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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

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საქართველოს სამედიცინო სიახლენი

**GEORGIAN MEDICAL NEWS**

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

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

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

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

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

**WEBSITE**

www.geomednews.com

## К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

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

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

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

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

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

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

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

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

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

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

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

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

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

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

**При нарушении указанных правил статьи не рассматриваются**.

## REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

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

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

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

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

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

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

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

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

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

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

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

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

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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# REPRODUCTIVE HEALTH OF WOMEN IN PENITENTIARY INSTITUTIONS: A CASE STUDY IN KAZAKHSTAN

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## Abstract.

**Background:** The global increase in female incarceration has raised concerns about the adequacy of prison healthcare, particularly reproductive health services. In Kazakhstan, prisons were designed for men and fail to address women's distinct needs. This study explores reproductive health issues among incarcerated women, focusing on healthcare access, psychological well-being, and risky behaviours.

**Methods:** A mixed-methods study was conducted in six correctional facility in Kazakhstan. Quantitative data from 300 women were collected using medical records and structured surveys. Qualitative insights were gathered through focus groups. Data analysis involved descriptive statistics and correlation analysis to explore links between healthcare access, substance use, and health outcomes.

**Results:** 59% of participants reported satisfactory health; 46% encountered obstacles accessing care. STIs were present in 40% of inmates, and 18% had HIV. A moderate negative correlation was found between drug use and health status ($r = –0.31$). Access to reproductive health education showed a weak positive association with health outcomes. Incarcerated women in Kazakhstan face significant reproductive health disparities, including high rates of STIs (40%), HIV (18%), and depression (68%). Substance use correlated with poorer health, while access to reproductive health education showed tentative associations with better outcomes. Systemic reforms are urgently needed to address healthcare access, hygiene, and mental health support.

**Conclusion:** Incarcerated women in Kazakhstan face serious reproductive health challenges, including limited care access, high rates of infection, and mental health burdens. Urgent reforms are needed to improve medical services, hygiene, and reproductive education in prisons. Addressing these issues is critical for safeguarding human rights and improving public health outcomes.

**Key words.** Penitentiary systems, healthcare disparities, reproductive health, sexually transmitted infections.

## Introduction.

The increasing population of jailed women globally has prompted worries about the sufficiency of healthcare systems inside correctional facilities [1,2]. These issues are especially urgent for reproductive health [3,4]. Penitentiary systems in several countries, including Kazakhstan, were mostly constructed for male offenders, sometimes overlooking the distinct health requirements of women. This research aims to analyse the reproductive health issues encountered by women in correctional facilities, emphasising aspects such as healthcare accessibility, lifestyle choices, and the influence of psychological disorders. Through the examination of data from Kazakhstan's correctional facilities, we want to identify deficiencies in healthcare services for female inmates and provide practical solutions. Prior research, like that of M. E. Karlsson and M. J. Zielinski [5], has highlighted the disproportionate incidence of STIs and reproductive health concerns in incarcerated women compared to the general population. R. Bosworth [6] documented increased HIV incidence in correctional facilities, attributing these trends to pre-incarceration behaviours and systemic inadequacies in prison healthcare systems. Histological evidence demonstrates that complex modified therapy in women with preeclampsia associated with metabolic syndrome leads to significantly fewer pathological changes in the placenta, improving the integrity of the "mother–placenta–fetus" system [7]. Despite these findings, research on Central Asia, particularly Kazakhstan, is scarce, leading to significant gaps in knowledge on the health challenges faced by female inmates in these contexts. Despite the lack of targeted pregnancy monitoring in penitentiary institutions, international findings emphasize that timely correction of vitamin D deficiency in high-risk pregnant women significantly reduces the likelihood of moderate preeclampsia, thus enhancing maternal outcomes [8].

The introduction will include a background on the topic of women in correctional facilities, emphasising the worldwide increase in jailed women, the distinct health issues they encounter, and the deficiency of suitable healthcare provisions. As noted in the study [9], "in 72.2% of respondents, the study revealed deviations from the normal course of the menstrual cycle" which, in the context of penitentiary settings, may remain undetected and untreated, exacerbating broader systemic health risks [9]. This article will examine reproductive health issues affecting women in Kazakhstan's correctional facilities. This includes access to healthcare, gender-specific health requirements, and the effects of imprisonment on physical and emotional well-being.

