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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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PERCEPTION OF UROLOGY SPECIALTY AND FACTORS INFLUENCE ITS CONSIDERATION AS A CAREER CHOICE AMONG MEDICAL STUDENTS

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Abstract.

Background: Urology is a branch of medicine that deals with different diseases of the urinary tract or the reproductive organs in both men and women. It is well known that there is an increase in the number of urological diseases that are being encountered in both primary and secondary health services.

The purpose of this study is to evaluate the perception and interest in urology specialty among medical students at Qassim University and provide an idea about factors influencing student's consideration of pursuing urology as a career choice.

Subject and methods: This cross-sectional study was carried out among medical students of Qassim University, Saudi Arabia. A self-administered questionnaire was distributed among the medical students and interns using paper survey. The survey comprised basic demographic characteristics (gender, academic year level), a questionnaire about the basic knowledge of urology specialty, clinical skills in urology field, and 18 items to assess the influencing factors for choosing urology specialty.

Results: Among the 223 medical students, 55.6% were males, and 23.8% considered a career in the urology specialty. Being a male, believing that males dominated the urology specialty, and a positive influence when choosing urology specialty were the factors that increased student's consideration for the urology specialty. The top influential factors for urology consideration were the use of technology in urology, integration of medicine and surgery, and career opportunities. Deterrence factors were unattractive lifestyle, lack of knowledge, and social issues.

Conclusion: One-fourth of medical students would consider urology as their future specialty. Male students who believed that males dominated urology were more likely to exhibit greater consideration for choosing a urology specialty as a future career compared to other students. Further researches are needed to address more details on the factors that affects the choose of urology as a future carrier in female students and finding a solutions to them as well as correcting misconceptions about the urologists lifestyle.

Key words. Urology, medical students, perception, influencing factors.

Introduction.

Speciality selection takes an important deal in medical student carer life. They take different factors into consideration while choosing their speciality, some factors are related to the student personality and experience, and others are related to the speciality itself like the work lifestyle [1]. Urology is a medical speciality that deals with the urinary and reproductive systems in both genders. A urologist medical knowledge is expected to cover a wide range of other specialities as the urology system and the reproductive system are related to so many other systems [2]. Urological diseases dealt with in the health services are in a noticeably increased incidence [3]. And there is a raised concern recently about the decline in the education regarding the urological studies [4,5]. It is observed that medical student knowledge in urology as a speciality is not that thorough as it's when compared to other medical speciality as internal medicine and general surgery. This insufficient amount of knowledge in the urology speciality is owned to many factors that include the awareness of the medical student, the capacity of the curriculum, traditional method of education and the availability of hospital rotations during the clinical part of the medical college journey and in the internship year [6]. A cross-sectional study was done in 2013 from Riyadh, Saudi Arabia measure the knowledge of medical students regarding urology speciality, the results proved that their knowledge is inadequate, and that of those who participated only 8.9% of them have taken a urology rotation in the clinical years [7]. A more recent study that have been conducted in Saudi Arabia showed a better results where about 84% of the student participated in the study from different regions have had a urology rotation during undergraduate years [8]. A study in the United States targeted the urology program directors showed that more than half of the medical student could complete the medical college without been enrolled an official clinical exposure to urology [5]. In spite of the low urology educational experience, urological operations maintain to an appealing medical speciality for which large numbers of students are engaged in the match yearly [9]. Another issue have been noticed among medical students in some studies that showed a variable level of considering urology as a speciality between male and female, the later been less likely to consider it as a career [8,10]. Regarding the gender predominance in urology speciality, a Canadian study revealed that most the of medical students participated in the study consider urology as a male predominant speciality [11]. The same study states that urology had the second greatest gender discrepancy with a male-to-female ratio 4:1, while the first was obstetrics and gynaecology with the gender discrepancy reversed. A local study by Addar et al. [8]. established to assess the perception of urology speciality offered by the different Saudi universities. About 67.5% of participants regard urology as a male speciality primarily and majority of students who are considering a career in urology were male students.

