compared to their Western counterparts (10%). In contrast, no statistically significant difference was found in the prescription rates for Analgesics/Antipyretics or for the combined category of Vitamins, Supplements, and Dermatological agents. The table indicates that no comparative Western data were available for Antihistamines. These results highlight distinct therapeutic emphases, with Mosul City practices showing higher relative use of antibiotics and GI medications. In contrast, Western practices allocate a substantially greater proportion of prescriptions to managing respiratory conditions (Table 1).

A comparison of antibiotic prescription patterns between pediatricians in Mosul City and those in Western countries revealed several significant differences. The use of plain Amoxicillin was substantially more common in Western countries (37.5%) than in Mosul City (16%). Conversely, the prescription of Amoxicillin-Clavulanate was markedly higher among Mosul City pediatricians (32%) compared to their Western counterparts (9%). Furthermore, the category of "Other" antibiotics (e.g., metronidazole, gentamicin) was prescribed at a significantly higher rate in Mosul City (12%) than in the West (5%). For Macrolides and other Cephalosporins, the differences in prescription rates (12% vs. 17.5% and 7.2% vs. 11%, respectively) were not statistically significant. Notably, the table indicates no comparable Western data for the prescription of Ceftriaxone or Imipenem/Cilastatin, precluding a direct comparison for these agents. Overall, the key distinctions were

a Western preference for first-line Amoxicillin and a Mosul preference for broader-spectrum Amoxicillin-Clavulanate and other non-first-line agents (Table 2).

A comparison of broad drug class prescribing patterns between pediatricians in Mosul City and Jordan revealed substantial and statistically significant differences in overall therapeutic approach. The most striking disparity was in the use of antibiotics, which constituted a significantly larger proportion of prescribed drugs in Jordan (60.9%) compared to Mosul City (27.77%). Conversely, prescriptions for Gastrointestinal (GI) medications and Antihistamines were markedly more prevalent in Mosul City (22.22% and 14.44%, respectively) than in Jordan (3% and 5%). Similarly, the combined category of Vitamins, Supplements, and Dermatological agents was prescribed significantly more often in Mosul (8.88%) than in Jordan (1-2%). In contrast, no statistically significant difference was found in the prescribing rates for Analgesics/Antipyretics (18.88% vs. 20%) or Respiratory medications (7.77% vs. 10%) between the two locations. These results indicate fundamentally different prescription profiles, with Jordanian practice heavily weighted toward antibiotics, while pediatricians in Mosul City more frequently prescribed medications for GI symptoms, allergies, and supportive supplements (Table 3).

The results of the comparative analysis, presented in Table 4, reveal several statistically significant and non-significant differences in antibiotic prescribing patterns between pediatricians in Mosul City and Jordan. A statistically significant difference ($p < 0.05$) was found for two key antibiotics. Pediatricians in Mosul City prescribed Amoxicillin-Clavulanate at a notably higher rate (32%) compared to their counterparts in Jordan (15%). Conversely, the prescription of plain Amoxicillin was significantly more common in Jordan (30%) than in Mosul

Table 1. Comparison between the percentage of drug classes prescribed by pediatricians in Mosul city and in Western countries and p-values.

Drug class	% of drugs prescribed in Mosul City	% of drugs prescribed in Western	p-value
Antibiotics	27.77	21	0.004*
Analgesics/Antipyretics	18.88	15	0.06 NS
Respiratory medications	7.77	25.6	<0.0001*
Antihistamines	14.44	-	-
GI medications (antiemetics+antidiarrheals)	22.22 (5+17.22)	10	<0.0001*
(Vitamins, supplements, Dermatological)	8,88	8	0.5 NS

* Difference at p-value less than 0.05 considered significant
NS: not significant

Table 2. The percentage of each type of Antibiotics prescribed by pediatricians in Mosul city and in Western countries.