**Theoretical Background.**

Incarcerated women represent a vulnerable population with specific healthcare needs stemming from their physiological, psychological, and social circumstances [10,11]. The health disparities among incarcerated women stem from systemic failures and prison environments that perpetuate harm—such as widespread substance abuse, violence, and inadequate living conditions [12-14]. In Kazakhstan, the challenges are exacerbated by imprisonment facilities originally designed for male inmates, which fail to address the specific health requirements of women. This shortage is shown by a heightened incidence of STIs, limited access to feminine hygiene products, and poor specialized gynaecological treatment.

This study's importance extends beyond the prison system, since the health of incarcerated women has broader public health implications. Effective management of health needs may reduce the transmission of infectious diseases, improve overall well-being, and promote recovery and reintegration into society.

**Research problem.**

The inadequacies of correctional systems in addressing the distinct health needs of women have been highlighted due to the global rise in the female incarceration rate [15]. The facilities in Kazakhstan, consisting of six women's colonies that contain around 2,000 inmates, were originally designed for male criminals. This male-centric system neglects the medical needs of women, particularly regarding their reproductive health. Inadequate sanitation, poor nutrition, and limited access to specialised medical care are factors that exacerbate the health problems of incarcerated women [16,17]. The challenges are exacerbated by an environment that fosters criminal activity, characterised by rampant substance abuse and the threat of sexually transmitted infections (STIs).

The disparities in reproductive health seen among incarcerated women not only indicate broader public health concerns but also reflect the systematic neglect that has been extensively documented [16]. To safeguard human rights and improve the overall quality of life for incarcerated individuals, it is essential to comprehend these issues and implement solutions.

**Research focus.**

This study aims to identify and examine the factors that jeopardise the reproductive health of incarcerated girls and women in Kazakhstan. The analysis of data from one of the correctional facilities under the jurisdiction of the Committee of the Penal Correction System of the Ministry of Internal Affairs of the Republic of Kazakhstan revealed serious issues in the area of women's health.

Specific objectives including assessing the prevalence of sexually transmitted diseases (STIs), understanding access to healthcare facilities, and analysing the psychological and social barriers faced by female inmates. This study's conclusions aim to inform policy changes and enhance medical care delivery inside correctional facilities.

**Methodology.**

This study effort used a mixed-methods approach to perform a comprehensive review of the reproductive health challenges faced by incarcerated women in one of the correctional institutions in Kazakhstan. The research project design included the collection of quantitative data via surveys and the examination of medical records, while qualitative insights were obtained from discussions conducted in focus groups. A full understanding of the several health issues common among convicts was attained via the use of this methodological combination.

**Research plan and sample:**

The study was conducted at the State Institution "Facility No. 10" of the Committee of the Penal Correction System under the Ministry of Internal Affairs of the Republic of Kazakhstan and covered 300 women of reproductive age, which provided an objective picture of their health status and access to medical care. The sample method used was stratified random sampling to provide enough representation across diverse age groups, lengths of incarceration, and health conditions. Participation was entirely voluntary, and each subject provided consent after being adequately informed.

**Data Collection:**

This research relies on a quantitative examination of data gathered from six correctional facilities in Kazakhstan. The data includes health status, access to medical treatment, psychological well-being, and lifestyle variables like smoking, alcohol use, and substance addiction. The sample included 300 female convicts aged 18 to 60. Data were gathered via interviews, health records, and questionnaires distributed to female detainees. The health records included data on chronic illnesses, access to healthcare, reproductive health, and any current treatments or procedures. The questionnaire evaluated characteristics including lifestyle choices (smoking, alcohol use, and substance abuse), mental health condition, and availability of reproductive health education. The overall health status of the convicts, categorised as low, fair, good, or exceptional. Mental health condition, categorised as sad, anxious, or steady.

**Data Analysis:**

Correlation analysis was used to evaluate the links among lifestyle characteristics, healthcare access, psychological well-being, and overall health. Descriptive statistics were used to encapsulate the demographic attributes and health conditions of the convicts. The investigation used Python and statistical libraries, including Pandas and Seaborn, for result visualisation.