Methods.

A descriptive cross-sectional study was carried out using a previously validated 36 item questionnaire taken from a previous study [12], and it was modified to assess medical student's perception, knowledge and interest toward urology as well as measuring the factors that influence student's

consideration of urology as a future career. The questionnaire was then reviewed by a party of selected experts as urology consultants from the college of medicine at Qassim University to ensure its applicability and content validity. The questionnaire included participants' demographic data, knowledge assessment questions, barriers and factors influencing the chose of urology as a future career.

The involved sample was any medical student and medical intern at Qassim University who is aware of urology specialty. A total of 261 medical students received & responded to our survey, 38 of them have been excluded as they were not aware of a specialty called urology.

The questionnaire was delivered to our sample as a hardcopy survey, and they were willingly filling it out after explaining the purpose and conforming to their data confidentiality.

After data collection and extraction, it was revised, coded, and fed to a statistical software IBM SPSS version 21 Armonk, New York, IBM Corporation.

Statistical Analysis.

The overall influential factors when choosing a urology specialty have been assessed using 18-item factors with 5-point Likert scale categories ranging from "strongly negative influence" coded with 1 to "strongly positive influence" coded with 5 as an answer options. The total score for influential factors has been calculated by adding all 18 items. A score ranging from 18 to 90 points was generated, indicating that the higher the score, the greater influence when choosing a urology specialty. By using 60% as a cutoff point to determine the level of influence, medical students were classified as having a negative influence if the score was 60% or below, and above 60% were classified as having a positive influence.

For the descriptive analysis, the mean and standard deviation were used for metric variables, while the numbers and percentages were given for categorical variables. The relationship between considering the urology specialty and the level of influence according to the basic demographic characteristics and knowledge about the urology specialty was performed using the Chi-square test. All analyses were performed using the software program Statistical Packages for Software Sciences (SPSS) version 21 Armonk, New York, IBM Corporation. Values were considered significant with a confidence interval of 95% ($p<0.05$).

Results.

This study recruited 223 medical students. Table 1 describes the basic demographic characteristics of medical students. More than half were males (55.6%), and 27.8% were in the fourth-year level.

In Table 2, medical students were aware that urologists were mostly involved in managing male and female urinary tract disorders (97.3%), and they knew that the primary function was to have an outpatient clinic (82.5%). 48.4% were aware that urology has its own residency program. The proportion of medical students who were considering urology as a future

Table 1. *Basic demographic data of the medical students (n=223).*

Study variables	**N (%)**
Gender	
• Male	124 (55.6%)
• Female	99 (44.4%)
Academic year level	
First year	25 (11.2%)
Second year	38 (17.0%)
Third year	37 (16.6%)
Fourth year	62 (27.8%)
Fifth year	51 (22.9%)
Medical Intern	10 (04.5%)

Table 2. *Medical students' knowledge about urology specialty (n=223).*

Statement	**N (%)**
The role of a urologist involves managing diseases such as †	
Male and female urinary tract	217 (97.3%)
Child urinary tract	151 (67.7%)
Male reproductive organs	134 (60.1%)
Female reproductive organs	87 (39.0%)
Proteinuria and glomerulonephritis	80 (35.9%)
Functions of urologist †	
Has outpatient clinic	184 (82.5%)
Perform inpatient procedures/surgeries	181 (81.2%)
Does ward rounds	148 (66.4%)
Admits patients to the hospital	138 (61.9%)
Perform outpatient procedures	123 (55.2%)
A urologist is trained via the following pathway after medical school	
Urology as its own residency program	108 (48.4%)
General surgery residency followed by urology fellowship	56 (25.1%)
Internal medicine residency followed by urology fellowship	52 (23.3%)
Obstetrics & gynecology internship followed by urology residency	07 (03.1%)
Are you considering urology as a career of choice?	
Yes	53 (23.8%)
No	170 (76.2%)
Is Urology a male-dominated specialty	
Yes	146 (65.5%)
No	77 (34.5%)
If yes, did that affect your decision to choose urology as a career choice? (n=146)	
Yes	35 (24.0%)
No	111 (76.0%)

† Variable with multiple responses.

