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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 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 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. 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.

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IMMUNISATION OF CHILDREN IN KAZAKHSTAN: ASSESSMENT OF COVERAGE AND BARRIERS TO VACCINATION REFUSALS IN THE CONTEXT OF SOCIAL NETWORKS AND PARENTAL BELIEFS

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Abstract.

Objective: This study aims to assess childhood immunisation coverage in Kazakhstan, identify the main factors contributing to parental vaccine refusal, and examine the influence of social media and parental beliefs on immunisation decisions.

Materials and Methods: A comprehensive literature review was conducted using databases such as PubMed, Scopus, and DOAJ. Keywords included «Immunisation», «Vaccination Refusal», «Health Knowledge», «Kazakhstan», and «Public Health». Studies in English involving qualitative, quantitative, or mixed methods were included, while case reports and non-English publications were excluded.

Results: Despite free access to vaccines, Kazakhstan has seen a decline in immunisation coverage since 2018, with measles outbreaks re-emerging in 2023. Parental vaccine hesitancy is influenced by safety concerns, misinformation, cultural beliefs, and limited trust in healthcare providers. Social media plays a dual role—while it can spread misinformation, it also offers an opportunity to increase awareness through targeted communication strategies. Key barriers include lack of healthcare access, socio-economic factors, and insufficient provider communication.

Conclusion: Improving vaccination coverage in Kazakhstan requires a multidisciplinary approach involving healthcare professionals, educators, policymakers, and the media. Efforts should focus on strengthening public trust, addressing misinformation, and adapting strategies to the local cultural and social context. Strengthening training for medical professionals and leveraging social media for evidence-based communication are essential steps to improve vaccine acceptance.

Key words. Immunisation, vaccination refusal, public health, health knowledge, Kazakhstan.

Introduction.

Vaccination offers substantial economic benefits by significantly reducing healthcare costs. By preventing diseases, vaccines help alleviate the financial burden of treatment, which includes expenses for doctor visits, medications, and hospital stays. This effect is particularly significant in low- and middle-income countries, where individuals pay a substantial portion of healthcare expenses.

Childhood immunisation involves stimulating a child's immune system to defend against specific diseases through the administration of vaccines, making it one of the most cost-effective global public health measures aimed at reducing illness and death among children [1,2].

One of the most empowering aspects of specific vaccines is their ability to provide strong protection against certain diseases. They not only shield vaccinated individuals from symptomatic illness but also from the infection itself, thereby reducing the likelihood of passing the pathogen to others upon exposure. When a population achieves high levels of vaccination coverage through these effective vaccines, it can lead to the establishment of collective herd immunity. This powerful tool disrupts the pathogen's spread [3,4].

With assistance from the World Health Organisation (WHO), the Expanded Program on Immunisation (EPI) was officially launched in 1974, aiming to vaccinate every child to combat diseases that can be prevented by vaccines [5].

Notably, over the past twenty years, numerous vaccines have been developed and effectively integrated into immunisation initiatives, including those aimed at preventing diarrhoea caused by rotavirus, diseases linked to HPV infection, meningococcal disease, pneumococcal disease, and herpes zoster, among others [3,6].

A recent study by Panhuis et al. found that since 1924, vaccines have prevented over 100 million cases of some infectious diseases, as evidenced by analysing incidence rates before and after their approval. However, outbreaks of measles, rubella, mumps, and pertussis have occurred since the 1980s, partly due to incomplete vaccination. This underscores the importance of completing vaccination schedules to ensure maximum protection against these diseases [7-9].

As a result of widespread vaccination initiatives, it is projected that approximately 120 million child deaths caused by infectious diseases have been prevented among those born from 2000 to 2030, with a 95% confidence interval estimated between 93 and 150 million [10].

The role of vaccination in public health.

Failing to complete a full vaccination schedule presents a complex issue wherein a child does not receive routine

vaccinations, resulting in incomplete immunisation for various reasons that can increase the child's vulnerability to immunisation-preventable illnesses [11].

