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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 UROLITHIASIS AMONG THE POPULATION OF AL-BAHA REGION, SAUDI ARABIA

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Abstract.

Background: Urolithiasis, a common and painful condition, is influenced by various risk factors and can be mitigated through preventive measures. This study aims to assess the prevalence and risk factors of Urolithiasis among adults in Al-Baha region, Saudi Arabia, and to evaluate the public's knowledge and attitudes toward its prevention and management.

Methodology: Researchers conducted a cross-sectional study using electronic questionnaires distributed via social media platforms. The researchers collected data on demographics, BMI, smoking status, chronic diseases, and family history of Urolithiasis. Additionally, the researchers asked participants about their knowledge and attitudes regarding risk factors and preventive measures for Urolithiasis. Researchers performed statistical analyses using SPSS version 26, employing Chi-square and t-tests to assess associations, with significance set at $p < 0.05$.

Results: The study included 633 participants where 377 males (59.6%) and 256 females (40.4%). The age distribution ranged from 18 to 60 years older, with the majority aged 18-29 (38.5%). The prevalence of Urolithiasis was 13.6%, with 41.1% of participants reporting a family history of the condition. The researchers found significant associations between Urolithiasis and age ($p < 0.001$), employment status ($p < 0.001$), smoking ($p < 0.001$), and the presence of chronic diseases ($p < 0.001$). Knowledge about Urolithiasis was significantly associated with age ($p = 0.014$) and employment status ($p = 0.001$). Most participants (94.0%) thought that eating habits affect the occurrence of stones, and 75.8% believed that holding urine frequently causes stone disease. Additionally, 84.0% believed there are non-surgical treatments for stones, and 61.9% thought consuming 2.5 liters of fluid daily reduces stone formation.

Conclusion: The study highlights the significant prevalence of Urolithiasis in the Al-Baha region and underscores the importance of public education on risk factors and preventive measures. Age, employment status, smoking, and chronic diseases were significantly associated with Urolithiasis, emphasizing the need for targeted interventions.

Key words. Urolithiasis, Saudi Arabia, prevention, management.

Introduction.

Although there are no symptoms at the beginning of stone development, renal colic, flank discomfort, hematuria, restriction of urine flow, and hydronephrosis may later signify renal stone disease. Most of the year in Saudi Arabia, the weather is quite hot, which raises the possibility of having nephrolithiasis [1]. Apart from age, gender, ethnicity, and climate, various other factors might lead to Urolithiasis. Globally, kidney stone disease is becoming more common and more likely to recur, but there are currently few effective therapeutic options available [2].

Previous studies showed a strong association between nephrolithiasis and risk factors like diabetes and hypertension [2]. Despite its worldwide prevalence, the epidemiology of kidney stones exhibits regional variations, necessitating localized studies to understand its prevalence and risk factors comprehensively. In a study, the prevalence of renal stones among residents in Saudi Arabia was 9.1%, with a relatively high percentage of positive family histories among renal stone patients (34.9%). However, the need for more specific data regarding kidney stone disease in Al-Baha region highlights a critical gap in our understanding of this condition at the local level [3]. In addition, another study also reported that the prevalence of urolithasis in Makkah region, Saudi Arabia is 6.6 % in males and 5.8 % in females [4].

Urolithiasis is influenced by various risk factors that contribute to its development, progression, and recurrence. Demographic factors, such as age (most common between 30-60 years) and male gender, play a significant role, as does a positive family history, indicating genetic predisposition [5]. Lifestyle factors, including diets high in oxalates, animal protein, and sodium, as well as low fluid intake leading to dehydration, are critical contributors [6]. Metabolic disorders, such as hypercalciuria, hyperoxaluria, and hyperuricosuria, along with genetic conditions like cystinuria, also increase susceptibility [6]. Medical conditions, including obesity, metabolic syndrome, chronic kidney disease, and gastrointestinal disorders like Crohn's disease or post-bariatric surgery states, further elevate the risk [7]. Environmental factors, such as living in hot climates or experiencing seasonal dehydration during summer months, also play a crucial role [8].