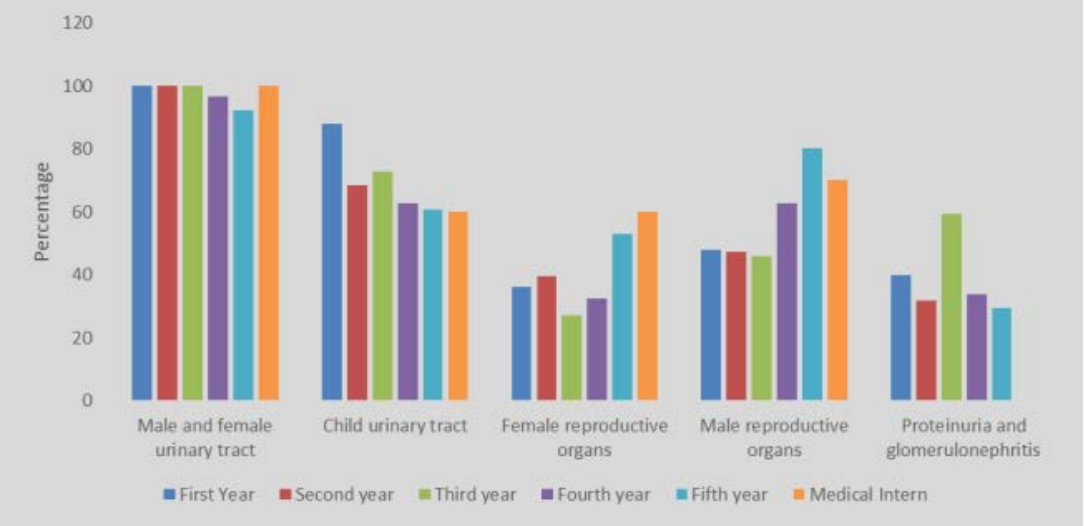

Figure 1. *Medical students' knowledge about the role of urologists in clinical settings.*

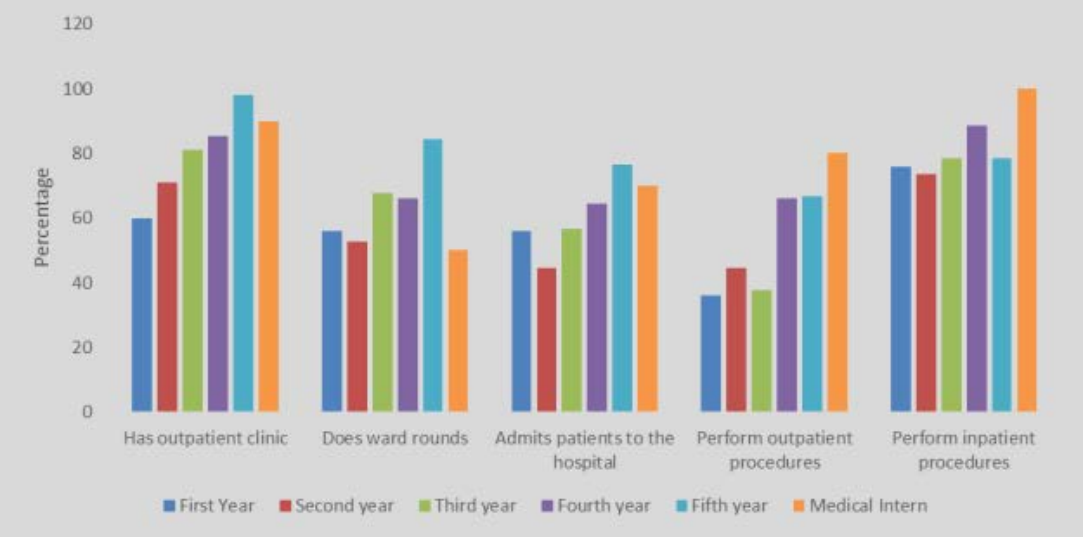

Figure 2. *Medical students' knowledge about the functions of urologists in clinical settings.*