The investigation revealed that, in 2024, both adults and juveniles have a higher likelihood of reaching their next birthday compared to a scenario without vaccinations since 1974. These conclusions highlight the ongoing beneficial impact of vaccinations across the lifespan, even considering the decline in vaccine effectiveness and a focus on vaccination schedules specific to infants and children. However, it should be noted that these schedules do not take into account other programs, such as vaccination against HPV, flu or COVID-19, which aim to reduce mortality among adults. This is reflected in the current need for vaccination programs, oriented at the highest level [12].

The specifics of the situation in Kazakhstan.

Low vaccination coverage can trigger the resurgence of diseases that are otherwise preventable through immunisation. According to the World Health Organisation (WHO), measles cases in Africa surged by 400% in 2022 compared to the same timeframe in 2021, largely due to limited vaccine availability and interruptions caused by the COVID-19 pandemic. In Kazakhstan, a similar trend was observed — since the beginning of 2023, 145 measles cases have been reported, predominantly affecting children who were either individuals who are not vaccinated or whose vaccination status cannot be verified [13-15].

This review aims to assess the present circumstances of childhood vaccination rates in Kazakhstan, identify the major obstacles contributing to vaccine refusals, and investigate how social media and parental beliefs influence immunisation choices. Through the combination of existing data and research, the study aims to provide insights that enhance vaccine acceptance and inform public health strategies.

Search strategy.

We performed a comprehensive search of PubMed, Scopus, and the Directory of Open Access Journals (DOAJ) using the keywords and medical search heading (MeSH) terms «Immunisation», «Vaccination Refusal», «Health Knowledge», «Kazakhstan» and «Public health» in various combinations. We excluded conference abstracts, case reports, and articles published in languages other than English. This review encompassed all types of studies (qualitative, quantitative, and mixed methods) published worldwide to collect relevant data on childhood immunisation and parents' perceptions of it.

Immunisation Coverage in Kazakhstan.

Soviet era:

Throughout the Soviet era, regular childhood vaccination initiatives reached significant coverage levels. These immunizations were offered at no cost to infants in maternity hospitals and primary healthcare centers [16]. Following the collapse of the Soviet Union in 1991, a rise in the occurrence of certain vaccine-preventable diseases, such as diphtheria and measles, was observed [17].

Post- independence period:

Following the dissolution of the USSR, there was a significant decrease in the rates of neonatal mortality, child mortality under

five years, and maternal mortality, along with a reduction in the overall mortality rate. Despite these positive advancements, statistics derived from data provided by the World Bank and World Health Organisation clearly indicate that health indicators for individuals in post-Soviet nations are considerably lower than those of wealthy Organisation for Economic Co-operation and Development (OECD) countries such as Japan, South Korea, Germany, Australia, Norway, and others [18].

After the breakup of the USSR, every nation implemented a comprehensive vaccination initiative that included immunisations for TB, diphtheria, tetanus, pertussis, polio, Haemophilus influenzae type b, hepatitis B, measles, mumps, and rubella. Except for Russia, all the countries incorporated pneumococcal vaccination into their programs [16]. Human papillomavirus vaccines were given in Turkmenistan, Kyrgyzstan, and Uzbekistan, whereas Kazakhstan tried to implement Human papillomavirus vaccination but did not succeed [19]. According to available data, vaccination coverage in Kazakhstan increased after 1995, consistent with the emergence of independent countries, leading to a decrease in the incidence of diphtheria, tetanus, and whooping cough [20,21]. One of the major milestones was the eradication of poliomyelitis. The final native case of polio was recorded in 1995, and after 7 years, Kazakhstan was officially declared polio-free [22].

Rubella is prevalent in Kazakhstan, with approximately 15,000 reported cases in 2004 [23].

Kazakhstan's National Vaccination Programme provided standard vaccinations for eight contagious diseases at primary health care centres, ensuring that the vaccines are available at no cost.

Numerous outbreaks of measles have taken place over the last two decades, and during the 1990s, there was a widespread pandemic of diphtheria [24,25].