Type of Antibiotic	% of Antibiotics Prescribed in Mosul City	% of Antibiotics prescribed in Western [16]	p-value
Amoxicillin	16	37.5	<0.0001*
Ceftriaxone	20.8	-	-
Amoxicillin-Clavulanate	32	9	<0.0001*
Macrolides (Azithromycin, Clarithromycin)	12	17.5	0.1NS
Cephalosporins (other)	7.2	11	0.2NS
Imipenem/Cilastatin	0	-	-
Others (e.g., metronidazole, gentamicin)	12	5	0.01*

* Difference at p-value less than 0.05 considered significant
NS: not significant

Table 3. Comparison between the percentage of drug classes prescribed by pediatricians in Mosul city and in Jordan, and p-values.

Drug class	% of drugs prescribed in Mosul City	% of drugs prescribed in Jordan [17]	p-value
Antibiotics	27.77	60.9%	<0.0001*
Analgesics/Antipyretics	18.88	20%	0.6 NS
Respiratory medications	7.77	10%	0.2 NS
Antihistamines	14.44	5%	0.01*
GI medications	22.22	3%	<0.0001*
(Vitamins, supplements, Dermatological	8.88	1–2%	0.01*

* Difference at p-value less than 0.05 considered significant
NS: not significant

Table 4. Comparison between the percentage of each Antibiotic prescribed by pediatricians in Mosul city and in Jordan, and p-values.

Type of Antibiotic	% of Antibiotics Prescribed in Mosul City	% of Antibiotics Prescribed in Jordan [17]	p-value
Amoxicillin	16	30%	0.004*
Ceftriaxone	20.8	25%	0.3NS
Amoxicillin-Clavulanate	32	15%	0.003*
Macrolides (Azithromycin, Clarithromycin)	12	10%	0.5NS
Cephalosporins (other)	7.2	10%	0.3NS
Imipenem/Cilastatin	0	5%	-
Others (e.g., metronidazole, gentamicin)	12	5%	0.02NS

* Difference at p-value less than 0.05 considered significant
NS: not significant

City (16%). For the remaining antibiotic classes, the differences in prescription percentages were not statistically significant. These included Ceftriaxone (20.8% vs. 25%), Macrolides (12% vs. 10%), and other Cephalosporins (7.2% vs. 10%). Notably, Imipenem/Cilastatin was not prescribed in the Mosul sample, compared to a 5% prescription rate in Jordan, though a p-value was not calculated for this comparison. The category of "Other" antibiotics (e.g., metronidazole, gentamicin) was prescribed at 12% in Mosul versus 5% in Jordan, a difference that was not statistically significant ($p=0.02$, denoted as NS). Overall, the most pronounced disparities in prescribing practices were the preference for Amoxicillin-Clavulanate in Mosul and for plain Amoxicillin in Jordan (Table 4).

Discussion.

Knowing the drugs prescribed by the doctors has many benefits to the medical authority and to the private pharmacists in order to choose and provide the suitable items, according to their repetition [18]. Each medical specialist needs to concentrate on certain medical items according to the needs of their patients [19]. In this project, we focus on drugs that are usually prescribed by pediatricians in Mosul City. After counting the number of items prescribed by the pediatricians in 100 prescriptions in Mosul city, it was found that the total number of drugs prescribed was 450 items. These items were classified. It is found that the most repeated drug class is the antibiotics, which form 27.77% of the total drugs prescribed in this study. This means that infectious diseases are the highest reported disease in our locality. This result can be attributed to the poor protection of the children against infectious microorganisms, although this survey was carried out during October, which has a moderate climate [20,21]. This result has been compared with a similar study in Jordan [17], and it is found that the antibiotics are the drugs that have the highest repetition in the prescriptions of

their hospitalized pediatric patients in Jordan (21%) [17] and in outpatients in Bangladesh (22.7%) [22]. Similarly, prescriptions collected from the outpatient clinic of the Teaching Hospital in India have shown a high rate of prescriptions with antibiotic indications reaching up to 33% in children up to 4 years old [23].

