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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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

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

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

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

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

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

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

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

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

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

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

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

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

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

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

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

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

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

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

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

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

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

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

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

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

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

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

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

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

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

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

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

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

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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PREVALENCE AND RISK FACTORS OF UTERINE FIBROIDS IN WOMEN OF REPRODUCTIVE AGE: A FACILITY-BASED STUDY IN A MEGACITY

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Abstract.

Introduction: Uterine fibroids (leiomyomas) are the most common benign tumors among women of reproductive age, significantly affecting reproductive function, quality of life, and work capacity. In Kazakhstan, there is a lack of systematic data on the population-level prevalence of uterine fibroids and associated risk factors. This study aimed to assess the prevalence of uterine fibroids among women in Almaty and to develop a predictive risk model.

Materials and Methods: A prospective facility-based study was conducted involving 1,200 women aged 18–49 years who sought gynecological consultation. Diagnosis was established using transvaginal ultrasound and hormonal profile assessment. The questionnaire covered reproductive history, lifestyle, nutrition, and comorbid conditions. Binary logistic regression was employed to identify risk factors, and the predictive model was evaluated using the area under the ROC curve (AUC).

Results: The prevalence of uterine fibroids was 34.9% (crude prevalence), with clinically significant forms identified in 17.2% of cases. When recalculated using direct age standardization to the female population of Almaty, the overall prevalence was 11.3%, reflecting the influence of the sample's age composition. The incidence increased with age, peaking in the 45–49 age group (38.6%). The most common symptoms were menorrhagia (69.1%), pelvic pain (49.3%), and reproductive dysfunction (28%). Significant risk factors included advanced age, elevated BMI, high prolactin levels, and vitamin D deficiency. The predictive model demonstrated high accuracy (AUC = 0.929), with sensitivity of 86.2% and specificity of 78.5%.

Conclusion: The prevalence of uterine fibroids in the urban population of Kazakhstan is comparable to international data. The developed model can be applied for individual risk stratification and for designing targeted screening programs. The identified associations underscore the importance of monitoring metabolic and hormonal factors in reproductive healthcare.

Key words. Uterine fibroids, prevalence, risk factors, vitamin D, prolactin, logistic regression, Kazakhstan.

Introduction.

Uterine fibroids (leiomyomas or fibromyomas) are the most prevalent benign tumors in women of reproductive age. According to estimates, by the age of 50, fibroids are detected in 50–70% of women, with prevalence reaching up to 80% among women over 60 years of age [1,2]. These statistics are primarily derived from countries with well-developed healthcare systems where ultrasound and clinical screening are routinely implemented. In regions with limited access to medical care, insufficient gynecological coverage, and unsystematic diagnostic practices, the actual burden of disease may be significantly underestimated [3,4].

The multifactorial nature of fibroid development reflects a wide spectrum of influencing variables, including ethnicity, age, reproductive history, excess body weight, and metabolic and hormonal imbalances [5,6]. Large cohort studies, such as the Black Women's Health Study, have shown that women of African descent tend to develop fibroids 10–15 years earlier and more frequently than Caucasian women [7]. In European and North American countries, the prevalence of symptomatic fibroids ranges from 19% to 26%, while up to 40–45% of women of advanced reproductive age may have asymptomatic forms [8].

Diagnostic strategies significantly affect detection rates. Transvaginal ultrasonography identifies fibroids in 20–25% of women, whereas MRI can detect them in up to 40% of cases [9,10]. Approximately one-third of fibroids are asymptomatic and are discovered incidentally during evaluation for unrelated conditions [7], contributing to the underreporting of fibroids in population-based registries and official statistics.

The clinical significance of fibroids extends beyond reproductive implications. They are among the leading causes of gynecologic hospitalizations, surgeries for abnormal uterine bleeding, and hysterectomies [2,9]. According to the WHO [11] and the Guttmacher Institute [12], fibroids have a substantial impact on work productivity, quality of life, sexual function, and emotional well-being. In countries with high healthcare coverage, the economic burden of fibroids is estimated in the billions—USD 5.9 billion annually in the United States [13], and approximately EUR 1.5 billion in the EU [3].

In addition, fibroids represent a major reproductive concern, particularly among women under 40 who are planning pregnancy. Fibroids can interfere with embryo implantation, increase the risk of miscarriage, disrupt uterine contractility, and cause anatomical deformation of the uterine cavity [14,15]. For this reason, special attention is given to fertility-preserving treatment strategies and early diagnosis in women of reproductive age.

Risk factors for fibroid development include early menarche, nulliparity, obesity, hypertension, chronic stress, smoking, vitamin D deficiency, and prolonged estrogen exposure [5,16,17]. Current research also highlights the role of genetic and molecular mechanisms, including MED12 gene mutations, activation of the WNT/β-catenin and TGF-β signaling pathways, and dysregulation of extracellular matrix components [18-20].

Diagnostic and therapeutic approaches continue to evolve. International guidelines (NICE, ACOG, ESHRE) emphasize the importance of individualized treatment planning based

on age, reproductive goals, and symptom severity [2,21]. Effective treatment options include GnRH antagonists, selective progesterone receptor modulators, uterine artery embolization, laparoscopic, and hysteroscopic myomectomy [14,15,21]. Of particular interest are novel pharmacological agents and minimally invasive interventions aimed at preserving fertility and minimizing complications.

Despite the high prevalence of fibroids, Kazakhstan lacks standardized population-level data on the true incidence of the condition. Available local studies indicate an increase in laparoscopic procedures [22-25], but these data are insufficient to assess prevalence trends or regional variations in clinical presentation.

There is also growing interest in the non-medical impact of fibroids, including social stigma and psychological distress associated with chronic bleeding, pain, and reproductive dysfunction. In younger women, fibroids can lead not only to physical symptoms but also to emotional exhaustion, reduced self-esteem, impaired sexual and family life, and delayed childbearing. Some studies report that women with severe fibroid symptoms experience anxiety and depression at rates exceeding those in the general population [2,11]. The inclusion of these dimensions in clinical recommendations underscores the need for a comprehensive, multidisciplinary approach to fibroid management.

In the absence of a national registry and representative population-based data, regionally conducted studies with clinical and instrumental verification of diagnosis are of particular value. Such studies provide insight into the prevalence of fibroids, identification of key associated risk factors, and comparison with international epidemiological trends.

Materials and Methods.