Current Status of Immunization in Kazakhstan:

Six years ago, the World Health Organisation (WHO) classified reluctance or refusal to vaccinate as a significant global risk to public health [26]. This growing uncertainty has played a role in the reappearance of infectious diseases preventable by vaccines, both across Asia and in other parts of the world [26,27].

Hesitation toward immunisation, characterised by an unwillingness or refusal to get vaccinated, remains a significant and pressing issue in many parts of the world, with Asia being a key region. The widespread use of traditional healing practices and alternative treatments- rooted in cultural trust in natural methods and doubt about contemporary medical approaches- plays a significant role in reducing vaccine acceptance [28,29]. Cultural values have a significant impact on how people perceive risks and their intention to get vaccinated during crises [30].

The high rates of vaccine refusal played a significant role in the unsuccessful outcome of Kazakhstan's pilot Human papillomavirus immunisation program in 2013 [31].

Based on the decree issued by the Government of the Republic of Kazakhstan., routine preventive vaccinations are administered following the National Immunisation Schedule. The mandatory vaccines cover a range of serious infectious diseases, including tuberculosis, hepatitis B, poliomyelitis, pertussis, diphtheria, tetanus, Haemophilus influenzae type b,

pneumococcal infection, measles, rubella, and mumps [32]. All compulsory immunisations are offered free of charge and are financed by the state. Since 2016, vaccination uptake in Kazakhstan, as outlined in the National Vaccination Schedule, has consistently surpassed 80% [33].

The duty of ensuring children's health and wellness often falls to mothers rather than fathers or other family members. In households where mothers made decisions about children's vaccinations, there was a notably higher percentage of vaccinated children compared to families where someone other than the mother was the decision-maker [34-36].

Vaccination rates have stabilised in the past few years, and the situation has worsened due to the COVID-19 pandemic. From 2010 to 2019, the vaccination rate for DTP-3 (three doses of diphtheria, tetanus, and pertussis) as well as one dose of the measles vaccine, which are commonly regarded as significant indicators of immunisation coverage, remained stagnant at approximately 86% [37].

In 2021, a decline in first-dose measles vaccine (MCV-1) coverage to 81% — the lowest rate since 2008 - left 24.7 million children vulnerable to measles infection [38].

In Kazakhstan, the national immunisation coverage for 15 standard vaccines dropped from 94.7% in 2018 to 92.4% in 2019 and further to 89.1% in 2020, expressing significant worries regarding the nation's capability to preserve herd immunity and avert disease outbreaks [39].

Principal Obstacles to Vaccination.

A notable proportion of children experienced delays in receiving their vaccinations, which is crucial for understanding vaccination coverage since those with postponed vaccinations are more susceptible to infectious diseases for an extended period. Postponements in vaccination were more significant for vaccines that require multiple doses compared to those that only need a single dose [40].

Parental Beliefs and Concerns.

The awareness of parents regarding the significance and efficacy of HPV vaccination is crucial in influencing their choice to immunize their children. Although several elements affect the choices parents make, maternal approval and consent play a crucial role in boosting HPV vaccination rates. Moreover, this influence extends beyond HPV vaccination and is relevant to childhood immunisations in general [36,41].

Findings from a cross-sectional survey conducted in Kazakhstan indicate that even among parents whose children have been immunised, negative perceptions of vaccination persist. Within the group of 239 respondents (7.8%), specific individuals had earlier declined immunisations due to personal beliefs. This underscores the need for targeted interventions, as personal beliefs significantly influence vaccination decisions and agreeing to vaccinate a child does not necessarily reflect a favourable view of vaccines [42].

In various Asian countries, such as Hong Kong and South Korea, parents express concerns about giving their children the human papillomavirus vaccine, driven by the belief that it might indirectly support or encourage early sexual conduct [43].

In Kazakhstan, scientists' analysis of the risk of being undervaccinated for children of unmarried mothers was 70%

higher than for children of married mothers. However, the percentage of unmarried mothers was just 10%, and the disparity was not statistically significant. The marital status of the mother has been recognized as an important factor in forecasting child health in developing countries [44,45].

In surveys, parents of children who are not vaccinated frequently express concerns regarding the safety of vaccines. They additionally indicate that doctors have minimal impact on their choices regarding immunisation [46].