Due to the insignificant of studies related to our topic, prevalence, and risk factors of renal stones, we aim to assess the risk factors associated with renal stones among the population of Al-Baha region.

Methodology.

The researchers meticulously crafted the methods for this cross-sectional study to ensure comprehensive and reliable data collection and analysis. The study targeted the adult population of Al-Baha region, specifically individuals aged 18 years and older. The inclusion criteria encompassed all consenting males and females within this age range who resided in Al-Baha. Conversely, the study excluded individuals under 18, non-residents of Al-Baha, and those who refused to participate.

The size was determined using the Raosoft sample size calculator, with parameters set to a 5% margin of error, a 95% confidence interval, and a 50% response distribution. Based on the latest statistics from the General Authority for Statistics, which indicated that the population of Al-Baha aged 20 years

and older was 217,769, the calculated minimum sample size was 384 participants.

Data was collected using a structured online questionnaire, which various medical professionals validated to ensure accuracy and relevance. The questionnaire was designed to assess Urolithiasis's prevalence and risk factors and was disseminated through multiple social media platforms to reach a broad audience.

The researchers performed statistical analysis using SPSS version 26. Descriptive statistics, including frequency and percentage, were used to characterize categorical variables; the researchers employed means and standard deviations for continuous variables. The researchers assessed associations between prevalence, knowledge, and demographic factors using Chi-square and t-tests. Body Mass Index (BMI) was used to assess the obesity of the participants where lower than 18.5 Kg/m^2 indicates underweight state, while normal weight was having BMI between 18.5-24.9 Kg/m^2, and having 25-29.9 Kg/m^2 and over 30 Kg/m^2 indicate overweight and obese. Knowledge was evaluated based on participants' responses to the questionnaire, with correct answers awarded one point each. The researchers classified participants with more than 66% correct answers as having adequate knowledge. The researchers determined statistical significance with a p-value threshold of less than 0.05.

Results.

The study encompassed a diverse group of participants, with 377 males (59.6%) and 256 females (40.4%). The age distribution was broad, with 38.5% aged 18-29, 10.7% aged 30-39, 27.2% aged 40-49, 19.4% aged 50-59, and 4.1% aged 60 or older. Regarding Body Mass Index (BMI), the data showed that 6.1% of participants were underweight, 31.4% had average weight, 34.1% were overweight, and 28.5% were obese. Most participants were Saudi nationals (98.1%), while a small percentage were non-Saudis (1.9%). Educational attainment varied, with 0.3% having completed primary school or less, 13.9% completing middle or high school, 9.0% holding a diploma, and a significant majority of 76.8% possessing a university degree. The data showed that 18.2% of participants were health practitioners, while 81.8% worked in fields unrelated to healthcare, such as education, finance, engineering, and other sectors. Smoking habits indicated that 81.2% were non-smokers and 18.8% were smokers. Regarding chronic diseases, 78.5% of participants reported having no chronic conditions. Specific conditions included hyperthyroidism (0.9%), gout (4.1%), diabetes (7.4%), hypertension (5.8%), intestinal diseases (2.4%), and chronic kidney disease (0.8%) (Table 1).

The researchers also assessed the prevalence of urinary stones, revealing that 13.6% of participants had been diagnosed with them, while 86.4% had not. Additionally, 41.1% reported that family members had experienced urinary stones, compared to 58.9% who did not have a family history of the condition (Table 2).

The study explored various factors influencing the prevalence of urolithiasis among the participants. Gender was not significantly associated with the diagnosis of urinary stones, with 15.4% of males and 10.9% of females having been diagnosed ($p = 0.109$). Age, however, showed a significant association ($p < 0.001$). The prevalence of urinary stones increased with age, being lowest among the 18-29 age group (4.1%) and highest among those 60 or older (30.8%). BMI did not significantly affect the prevalence of urinary stones ($p = 0.092$). However, those with average weight had a lower prevalence (11.7%) compared to overweight (16.8%) and obese individuals (14.0%). Nationality also did not show a significant association ($p = 0.244$), though non-Saudis had a higher prevalence (25.0%) compared to Saudis (13.4%). The researchers found no significant link between educational level and the prevalence of urinary stones. ($p = 0.937$). Participants with various academic backgrounds had similar rates of urinary stones. Employment status, however, was significantly associated ($p < 0.001$), with health practitioners having a much lower prevalence (3.5%) compared to those in other professions (15.8%). Smoking status was another significant factor ($p < 0.001$), with smokers having a higher prevalence of urinary stones (23.5%) compared to