This facility-based prospective study was conducted in the city of Almaty between September 2024 and May 2025 and included 1,200 women aged 18 to 49 years. The study was carried out at the LS Clinic medical center. The research protocol was approved by the local bioethics committee of the Kazakh Medical University "Higher School of Public Health" (ф).

Inclusion criteria were: female sex; age between 18 and 49 years; consultation with a gynecologist (regardless of presenting complaints); availability of a transvaginal pelvic ultrasound performed within the previous six months; and current hormonal profile data, including TSH, estradiol, progesterone, FSH, LH, prolactin, testosterone, DHEA-S, and vitamin D3 levels. Hormonal tests were required to be performed on days 3 to 5 of the menstrual cycle. Written informed consent was mandatory for participation.

Exclusion criteria included: pregnancy at the time of assessment, confirmed malignant pelvic tumors, previous hysterectomy, absence of ultrasound data, or incomplete hormonal profile.

Data were collected via direct face-to-face interviews using a structured, author-developed questionnaire consisting of 63 items. The questionnaire included the following sections: (1) general patient information (6 items); (2) metabolic characteristics and dietary habits (8 items); (3) hormonal status and endocrine history (11 items); (4) reproductive history (7 items); (5) history of inflammatory diseases of the reproductive tract (6 items); (6) exposure to toxic agents and occupational factors (5 items); (7) psycho-emotional status (6 items); and (8) family history and awareness of the diagnosis (14 items). The presence of comorbidities was established based on self-reported medical history and documentation from relevant specialists.

In addition, data from transvaginal pelvic ultrasonography and laboratory hormonal profiles, provided by the participants at the time of enrollment, were included in the analysis. The prevalence of uterine fibroids was determined based on ultrasound findings.

Statistical analysis was performed using IBM SPSS Statistics software version 26.0. The normality of quantitative variables was assessed using the Kolmogorov–Smirnov test. For normally distributed variables, Student's t-test was applied; for non-normally distributed variables, the Mann–Whitney U test was used. Categorical variables were analyzed using Pearson's chi-square test and Fisher's exact test, as appropriate. Associations between variables were evaluated using Cramér's V coefficient. Data visualization, including generation of figures and graphs, was conducted using Python programming language and the Matplotlib library (version 3.7.1).

The required sample size was calculated using the standard formula for estimating sample size in population-based studies with a finite population. The calculation assumed a fibroid prevalence of 30% in women of reproductive age, a 95% confidence level ($Z = 1.96$), and a margin of error of ±3%. Based on demographic data for Almaty in 2024 (570,904 women aged 18–49 years), the minimum required sample size was estimated at approximately 897 women. To ensure adequate statistical power (target ≥ 0.90) and allow for stratified analysis by age and risk factors, 1,200 women were ultimately included. This sample size ensured the representativeness of the findings and the robustness of statistical inference.

Prevalence assessment. The primary outcome was the crude prevalence of uterine fibroids, defined as the proportion of cases among all examined women ($n = 1200$). This reflects the frequency of the condition in a facility-based population of women seeking gynecological care.

Age standardization. To account for differences in age structure, we additionally performed direct age standardization. Age-specific prevalence rates (18–24, 25–29, 30–34, 35–39, 40–44, and 45–49 years) were weighted according to the actual age distribution of the female population of Almaty (official data, Committee on Statistics). For each age group, the expected number of cases was calculated by multiplying the group-specific prevalence by the corresponding population size. The total expected cases were then summed across all age groups and divided by the total female population aged 18–49 years, yielding the overall age-standardized prevalence. This adjustment provides an estimate less influenced by the sample's age composition and illustrates the prevalence level expected in the city's underlying population [12].

To identify factors associated with the presence of uterine fibroids, binary logistic regression analysis was performed. Variables entered into the model included age, body mass index, hormonal profile parameters, reproductive characteristics,

history of inflammatory conditions, lifestyle and nutritional factors, presence of chronic diseases, and psycho-emotional variables. Model fit and statistical significance were evaluated using the Nagelkerke R^2 coefficient, with odds ratios (ORs) and 95% confidence intervals (CIs) reported. Statistical significance was set at $p < 0.05$.

The population prevalence of uterine fibroids was assessed through clinically and instrumentally verified diagnoses, adjusted for the age structure of the female population in Almaty.

Results.

A total of 1,200 women were included in the study, exceeding the minimum required sample size (n = 897) calculated to estimate the prevalence of uterine fibroids based on an expected rate of 35%, a 95% confidence level, and a ±3% margin of error. The increased sample size provided sufficient statistical power (>90%) and enabled stratified analyses by age group and clinical-hormonal parameters.

The overall prevalence of uterine fibroids in the study sample was 34.9% (419 out of 1200 women). This estimate reflects the proportion of cases among patients attending the clinic (facility-based design). To reduce the influence of the sample's age composition, we performed a recalculation using direct age standardization based on the age distribution of the female population of Almaty. The standardized prevalence was 11.3%. Among them, 17.2% (207 women) were diagnosed with clinically significant fibroid forms, potentially requiring surgical intervention due to pronounced symptoms, tumor size, or rapid growth. The remaining 17.7% of cases (212 women) represented asymptomatic or conservatively monitored forms that did not require immediate surgical treatment.

The age-stratified distribution revealed a gradual increase in fibroid prevalence with advancing age, peaking in the 40–44 age group. The diagnostic rates across age categories were as follows:

- 18–24 years: 1.2%
- 25–29 years: 3.8%
- 30–34 years: 7.6%
- 35–39 years: 12.8%
- 40–44 years: 14.5%
- 45–49 years: 38.6%

This trend underscores the strong age-related pattern in fibroid development, with the highest prevalence observed in women aged 45–49 years (21.5% of the total sample).

Figure 1 illustrates the primary clinical symptoms reported by women with symptomatic uterine fibroids (n = 207). The most common complaint was heavy and/or prolonged menstrual bleeding, reported by 143 patients (69.1%), followed by lower abdominal or pelvic pain in 102 women (49.3%), and infertility or pregnancy loss in 58 women (28.0%). Additional symptoms included urinary disturbances such as increased frequency or difficulty in urination (37 cases, 17.9%), constipation and rectal pressure (29 cases, 14.0%), abdominal enlargement or a palpable pelvic mass (25 women, 12.1%), and secondary anemia confirmed by laboratory tests (41 cases, 19.8%). The diagram illustrates the relative frequency of each symptom and can be used to visualize the clinical burden associated with fibroids.