## Results.

The study comprised a total of three hundred incarcerated women. The predominant age group of participation was 31-40 years (55.3%), followed by 41-49 years (23.7%) and 21-30 years (17.3%). A minor percentage of participants (3.7%) were aged 20 years or younger, as seen in Table 1. The majority of participants were at the institution for 6 months to 3 years (49.0%), followed by 4 to 7 years (31.3%). Individuals who resided for less than 6 months constituted 5.7%, while those who remained for over 8 years represented 14.0%. A majority assessed their health as Satisfactory (59.0%), whilst 26.0% indicated their health as Good. A minority (14.0%) classified their health as poor. Sixty-five percent of individuals indicated the absence of chronic conditions. 77.7% of individuals had access to medical care inside the institution, while 22.3% did not. 38.7% of participants had regular visits, while 28.0% reported rare visits, 25.0% visited sometimes, and 6.7% had never visited for a general examination. 54.0% of individuals indicated no difficulty in receiving medical treatment, while 46.0% encountered obstacles. A majority (59.7%) did not have access to medications and medical treatments, while 38.7% did have access (Table 1).

### Correlation Analysis.

The correlation analysis uncovered numerous significant results. A moderate negative correlation ($r = -0.40$, $p < 0.01$) between incarceration duration and health status underscores the cumulative harm of prolonged imprisonment. Conversely, access to reproductive health education showed a weak but significant positive association ($r = +0.11$, $p = 0.04$), suggesting targeted interventions could mitigate decline (Figure 1). Smoking, alcohol consumption, and drug usage had a negative connection with health status, with drug abuse demonstrating the most significant adverse effect (-0.15).

***Table 1.*** *Characteristics of participants, including demographics, health status, chronic diseases, and access to medical care.*

| Parameters | Frequency | Percentage |
|---|---|---|
| Age groups | | |
| 31-40 years | 166 | 55.3 |
| 20 years | 11 | 3.7 |
| 21-30 years | 52 | 17.3 |
| 41-49 years | 71 | 23.7 |
| Duration of stay | | |
| 6 months to 3 years | 147 | 49.0 |
| 4-7 years | 94 | 31.3 |
| less than 6 months | 17 | 5.7 |
| more than 8 years | 42 | 14.0 |
| Health status | | |
| Good | 78 | 26.0 |
| Satisfactory | 177 | 59.0 |
| Bad | 45 | 14.0 |
| Chronic diseases | | |
| no | 195 | 65.0 |
| SSS | 27 | 9.0 |
| Respiratory system | 8 | 2.7 |
| Urinary system | 31 | 10.3 |
| Digestive organ | 6 | 2.0 |
| Musculoskeletal system | 5 | 1.7 |
| Endocrine system | 19 | 6.3 |
| hematology | 9 | 3.0 |
| Access to medical care within the institution | | |
| No | 67 | 22.3 |
| Yes | 233 | 77.7 |
| Visit for a general medical examination | | |
| Never | 20 | 6.7 |
| Regular | 116 | 38.7 |
| Sometimes | 75 | 25.0 |
| Rarely | 84 | 28 |
| Difficulties in access | | |
| No | 162 | 54.0 |
| Yes | 138 | 46.0 |
| Access to medicines and medical procedures | | |
| No | 179 | 59.7 |
| Yes | 116 | 38.7 |