Table 1. *Demographic factors of the participants.*

		Count	Column N %
Gender	Male	377	59.6%
	Female	256	40.4%
Age	18-29	244	38.5%
	30-39	68	10.7%
	40-49	172	27.2%
	50-59	123	19.4%
	60 or older	26	4.1%
BMI	Underweight	38	6.0%
	Normal weight	202	31.9%
	Overweight	214	33.8%
	Obese	179	28.3%
Nationality	Saudi	621	98.1%
	Non-Saudi	12	1.9%
Educational level	Primary school or less	2	0.3%
	Middle or high school	88	13.9%
	diploma	57	9.0%
	University	486	76.8%
Employment	Health practitioner	115	18.2%
	Non-health practitioner	518	81.8%
Smoking	No	514	81.2%
	Yes	119	18.8%
Do you have one of these diseases?	I do not have any chronic disease	497	78.5%
	Hyperthyroidism	6	0.9%
	Gout	26	4.1%
	diabetes	47	7.4%
	Hypertension	37	5.8%
	A disease related to the intestines	15	2.4%
	Chronic kidney disease	5	0.8%

Table 2. *Prevalence of Urolithiasis.*

		Count	Column N %
Have you been diagnosed with Urolithiasis?	No	547	86.4%
	Yes	86	13.6%
Have any of your family members ever had Urolithiasis?	No	373	58.9%
	Yes	260	41.1%

non-smokers (11.3%). Chronic diseases were also significantly associated with the prevalence of urinary stones ($p < 0.001$). Participants without chronic diseases had a lower prevalence (9.9%), whereas those with hyperthyroidism (50.0%), gout (30.8%), diabetes (27.7%), hypertension (27.0%), and chronic kidney disease (40.0%) had higher prevalence rates. The prevalence was lowest among those with intestinal diseases (6.7%) (Table 3).

The study revealed several key insights into participants' thoughts on the risk factors and prevention of stone formation. A significant majority (75.8%) believed that holding urine frequently causes stone disease. Additionally, 94.0% thought that eating habits affect the occurrence of stones, and 84.0% believed there are treatments other than surgical intervention for stones. The patients with stones rated their perceived pain as high., with 79.1% rating it between 6 and 10 on a scale of 1 to 10. Furthermore, 68.2% of participants considered the largest stones the most painful.

Regarding daily fluid intake, 61.9% of participants believed consuming 2.5L per day would reduce the rate of stone formation. Most participants (71.4%) felt that protein intake helps form stones, and 56.6% thought that limiting calcium intake is beneficial in preventing stone disease. Furthermore, 80.6% believed high sodium consumption increases the risk of stone formation, while 51.3% thought citrus fruits or juices could avert stone formation (Table 4).

In terms of knowledge about renal stone disease symptoms, the most commonly recognized symptom was a sharp pain in the back and sides (76.3%), followed by a burning feeling during urination (58.1%) (Figure 1). When asked what to do if their urine color is dark, 56.6% of participants indicated they would go to the doctor directly (Figure 2).

The most recognized risk factors were not drinking enough fluids (88.7%) and having a protein-based diet (42.4%). In terms of dietary ingredients that may predispose to the formation of renal stones, coffee (39.9%) and nuts (23.1%) were the most frequently identified (Table 5).