Parents who have declined some or all vaccinations for their children express comparable worries regarding the safety of vaccines and frequently think that their children are not very vulnerable to infections that vaccines can prevent. They additionally express a lack of trust in the government and are doubtful about information from medical or public health organisations, opting instead to depend on alternative medical practitioners [47].

Many parents who have concerns about the safety of vaccines often cite the supposed connection between immunisations and autism as a significant worry. Although the initial, controversial study published in the *Lancet* that connected certain vaccines to autism has been largely discredited and retracted, a substantial amount of counter-evidence has surfaced showing that no link exists. The initial study in *Lancet* linking vaccines to autism has been discredited and retracted, with significant evidence showing no connection. However, the media continues to portray the vaccine-autism debate as contentious in scientific and medical circles [48].

In developing nations, a lack of vaccinations is often linked to mothers who are not married, a greater number of children in the home, and a later birth order; the likelihood of being undervaccinated is increased in rural regions [46,49,50].

Socio-demographic Factors.

Reduced vaccination rates in urban areas, particularly in the former capital and among Muslim children, necessitate targeted programs for these specific groups [40].

The elements linked to low vaccine coverage included a combination of trends found in both developing and developed nations, aligning with the Republic of Kazakhstan's position as a transitional community.

It was discovered that residing in urban areas was a risk factor in developed countries [46,49,50].

Systemic Factors.

The economic environment and healthcare infrastructure of a nation also influence access to vaccines [51]. The price of vaccines plays a major role in vaccine hesitancy in Asia, as it creates an obstacle for individuals who are unable to afford them. Political and economic aspects influence how vaccines are perceived in Asia, affecting vaccine hesitancy, confidence in healthcare systems, and the availability of immunisation services [49].

The reduced immunisation rates in certain suburban regions of developing areas may be attributed to shortcomings in medical care facilities [40]. A notable obstacle to following the necessary childhood vaccination schedule is the absence of a consistent location for receiving health services. Juveniles without a medical home and insufficient insurance coverage are

more prone to being underimmunized and often do not receive their immunisations on schedule [52].

The Impact of Social Media and Misinformation.

The internet and social media networks have transformed the contemporary world by linking individuals and broadly sharing knowledge. While healthcare providers are the leading source of information regarding health matters, numerous parents view the internet as a readily available resource for health-related data, particularly concerning immunisation [53].

Considerable factors influence immunisation rates, including insufficient medical staff, inadequate awareness among both the general public and healthcare providers, scepticism toward the medical system, and poor communication skills within clinical settings. People of Asian descent constitute the largest group of users on social media platforms globally, with numerous countries reporting over 90% of social media platform penetration among their residents [54]. The increased reliance on digital sources has pushed many people to turn to social media for guidance—particularly during the pandemic—where they often encounter misleading or harmful information [55].

Vaccine reluctance is influenced by various factors that differ by region. To foster immunisation in Asian countries, it is crucial to comprehend the distinguishable cultural, historical, governance, and economic contexts present in the region. Adapting strategies to these unique traits can successfully diminish vaccine hesitancy throughout the area [29].

Particularly throughout the COVID-19 pandemic, social media networks became the epicentre for the spread of anti-immunisation campaigns, impacting the public's view of vaccines and, in turn, shaping the overall direction of the pandemic [54]. Addressing the misinformation presented in popular media offers a valuable possibility to enhance collaboration between parents and healthcare professionals, thereby boosting immunisation rates [56].

Social media platforms enable interactive communication with specific audiences and individuals, enhancing the availability, accessibility, and provision of a cost-effective and highly efficient means for advocating vaccination policies [57]. Working alongside interactive websites and social media platforms, traditional methods are surpassed in enhancing vaccine acceptance [58].

Coverage rate for core vaccines.

For much of the 20th century, there was a significant lag between the release of a vaccine in wealthy nations and its widespread adoption in developing countries. However, recent global public-private collaborations and advocacy efforts are facilitating the faster implementation of new and lesser-used vaccines [59].