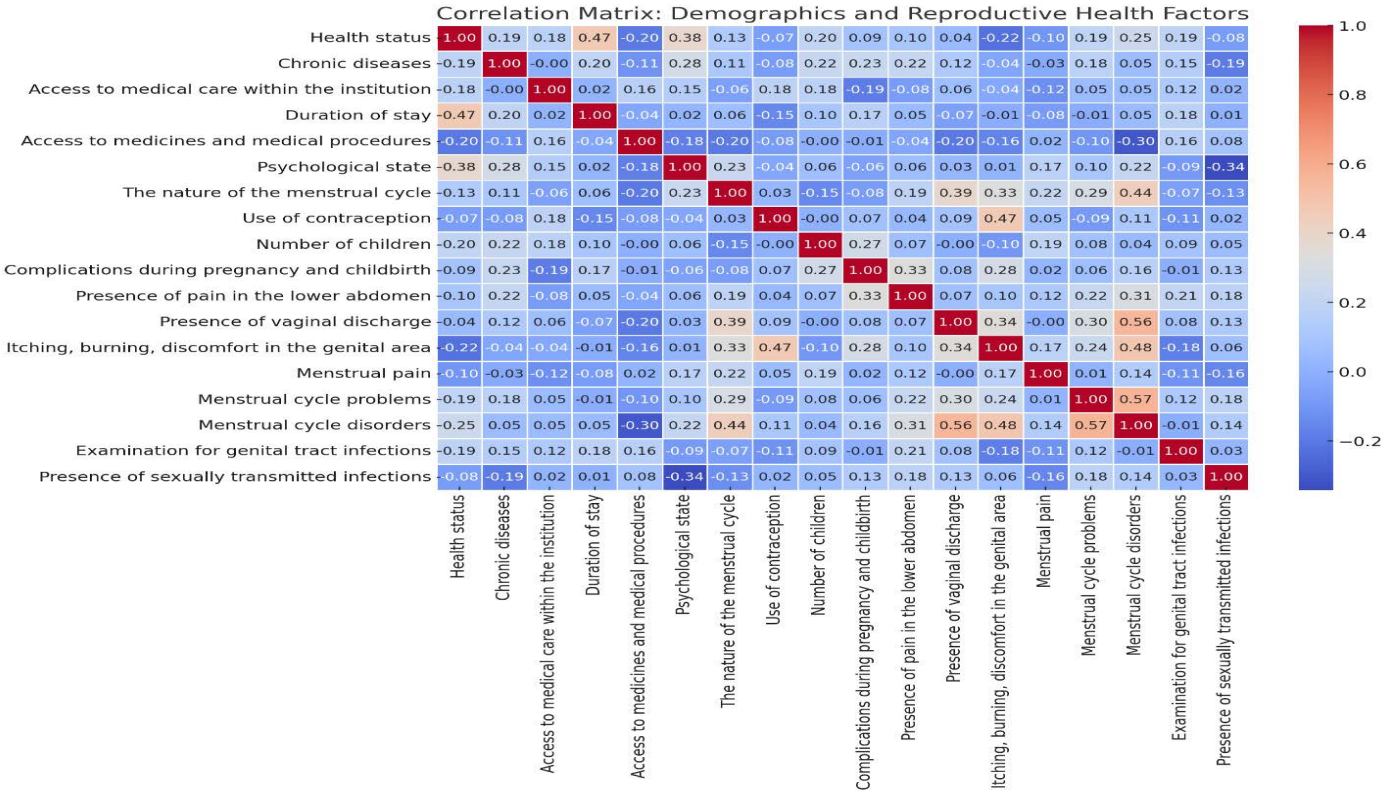


***Figure 1.*** *Correlation Matrix Heatmap.*

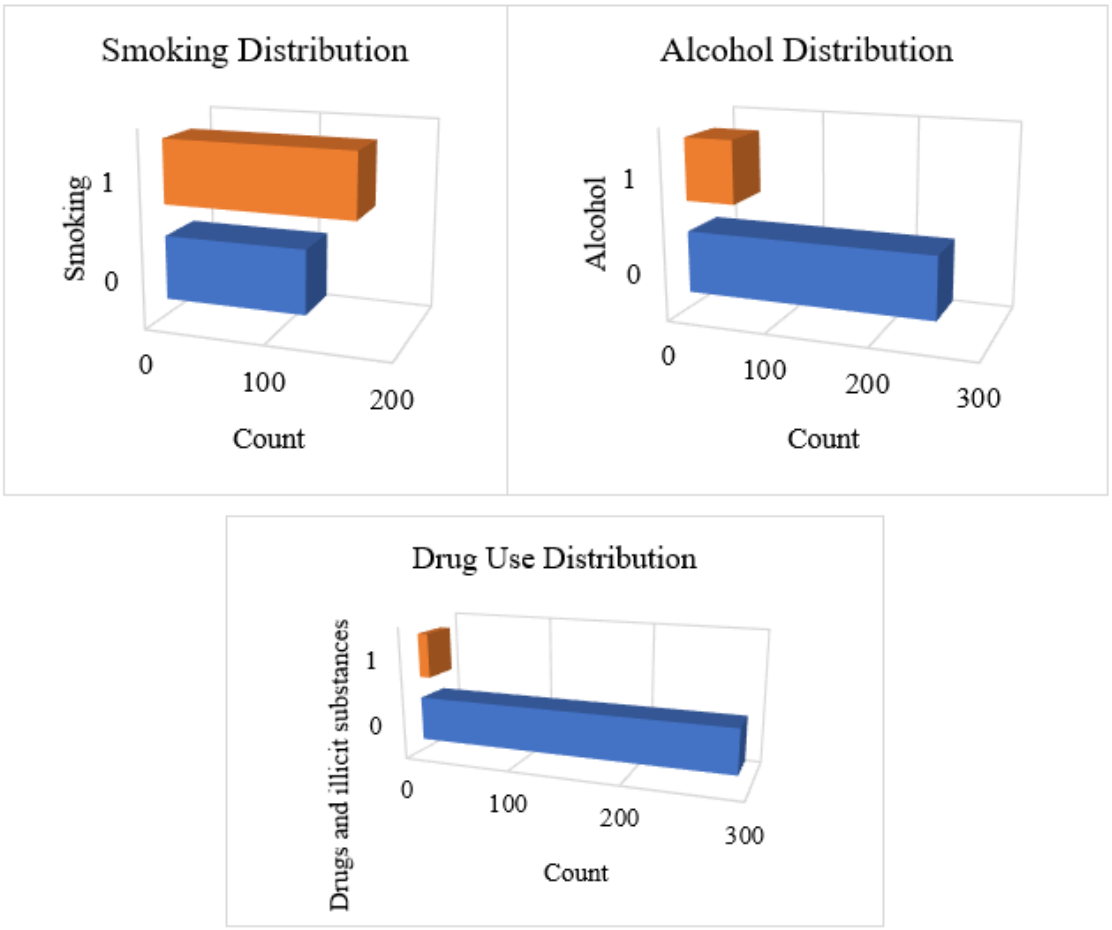


***Figure 2.*** *Smoking, alcohol, and drug use distribution among incarcerated women in Kazakhstani correctional facilities.*

A moderate positive connection (0.40) exists between length of stay and health status. This indicates that prolonged incarceration of women may deteriorate their health state. A small connection (0.06) suggests that access to medical treatment inside the institution may not influence general health status, indicating deficiencies in care quality. The connection between access to reproductive health information and overall health status is moderate (0.17), indicating a weak relationship. A negative association of -0.31 is observed between drugs and illegal substances and health status, indicating the detrimental impact of substance addiction on health. Smoking has a marginal positive correlation with health effect (0.08), indicating that it leads to worse health outcomes.

A slight positive connection (0.11) exists between access to reproductive health information and health status. This indicates that women with access to reproductive health education may have marginally improved overall health outcomes. A slight positive association (0.22) exists between access to reproductive health information and length of stay, suggesting that extended stays in penal facilities may correlate with improved access to reproductive health information.

**Lifestyle Factors (Smoking, Alcohol, and Drugs):**

Smoking has a negligible negative association (-0.06) with access to reproductive health information, indicating that smoking does not influence the availability of reproductive health education, while it may represent an independent risk factor for reproductive health. Alcohol has a modest positive connection (0.70) with drug use. This suggests a robust correlation between alcohol use and the use of illegal drugs, potentially exacerbating health hazards, especially those related to reproductive health. Drugs and illegal substances have a moderate negative association (-0.15) with health status, indicating that drug use adversely impacts health conditions, affecting reproductive health detrimentally (Figure 2).

## Discussion.

This research reveals significant reproductive and overall health concerns for incarcerated women in Kazakhstan. These results align with and expand upon previous studies on health disparities inside jails. The elevated incidence of sexually transmitted infections (STIs), monthly irregularities, depression, and hygiene-related issues underscores the compounded vulnerability of this population due to systemic flaws within the healthcare system of correctional institutions [1,13,14]. Research on environmentally adverse regions of Kazakhstan has demonstrated that chronic exposure to industrial pollutants is associated with a broad spectrum of somatic dysfunctions, including reproductive system disorders, which may be further exacerbated among incarcerated women with previous residence in such ecologically burdened territories [18].