Although all three studies are in agreement that antibiotics are the most commonly used drug class, there are different types of antibiotics used, and again, there are different levels of use for each type. Amoxicillin-Clavulanate oral form is the highest usage of antibiotics in Mosul City, it forms 32% of total antibiotics used, whereas in Western is 9% and in Jordan 15% [16,17]. When the results in Mosul City are compared with the results of the above-mentioned countries, they show significant differences with both results, as $p<0.0001$ and $p = 0.003$, respectively. These differences in the repetition of choosing this antibiotic depend on the type of invited microorganism, on the propaganda of the drug companies and on the opinion of the pediatricians. In line with the present study, the antibiotic prescription rate was the highest among prescribed drugs for children attending an outpatient clinic in Bangladesh [22].

The next highest prescribed antibiotic by pediatricians in Mosul City was Ceftriaxone vials, the percentage of its prescription in Mosul City was 20.8%, while in hospitalized pediatric patients in Jordan is 45% [17]. In an alternative study based on an outpatient clinic in Jordan [24] and in Western countries [16], ceftriaxone has not even been mentioned among the usable antibiotics. This difference may be attributed to the desire of the pediatrician in Mosul City to give a broad-spectrum antibiotic, more accurate doses and for quick relief of the infection. Mosul City and Jordan show higher use of broad-spectrum and injectable antibiotics like Ceftriaxone; this is an inappropriate practice in the lens of antimicrobial stewardship.

The next highest prescribed antibiotic by pediatricians in Mosul City was Amoxicillin, which forms 16% of the antibiotics prescribed by pediatricians, whereas their prescription in Western and Jordan is much higher, 37.5% and 30%, in hospitalized pediatric patients respectively [16,17], with similar rate of amoxicillin prescription in outpatients clinic reaching the highest rate at (35.1%) [24], with statistical analysis shows highly significant difference of both when compared with that in Mosul ($p < 0.0001$ and $P = 0.004$ respectively). Although the Jordanian studies may have encompassed inpatients, this study focused on outpatients/private clinics, potentially resulting in variations in antibiotic usage intensity.

Macrolides (Azithromycin, Clarithromycin) form the next highly prescribed antibiotic by pediatricians in Mosul City; they form 12% of antibiotics used, while in Western and Jordan form 17.1% and 10% respectively [16,17], with nearly similar rate of azithromycin and clarithromycin prescription in outpatients clinic reaching the highest rate at (34.7%) [24], with statistical analysis shows no significant differences between results in Mosul City and the other mentioned countries ($p = 0.1$ and $p = 0.5$ respectively).

Other cephalosporins were the least common class of pediatric drugs prescribed by pediatricians in Mosul City, which forms only 7.2% of total antibiotics prescribed. Almost the same for Western and Jordan hospitalized pediatric patients as their percentages of prescriptions are 11% and 10% respectively [16,17], with a higher rate of cefixime and cefuroxime prescription in outpatients clinic reaching the highest rate at (12.2%) [24], and when the results are statistically compared, they show no significant differences between all three results ($P = 0.2$ and $P = 0.3$).

Analgesics and antipyretics are important drugs in the treatment of children; the repetition of using this class of medicines by pediatricians in Mosul City reaches up to 18.88% of prescribed pediatrician drugs. This result is reasonable, especially when looking at those of hospitalized pediatric patients in Jordan and Western results, 20% and 15 % of prescribed drugs, respectively [16,17]. When comparison was done between the results of the current study and those of Jordan and Western study, no significant differences were found ($p = 0.6$ and 0.06 , respectively), which is very acceptable and might be linked to pharmacists' awareness and advice to avoid analgesic misuse in the community [25]. In a study conducted in outpatient clinics in Nepal, the rate of analgesic use was much higher, reaching up to 33.95% in pediatric patients; however, most of these cases were using these medications off-label and indicated by parents without seeking medical prescriptions [26].

Respiratory medications are very important drugs for the treatment of children, especially during winter. Fortunately, the use of these medications in the current study was very acceptable as it forms only 7.77% of the total drugs used by pediatricians in Mosul City, whereas in Jordan it forms 10% and in Western it forms 25.6 % of the total drugs prescribed by pediatricians [16,17]. Perhaps related to parent knowledge and awareness about the treatment of respiratory diseases alongside pharmacist advice and orientation regarding therapeutic options and approaches [11]. When comparing the results of the current

study with those of Jordan's study, no significant difference was found ($p = 0.2$), which may be due to a similar climate. Whereas, when compared with Western results, there is a highly significant difference ($p < 0.0001$), this difference is probably due to the cold climate in Western countries and our moderate climate at the time of carrying out the research in October.