career was 23.8%. Nearly two-thirds (65.5%) agreed that urology is a male-dominated specialty, which affects student's decision to choose this career (24%).

In Figure 1, medical students' knowledge about urologists' role in managing male and female urinary tract infections was not significantly different across the year levels. However, first-year students had better knowledge in terms of urologists' role in child urinary tract, while medical interns showed better in female reproductive organs, the fifth year in male reproductive organs, and medical interns were the most knowledgeable about proteinuria and glomerulonephritis not being involved in urology specialty.

In Figure 2, regarding urologists' functions, medical interns showed better knowledge of urologists' functions, such as inpatient and outpatient procedures, while the fifth year showed better having an outpatient clinic, doing ward rounds, and admitting patients to the hospital.

In Table 3, the most common barrier to not choosing urology was an unattractive lifestyle (65.9%). More than half (54.7%) would like to pursue a medical specialty career. Approximately 28.4% of senior medical students and interns completed a urology clinical rotation during medical school.

Among senior medical students who are considering a career in urology (Table 4), Five students (14.3%) were very comfortable with the digital rectal examination, and the same goes female urinary catheterization. Only two students said that they were very comfortable with male urinary catheterization, while four were comfortable with sexual history taking. In addition, more than half (54.3%) of the senior students were very comfortable with renal ultrasound.

In Table 5, the top 5 most influential factors rated by the medical students when choosing a urology specialty were the availability of technology (mean score: 3.55), integration of medicine and surgery (mean score: 3.54), career opportunities (mean score: 3.44), awareness of urology (mean score: 3.42) and lifestyle after training (mean score: 3.35). The overall mean score of the influential factors was 56.5 (SD 11.6), with 43.9% being considered negative and 56.1% considered to have a positive level.

In Table 6, it was revealed that the prevalence of medical students who considered urology specialty as a future career

Table 3. *Barriers to not choosing urology specialty according to senior medical students (n=170).*

Statement	**N (%)**
What caused you not to pursue a career in urology? †	
Unattractive lifestyle	112 (65.9%)
Lack of knowledge about urology	67 (39.4%)
Social issue	50 (29.4%)
Limited sub-specialties	27 (15.9%)
Demand of surgical residency	22 (12.9%)
Not interested	10 (05.9%)
Which area would you like to pursue your medical career in?	
Medical specialty	93 (54.7%)
Surgical specialty	72 (42.4%)
Undecided	05 (02.9%)
Have you completed a clinical rotation in urology during your medical school training? § **(n=123)**	
Yes, completed by requirement	24 (19.5%)
Yes, completed by choice	11 (08.9%)
Plan to complete in future by requirement	16 (13.0%)
Plan to complete in future by choice	25 (20.3%)
No plan to complete one in the future	47 (38.2%)

†*Variable with multiple responses.*
§*This question have been asked only to senior medical students and interns.*

Table 4. *Comfortability in performing the following procedures among senior medical students who considered a career in urology specialty (n=35).*

