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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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SOCIODEMOGRAPHIC DETERMINANTS OF PRENATAL CARE ACCESS AMONG PREGNANT WOMEN IN THE MANGYSTAU REGION: A CROSS-SECTIONAL STUDY

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Abstract.

Background: Congenital anomalies (CAs) are a leading cause of infant mortality and disability, accounting for 15–20% of neonatal deaths worldwide. Their etiology is multifactorial, involving genetic, medical, environmental, and socioeconomic determinants. Industrial regions such as Mangystau, Kazakhstan, exhibit particularly elevated rates of birth defects, likely attributable to environmental pollution and limited healthcare access. Given the elevated burden of CAs in this high-risk industrial region, this study aimed to evaluate sociodemographic determinants of prenatal care access and health-seeking behaviors among pregnant women in the Mangystau Region of Kazakhstan.

Methods: A cross-sectional survey was conducted among 318 pregnant women from urban and rural areas of Mangystau Region. Data were collected via structured questionnaires covering sociodemographic characteristics, health behaviors, medical screening practices, and environmental perceptions. Chi-square tests were applied to identify statistically significant associations ($p < 0.05$).

Results: Higher education and urban residence were significantly associated with greater access to prenatal care services, including ultrasound and genetic testing ($p < 0.001$). Lower education and income levels were correlated with higher rates of pregnancy complications ($p < 0.01$). Rural participants reported poorer food and water quality ($p = 0.017$).

Conclusion: Sociodemographic inequalities significantly shape prenatal care access in the Mangystau Region, with rural residence, low education, and low income being key barriers. Targeted public health efforts to improve maternal education and access to diagnostic services, particularly in rural areas, are essential to strengthening prenatal care utilization and ultimately reducing the burden of CAs in the region.

Key words. Congenital anomalies, maternal health, prenatal screening, health promotion, prenatal care, health education, Kazakhstan.

Introduction.

Congenital anomalies (CAs) remain one of the most critical challenges in perinatology and neonatology, accounting for 15–20% of infant mortality and a substantial proportion of childhood disabilities. According to the World Health Organization, approximately 7.9 million children are born each year with CAs, representing about 6% of all live births globally [1]. These conditions range from minor anatomical variations to severe, life-threatening disorders requiring surgical intervention or long-term medical care [2]. The etiology of CAs is complex and multifactorial, involving genetic, medical, sociodemographic, and environmental factors [3].

Among medical risk factors, particular attention has been given to advanced maternal age (over 35 years), the presence of chronic conditions such as diabetes, hypertension, and epilepsy, and infections during pregnancy, including cytomegalovirus, toxoplasmosis, and rubella [4]. Sociodemographic factors such as low educational attainment, lack of pregnancy planning, and socioeconomic instability, also contribute significantly to the incidence of CAs [5]. Furthermore, studies indicate that environmental pollution and exposure to industrial emissions can substantially increase the risk of congenital defects [6].

Research conducted across different countries presents varying prevalence rates of CAs depending on sociodemographic characteristics. A study in Iraq found that low maternal education and inadequate prenatal care were correlated with a high incidence of congenital heart defects [7]. In Ethiopia, the absence of folic acid in the diets of pregnant women was found to significantly increase the risk of neural tube defects [8]. In China, researchers demonstrated that exposure to tobacco smoke combined with adverse social conditions increased the likelihood of cardiovascular anomalies in newborns [5]. Mangystau Region is one of the industrial areas of Kazakhstan with elevated rates of CAs. Studies indicate that a significant proportion of these anomalies are associated with unfavorable environmental conditions, including industrial emissions and water and air pollution. The impact of oil extraction and refining industries is particularly pronounced, increasing the risk of intrauterine anomalies in newborns [9].

Despite advances in medical diagnostics, the accessibility of prenatal screening examinations in Mangystau Region remains insufficient, particularly in rural areas. Research has shown that the introduction of perinatal monitoring and medical-genetic counseling has improved the detection of CAs; however, a shortage of trained specialists and diagnostic equipment continues to be a significant barrier [10].

According to a study based on data from the Republican Center for Health Development, the prevalence of CAs in Kazakhstan decreased by 30–40% during the period from 2015 to 2019. Nonetheless, neonatal and infant mortality increased in the western regions of Mangystau and Atyrau, possibly due to inadequate medical services and limited access to screening programs [11]. An analysis of maternal and child health indicators from 2003 to 2018 reveals a positive trend in the reduction of infant and maternal mortality following the implementation of the state programs “Salamatty Kazakhstan” (2011–2015) and “Densaulyk” (2016–2019). Nevertheless, despite this progress, the rate of CAs among newborns remains elevated in the Mangystau Region, underscoring the urgent need to understand barriers to prenatal care access in this high-risk area [12].