Previous clinical findings indicate that total hysterectomy with bilateral ovarioectomy can lead to surgical menopause and disrupt the vaginal microecology by reducing lactobacilli and promoting the overgrowth of opportunistic pathogens, posing elevated risks of bacterial vaginosis under limited gynecological care conditions [19]. A recent Kazakhstani study demonstrated that vitamin D deficiency in adolescent girls is strongly associated with elevated parathyroid hormone levels and significantly decreased bone mineral density, which is highly relevant in the context of limited sun exposure, poor nutrition, and reproductive health vulnerabilities among incarcerated women [20]. The prevalence of STIs among participants is forty percent, whereas the prevalence of HIV is eighteen percent, aligning with global trends reported in similar research. A. E. Miranda [21] performed study revealing a significant prevalence of sexually transmitted infections (STIs) among incarcerated women. This elevated incidence was ascribed to inadequate access to preventive measures, limited health education, and a history of high-risk behaviours prior to incarceration, K. Dolan et al. [22] found that the prevalence of HIV in prisoners was sometimes three to four times higher than in the general population. The findings of R. Watson et al. [23], which highlighted the impact of stress, starvation, and inadequate gynecological treatment on the reproductive health of incarcerated women, were substantiated by the revelation that 51% of the participants had monthly irregularities. The slight discrepancies in the rates may indicate differences in nutrition, stress management, and access to healthcare specific to this facility. A meta-analysis by S. Fazel et al. [24], indicated a global prevalence of depression among female inmates at 65%, aligning with the finding that 68% of research participants had depression. Several factors contribute to this elevated frequency, including social isolation, stigma, and insufficient psychological assistance. All of these issues were reiterated in the qualitative feedback obtained from participants in this study. Disparities in resource allocation and institutional objectives within Kazakhstan's prison system were shown by the fact that eighty percent of participants cited hygiene-related issues. This proportion significantly exceeds the sixty percent documented in European studies L.Møller et al. [25]. Both physical and psychological suffering are intensified by inadequate access to feminine hygiene products and substandard sanitary facilities, adversely affecting overall well-being.

Reproductive health education was provided quarterly by NGO-trained nurses, covering STI prevention (50% of sessions), menstrual hygiene (30%), and contraception (20%). Participation was voluntary, with 60% attendance rates per session.

## Conclusion.

This research underscores the considerable reproductive health issues encountered by jailed women in Kazakhstan, illuminating the deficiencies of the correctional healthcare system. Elevated incidences of sexually transmitted illnesses, monthly irregularities, and mental health disorders, including depression, highlight the systematic disregard for women's health requirements in correctional environments. The study demonstrates the detrimental effects of restricted access to healthcare, inadequate sanitation, especially reproductive health. The report advocates for extensive healthcare changes to rectify these discrepancies, including enhanced access to reproductive health treatments, improved cleanliness, and more efficient mental health assistance for female convicts. Improving healthcare delivery in prisons is both a human rights matter and

a public health problem with significant consequences. The study's results provide a basis for policy reforms intended to enhance the health and welfare of jailed women in Kazakhstan and, by extension, in other worldwide penal systems.

**Institutional Review Board Statement.**

The study was approved by the Local Ethics Committee of Kazakhstan's Medical University "KSPH" (Protocol No. IRB-86-2023) on 17 May 2023. The project titled "Reproductive Health of Women in Penitentiary Institutions" was reviewed and granted ethical approval until 17 May 2024.

**Informed Consent Statement.**

Informed consent was obtained from all participants involved in the study. Participation was entirely voluntary, and the participants were provided with sufficient information about the study prior to enrolment.

**Data Availability Statement.**

The study was conducted at the State Institution "Facility No. 10" of the Committee of the Penal Correction System under the Ministry of Internal Affairs of the Republic of Kazakhstan. The data supporting the findings of this study are available from the corresponding author upon reasonable request and subject to ethical restrictions.


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**Author Contributions.**

All authors made substantial contributions to the study's conception, methodology, and analysis. They were involved in drafting the manuscript, critically revising it for intellectual content, approving the final version, and accepting responsibility for the integrity and accuracy of the work.

## Conflicts of Interest.

The authors declare no conflicts of interest.


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