Table 2 presents data on the prevalence of comorbid conditions among women diagnosed with uterine fibroids (n = 419) compared to those without fibroids (n = 781). The most common comorbidities in the fibroid group were obesity (41.1%), arterial hypertension (34.6%), and anemia (19.8%). In all three cases, differences from the control group were statistically significant ($p < 0.001$), although the strength of association was weak, indicating a potential role of these conditions as risk factors or complications of fibroids.

Pelvic inflammatory disease was observed more frequently in the fibroid group (16.0%), but the difference did not reach statistical significance. Conversely, ovarian cysts and endometriosis were more frequently diagnosed in women without fibroids; however, these differences were also not statistically significant.

No significant differences were found between the groups in terms of other systemic conditions, including hypothyroidism, autoimmune diseases, renal or urinary tract disorders, gastrointestinal conditions, or central nervous system involvement.

In the comparative analysis of quantitative parameters between women with and without uterine fibroids, statistically significant differences were identified in age, body mass index (BMI), serum vitamin D levels, and prolactin concentrations (Table 3).

Women with fibroids were, on average, older (42.0 ± 7.9 years vs. 39.8 ± 7.65 years; $p < 0.001$), supporting the well-established role of age as a key risk factor for fibroid development. BMI was also significantly higher in the fibroid group (26.1 ± 4.7 vs. 23.0 ± 3.7; $p < 0.001$), suggesting a potential link between excess body weight and hormonally dependent uterine neoplasms.

Vitamin D levels were markedly lower among women with fibroids compared to those without (15.0 ± 4.9 ng/mL vs. 24.8 ± 6.9 ng/mL; $p < 0.001$), consistent with literature highlighting the role of vitamin D deficiency in fibroid pathogenesis. The median serum prolactin level and interquartile range were also significantly higher in the fibroid group (Me: 19.09, IQR: 11.43–35.20) compared to the non-fibroid group (Me: 15.71, IQR: 10.05–21.52; $p < 0.001$).

No statistically significant differences were found between groups in other biochemical and hormonal markers (TSH, estradiol, progesterone, testosterone, DHEA-S), or in reported anxiety levels ($p > 0.05$).

Among women with uterine fibroids (n = 419), the consumption of fried foods was significantly more frequent—reported by 142 participants (33.9%)—compared to 85 women (10.9%) in the control group (n = 781), $p < 0.001$ (Cramér's V = 0.286; moderate association). A similar trend was observed regarding fast food intake: 128 women with fibroids (30.5%) vs. 77 without fibroids (9.9%), $p < 0.001$ (Cramér's V = 0.262; moderate association). Frequent consumption of sugar and spices was also significantly higher in the fibroid group—136 patients (32.5%) vs. 82 in the control group (10.5%), $p < 0.001$—although the strength of association was weak (Cramér's V = 0.174) (Figure 2).

A positive family history of uterine fibroids was reported more often among patients with fibroids—93 cases (22.2%) vs. 47 (6.0%) in the control group, $p < 0.001$ (Cramér's V = 0.263; moderate association). A history of induced abortion was

Table 1. *Age-Specific and Standardized Prevalence of Uterine Fibroids Among Women Aged 18–49 Years in Almaty.*

Age group (years)	**Female population in Almaty**	**Percentage of fibroid cases (%)**	**Estimated number of cases**	**Age-specific prevalence (per 100,000)**
18–24	111 034	1.2	2605	1200.2
25–29	71 401	3.8	5973	3799.9
30–34	88 123	7.6	14508	7599.8
35–39	90 931	12.8	23311	12800.2
40–44	70 098	14.5	20883	14500.0
45–49	58 676	38.6	48881	38599.6
"Crude prevalence = 34.9%; Age-standardized prevalence = 11.3% (standardized to the female population of Almaty)."				

Table 2. *Comorbid Conditions Among Women with and Without Uterine Fibroids (n = 1200).*

Comorbid condition	With fibroids (n = 419)	%	Without fibroids (n = 781)	%	Statistical significance	Cramér's V (strength)
Obesity	172	41.1%	218	27.9%	p < 0.001*	0.134, (weak)
Arterial hypertension	145	34.6%	164	21.0%	p < 0.001*	0,148, (weak)
Hypothyroidism	58	13.8%	78	10.0%	0.229*	0,034, (negligible)
Pelvic inflammatory disease	67	16.0%	84	10.8%	0.01*	0,075, (negligible)
Ovarian cysts	49	11.7%	92	11.8%	0.532*	0,005, (negligible)
Endometriosis	37	8.8%	85	10.9%	0.787*	0,007, (negligible)
Autoimmune diseases	28	6.7%	54	6.9%	0.880*	0,004, (negligible)
Renal and urinary tract diseases	23	5.5%	39	5.0%	0,712*	0,011, (negligible)
Gastrointestinal disorders	31	7.4%	57	7.3%	0,950*	0,002, (negligible)
Central nervous system disorders	19	4.5%	33	4.2%	0,802*	0,007, (negligible)
Anemia	81	19.8%	74	9,5%	p < 0.001	0,140, (weak)

Table 3. *Comparative Analysis of Quantitative Parameters in Women with and Without Uterine Fibroids (n = 1200).*

Parameter	**With fibroids**				**Without fibroids**				**p-value**
	M	**SD±**	**Me**	**Q1-Q3**	**M**	**SD±**	**Me**	**Q1-Q3**	
Age (years)	42,5	7,90	43	36.0–48.0	39,8	7,65	39	34.0–45.0	<0,001*
BMI (kg/m²)	26,1	4,70	25,5	22.8–28.9	23,0	3,70	22,1	20.3–24.2	<0,001*
Vitamin D3 (ng/mL; normal: 30–100)	15,0	4,90	15,0	11.3–18.2	24,8	6,90	24,9	20.1–29.6	<0,001*
TSH (μIU/mL; normal: 0.4–4.0)	2,13	0,94	2,02	1.47–2.78	2,09	0,91	2,01	1.43–2.68	0,432**
Prolactin (ng/mL; normal: 4.8–23.3)	23,94	15,42	19,09	11.43–35,2	19,17	13,11	15,71	10,05–21,52	<0,001**
Estradiol (pg/mL; normal: 30–120)	112,5	44,1	110	85.0–138.0	115,7	46,8	111	87.0–142.0	0,347**
Progesterone (ng/mL; normal: 0.2–1.5)	6,3	3,5	6,1	4.2–8.3	6,5	3,4	6,2	4.3–8.1	0,488**
DHEA-S (μg/dL; normal: 80–350)	210,2	65,4	208	172–248	215,1	62,7	211	174–252	0,274**
Total testosterone (ng/mL; normal: 0.3–2.0)	1,12	0,39	1,10	0.9–1.4	1,08	0,41	1,07	0.85–1.35	0,364**
Anxiety level (score 0–10)	5,8	1,9	6,0	4.5–7.0	5,7	2,0	6,0	4.3–6.9	0,571**
*M – mean; SD – standard deviation; Me – median; Q1–Q3 – interquartile range; *p-values based on Student's t-test for normally distributed variables; *Mann–Whitney U test for non-normally distributed variables.									