Despite the introduction of prenatal screening and medical monitoring programs for pregnant women, access to early prenatal care in the Mangystau Region remains inadequate, particularly in rural areas. Given the elevated burden of CAs in this region, identifying the sociodemographic factors that limit prenatal care utilization is critical for designing targeted interventions. Therefore, this study aimed to evaluate sociodemographic determinants of prenatal care access and health-seeking behaviors among pregnant women in the Mangystau Region.

Materials and Methods.

Study design and Participants:

This cross-sectional study was conducted among pregnant women to assess the influence of sociodemographic factors on their health-seeking behaviors and access to prenatal care services. A total of 318 participants were enrolled from both urban and rural areas using a convenience sampling method. Participation was voluntary, and written informed consent was obtained from all participants prior to data collection.

Data Collection:

Data were collected through structured questionnaires covering sociodemographic characteristics, health-related behaviors, medical examination history, and participants' perceptions of environmental factors affecting pregnancy. The questionnaire was developed based on the findings of previous studies and expert recommendations. It was subsequently pilot-tested on a small sample of pregnant women to assess content validity, clarity, and internal reliability.

Statistical Analysis:

The data were processed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were employed to present categorical variables as frequencies and percentages. Associations between sociodemographic factors and selected health and screening indicators were evaluated using the Chi-square (χ^2) test. Statistical significance was set at $p < 0.05$.

Ethical Considerations:

The study received ethical approval from the Semey Medical University Ethics Committee (Approval No. 1b, dated 25.10.2024). Informed consent was obtained from all participants prior to data collection. Participant anonymity and data confidentiality were strictly maintained throughout the study.

Results.

Sociodemographic Profile of Participants:

Table 1 presents the sociodemographic characteristics of the study participants. The majority of women were aged 30–39 years (59.4%), resided in urban areas (73.6%), and reported an average family income level (86.5%). Regarding educational attainment, 45.9% had completed higher education. Nearly all participants were married (99.1%), and no participants reported alcohol consumption or occupational exposure to harmful chemicals or radiation during pregnancy.

Perception of Living Conditions Affecting Fetal Health:

Table 2 displays data on respondents' perceptions of whether their living conditions could affect the health of their unborn child. Among women aged 20–29 years, 26.6% believed that living conditions influence fetal health, and the proportion of affirmative responses was higher among urban residents (74.0%). Statistically significant differences were observed based on marital status ($p = 0.003$), with 99.4% of married respondents acknowledging the potential impact of living conditions on fetal health, compared to 66.7% of unmarried women.

Table 1. *Sociodemographic characteristics of respondents.*

Variables		**n**	**%**
Age	20–29 years	89	28.0%
	30–39 years	189	59.4%
	40 years and older	34	10.7%
	Under 20 years	6	1.9%
Place of residence	Urban	234	73.6%
	Rural	84	26.4%
Education level	Higher	146	45.9%
	Secondary (general)	49	15.4%
	Secondary (specialized)	123	38.7%
Marital status	Married	315	99.1%
	Unmarried	3	0.9%
Family income	High	41	12.9%
	Low	2	0.6%
	Average	275	86.5%
Smoking (before/during pregnancy)	Yes	1	0.3%
	No	317	99.7%
Alcohol consumption (before/during pregnancy)	No	318	100.0%
Exposure to harmful chemicals or radiation	No	318	100.0%
Severe life events during pregnancy	Yes	2	0.6%
	No	316	99.4%
Stress and psychological pressure at home or work	Yes	27	8.5%
	No	291	91.5%

Table 2. *Perception of living conditions affecting fetal health.*

Variables		Do living conditions affect your future child's health?				p-value
		Yes		No		
		n	%	n	%	
Age	20–29 years	82	26.6%	7	70.0%	0.019*
	30–39 years	186	60.4%	3	30.0%	
	40 years and older	34	11.0%	0	0.0%	
	Under 20 years	6	1.9%	0	0.0%	
Place of residence	Urban	228	74.0%	6	60.0%	0.322
	Rural	80	26.0%	4	40.0%	
Education level	Higher	141	45.8%	5	50.0%	0.373
	Secondary (general)	49	15.9%	0	0.0%	
	Secondary (specialized)	118	38.3%	5	50.0%	
Marital status	Married	306	99.4%	9	90.0%	0.003*
	Unmarried	2	0.6%	1	10.0%	
Family income	High	40	13.0%	1	10.0%	0.929
	Low	2	0.6%	0	0.0%	
	Average	266	86.4%	9	90.0%	