Statement	*N (%)*
Digital rectal examination (DRE) †	
• *Very uncomfortable*	*11 (31.4%)*
• *Uncomfortable*	*06 (17.1%)*
Neutral	*10 (28.6%)*
Comfortable	*03 (08.6%)*
Very comfortable	*05 (14.3%)*
Male urinary catheterization	
Very uncomfortable	*07 (20.0%)*
Uncomfortable	*08 (22.9%)*
Neutral	*08 (22.9%)*
Comfortable	*10 (28.6%)*
Very comfortable	*02 (05.7%)*
Female urinary catheterization	
Very uncomfortable	*14 (40.0%)*
Uncomfortable	*08 (22.9%)*
Neutral	*06 (17.1%)*
Comfortable	*02 (05.7%)*
Very comfortable	*05 (14.3%)*
Sexual history taking	
Very uncomfortable	*07 (20.0%)*
Uncomfortable	*05 (14.3%)*
Neutral	*11 (31.4%)*
Comfortable	*08 (22.9%)*
Very comfortable	*04 (11.4%)*
Renal Ultrasound (US)	
Very uncomfortable	*0*
Uncomfortable	*0*
Neutral	*07 (20.0%)*
Comfortable	*09 (25.7%)*
Very comfortable	*19 (54.3%)*

†*Only senior students who completed a clinical rotation in the urology specialty were included in the analysis.*

Table 5. *Influential factors when choosing urology specialty (n=202).*

Statement	**Mean ± SD**
1. Use of technology in urology (ex: Lasers, Robots)	3.55 ± 1.04
2. Integration of medicine & surgery	3.54 ± 1.01
3. Career opportunities	3.44 ± 1.01
4. Awareness of Urology	3.42 ± 1.07
5. Lifestyle after training	3.35 ± 1.06
6. Financial earning potential	3.32 ± 1.06
7. Interaction with urology residents	3.30 ± 1.03
8. Personality fit	3.20 ± 1.26
9. Family or social demands	3.14 ± 1.07
10. Gender distribution in Urology	3.13 ± 1.14
11. Patient relationships	3.13 ± 1.06
12. Self or family member with a urologic problem	3.10 ± 0.95
13. Lifestyle during residency	3.06 ± 1.05
14. Family member in urology	3.01 ± 0.99
15. Influenced by friends or colleagues	2.96 ± 1.02
16. Length of training	2.98 ± 0.97
17. Competitiveness	2.98 ± 0.96
18. Experience in urology clinical rotation	1.91 ± 1.87
Total score	**56.5 ± 11.6**
Level of influence	**N (%)**
□ Negative	98 (43.9%)
□ Positive	125 (56.1%)

Response has a range from "strongly negative influence" coded with 1 to "strongly positive influence" coded with 5.

Table 6. *Relationship between considering urology specialty according to the demographic characteristics, knowledge, and the influence of urology specialty among the medical students (n=223).*

Factor	**Considered urology specialty**		**P-value** [§]
	Yes N (%) (n=53)	**No N (%)** (n=170)	
Gender			
Male	36 (67.9%)	88 (51.8%)	**0.039** **
Female	17 (32.1%)	82 (48.2%)	
Academic year level			
Junior students	19 (35.8%)	81 (47.6%)	0.132
Senior students	34 (64.2%)	89 (52.4%)	
The role of urologist involves managing diseases such as [†]			
Male and female urinary tract	50 (94.3%)	167 (98.2%)	0.126
Child urinary tract	33 (62.3%)	118 (69.4%)	0.331
Female reproductive organs	23 (43.4%)	64 (37.6%)	0.454
Male reproductive organs	35 (66.0%)	99 (58.2%)	0.311
Proteinuria and glomerulonephritis	15 (28.3%)	65 (38.2%)	0.188
Functions of urologist [†]			
Has outpatient clinic	43 (81.1%)	141 (82.9%)	0.762
Does ward rounds	34 (64.2%)	114 (67.1%)	0.696
Admits patients to the hospital	34 (64.2%)	104 (61.2%)	0.697
Perform outpatient procedures	29 (54.7%)	94 (55.3%)	0.941
Perform inpatient procedures/surgeries	40 (75.5%)	141 (82.9%)	0.225
Is Urology a male dominated specialty			
Yes	27 (50.9%)	119 (70.0%)	**0.011** **
No	26 (49.1%)	51 (30.0%)	
Level of influence when choosing urology specialty			
Negative	08 (15.1%)	90 (52.9%)	**<0.001** **
Positive	45 (84.9%)	80 (47.1%)	