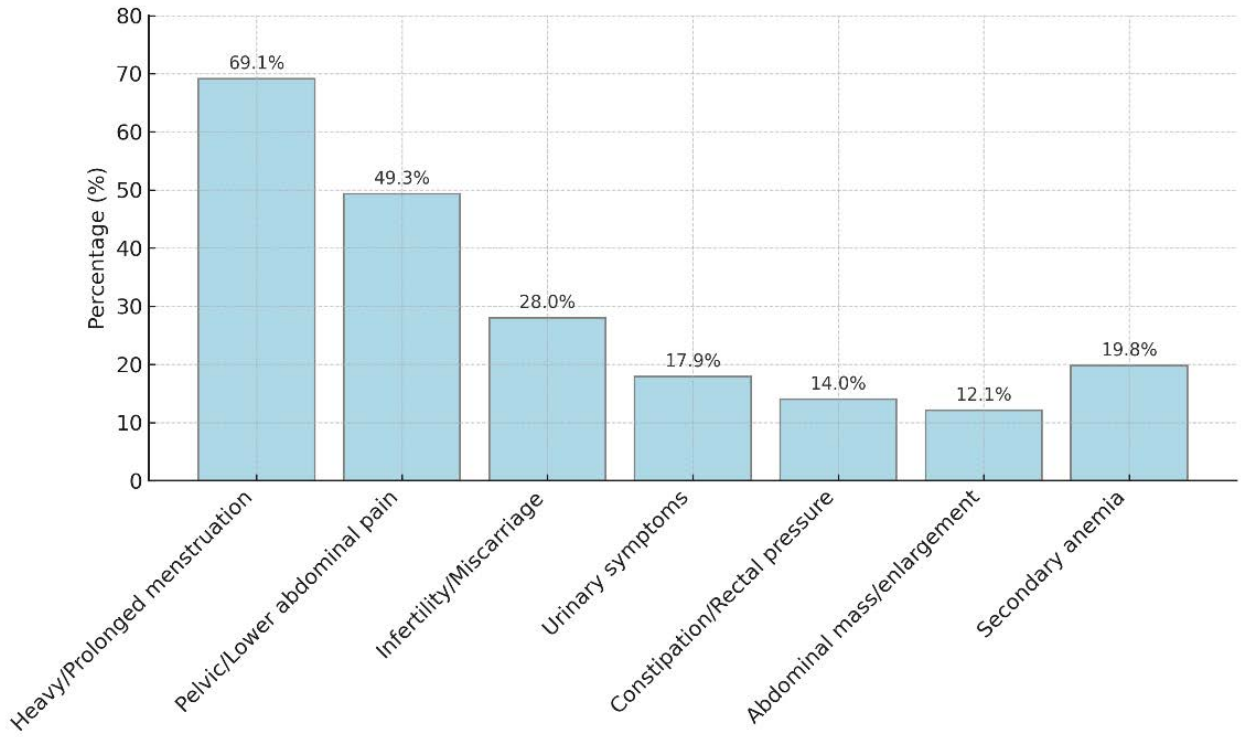

Figure 1. *Distribution of clinical symptoms among women with symptomatic uterine fibroids (n = 207).*

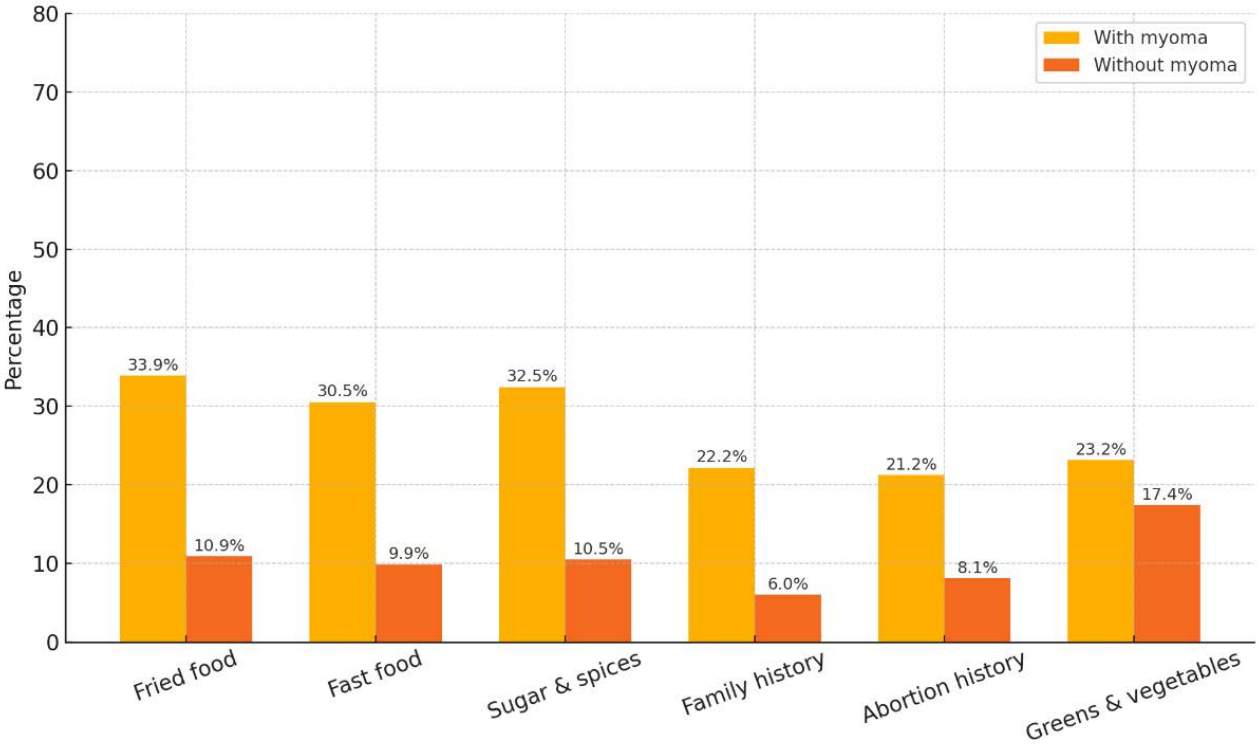

Figure 2. *Dietary habits and reproductive history in women with and without uterine fibroids (%).*