The study examined the relationship between knowledge level about stone disease and various demographic factors. Gender was not significantly associated with knowledge levels, with 5.0% of males and 4.3% of females having adequate knowledge ($p = 0.666$). Age showed a significant association ($p = 0.014$), with the highest proportion of adequate knowledge found in the 18-29 age group (7.8%) and the lowest in the 50-59 age group (0.8%). BMI was not significantly associated with knowledge levels ($p = 0.593$), though participants with an average weight exhibited slightly lower rates of inadequate knowledge (97.0%) compared to other BMI categories. Nationality did not show a significant association ($p = 0.435$), with 4.8% of Saudis having adequate knowledge, whereas none of the non-Saudis

Table 3. *The factors affecting the prevalence of Urolithiasis.*

		Have you been diagnosed with Urolithiasis?				**P-value**
		No		**Yes**		
		Count	**Row N %**	**Count**	**Row N %**	
Gender	Male	319	84.6%	58	15.4%	0.109
	Female	228	89.1%	28	10.9%	
Age	18-29	234	95.9%	10	4.1%	< 0.001
	30-39	57	83.8%	11	16.2%	
	40-49	144	83.7%	28	16.3%	
	50-59	94	76.4%	29	23.6%	
	60 or older	18	69.2%	8	30.8%	
BMI	Underweight	37	97.4%	1	2.6%	0.092
	Normal weight	178	88.1%	24	11.9%	
	Overweight	178	83.2%	36	16.8%	
	Obese	154	86.0%	25	14.0%	
Nationality	Saudi	538	86.6%	83	13.4%	0.244
	Non-Saudi	9	75.0%	3	25.0%	
Educational level	Primary school or less	2	100.0%	0	0.0%	0.937
	Middle or high school	76	86.4%	12	13.6%	
	Diploma	50	87.7%	7	12.3%	
	University	419	86.2%	67	13.8%	
Employment	Health practitioner	111	96.5%	4	3.5%	< 0.001
	Non-health practitioner	436	84.2%	82	15.8%	
Smoking	No	456	88.7%	58	11.3%	< 0.001
	Yes	91	76.5%	28	23.5%	
Do you have one of these diseases?	I do not have any chronic disease	448	90.1%	49	9.9%	< 0.001
	Hyperthyroidism	3	50.0%	3	50.0%	
	Gout	18	69.2%	8	30.8%	
	Diabetes	34	72.3%	13	27.7%	
	Hypertension	27	73.0%	10	27.0%	
	A disease related to the intestines	14	93.3%	1	6.7%	
	Chronic kidney disease	3	60.0%	2	40.0%	

Table 4. *Thoughts considering risk factors of stone formation.*

		Count	Column N %
Do you think that holding urine (several times) causes stone disease?	No	153	24.2%
	Yes	480	75.8%
Do you think the weather affects stone formation?	No	397	62.7%
	Yes	236	37.3%
Do you think that eating habits affect the occurrence of stones?	No	38	6.0%
	Yes	595	94.0%
Do you think there is another treatment for stones other than surgical intervention?	No	101	16.0%
	Yes	532	84.0%
Please use the scale below to describe the pain a stone patient may experience (1 is the least painful, and 10 is the most painful)	1-5	132	20.9%
	6-10	501	79.1%
Which of the following stone sizes causes the most pain?	Smaller in size	201	31.8%
	The largest	432	68.2%
What is the minimum amount of fluid that experts recommend daily to reduce the rate of stone formation?	2.5 liters daily	392	61.9%
	1 liter per day	91	14.4%
	4 liters per day	150	23.7%
What do you think about protein intake for stone patients?	Prevents the formation of stones	181	28.6%
	Helps form stones	452	71.4%
Do you think that limiting calcium intake is beneficial in preventing stone disease?	No	275	43.4%
	Yes	358	56.6%
Do you think increasing potassium intake (bananas, dates, potatoes, peaches) prevents stone formation?	No	262	41.4%
	Yes	371	58.6%
Do you think high sodium consumption increases the risk of stone formation?	No	123	19.4%
	Yes	510	80.6%
Do you think citrus fruits or juices (orange and lemon) prevent stone formation?	No	308	48.7%
	Yes	325	51.3%

Table 5. *Thoughts about risk factors and dietary ingredients associated with stone formation.*