Vaccines promote fairness by reducing the number of deaths in regions where fatalities are more common. The impact of vaccines on the overall decrease in infant mortality differs by region, with a more significant effect observed in the WHO African and European regions, which have distinct absolute mortality rates [12]. Childhood immunisations worldwide help avert around three to five million premature deaths in children under the age of five [60–62]. Immunisation rates varied between 82% and 87%, indicating notably high coverage compared to other

nations, including several developed countries. This outcome can be traced back to the country's historical background, as the Soviet nations had a well-structured healthcare system that provided better access to healthcare services, despite their modest wealth [40].

Following the dissolution of the Soviet Union in 1991, the Central Asian republics that were once part of it gained their independence. In the newly established states, the administrations struggled to uphold the vaccination coverage levels that had existed before [40,63].

According to official data, vaccination rates increased after 1995, leading to a decline in the incidence of diphtheria, tetanus, and pertussis [21,64]. Despite this, outbreaks of certain infectious diseases continue to happen in Kazakhstan. In the autumn of 2004, a measles outbreak occurred across multiple areas of the country, including Almaty, the country's previous capital, resulting in almost 10,000 reported cases from September 2004 to February 2005 [21]. In 2020, it was estimated that the immunisation coverage for children between the ages of 0 and 59 months worldwide was 81%. Due to the COVID-19 pandemic, the worldwide immunisation rate for children under five years old dropped by 5%, down from 86% in 2018 [65].

Numerous studies on vaccination rates in children under the age of five have found that factors such as the mother's level of education, economic status, place of birth, living location, access to perinatal care, household income, family size, and the sequence of childbirth greatly affects vaccination rates. [66,67,68]. Researchers have found a positive link between mothers' literacy levels and their children's vaccination rates.

Comparison with global indicators.

Following the COVID-19 pandemic and the global disruptions to health systems, nations that experienced drops in childhood vaccination rates have not fully rebounded; as a result, these nations are more vulnerable to increases in vaccine-preventable disease occurrences [69]. While the coverage of widely used vaccines, such as DTPcv, had plateaued prior to the COVID-19 pandemic and has been gradually recovering to levels seen before the pandemic, the introduction of new vaccines has enhanced the average coverage of all vaccine antigens recommended by the WHO [1].

Factors Influencing Vaccine Hesitancy in Post-Soviet Settings: The Situation in Kazakhstan.

In recent years, there has been a noticeable increase in the proportion of parents who either postpone or decline routine vaccinations for their children, posing risks not only to individual child health but also to public well-being. Examining the existing environment and predicting forthcoming trends concerning parental refusal regarding vaccine-preventable diseases is essential. This study has the potential to guide the creation of focused initiatives to enhance awareness and increase immunisation rates among children, thus greatly enhancing the health of the public. The potential benefits of these initiatives are promising, offering hope for a future with higher immunisation rates and improved public health. Earlier research in Kazakhstan highlighted a scarcity of published work exploring the drivers behind parental choices about required

childhood immunisations, including studies with a predictive perspective on this issue [70,71].

Despite well-established scientific proof confirming the success of vaccines in lowering illness and death rates among babies and young children, the world continues to face a significant challenge: a growing number of parents are declining childhood vaccinations. This issue has become even more pronounced in the wake of the COVID-19 pandemic [72].

This issue is particularly urgent in post-Soviet countries, even though free vaccinations are available. The widespread refusal to vaccinate has led to repeated disease flare-ups, notably between 2015 and 2019, including measles and whooping cough. These are illnesses that can be avoided through immunisation. Despite earlier preventive efforts, Kazakhstan saw another surge in infectious disease cases in 2023, reaching record highs [71,73].

The Importance of Vaccination.

Considering the severe consequences of disease outbreaks, the advantages of widespread vaccination are undeniable for both the individual receiving the vaccine and the community at large [74]. Ongoing or repeated infections during early childhood may result in inadequate growth and stunting, which can negatively impact adult health, mental abilities, and economic productivity. Employing advanced methods, researchers have demonstrated that a measles infection in juveniles eradicates existing antibodies to various pathogens in the months following the infection, rendering them susceptible to numerous other diseases and increasing the risk of death [75].