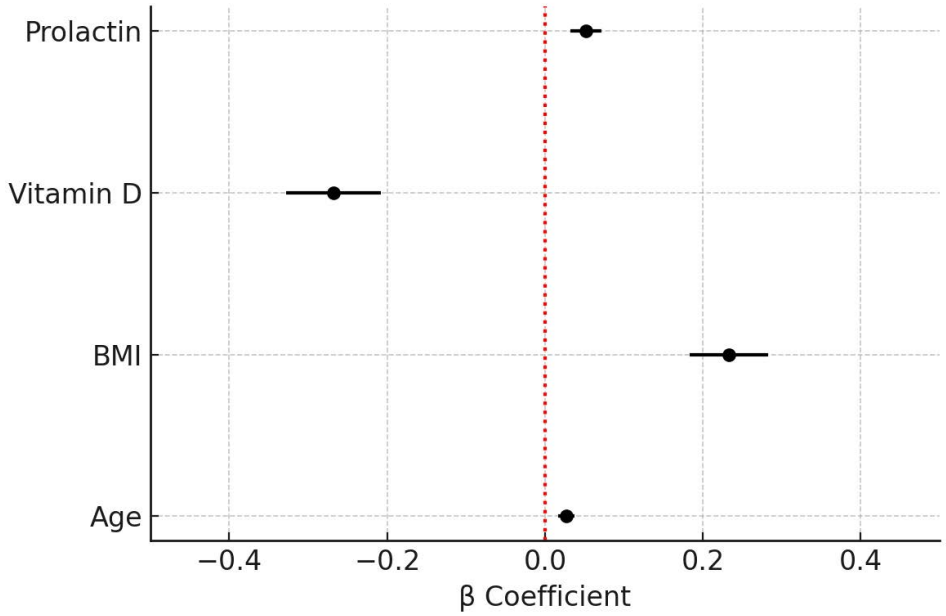

Figure 3. *Association of key factors with the risk of uterine fibroids based on binary logistic regression analysis (n = 1200).*

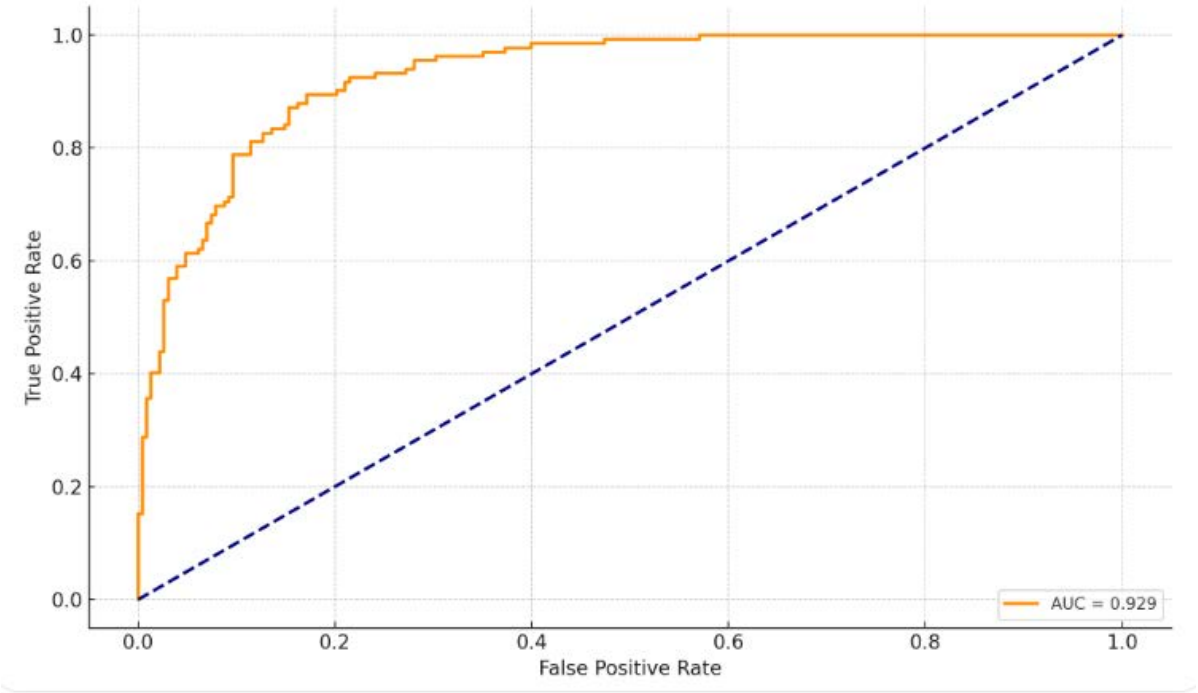

Figure 4. *ROC curve for the predictive model of uterine fibroids based on logistic regression analysis.*

also more common in the fibroid group—89 women (21.2%) compared to 63 (8.1%) without fibroids, $p < 0.001$, though with a weak association (Cramér's V = 0.189).

In contrast, regular consumption of fresh greens and vegetables was more frequently reported in the control group—136 women (17.4%) vs. 97 (23.2%) in the fibroid group; however, the difference was not statistically significant.

No statistically significant differences were found between groups in relation to behavioral factors such as smoking, alcohol consumption, meal frequency, intake of protein or red meat, physical activity, sleep patterns, stress levels, or dietary supplement use. Similarly, no significant associations were observed with obstetric history, including the number of pregnancies and deliveries, manual removal of the placenta, endometritis, chorioamnionitis, prolonged second stage of labor, instrumental delivery, preterm birth, stillbirth, or history of in vitro fertilization (IVF) and ovarian stimulation.

Additionally, there were no statistically significant differences between groups regarding the history of sexually transmitted infections (STIs).

The association between uterine fibroid presence and identified risk factors was modeled using a binary logistic regression equation:

$P = 1 / (1 + e^{-z}) * 100\%$, where:

$z = -4{,}120 + 0{,}027 \cdot Age + 0{,}233 \cdot BMI - 0{,}268 \cdot Vitamin\ D + 0{,}052 \cdot Prolactin$

Here, P represents the estimated probability (%) of having uterine fibroids,

Age is age in years, BMI is body mass index in kg/m², Vitamin D is serum vitamin D level in ng/mL, Prolactin is serum prolactin level in ng/mL.