§ P-value has been calculated using Chi-square test.
*** Significant at p<0.05 level.*

Table 7. *Relationship between influence when choosing urology specialty according to the basic demographic characteristics and the knowledge about urology specialty (n=223).*

Factor	Influence when choosing urology specialty		P-value [§]
	Negative N (%) (n=98)	Positive N (%) (n=125)	
Gender			
Male	47 (48.0%)	77 (61.6%)	**0.042 ****
Female	51 (52.0%)	48 (38.4%)	
Academic year level			
Junior students	52 (53.1%)	48 (38.4%)	**0.029 ****
Senior students	46 (46.9%)	77 (61.6%)	
The role of urologist involves managing diseases such as [†]			
Male and female urinary tract	95 (96.9%)	122 (97.6%)	0.762
Child urinary tract	67 (68.4%)	84 (67.2%)	0.853
Female reproductive organs	28 (28.6%)	59 (47.2%)	**0.005 ****
Male reproductive organs	54 (55.1%)	80 (64.0%)	0.178
Proteinuria and glomerulonephritis	43 (43.9%)	37 (29.6%)	**0.027 ****
Functions of urologist [†]			
Has outpatient clinic	82 (83.7%)	102 (81.6%)	0.686
Does ward rounds	63 (64.3%)	85 (68.0%)	0.560
Admits patients to the hospital	59 (60.2%)	79 (63.2%)	0.648
Perform outpatient procedures	54 (55.1%)	69 (55.2%)	0.988
Perform inpatient procedures/surgeries	78 (79.6%)	103 (82.4%)	0.594
Is Urology a male-dominated specialty			
• Yes	70 (71.4%)	76 (60.8%)	0.098
• No	28 (28.6%)	49 (39.2%)	

*[§]P-value has been calculated using Chi-square test.,**Significant at p<0.05 level.*

was significantly more common among males (p=0.039), those who believed that urology specialty is a male-dominated specialty (p=0.001) and those who considered as having positive influential levels (p<0.001).

When measuring the relationship between the influence when choosing a urology specialty according to the basic demographic characteristics and the knowledge of medical students about urology specialty (Table 7), it was found that males (p=0.042), senior students (p=0.029) and the knowledge of the role of urologist in managing disease related to female reproductive organs (p=0.005), and not managing diseases such as proteinuria/glomerulonephritis (p=0.027) were more associated with having a positive influencing factors when choosing urology specialty.

Discussion.

This study evaluates the medical students' perception of the urology specialty and determines the influential factors in its consideration as a career of choice. Based on our results, among 223 medical students, 23.5% would consider a career in the urology specialty. This is almost consistent with the study of Reale et al. [13]. According to the report, 30.8% of medical students would pursue a career in urology. They further indicated that the most common reasons for choosing this specialty were "Diverse specialties" and "medical and surgical mixed." Experience in both medical and surgical was also cited as the positive determinant for urology applicants among US urology applicants; this was followed by the diversity of urological procedures and clinical exposure to the field [1]. In our study, however, the top five most influential factors were technology use, combined experience in medicine and surgery, career opportunities, awareness of urology, and lifestyle after training. Although there are some conflicting opinions about these factors, it is clearly seen that the most prominent one was the opportunity for medical and surgical exposure. Future research may consider these factors as a foundation for improving the urological educational curriculum.