		N	N%
Which of the following is considered a risk factor for renal stones?	Infection of a relative with this disease	112	17.8%
	Not drinking sufficient amounts of fluids	559	88.7%
	Protein-based diets	267	42.4%
	Weight gain	146	23.2%
	Gastric bypass surgery	57	9.0%
	Chronic diarrhea	48	7.6%
	Hyperthyroidism	62	9.8%
	I don't know	64	10.2%
In your opinion, which of the dietary ingredients may predispose to the formation of renal stones?	Nuts	144	23.1%
	Coffee	249	39.9%
	Potatoes	110	17.6%
	Eggplant	27	4.3%
	Dark chocolate	51	8.2%
	Beetroot	10	1.6%
	Beets	36	5.8%
	Spinach	75	12.0%
	Lemon	40	6.4%
	Grapefruit	22	3.5%
	I do not know	285	45.7%

demonstrated sufficient knowledge. Educational level was also not significantly related to knowledge levels ($p = 0.372$). However, those with a university education had the highest proportion of adequate knowledge (5.6%). Employment status revealed a significant association ($p = 0.001$), with health practitioners having a higher proportion of proper knowledge (10.4%) compared to other professions (3.5%). Smoking status did not significantly affect knowledge levels ($p = 0.515$), with 4.5% of non-smokers and 5.9% of smokers having adequate knowledge. These findings suggest that while certain demographic factors like age and employment status are associated with knowledge levels about stone disease, others such as gender, BMI, nationality, educational level, and smoking status are not significantly linked (Table 6).

Table 6. *The relation between knowledge level and demographic factors.*

		Knowledge				
		Inadequate		Adequate		P-value
		Count	Row N %	Count	Row N %	
Gender	Male	358	95.0%	19	5.0%	0.666
	Female	245	95.7%	11	4.3%	
Age	18-29	225	92.2%	19	7.8%	0.014*
	30-39	63	92.6%	5	7.4%	
	40-49	168	97.7%	4	2.3%	
	50-59	122	99.2%	1	0.8%	
	60 or older	25	96.2%	1	3.8%	
BMI	Underweight	36	94.7%	2	5.3%	0.593
	Normal weight	191	97.0%	6	3.0%	
	Overweight	202	94.4%	12	5.6%	
	Obese	169	94.4%	10	5.6%	
Nationality	Saudi	591	95.2%	30	4.8%	0.435
	Non-Saudi	12	100.0%	0	0.0%	
Educational level	Primary school or less	2	100.0%	0	0.0%	0.372
	Middle or high school	86	97.7%	2	2.3%	
	Diploma	56	98.2%	1	1.8%	
	University	459	94.4%	27	5.6%	
Employment	Health practitioner	103	89.6%	12	10.4%	0.001*
	Non-health practitioner	500	96.5%	18	3.5%	
Smoking	No	491	95.5%	23	4.5%	0.515
	Yes	112	94.1%	7	5.9%	