Based on the values of the regression coefficients, the following factors were found to be significantly associated with the presence of uterine fibroids: age, body mass index (BMI), serum prolactin, and vitamin D levels (Figure 3).

An increase in age by one year was associated with a 1.03-fold increase in the likelihood of having fibroids (95% CI: 1.01–1.05). Each 1 kg/m² increase in BMI raised the risk by 1.26 times (95% CI: 1.16–1.38). Similarly, each 1 ng/mL increase in prolactin level was associated with a 1.05-fold increase in risk (95% CI: 1.01–1.09). In contrast, each 1 ng/mL increase in vitamin D level was associated with a 1.3-fold decrease in the likelihood of fibroid presence (95% CI: 0.69–0.85).

All listed factors were statistically significant at the $p < 0.05$ level. Other examined variables did not show a significant impact on the probability of fibroid presence within the model ($p > 0.05$).

The area under the receiver operating characteristic (ROC) curve for the model predicting uterine fibroid presence was 0.929, indicating excellent diagnostic accuracy (Figure 4). The logistic regression model was statistically significant ($p < 0.001$).

The optimal cut-off point for the predicted probability (P) was determined to be 0.453. Values of P equal to or exceeding this threshold were classified as a positive prediction for fibroid presence. At this cut-off, the model demonstrated a sensitivity of 86.2% and a specificity of 78.5%.

Discussion.

The findings of this study indicate a high prevalence of uterine fibroids among women of reproductive age in Almaty. According to transvaginal ultrasound data, signs of fibroids were identified in 34.9% of participants, with 17.2% presenting clinically significant forms requiring medical intervention. When the results were recalculated using direct age standardization relative to the actual female population structure of Almaty, the overall prevalence was 11.3%. This substantial difference highlights the effect of the sample's age composition—particularly the higher proportion of older women attending the clinic—on the crude prevalence estimate. Therefore, while the crude prevalence reflects the clinical burden in a facility-based population, the age-standardized prevalence provides an approximate indication of the expected prevalence in the general female population of the city. These results are consistent with international data, which report a prevalence of 30–40% among women over the age of 35 [1,8]. Age-specific prevalence revealed a clear trend of increasing incidence with advancing age, peaking at 38.6% in the 45–49 age group. This highlights the importance of targeted screening and preventive strategies for women in older reproductive age brackets.

When age-standardized prevalence was calculated using WHO and ESP population structures, a marked difference was observed (11.5% vs. 23.7%), underscoring the sensitivity of prevalence estimates to demographic structure and the need for standardized measures in international comparisons [11]. Global data consistently report high rates of uterine fibroids, particularly among women aged 35 years and older. A meta-analysis published in The Lancet Global Health found an overall fibroid prevalence of 26.1% among reproductive-aged women, with rates reaching up to 45% in populations with elevated BMI and in those over the age of 40 [8]. These estimates are in line with the current study's results.

The age distribution of fibroid prevalence, particularly the peaks observed in the 25–34 and 35–44 age groups, aligns with findings from large-scale international epidemiologic studies. According to Laughlin-Tommaso et al. (2022), the highest incidence occurs during the reproductive years, with fibroid presence exceeding 60% among women aged over 35 years [16]. Similarly, the study by Baird et al. (2003) reported that by age 50, fibroids are diagnosed in 60% of white women and over 80% of Black women [1]. These findings further reinforce the role of age as a key risk factor, which should be considered when designing screening and prevention programs.

The symptom profile observed in the current study was typical of uterine fibroids: menorrhagia (69.1%), pelvic pain (49.3%), and reproductive dysfunction (28.0%) were the most commonly reported complaints. These findings are consistent with previous literature [2,15], and reflect a high clinical burden—particularly in relation to surgical treatment and management of anemia. International reviews emphasize that menorrhagia is one of the leading reasons for women with fibroids to seek medical care, often resulting in iron deficiency anemia, which adversely affects overall health and quality of life [13,26]. According to NICE (2021), symptomatic fibroids are clear indications for active management, ranging from medical therapy to myomectomy or uterine artery embolization [2].

Furthermore, studies have shown that women with severe menorrhagia are more likely to experience reduced fertility, chronic fatigue, depression, and increased rates of hospitalization, all of which contribute to a heightened economic and societal burden on healthcare systems [15,19]. Consequently, the presence of pronounced clinical symptoms necessitates a personalized approach and timely referral pathways for affected patients.

A notably high frequency of uterine fibroids among nulliparous women and those with infertility has been reported in several clinical and pathomorphological studies. According to Munro et al. (2021), the presence of fibroid nodules—particularly submucosal and intramural types—may negatively impact embryo implantation, disrupt endometrial perfusion, and reduce the likelihood of conception [15]. Stewart et al. (2021) also emphasize that fibroids are commonly diagnosed in women with long-standing infertility [9].

However, in the present analysis, no statistically significant associations were found between the presence of uterine fibroids and reproductive factors, including obstetric history, use of assisted reproductive technologies (including in vitro

fertilization), or ovarian stimulation. These findings are consistent with previously published data suggesting that there is no strong or consistent association between these reproductive variables and the development of uterine leiomyomas [2].

The comparative analysis between women with and without fibroids revealed several comorbid conditions associated with the disease. Obesity, arterial hypertension, and anemia were significantly more common in the fibroid group, suggesting they may either contribute to fibroid pathogenesis through metabolic and hormonal pathways or result from fibroid-related complications [3,5]. Interestingly, although hypothyroidism and pelvic inflammatory disease showed a trend toward association with fibroids, these findings did not reach statistical significance. Conversely, endometriosis was more frequently diagnosed in women without fibroids, which may reflect divergent pathogenic mechanisms between the two conditions [14].

These distinctions are supported by existing literature. As noted by Donnez and Dolmans (2021), despite both conditions being estrogen-dependent, fibroids and endometriosis exhibit different molecular and immunological profiles [14]. Endometriosis is characterized by chronic inflammation, local invasion, and neoangiogenesis, whereas fibroids are monoclonal benign tumors primarily composed of smooth muscle cells and fibrotic tissue. Similarly, Commandeur et al. (2021) observed that fibroids and endometriosis rarely coexist in the same patient—particularly in severe forms—suggesting the presence of antagonistic pathogenic pathways [18].