It is important to discuss the factors for not choosing a urology specialty as a future career to improve mentorship and enhance interest during educational training. In our study, unattractive lifestyle (65.9%), insufficiency of knowledge (39.4%), and social issue (29.4%) were the top three most cited barriers to choosing a urology specialty. Other cited barriers were limited subspecialties (15.9%), the demand for surgical residency (12.9%), and the least being not interested in urology (5.9%). This is almost mirrored in a study by Binsaleh et al. [7]. Based on their accounts; their respondents cited social barriers (39.8%), unattractive lifestyle (24.4%), and limited specialty (13.1%) as the primary reason for not considering a career in urology. This was concurred by the study of Tshiala et al. [14], wherein medical students mentioned that unattractive lifestyle and lack of knowledge about the specialty were the major reasons to detach themselves from the urology specialty. However, in USA [4] and in Canada [11], the misconception about the specialty was related to the lack of exposure to urology, poor staff, and resident involvement. The authors emphasized the importance of addressing these concerns to change the negative perception of the students about this type of surgical specialty.

Data from this study indicate that male students with a positive level of influence, who were aware that urology is a male-dominated specialty, were more likely to pursue a future career in urology. In contrast, female students were less likely to consider urology. This may be linked to the perception that male dominance is given in this field. Notwithstanding this scenario, studies carried out in Riyadh [8] and London [10] found that female medical students were significantly less likely to consider a career in urology. On the contrary, a study conducted by Kerfoot et al. [1] found no significant correlation between the interest in pursuing a career in urology in relation to gender, academic degree, and medical school nationalities. More investigations are needed to determine the true effect of the students' demographic variables and the consideration for choosing urology as a future specialty.

Moreover, when we assessed students' overall level of influence, we discovered that 56.1% of the students were regarded as having positive influence levels, and the rest were negative (43.9%). The overall mean score was 56.5 out of 90 points. We also noted that male senior medical students with knowledge about the roles of urologists in female reproductive organs, were the factors that positively influence for choosing urology specialty. This is contradicted by the study done in South Africa [14], wherein females have a more positive attitude to urology than males. However, they found no significant differences in attitude between students who rotated in one center against students who rotated in another.

Our subjects seem to have good knowledge about the role of urologists and their functions in clinical settings. 97.3% knew that the male and female urinary tract was the main role of the urologist, followed by the child's urinary tract (67.7%) and male reproductive organs (60.1%). Regarding urologist functions, most of the students were aware that having outpatient clinics (82.5%), performing inpatient surgeries (81.2%), and ward rounds were the urologists' primary functions. Stratifying these results according to academic year levels, we have learned that first-year students exhibited increased knowledge in terms of urologists' role in child urinary tract infection, the fifth year in male reproductive organs, while medical interns showed better perception in female reproductive organs. When analysing urologist functions, medical interns showed better knowledge in terms of inpatient and outpatient procedures, while fifth-year students had better awareness that urologists should have an outpatient clinic, do ward rounds, and admits patients to the hospital.

Although our students knew adequately about urologists' basic roles and functions, this did not reflect their confidence in diagnostic procedures for certain urological diseases. Among senior students and interns who considered a career in urology, only (28.4%) have completed a clinical rotation in urology. In contrast, Binsaleh et al. [7] have indicated that 91% of the students have participated in a urology clerkship with 63.5% of the students recommended more exposure to urology during their clinical years. Another local study by Addar et al. [8], found that 84% of the students have participated in a urology clerkship. These high results were because urology rotations were mandatory in these universities. In 2008, a US study that was directed to urology program directors showed that About 65% of them believing that it was very plausible for a student to graduate without any clinical exposure to urology. [15] For students who participated in Urology rotations, few students were very comfortable (14.3%) in DRE. Senior students were also skeptical about performing male (5.7%) and female (14.3%) urinary catheterizations with similar ratings in taking a sexual history (11.4%). Only performing renal ultrasounds had a good comfortableness rating, wherein 54.3% of the seniors were very comfortable performing this type of procedure. A deficit in performing various conditions related to a urologist was also documented by Mishael et al. [4], including hematuria, recognition of an age-specific abnormality in serum prostate-specific antigen, and overactive bladder. In addition, students were less likely to request a formal neurological evaluation for these conditions. On the contrary, Binsaleh et al. [7] indicated that medical interns demonstrated a better confidence level in performing male catheterization than 5th year students but comfortability in other procedures such as genitourinary examination, DRE, female catheterization, taking sexual history as well as interpreting results of a urinalysis and renal ultrasound were deemed equal between the two groups.