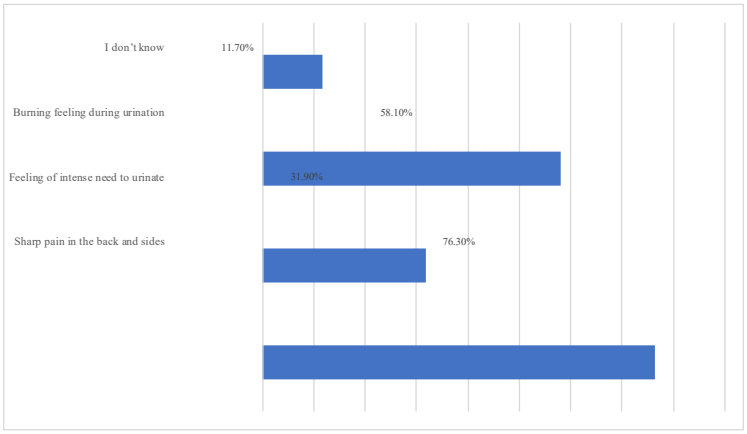

Figure 1. *Knowledge considering the symptoms of renal stone diseases.*

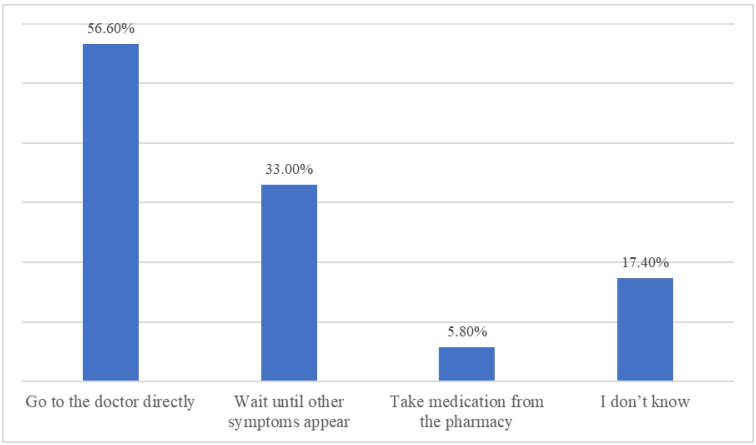

Figure 2. *If your urine color is dark, what should you do?*

Discussion.

This study provided valuable insights into the prevalence, awareness, and knowledge of Urolithiasis among a diverse population sample in Al-Baha region. Understanding the factors influencing the occurrence of urinary stones and the level of public knowledge about this condition is crucial for implementing effective prevention and education strategies.

The findings revealed a 13.6% prevalence of urolithiasis among participants, a significant health concern considering its potential to cause severe discomfort and complications. This prevalence is consistent with global trends where Urolithiasis is a common urological disorder, affecting a substantial proportion of the population [9-12]. The prevalence of 13.6% reported in this study is higher than the 6.2% reported in a previous study conducted in the Western region of Saudi Arabia [4]. In another study in Saudi Arabia, the authors reported a prevalence of 9.1 % [3]. In the Bisha population in Saudi Arabia, Bokhari et al. reported a higher prevalence of Urolithiasis of 16.1 % [2]. The region's hot and arid climate likely contributes to increased fluid loss through sweating, leading to dehydration, which is a well-documented risk factor for urolithiasis [5]. Additionally, dietary habits prevalent in the area, such as high consumption of animal protein or foods rich in oxalates, might play a role in stone formation.

Interestingly, the prevalence was higher among males (15.4%) compared to females (10.9%), although this gender difference was not statistically significant ($p = 0.109$).

The finding of a higher prevalence of urinary stones among male participants is similar to previous studies [2,13,14]. Previous studies have shown similar trends, suggesting that biological differences and lifestyle factors may contribute to the higher incidence in males [15,16].

Age showed a significant association with the prevalence of urinary stones ($p < 0.001$), with the condition becoming more familiar with increasing age. Participants aged 60 or older had the highest prevalence (30.8%), while those aged 18-29 had the lowest (4.1%).

This finding aligns with existing literature, which indicates that the risk of Urolithiasis increases with age due to cumulative exposure to risk factors such as diet, dehydration, and comorbidities [4,12,17].

While BMI did not show a statistically significant association with urinary stones prevalence ($p = 0.092$), the data suggested that individuals with average weight had a lower prevalence (11.7%) compared to overweight (16.8%) and obese (14.0%) participants. This trend highlights the importance of maintaining a healthy weight to reduce the risk of stone formation, as obesity and overweight are known risk factors due to their association with metabolic abnormalities [18-20].

Nationality was not significantly linked to the prevalence of urinary stones ($p = 0.244$), although non-Saudis had a higher prevalence (25.0%) compared to Saudis (13.4%). This difference might be attributable to varying dietary habits, lifestyle factors, and genetic predispositions between different nationalities.

Educational attainment did not significantly correlate with urinary stones prevalence ($p = 0.937$), indicating that stones are widespread across different academic backgrounds. However, employment status was significantly associated ($p < 0.001$), with health practitioners having a much lower prevalence (3.5%) compared to those in other professions (15.8%).

The lower prevalence observed among health practitioners could be due to their better awareness and preventive practices.

Smoking status was another significant factor ($p < 0.001$), with smokers having a higher prevalence of urinary stones (23.5%) compared to non-smokers (11.3%). Researchers have implicated smoking in various renal pathologies, possibly due to its effects on renal function and oxidative stress [21-23].