The potential link between hypothyroidism and uterine fibroids remains a subject of debate. While several studies have proposed a role for thyroid hormones in regulating myometrial growth, clinical data remain inconclusive and highlight the need for further prospective studies [5]. Stratified analyses accounting for hormonal status, duration of endocrine disorders, and reproductive history may offer more clarity in understanding these associations.

Dietary and lifestyle factors were also shown to be relevant. Frequent consumption of fried foods, fast food, and sugar, along with a positive family history of fibroids and previous abortions, were significantly more common among women with fibroids. These findings align with other observational studies [3,7,26,27]. Diet plays an important role in fibroid pathogenesis. Evidence suggests that low intake of fruits, vegetables, and antioxidant-rich foods is associated with an increased risk of fibroid development. Liu et al. (2021) reported a statistically significant association between a Western dietary pattern and higher fibroid prevalence among women [27]. Additionally, Wise et al. (2022) found that high consumption of red meat, fried foods, and sugar may enhance estrogenic stimulation and promote tumor growth [7].

Among the studied quantitative biomarkers, the most pronounced differences between women with and without uterine fibroids were observed in age, body mass index (BMI), and serum vitamin D levels. Women with fibroids were older, had higher BMI, and exhibited significantly lower vitamin D concentrations. These three variables, along with prolactin levels, were included in the final logistic regression model, each demonstrating a statistically significant association with fibroid risk.

According to the model:

– Each one-year increase in age was associated with a 1.03-fold increase in the likelihood of having fibroids (95% CI: 1.01–1.05).

– Each 1 kg/m² increase in BMI raised the risk by 1.26 times (95% CI: 1.16–1.38).

– Each 1 ng/mL increase in prolactin level increased the risk by 1.05 times (95% CI: 1.01–1.09).

– Each 1 ng/mL increase in vitamin D level reduced the probability of fibroid presence by 1.3 times (95% CI: 0.69–0.85).

The area under the receiver operating characteristic (ROC) curve was 0.929, indicating excellent predictive accuracy. At a cut-off threshold of 0.453, the model achieved a sensitivity of 86.2% and a specificity of 78.5%. These metrics confirm the model's strong discriminative power. As noted by Munro et al. (2021), an AUC greater than 0.85 qualifies a logistic model as clinically applicable in real-world settings [15]. Furthermore, the combination of high sensitivity and specificity supports its utility as a tool for primary risk stratification.

Vitamin D deficiency and elevated prolactin levels—both of which were observed in a substantial proportion of the study population—may represent key metabolic and hormonal triggers for fibroid growth. Leshin et al. (2023) demonstrated a direct association between low vitamin D status and increased fibroid volume [17]. Additionally, Khan et al. (2020) reported that vitamin D plays a regulatory role in myometrial cell proliferation and inhibits angiogenesis, while hyperprolactinemia may enhance estrogen-driven stimulation of fibroid tissue [5].

The associations between fibroids, obesity, prolactin, and vitamin D deficiency are further supported by other studies. Leshin et al. identified an inverse correlation between circulating 25(OH)D levels and fibroid volume [17], and Donnez and Dolmans emphasized the role of prolactin in increasing tissue sensitivity to estrogens [14].

It is likely that the combined effect of risk factors—including advanced age, excess body weight, vitamin D deficiency, hyperprolactinemia, and poor dietary habits—contributes to a proliferative environment within the myometrium. Contemporary research supports this systemic view, suggesting that the cumulative influence of these parameters creates a biological milieu conducive to tumor growth [5,17,27]. Such a comprehensive understanding is critical for the development of preventive strategies and clinical guidelines.

Several authors also highlight marked racial and ethnic disparities. For instance, the Black Women's Health Study found that women of African descent have a 3–4 times higher risk of developing fibroids compared to Caucasian women, even after adjusting for diet and lifestyle factors [7]. These findings underscore the importance of stratified approaches in international comparisons and public health planning.

From a clinical perspective, current attention is increasingly directed toward uterus-sparing treatment strategies. Modern guidelines and expert reviews (NICE, ACOG, Munro et al.) emphasize individualized management, including medical therapies (GnRH antagonists, selective progesterone receptor modulators), laparoscopic myomectomy, and uterine artery embolization [2,5,15].

In recent years, increasing attention has been directed toward immunological and microbiome-related mechanisms in the pathogenesis of uterine fibroids. Several authors have suggested that dysregulation of the local immune response within the endometrium, elevated levels of pro-inflammatory cytokines, and disturbances in the vaginal microbiota may contribute to chronic inflammation and promote smooth muscle cell proliferation [18-20]. While these hypotheses require further validation, they present promising avenues for novel therapeutic strategies—ranging from immunotherapy to microbiota-targeted interventions such as probiotics.

Given the multifactorial nature of uterine fibroids, future clinical research should take into account not only hormonal and metabolic factors but also the composition of the microbiome, lifestyle behaviors, and the psychoemotional status of patients. In the present study, no associations were found between fibroid presence and a history of sexually transmitted infections (STIs) or bacterial vaginosis. However, these factors were assessed retrospectively through self-reported questionnaires, which may have limited the objectivity of the findings.

It is noteworthy that, despite statistically significant group differences in several variables (e.g., anemia, hypothyroidism, dietary patterns), these factors did not enter the final predictive model. This may be explained by multicollinearity, limited independent contribution to the outcome, or insufficient strength of association after adjustment for confounding variables. Studies by Munro et al. (2021) and Leppert et al. (2021) similarly emphasize that in multifactorial models, some clinically relevant parameters may lose predictive power due to high intercorrelation—particularly when age and BMI emerge as dominant predictors [15,26]. These findings underscore the importance of multivariable analysis in risk modeling and the need for cautious interpretation of univariate associations.

Strengths and Limitations

Strengths:

One of the major strengths of this study is the sufficiently large sample size (n = 1200), which considerably exceeds the minimum required number for estimating disease prevalence with the specified precision. This allowed for high statistical power (>90%) and enabled stratified analyses across age groups, clinical characteristics, and laboratory variables. The use of ultrasound-based screening for fibroid detection improved diagnostic objectivity, while logistic regression analysis provided a valid predictive model with excellent diagnostic accuracy (AUC = 0.929). Furthermore, the study encompassed a wide range of potential risk factors—from biochemical markers to dietary patterns, lifestyle characteristics, and obstetric history—allowing for a comprehensive multifactorial assessment of the disease.