** Statistically significant difference, $p < 0.05$.*

Table 3. *Utilization of genetic and specialized medical tests.*

Variables		Did you undergo additional genetic or specialized medical tests?				p-value
		Yes		No		
		n	%	n	%	
Age	20–29 years	47	21.7%	42	41.6%	0.001*
	30–39 years	140	64.5%	49	48.5%	
	40 years and older	28	12.9%	6	5.9%	
	Under 20 years	2	0.9%	4	4.0%	
Place of residence	Urban	170	78.3%	64	63.4%	0.005*
	Rural	47	21.7%	37	36.6%	
Education level	Higher	111	51.2%	35	34.7%	0.001*
	Secondary (general)	10	4.6%	39	38.6%	
	Secondary (specialized)	96	44.2%	27	26.7%	
Marital status	Married	216	99.5%	99	98.0%	0.192
	Unmarried	1	0.5%	2	2.0%	
Family income	High	30	13.8%	11	10.9%	0.092
	Low	0	0.0%	2	2.0%	
	Average	187	86.2%	88	87.1%	

** Statistically significant difference, $p < 0.05$.*

Table 4. *Utilization of ultrasound and early pregnancy screening.*

Variables		Did you have ultrasound and other early pregnancy screening tests?				p-value
		Yes		No		
		n	%	n	%	
Age	20–29 years	64	25.2%	25	39.1%	0.033*
	30–39 years	154	60.6%	35	54.7%	
	40 years and older	32	12.6%	2	3.1%	
	Under 20 years	4	1.6%	2	3.1%	
Place of residence	Urban	194	76.4%	40	62.5%	0.024*
	Rural	60	23.6%	24	37.5%	
Education level	Higher	130	51.2%	16	25.0%	0.001*
	Secondary (general)	16	6.3%	33	51.6%	
	Secondary (specialized)	108	42.5%	15	23.4%	
Marital status	Married	251	98.8%	64	100.0%	0.382
	Unmarried	3	1.2%	0	0.0%	
Family income	High	36	14.2%	5	7.8%	0.008*
	Low	0	0.0%	2	3.1%	
	Average	218	85.8%	57	89.1%	

** Statistically significant difference, $p < 0.05$.*

Table 5. *Self-reported quality of water and food consumption.*

Variables		What quality of water and food do you consume? (Average vs. Good)				p-value
		Yes		No		
		n	%	n	%	
Age	20–29 years	67	28.2%	22	27.5%	0.967
	30–39 years	142	59.7%	47	58.8%	
	40 years and older	25	10.5%	9	11.2%	
	Under 20 years	4	1.7%	2	2.5%	
Place of residence	Urban	167	70.2%	67	83.8%	0.017*
	Rural	71	29.8%	13	16.2%	
Education level	Higher	93	39.1%	53	66.2%	0.001*
	Secondary (general)	37	15.5%	12	15.0%	
	Secondary (specialized)	108	45.4%	15	18.8%	
Marital status	Married	235	98.7%	80	100.0%	0.313
	Unmarried	3	1.3%	0	0.0%	
Family income	High	21	8.8%	20	25.0%	0.001*
	Low	2	0.8%	0	0.0%	
	Average	215	90.3%	60	75.0%	

Note: *Response options were 'Average' (Yes column) and 'Good' (No column). * Statistically significant difference, $p < 0.05$.*

Table 6. *History of miscarriages, stillbirths, or preterm births.*

Variables		Have you had any previous miscarriages, stillbirths, or preterm births?				p-value
		Yes		No		
		n	%	n	%	
Age	20–29 years	20	26.7%	69	28.4%	0.206
	30–39 years	43	57.3%	146	60.1%	
	40 years and older	12	16.0%	22	9.1%	
	Under 20 years	0	0.0%	6	2.5%	
Place of residence	Urban	62	82.7%	172	70.8%	0.041*
	Rural	13	17.3%	71	29.2%	
Education level	Higher	47	62.7%	99	40.7%	0.001*
	Secondary (general)	12	16.0%	37	15.2%	
	Secondary (specialized)	16	21.3%	107	44.0%	
Marital status	Married	74	98.7%	241	99.2%	0.689
	Unmarried	1	1.3%	2	0.8%	
Family income	High	18	24.0%	23	9.5%	0.004*
	Low	0	0.0%	2	0.8%	
	Average	57	76.0%	218	89.7%	

** Statistically significant difference, $p < 0.05$.*

Table 3 illustrates data on whether respondents underwent additional genetic or specialized medical tests, including infection screening. The highest proportion of women who completed such testing was in the 30–39-year age group (64.5%). Statistically significant differences were found based on education level ($p = 0.001$), with 51.2% of women with higher education having undergone these tests. Urban women (78.3%) were significantly more likely to undergo genetic testing than rural women (63.4%; $p = 0.005$).