Antihistamines are an important class of drugs for children, but their repetition is less than that of other classes of drugs. The results of the current study show 14.44% of pediatric prescriptions in Mosul City included one of the antihistamine drugs, and when compared with the results found in Jordan, which was 5%, indicate a significant difference ($p = 0.01$). This difference might be attributed to differences in climate [27]. Whereas no results have been included in this class of drugs in Western countries, they may be included with other classes.

GI medication is one of the highest levels of drug classes prescribed by pediatricians in Mosul City. It forms 22.22% of the prescribed pediatric drugs, whereas in Western countries, it forms only 10% of the prescribed outpatient pediatric drugs [16], and the rate in Nepal outpatient study was 11.4 [26], whereas in outpatients in Bangladesh, GIT medication prescriptions were much higher (35%) in pediatric prescribed drugs. This means that there are significant differences in the number of GI medications prescribed by pediatricians in Mosul City or Bangladesh and that in both Western and Nepal countries ($p < 0.0001$ for both). This result may indicate that there is less hygiene in Mosul and Bangladesh regarding the food or feedings may be unhealthy and not clean, resulting in more prescribed GI medications compared to Western data.

Vitamins, supplements and others are complementary drugs; they form 8.88% of the pediatric prescriptions in Mosul City and form 8% of the pediatric prescriptions. In line with this study, the vitamin intake was much higher, reaching nearly 100% for vitamin D or calcium, up to 50% for vitamin A, with various amounts of minerals in a large-scale outpatient study conducted in the Emirates on children [28]. Moreover, in a cross-sectional survey conducted on Iraqi pharmacists in Baghdad to collect their opinion about the rate of vitamin dispensing for outpatient prescriptions, results confirmed that up to 16% of prescriptions contain multivitamins, 34.7% minerals, 38% specific vitamins, and the rest were herbal products [29]. Alternatively, in a study conducted in Basra (Iraq), outpatient hospital clinics identified that only 4.7% of pediatric prescriptions contained vitamin supplements [30], these discrepant results confirming possible medication error in pediatric prescriptions.

This study has several limitations that should be acknowledged. First, the sample size of 100 prescriptions, while providing a clear preliminary snapshot, limits the generalizability and statistical power of our findings. Second, the convenience sampling method from private clinics may not fully represent all pediatric prescribing in Mosul, particularly in hospital settings. Third, and most importantly, the lack of associated clinical diagnosis data prevents any assessment of prescribing appropriateness; we can describe what was prescribed but not judge why. Finally, as a cross-sectional audit, it cannot capture seasonal trends or changes over time. Despite these limitations, this work provides essential, systematically collected baseline

data on prescription patterns in a major Iraqi city, which can serve as a foundation for more comprehensive, diagnosis-linked studies in the future.

Although GIT medications represented a substantial portion of prescriptions, we could not furnish a detailed analysis of specific agents (e.g., antiemetics versus anti-diarrheals) owing to limitations in data collection.

Conclusion.

The results of the current study show that the most prescribed drugs class by pediatricians in Mosul City are the Antibiotics, the same conclusion was found in both studies in Western countries and in Jordan as in both the Antibiotics had the highest class of drugs in the ranking of drug classes prescribed by pediatrician in the mentioned countries although the percentage of use in each country differ than in the others. Also, the types of Antibiotics prescribed differ significantly in all three countries, and this depends on the protocol of treatment in each country. Other classes of drugs in the other studies show some similarity, as in Mosul City and sometimes show significant differences from Mosul City, and this depends on different factors and on different climates. Rational use of medicine, especially in prescribing antibiotics, should not be prescribed except in cases of extreme necessity. Hygiene is necessary to decrease infections. Public education about the dangers of overuse of medications, especially antibiotics, and increasing public awareness of hygiene and sterilisation.

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