Limitations:

At the same time, several limitations must be acknowledged. Some parameters, such as dietary habits (e.g., consumption of sugar, protein, fried foods), physical activity level, sleep quality, and stress, were assessed via self-reported questionnaires. This introduces the potential for information bias and reduces the objectivity of the data. Nutritional status was not validated through quantitative measures (e.g., assessment of macro- and micronutrient intake), which limits the ability to fully evaluate the contribution of diet to fibroid pathogenesis.

Vitamin D levels and other biomarkers were measured only once, without accounting for seasonal variation or the potential influence of medications, which may affect result interpretation. Moreover, the cross-sectional nature of the study precludes the establishment of causal relationships between the identified factors and fibroid presence.

The obtained crude prevalence (34.9%) reflects the frequency of uterine fibroids among women attending the clinic (facility-based design) and characterizes the clinical patient flow rather than the true level of the condition in the general population.

To reduce the influence of the sample's age composition, we additionally performed a recalculation using direct age standardization to the age structure of the female population of Almaty. This provided a more general reference point, with an age-standardized prevalence of 11.3%.

However, the standardized results should be interpreted with caution. First, the study was not based on a randomly selected population sample; participants were women who sought medical care, which may bias the estimates toward older or more symptomatic patients. Second, the standardization was performed only by age, without adjustment to the national population structure of Kazakhstan or to international standards recommended by WHO (ESP/WSP), which makes direct interregional or international comparisons inappropriate.

Nevertheless, given the sufficient sample size calculated to ensure statistical power and the complete absence of previously published data on uterine fibroid prevalence in this region, the standardized estimate can be regarded as an approximate indicator, valuable for guiding future research and informing subsequent stages of scientific work in this field.

Lastly, the study presents crude, unadjusted prevalence data, without age standardization. While these preliminary findings reflect the situation within the study population and serve as a foundation for future planning, further research involving a broader sample and standardized methodologies is warranted.

Conclusion.

This facility-based study expands current knowledge on the prevalence of uterine fibroids among women of reproductive age living in a metropolitan area with a transitional demographic structure. The findings not only confirm previously reported epidemiological and clinicodemographic patterns but also provide new insights into regional characteristics, including the influence of dietary habits, vitamin D deficiency, and prolactin levels.

The predictive model developed in this study demonstrated high sensitivity and specificity, supporting its potential utility in routine screening and individual risk stratification. These results may inform the development of early detection programs, improve access to uterus-preserving treatment options, and optimize management strategies for women at increased risk of developing uterine fibroids.

Gratitude.

We sincerely thank all the women who participated in this study.

Informed Consent.

Written informed consent was obtained from all participants prior to their inclusion in the study.

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Conflict of Interest.

The authors declare that none of the content presented in this manuscript has been previously published or is currently under consideration elsewhere.

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საშვილოსნოს ფიბროიდების გავრცელება და რისკფაქტორები რეპროდუქციული ასაკის ქალებში: ობიექტზე დაფუძნებული კვლევა მეგაქალაქში

ანოტაცია

შესავალი. საშვილოსნოს მიომა (ლეომიომა) წარმოადგენს ყველაზე გავრცელებულ კეთილთვისებიან სიმსივნეს სანაყოფე ასაკის ქალებში და მნიშვნელოვან გავლენას ახდენს რეპროდუქციულ ფუნქციაზე, ცხოვრების ხარისხსა და შრომისუნარიანობაზე. ყაზახეთში ამ პათოლოგიის პოპულაციური გავრცელებისა და რისკის ფაქტორების შესახებ სისტემური მონაცემები არ არსებობს. კვლევის მიზანს წარმოადგენდა საშვილოსნოს მიომის გავრცელების შეფასება ქალაქ ალმატიში და ინდივიდუალური რისკის პროგნოზული მოდელის შექმნა.

მასალები და მეთოდები. ჩატარდა პერსპექტიული დაწესებულებაში დაფუძნებული კვლევა, რომელშიც მონაწილეობდა 18-49 წლის ასაკის 1200 ქალი, რომლებიც გინეკოლოგიურ კონსულტაციას ითხოვდნენ. დიაგნოზი დგინდებოდა ტრანსვაგინალური ულტრაბგერითი გამოკვლევითა და ჰორმონული პროფილის ანალიზით. ანკეტა მოიცავდა რეპროდუქციულ ანამნეზს, ცხოვრების წესს, კვებასა და თანხმლებ მდგომარეობებს.

რისკის ფაქტორების ანალიზისთვის გამოყენებული იყო ბინარული ლოგისტიკური რეგრესია, ხოლო პროგნოზული მოდელის ეფექტიანობა შეფასდა ROC-მრუდის ქვეშ არსებული ფართობის მიხედვით.

შედეგები. საშვილოსნოს მიომის გავრცელება შეადგენდა 34.9%-ს, კლინიკურად მნიშვნელოვანი ფორმები — 17.2%. გავრცელება იზრდებოდა ასაკთან ერთად და პიკს აღწევდა 45–49 წლის ასაკობრივ ჯგუფში (38.6%). წამყვანი სიმპტომები იყო მენორაგია (69.1%), მენჯის ტკივილი (49.3%) და რეპროდუქციული დარღვევები (28%). რისკის მნიშვნელოვან ფაქტორებად გამოიკვეთა: ასაკი, სხეულის მასის ინდექსი, პროლაქტინის მაღალი დონე და ვიტამინ D-ს დეფიციტი. პროგნოზულმა მოდელმა აჩვენა მაღალი სიზუსტე (AUC = 0.929; მგრძნობელობა — 86.2%; სპეციფიკურობა — 78.5%).

დასკვნა. ქალაქური მოსახლეობის ფარგლებში მიომის გავრცელება ყაზახეთში შეესაბამება საერთაშორისო მონაცემებს. შექმნილი მოდელი შეიძლება გამოყენებულ იქნეს ინდივიდუალური რისკის სტრატიფიკაციისა და მიზნობრივი სკრინინგის პროგრამების დასაგეგმად. გამოვლენილი ასოციაციები ხაზს უსვამს მეტაბოლური და ჰორმონული ფაქტორების მონიტორინგის მნიშვნელობას რეპროდუქციულ მედიცინაში.

საკვანძო სიტყვები: საშვილოსნოს მიომა, გავრცელება, რისკის ფაქტორები, ვიტამინი D, პროლაქტინი, ლოგისტიკური რეგრესია, ყაზახეთი