A clear advantage of immunisation is the reduction of healthcare costs. By using a vaccine to avoid an outbreak of the disease, the financial burdens of treatment- including doctor fees, medications, hospital stays, travel expenses, and income loss for caretakers- can be avoided. This is especially crucial for low and middle-income nations where a significant portion of healthcare costs is paid directly by individuals [76].

A newly developed online resource, the Value of Immunisation Compendium Evidence, managed by the International Vaccine Access Centre at Johns Hopkins University, now monitors studies on the broader benefits of vaccines for global health, education, financial, and equity outcomes [77]. The research indicated that by 2024, both kids and adults will have a higher chance of reaching their next birthday compared to a scenario where no vaccinations were given since 1974. These findings emphasise the sustained beneficial impact of vaccinations across the lifespan, even in light of diminishing vaccine immunity. An analysis centred exclusively on schedules for infants and children excludes other vaccination initiatives, such as those for HPV, influenza, or COVID-19, which directly lower mortality rates in adults [12].

In the United States, vaccinations have led to significant reductions in the occurrence of diseases and associated mortality rates. A study that examined disease prevalence in 2006 alongside historical peaks of those illnesses from the early 1900s (prior to the advent of vaccines) found an average reduction of 92% due to the introduction of vaccines [56,74]. Despite the reduction in cases, economic evaluations have consistently shown that regularly providing childhood vaccinations offers significant advantages to both individuals and the community [78].

Similar to the United States, Kazakhstan has also experienced significant declines in the incidence of vaccine-preventable diseases since the implementation of national immunization programs, particularly after gaining independence. For instance, the introduction of widespread childhood vaccination has contributed to the near-elimination of diseases such as polio and a substantial decrease in measles and diphtheria cases. Although comprehensive cost-effectiveness studies specific to Kazakhstan remain limited, global evidence- as seen in the US supports the long-term economic and public health benefits of routine immunization. This reinforces the importance of sustaining high coverage rates and addressing vaccine hesitancy to maintain progress in Kazakhstan [40].

The need for an integrated approach.

Healthcare professionals play a crucial role in vaccinating children, as they are often the main source of credible information. Their viewpoints on immunisation can significantly influence how parents perceive and approach the topic of immunisation. By identifying the obstacles and attitudes related to immunisation, healthcare providers and policymakers are presented with a challenge. This understanding can motivate them to address parental concerns more effectively and develop strategies to increase vaccination rates [79]. It is also crucial to enhance the curricula of medical HEIs by placing a stronger focus on immunological prevention, clinical microbiology, and rational antibiotic use [80].

Recommendations for health policy.

The vaccination rates in different regions are primarily influenced by existing policies and social norms that reflect collective views and behaviours. Regulations and decisions created by government entities encompass a broad array of policies, particularly those relating to financial assistance for immunisation initiatives. Social norms, such as the vaccination rate in a region and the level of societal approval for it, underscore the importance of community-wide efforts to promote vaccination. These elements together play a role in contributing to what is known as a vaccination culture, which refers to the general attitudes and behavioural patterns typical of a specific social group [81,82]. For example, in Japan, scepticism toward vaccination initiatives has deep historical roots, stemming from past incidents and previously enforced mandatory immunisation policies by the state [83].

The implementation of school entry laws that require vaccinations before children can attend day care or school has been a significant and successful strategy in the control of infectious diseases [56]. Enhancing the efficiency of vaccination initiatives can significantly improve public health outcomes. To accomplish this, it is essential to establish ongoing training and development initiatives for healthcare providers involved in immunisation services. Communication strategies should utilise multiple channels- including mass media, community health workers, and local leaders who play an influential role in their communities- to ensure that accurate and culturally relevant information is disseminated. Additionally, robust monitoring and evaluation systems must be established to measure vaccination services' quality, reach, and user satisfaction [84].