Chronic diseases were significantly associated with the prevalence of urinary stones ($p < 0.001$). Participants with hyperthyroidism, gout, diabetes, hypertension, and chronic kidney disease had higher prevalence rates, highlighting the role of comorbid conditions in increasing the risk of stone formation [24,25]. Hyperthyroidism, for instance, is linked to hypercalciuria due to increased bone resorption, which elevates urinary calcium levels, a major risk factor for calcium-based stones [26]. Gout contributes to urolithiasis through hyperuricemia and subsequent uric acid crystal deposition, creating an environment conducive to stone formation [27]. Similarly, diabetes is associated with altered urinary pH and increased excretion of calcium, oxalate, and uric acid, all of which contribute to stone pathogenesis [28]. Hypertension has been implicated in urolithiasis through its association with metabolic syndrome, increased urinary calcium excretion, and renal abnormalities [29]. Chronic kidney disease (CKD) exacerbates the risk due to impaired renal filtration and changes in urine composition, which favor stone development [29]. These findings emphasize the importance of integrating urolithiasis screening and preventive strategies into the management of chronic conditions. Early intervention and comprehensive care tailored to these high-risk groups are essential to mitigate the burden of urinary stones and associated complications.

The study also examined participants' knowledge and awareness regarding urinary stones. While certain demographic factors like age and employment status were significantly associated with knowledge levels, others such as gender, BMI, nationality, educational level, and smoking status were not. Younger participants (18-29 years) had the highest proportion of adequate knowledge (7.8%), while those aged 50-59 had the lowest (0.8%) ($p = 0.014$).

The higher prevalence of Urolithiasis among older populations suggests a need for increased educational efforts targeting these groups.

Health practitioners had a higher proportion of adequate knowledge (10.4%) compared to other professions (3.5%) ($p = 0.001$), indicating that professional exposure to health information positively impacts knowledge levels. This finding suggests that enhancing public health education can improve awareness and preventive behaviors.

Participants demonstrated a high level of awareness regarding certain risk factors for stone formation. A significant majority believed that holding urine frequently (75.8%) and poor eating habits (94.0%) contribute to stone disease. Additionally, 84.0% recognized non-surgical treatments for stones, indicating good awareness of alternative management options. The perceived

severity of pain associated with stone disease was also high, with 79.1% rating it between 6 and 10 on a pain scale. These perceptions motivate individuals to seek timely medical advice and adopt preventive measures.

However, misconceptions were also evident, such as the belief that protein intake helps form stones (71.4%) and the need to limit calcium intake (56.6%). While high protein and sodium intake can increase the risk of stone formation, Experts generally recommend moderate calcium intake to prevent stones [30]. Efforts to correct such misconceptions through public health campaigns are essential.

Strengths and Limitations.

The strengths of this study include a large and diverse sample size, which enhances the generalizability of the findings. Electronic questionnaires distributed via social media allowed for broad participation and timely data collection. However, there are limitations to consider. Self-reported data may be subject to recall bias, and the cross-sectional design does not allow for causal inferences. Additionally, the study's reliance on online questionnaires may result in the exclusion of individuals who lack internet access, potentially skewing the results. Furthermore, we did not collect data on the specific specialties of healthcare professionals, which limits our ability to explain the reasons behind the high prevalence of urolithiasis among this group. The prevalence may vary depending on whether the physicians are internal medicine specialists or surgeons, as surgeons may have an elevated risk due to prolonged restrictions on urination resulting from extended surgical procedures. These factors highlight areas for improvement in future research to provide a more comprehensive understanding of urolithiasis prevalence and its contributing factors.

Conclusion.

In conclusion, this study highlights the significant prevalence of Urolithiasis in Al-Baha region and identifies critical demographic and health-related factors associated with stone disease. The findings underscore the importance of targeted education and prevention strategies, particularly for high-risk groups such as older adults, smokers, and individuals with chronic diseases. Enhancing public knowledge and correcting misconceptions about stone formation can contribute to better prevention and management of Urolithiasis. Future research should focus on longitudinal studies to establish causal relationships and evaluate educational interventions' effectiveness in reducing urethral stone prevalence.

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