Data on prenatal screening, including ultrasound and other early pregnancy tests, are shown in Table 4. Women aged 30–39 years had the highest screening rate (60.6%). Education played a crucial role: 51.2% of women with higher education underwent prenatal screening ($p = 0.001$). Rural residents were significantly less likely to have received early screening compared to urban residents (23.6% vs. 76.4%; $p = 0.024$).

Table 5 presents participants' assessments of the quality of water and food they consumed. Approximately 84% of urban residents rated their water and food quality as good ($p = 0.017$). Education was a significant factor: 66.2% of women with higher education reported good quality, compared to 39.1% of those with only secondary general education ($p = 0.001$). Income level also played a key role ($p = 0.001$), with 25.0% of high-income respondents rating quality as good, compared to 8.8% of those with average income.

Table 6 displays data on previous pregnancy complications, including miscarriages, stillbirths, and preterm births. The highest rate of complications was reported among women aged 30–39 years (57.3%). Statistically significant differences were found based on education level ($p = 0.001$), with 62.7% of women with higher education reporting previous complications compared to 21.3% of those with secondary specialized education. Place of residence was also significant ($p = 0.041$), with a higher proportion of urban women reporting complications (82.7% vs. 17.3% for rural). Family income was significantly associated with complication history ($p = 0.004$), with 24.0% of

high-income women reporting past complications, compared to 76.0% among those with average income.

Discussion.

The present study underscores the significant influence of socioeconomic determinants on maternal health-seeking behaviors during pregnancy. Women with higher education levels and those residing in urban areas demonstrated better access to key prenatal care services, including genetic screening, ultrasound examinations, and improved nutrition and water quality. Mekonnen et al. identified modifiable maternal risk factors and disparities in healthcare access as key contributors to the incidence of CAs, noting that inadequate prenatal care, poor maternal nutrition, and limited access to skilled birth attendants were significantly associated with higher rates of congenital defects. The authors advocated for the expansion of subsidized prenatal services, improved maternal health education, and investment in healthcare infrastructure in underserved areas [3].

Our findings indicate that women in rural areas had significantly lower rates of genetic testing and prenatal screening compared to urban women, likely due to limited access to specialized medical facilities. Low maternal education and income were also linked to more frequent pregnancy complications, highlighting the need to address healthcare access disparities to improve maternal and neonatal outcomes. Shams et al. demonstrated that financial difficulties, social isolation, and family stress increased the risk of birth defects, preterm birth, and fetal growth restriction. Higher maternal cortisol levels were associated with neural tube defects, and the authors recommended targeted mental health support, social assistance programs, and improved workplace policies for pregnant women [13].

A hospital-based study from Ethiopia highlighted a notable gap in prenatal care, reporting that women with inadequate antenatal visits (66.5%) and those who did not take folic acid during pregnancy (75%) were at significantly higher risk of birth defects. Furthermore, a positive family history was associated with a 2.4-fold increase in the risk of congenital anomalies [14].

In the present study, participants were asked to assess the quality of water and food they consumed. Approximately 84% of urban residents and 66.2% of women with higher education reported consuming good-quality water and food. In this context, Pandey and colleagues examined modifiable lifestyle-related risk factors—including smoking, alcohol use, poor nutrition, and psychological stress and their potential associations with major developmental anomalies. Their research demonstrated a strong association between tobacco and alcohol use during pregnancy and an increased risk of orofacial clefts, congenital heart defects, and neural tube defects. Additionally, a deficiency in essential nutrients, particularly folic acid, was found to elevate the risk of neural tube abnormalities [15]. Notably, in our study cohort, only one participant reported a history of smoking, and none reported alcohol consumption during pregnancy, which limits comparative analysis with findings from settings with higher exposure prevalence. Liu et al. investigated the impact of tobacco smoke on fetal cardiac development and found that both active smoking and passive smoke exposure during pregnancy significantly increased the risk of congenital heart defects, including atrial septal defects, ventricular septal defects, and transposition of the great arteries [5]. Marwah et al. reported that high levels of radiation exposure, particularly during early pregnancy, can cause brain defects, growth abnormalities, and skeletal malformations, and emphasized the importance of improved safety protocols, provision of appropriate protective equipment, and public awareness campaigns [16].