Conclusion.

Even though medical students demonstrated a positive perception of the urology specialty; however, only one-fourth of them would consider this specialty in the future. Male students who believed that urology is a male-dominant specialty were more likely to pursue a career in this field of surgery. Technology, integration of medicine and surgery, and career opportunities are the most influential factors for choosing urology, while unattractive lifestyles, lack of knowledge about urology, and social issues are the deterrence factors. Clinical exposure to urology, proper mentorship, and more bedside teaching may improve medical students' perception of urology as a future career specialty.

Further researches are needed to address more details on the factors that affects the choose of urology as a future carrier in female students and finding a solutions to them as well as correcting misconceptions about the urologists lifestyle.

Statements & Declarations.

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Consent to participate: Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. Kerfoot BP, Nabha KS, Masser BA, et al. What makes a medical student avoid or enter a career in urology? Results of an International Survey. The Journal of Urology. 2005;174:1953-7.

2. American Urological Association - Why Urology? Internet. Auanet.org. cited 5 September 2017. Available from: http://www.auanet.org/about/what-is-urology.cfm,2017.

3. Miller DC, Saigal CS, Litwin MS. The Demographic Burden of Urologic Diseases in America. Urologic Clinics of North America. 2009;36:11-27.

4. Mishail A, Shahsavari M, Kim J, et al. Deficits in Urological Knowledge Among Medical Students and Primary Care Providers: Potential for Impact on Urological Care. The Journal of Urology. 2008;180:2140-2147.
5. Loughlin KR. The Current Status of Medical Student Urological Education in the United States. The Journal of Urology. 2008;179:1087-1091.
6. Kerfoot BP, Turek PJ. What Every Graduating Medical Student Should Know About Urology: The Stakeholder Viewpoint. Urology. 2008;71:549-53.
7. Binsaleh S, Al-Jasser A, Almannie R, et al. Attitude and perception of urology by medical students at the end of their medical school: An appraisal from Saudi Arabia. Urology Annals. 2015;7:211.
8. Addar AM, Mosa MAB, Alothman AS, et al. The perception and competency of undergraduates in urology: Is the clinical exposure necessary? Urology Annals. 2020;12:220.
9. Kerfoot BP, Masser BA, DeWolf WC. The Continued Decline of Formal Urological Education of Medical Students in the United States: Does it Matter? The Journal of Urology. 2006;175:2243-8.
10. Jones P, Rai BP, Qazi HAR, et al. Perception, career choice and self-efficacy of UK medical students and junior doctors in urology. Canadian Urological Association Journal. 2015;9:E573.
11. Kim S, Farrokhyar F, Braga LH. Survey on the perception of urology as a specialty by medical students. Canadian Urological Association Journal. 2016;10:349.
12. Whiles BB, Thompson JA, Griebling TL, et al. Perception, knowledge, and interest of urologic surgery: a medical student survey. BMC Med Educ. 2019;19:351.
13. Reale S, Orecchia L, Ippoliti S, et al. Is Urology a gender-biased career choice? A survey-based study of the Italian medical students' perception of specialties. Frontiers in Surgery. 2022:1056.
14. Tshiala AK, Haffejee M, Nel M. Attitude and perception of urology by fifth-year (GEMPIII) students at the end of their mixed block rotation at Wits Medical School. African Journal of Urology. 2020;26:1-6.
15. Loughlin KR. The current status of medical student urological education in the United States. J Urol. 2008;179:1087-1090.