Immunisation offers substantial economic benefits by

significantly reducing healthcare costs, a fact that should bring optimism to healthcare professionals, policymakers, and the general public. By stopping diseases, vaccines help alleviate the financial burden of treatment, which includes expenses for doctor visits, medications, and hospital stays. This impact is especially meaningful in low- and middle-income countries, where a significant part of healthcare costs is covered directly by individuals. [76,85,86].

Policymakers can utilise social media networks to promote vaccine adoption globally. Access to reliable sources, such as the WHO website, the immunisation information provided by the Centres for Disease Control and Prevention, immunisation data, and the official health departments of various countries, should be enhanced when seeking guidance from a health professional is not possible. Rebuilding confidence in scientific research and healthcare professionals is essential for enhancing worldwide vaccination initiatives [29]. Health authorities and health ministries must provide precise information regarding immunisation through social media channels [87].

It is essential to combat disinformation efforts by minimising political influence and enabling health professionals to advocate for global health successfully. Rebuilding confidence in science and health authorities is essential for enhancing worldwide vaccination initiatives.

This research has various limitations that must be considered. Firstly, the analysis mainly depends on existing secondary data and literature, which might not fully reflect the most recent shifts in parental attitudes or differences in immunisation rates among different regions of Kazakhstan.

Secondly, the evaluation of online misinformation is based on prior studies and may not accurately represent the current state of affairs in the country. Lastly, while international comparisons (such as with the United States or Europe) offer valuable context, the differences in sociocultural environments and healthcare systems may restrict the direct relevance of these findings to the situation in Kazakhstan.

Future research should focus on longitudinal studies that gather primary data from parents, healthcare providers, and analyse digital platforms to obtain a more thorough understanding of the immunisation landscape in Kazakhstan.

Conclusion.

This study provides an overview of the immunization landscape in Kazakhstan, highlighting both the progress achieved and the challenges that remain. While the primary focus is on Kazakhstan, some sections reference global trends and examples; wherever relevant, their applicability to the Kazakhstani context has been explicitly addressed to maintain a country-centered perspective.

Kazakhstan's experience demonstrates how sociopolitical transitions can influence public health outcomes, including vaccination coverage. The recent decline in vaccine uptake underscores the need for a proactive and multifaceted response. Misinformation—especially that spread via social media—has emerged as a major barrier to immunization. Addressing it requires more than just factual corrections; it demands rebuilding public trust in the healthcare system, depoliticizing vaccination discourse, and empowering healthcare professionals to lead

with scientific integrity and transparency.

To ensure effective and resilient immunization policies, Kazakhstan must adopt context-specific strategies that are sensitive to cultural, regional, and socioeconomic differences. Policymakers should implement regular community-based assessments to monitor public sentiment, identify emerging concerns, and adapt messaging accordingly.

Further research is needed, including the collection of primary data, in-depth analysis of digital information environments, and longitudinal studies involving parents and healthcare providers. This will enable a deeper understanding of vaccine hesitancy and help shape more targeted, evidence-based interventions.

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Author contributions.

AD and NT developed the study design. AD, NT, and SZ conducted the literature review and gathered the data. AD, NT, and SZ performed the data analysis. AD, NT, and SZ provided interpretations of the data analyses. AD, NT, and SZ drafted and critically evaluated the study for significant intellectual content. AD, NT, and SZ finalised the manuscript and consented to be responsible for all aspects of the work.

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ანოტაცია

კვლევის მიზანი. კაზახეთში ბავშვთა იმუნიზაციის დაფარვის დონის შეფასება, მშობლების მხრიდან ვაქცინაციაზე უარის თქმის ძირითადი მიზეზების გამოვლენა და სოციალურ ქსელებსა და მშობელთა რწმენებზე მათი გადაწყვეტილებების გავლენის შესწავლა.

მასალები და მეთოდები. შესწავლილი იქნა სამეცნიერო ლიტერატურა PubMed, Scopus და DOAJ მონაცემთა ბაზებში. გამოყენებული იყო საკვანძო სიტყვები: "იმუნიზაცია", "ვაქცინაციაზე უარის თქმა", "ჯანმრთელობის ცოდნა", "ყაზახეთი", "საზოგადოებრივი ჯანმრთელობა". განხილული იყო ინგლისურენოვანი კვლევები, რომლებიც შეიცავდა როგორც რაოდენობრივ, ასევე ხარისხობრივ და შერეულ მეთოდებს. გამოირიცხული იქნა კონფერენციული თეზისები, კლინიკური შემთხვევები და სხვა ენაზე გამოქვეყნებული მასალები.