The present study found that women aged 30–39 years (64.5%) had the highest proportion of genetic or specialized medical screening tests, and that higher education and urban residence were significantly associated with greater utilization of prenatal screening services. In this context, Ameen et al. assessed the effect of advanced maternal age (≥35 years) on the occurrence of CAs and found a significant increase in chromosomal abnormalities, including trisomy 21 (Down syndrome), trisomy 18, and trisomy 13 among older mothers. The authors advocated for early pregnancy planning, genetic counseling, and expanded access to non-invasive prenatal testing (NIPT) for women of advanced maternal age [17].

Similarly, Mashuda et al. demonstrated that maternal infections with rubella, toxoplasmosis, and cytomegalovirus during the first trimester were strongly associated with brain, cardiac, and ocular defects. They emphasized the importance of routine infection screening, wider vaccination coverage, and public health education to prevent these infections [18].

Limitations.

This study has several limitations. The use of a cross-sectional design limits the ability to establish causal relationships between sociodemographic factors and health outcomes during pregnancy. Second, reliance on self-reported data introduces the possibility of recall bias and social desirability bias, as participants may have inaccurately recalled past health-related behaviors and experiences. Furthermore, the data reflect a single point in time and may not capture temporal changes in healthcare access, environmental conditions, or maternal health awareness. Finally, the use of convenience sampling may limit the generalizability of findings to the broader population. Despite these limitations, the study provides valuable insights into sociodemographic inequalities affecting maternal health and represents a foundational step toward enhancing access to prenatal care services in Kazakhstan.

Conclusion.

This study underscores the significant influence of sociodemographic factors on prenatal care access and health-seeking behaviors among pregnant women in the Mangystau Region of Kazakhstan. Women with higher educational attainment and those residing in urban areas demonstrated substantially better utilization of key prenatal services, including genetic screening, ultrasound examinations, and access to better nutrition and water quality. Rural residence, low education level, and lower income were consistently associated with reduced access to prenatal care. Enhancing prenatal care infrastructure, expanding health education programs, and improving access to medical screening particularly in rural areas are essential strategies for improving maternal and newborn health in the region. Future research should employ prospective study designs with systematic outcome tracking to more precisely

characterize the relationship between sociodemographic factors and congenital anomaly rates in Kazakhstan.

Conflicts of Interest.

The authors declare no conflicts of interest.

Author Contributions.

Conceptualization: G.M. and Z.K.; Methodology: G.M. and I.S.; Data curation: I.S.; Supervision: G.M.; Writing original draft: G.M., I.S. and Z.K.

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Ethical Approval.

This study was approved by the Ethics Committee of Semey Medical University (Registration No. 1b, dated 25.10.2024).

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Data Availability.

The datasets generated and/or analyzed during the current study are not publicly available due to ethical restrictions but are available from the corresponding author upon reasonable request.

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ანოტაცია.

შესავალი: თანდაყოლილი ანომალიები (TA) წარმოადგენს ჩვილთა სიკვდილიანობისა და ინვალიდობის ერთ-ერთ ძირითად მიზეზს და შეადგენს ნეონატალური სიკვდილიანობის 15–20%-ს მსოფლიოში. მათი ეტიოლოგია მრავალფაქტორულია და მოიცავს გენეტიკურ, სამედიცინო, გარემოსდაცვით და სოციალურ-ეკონომიკურ ფაქტორებს. ინდუსტრიულ რეგიონებში, როგორიცაა ყაზახეთის მანგისტაუს რეგიონი, აღინიშნება თანდაყოლილი დეფექტების განსაკუთრებით მაღალი მაჩვენებელი, რაც სავარაუდოდ დაკავშირებულია გარემოს დაბინძურებასა და ჯანდაცვაზე შეზღუდულ ხელმისაწვდომობასთან. მოცემული კვლევის მიზანი იყო მანგისტაუს რეგიონში მცხოვრებ ორსულ ქალებში პრენატალური დახმარების ხელმისაწვდომობის სოციალურ-დემოგრაფიული დეტერმინანტების და ჯანდაცვაზე მიმართვის ქცევის შეფასება.