შედეგები. მიუხედავად იმისა, რომ ყაზახეთში ვაქცინები უფასოდ ხელმისაწვდომია, 2018 წლიდან იმუნიზაციის

დონე იკლებს. 2023 წელს დაფიქსირდა წითელას აფეთქება. მშობელთა ვაქცინაციასთან დაკავშირებულ ეჭვებს იწვევს უსაფრთხოებასთან დაკავშირებული შიშები, დეზინფორმაცია, კულტურული მახასიათებლები და სამედიცინო პერსონალისადმი ნდობის ნაკლებობა. სოციალური მედია მნიშვნელოვან როლს ასრულებს — როგორც დეზინფორმაციის გავრცელებაში, ასევე საზოგადოებრივი ცნობიერების ამაღლებაში. ძირითადი ბარიერებია შეზღუდული წვდომა სამედიცინო სერვისებზე, სოციალური და ეკონომიკური ფაქტორები და ექიმებთან კომუნიკაციის ნაკლებობა.

დასკვნა. იმუნიზაციის გაუმჯობესებისთვის საჭიროა ინტეგრირებული მიდგომა ექიმების, მასწავლებლების, მთავრობისა და მედიის ჩართულობით. აუცილებელია მოსახლეობასთან ნდობის განმტკიცება, დეზინფორმაციის წინააღმდეგ ბრძოლა და სტრატეგიების ადაპტირება ადგილობრივი სოციალური და კულტურული კონტექსტის მიხედვით. რეკომენდებულია სამედიცინო პერსონალის მომზადების გაძლიერება და სანდო ინფორმაციის გავრცელება სოციალურ ქსელებში.

საკვანძო სიტყვები. იმუნიზაცია, ვაქცინაციაზე უარის თქმა, საზოგადოებრივი ჯანმრთელობა, ჯანმრთელობის ცოდნა, ყაზახეთი.

Аннотация

Цель исследования. Оценить охват детской иммунизацией в Казахстане, выявить основные причины отказа родителей от вакцинации, а также изучить влияние социальных сетей и родительских убеждений на решение о прививках.

Материалы и методы. Был проведён всесторонний обзор литературы с использованием баз данных PubMed, Scopus и DOAJ. Использовались ключевые слова: «Иммунизация», «Отказ от вакцинации», «Медицинская осведомлённость», «Казахстан», «Общественное здравоохранение». Включались исследования на английском языке с качественными, количественными и смешанными методами. Были исключены отчёты о случаях, тезисы конференций и статьи на других языках.

Результаты. Несмотря на бесплатный доступ к вакцинам, в Казахстане с 2018 года наблюдается снижение охвата иммунизацией, что привело к повторным вспышкам кори в 2023 году. Родительская настороженность по отношению к вакцинации обусловлена опасениями по поводу безопасности, дезинформацией, культурными установками и низким доверием к системе здравоохранения. Социальные сети играют двойственную роль: с одной стороны, они способствуют распространению ложной информации, с другой — могут быть эффективным инструментом для повышения осведомлённости. Основные барьеры включают недостаточную доступность медицинской помощи, социально-экономические факторы и слабую коммуникацию со стороны медперсонала.

Заключение. Для повышения уровня вакцинации в Казахстане необходим междисциплинарный подход

с участием медицинских работников, педагогов, политиков и СМИ. Усилия должны быть направлены на укрепление общественного доверия, противодействие дезинформации и адаптацию стратегий с учётом местного культурного и социального контекста. Важно усилить

подготовку медицинских специалистов и эффективно использовать социальные сети для распространения научно обоснованной информации.

Ключевые слова: Иммунизация, отказ от вакцинации, общественное здравоохранение, медицинская осведомлённость, Казахстан.