მეთოდები: ჩატარდა კროსსექციური კვლევა, რომელშიც მონაწილეობდა მანგისტაუს რეგიონის ქალაქისა და სოფლის 318 ორსული ქალი. მონაცემები შეგროვდა სტრუქტურირებული კითხვარების საშუალებით, რომლებიც მოიცავდა სოციალურ-დემოგრაფიულ მახასიათებლებს, ჯანმრთელობის ქცევებს, სამედიცინო სკრინინგის პრაქტიკებს და გარემოს აღქმას. სტატისტიკურად მნიშვნელოვანი კავშირების დასადგენად გამოყენებულ იქნა χ^2 ტესტი ($p < 0.05$).

შედეგები: მაღალი განათლების დონე და ქალაქში ცხოვრება მნიშვნელოვნად იყო დაკავშირებული პრენატალურ სერვისებზე უკეთეს ხელმისაწვდომობასთან, მათ შორის ულტრაბგერით კვლევასა და გენეტიკურ ტესტირებასთან ($p < 0.001$). დაბალი განათლება და შემოსავალი ასოცირდებოდა ორსულობის გართულებების უფრო მაღალ სიხშირესთან ($p < 0.01$). სოფლის მონაწილეებმა აღნიშნეს საკვებისა და წყლის დაბალი ხარისხი ($p = 0.017$).

დასკვნა: სოციალურ-დემოგრაფიული უთანასწორობა მნიშვნელოვნად განაპირობებს პრენატალური დახმარების ხელმისაწვდომობას მანგისტაუს რეგიონში, სადაც სოფლად მცხოვრებობა, განათლების დაბალი დონე და დაბალი შემოსავალი ძირითადი ბარიერებია. მიზნობრივი ღონისძიებები დედათა განათლების გაუმჯობესებისა და დიაგნოსტიკური სერვისების ხელმისაწვდომობის გაზრდის მიმართულებით, განსაკუთრებით სოფლის რაიონებში, აუცილებელია პრენატალური მომსახურების გაფართოებისა და საბოლოო ჯამში თანდაყოლილი ანომალიების ტვირთის შემცირებისათვის.

საკვანძო სიტყვები: თანდაყოლილი ანომალიები, დედის ჯანმრთელობა, პრენატალური სკრინინგი, ჯანმრთელობის ხელშეწყობა, პრენატალური მოვლა, ჯანმრთელობის განათლება, ყაზახეთი.

Аннотация.

Введение: Врожденные аномалии (ВА) являются одной из ведущих причин младенческой смертности и инвалидности, составляя 15–20% неонатальных смертей во всем мире. Их этиология многофакторна и включает генетические, медицинские, экологические и социально-экономические факторы. В индустриальных регионах, таких как Мангистауская область Казахстана, наблюдаются особенно высокие показатели врожденных пороков, что, вероятно, связано с загрязнением окружающей среды и ограниченным доступом к медицинской помощи. Учитывая повышенную распространённость ВА в данном промышленном регионе, целью данного исследования была оценка социально-демографических детерминант доступности пренатальной помощи и поведения, связанного с обращением за медицинской помощью, среди беременных женщин Мангистауской области Казахстана.

Методы: Проведено поперечное исследование с участием 318 беременных женщин из городских и сельских районов Мангистауской области. Данные собирались с помощью структурированных анкет, охватывающих социально-демографические характеристики, поведенческие факторы здоровья, практики медицинского скрининга и восприятие экологической обстановки. Для выявления статистически значимых связей применялся критерий χ^2 ($p < 0,05$).

Результаты: Более высокий уровень образования и проживание в городской местности были статистически значимо связаны с лучшим доступом к пренатальной помощи, включая ультразвуковое исследование и генетическое тестирование ($p < 0,001$). Низкий уровень образования и дохода коррелировал с более высокой частотой осложнений беременности ($p < 0,01$). Участницы из сельских районов сообщали о худшем качестве пищи и воды ($p = 0,017$).

Заключение: Социально-демографическое неравенство существенно влияет на доступность пренатальной помощи в Мангистауской области: сельское проживание, низкий уровень образования и дохода являются ключевыми барьерами. Целенаправленные меры общественного здравоохранения по повышению уровня образования матерей и доступа к диагностическим услугам, особенно в сельских районах, необходимы для расширения охвата пренатальной помощью и снижения бремени врождённых аномалий в регионе.

Ключевые слова: врожденные аномалии, здоровье матери, пренатальный скрининг, укрепление здоровья, пренатальная помощь, санитарное просвещение, Казахстан.