

Assessment of Urological Knowledge and Practice Among Emergency and Primary Health Care Physicians

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Abstract

Background: Emergency and primary health care (PHC) are critical settings for addressing urological health problems and related emerging complaints. Therefore, physicians in these fields must possess the knowledge, skills, and competencies to diagnose and manage common urologic presentations accurately. This study aimed to evaluate the general level of knowledge about common urological problems among PHC and emergency room physicians in Qassim province, Saudi Arabia.

Methods and Results: A cross-sectional questionnaire-based study included 82 PHC and emergency room physicians. The study was mainly a descriptive study utilizing non-probability convenience sampling of all participants who completed online or hardcopy surveys. A self-administered questionnaire in the form of "Microsoft Forms" was distributed to all physicians.

As for the urological knowledge, it was found that 40.2% of the participants knew correctly that prostate-specific antigen (PSA) screening should be performed on a 60-year-old man who presents with urinary retention. In addition, 40.2% knew that patients should be referred for further urological evaluation of hematuria if they have a single episode of gross hematuria, a finding of microhematuria on 3 successive urine analyses, or when persistent microhematuria after treatment with antibiotics is present. Only 23.2% knew that when inserting a Foley catheter in a man, it is appropriate to inflate the balloon after the catheter has been inserted at its full length or when urine return is noted. More than half (58.5%) knew that patients should be referred to a urologist if they have a nodular prostate. Only 24.4% knew that the best test to evaluate for the presence of a kidney stone is a CT abdomen/pelvis, and 63.4% correctly defined microscopic hematuria.

As for the participants' urological skills, 70.7% agreed that they were proficient in performing a digital rectal examination and 76.9% said they performed male genitourinary examinations; 87.8% agreed that they are proficient in taking sexual history, 23.2% performed digital rectal examination >20 times, and 31.7% performed male genitourinary examination >20 times; 79.3% agreed they were proficient in performing male urinary catheterization, while 79.3% were proficient in performing female urinary catheterization. Only 24.4% were proficient in the insertion of a suprapubic catheter. As for the practice frequency, 37.8% performed male urinary catheterization more than 20 times, while only 12.2% performed it for females at the same frequency.

Conclusion: The general knowledge of emergency and PHC physicians in the Qassim region appears insufficient. The study identified significant gaps in urological knowledge among these physicians, highlighting the need for adequate training programs to bridge these gaps. (*International Journal of Biomedicine*. 2024;14(4):607-614.)

Keywords: primary health care • emergency room • urological knowledge • urological practice

For citation: Alharbi B, Alwashmi E, Al-Harbi FA, Alharbi AH, Alhuraisi A, Almansour K, Alwatban W, Alqazlan AS, Altwairgi AK. Assessment of Urological Knowledge and Practice Among Emergency and Primary Health Care Physicians. *International Journal of Biomedicine*. 2024;14(4):607-614. doi:10.21103/Article14(4)_OA12

Abbreviations

ER, emergency room; PHC, primary health care; PSA, prostate-specific antigen; RBCs, red blood cells.

Introduction

For most patients with urologic problems, the physician in their primary care or emergency department is the initial point of contact. Because of this, the first evaluation these physicians perform is essential in deciding on further diagnostic and treatment procedures. All doctors, but especially those working in emergency and primary care settings, must be able to identify common urological issues generically. Physicians can minimize unnecessary visits and overtreatment while providing correct diagnoses and recommendations by carefully evaluating patients and following key practice principles.¹

Urinary retention, renal colic, testicular torsion, frank hematuria, and Fournier's gangrene are examples of acute urological symptoms that require prompt identification and specialist referral. Prompt identification can enhance therapeutic outcomes and avert consequences. The quality of life of patients is significantly impacted by numerous chronic urological illnesses in addition to acute problems. To effectively manage a condition, individuals may need to make lifestyle changes and/or take oral medications at home with the help of their healthcare specialists.² Considering this, family and emergency room (ER) doctors should know the causes, evaluations, and treatments of typical urological issues. This will lessen the strain on healthcare facilities and resources in these contexts while facilitating early diagnostic and management decisions that may result in better patient outcomes.

It has been proposed that PHC employees and ER physicians lack the minimum knowledge and abilities to manage urological diseases.³⁻⁶ This deficit may lead to incorrect resource utilization through misdiagnosis, treatment delays, and mismanagement. Furthermore, a survey of PHC physicians in the western region of Saudi Arabia revealed a lack of understanding of frequent urological presentations.⁷

Over the past ten years, urology has become less and less of a subject taught to medical students worldwide. Despite notable progress and expansion in urological care, there hasn't been a commensurate rise in urologic education in some countries.^{8,9} Learning objectives of undergraduate urology rotations in Saudi Arabia are unclear, and a lack of case diversity and poor performance evaluation may result in short courses or insufficient clinical exposure.⁵

This study aimed to evaluate the general level of knowledge about common urological problems among PHC and ER physicians in Qassim province, Saudi Arabia.

Materials and Methods

A cross-sectional questionnaire-based study was done from July to September 2024. Inclusion criteria were PHC and ER physicians (GPs, residents, specialists, or consultants). Exclusion criteria were physicians who specialized in areas other than PHC and ER, physicians from other regions, and those temporarily staying in Qassim.

The study was mainly a descriptive study utilizing non-probability convenience sampling of all participants who completed online or hardcopy surveys.

A self-administered questionnaire in the form of "Microsoft Forms" was distributed to all physicians within reach, program directors, and medical directors to be filled by PHC and ER physicians. The survey collected demographic characteristics and assessed the participants' urologic knowledge and skills.

The study was approved by the Qassim Region Research Ethics Committee (QREC).

Statistical analysis was performed using statistical software package SPSS version 26.0 (SPSS Inc, Armonk, NY: IBM Corp). Baseline characteristics were summarized as frequencies and percentages for categorical variables and as mean \pm standard deviation (SD) for continuous variables. Group comparisons concerning categorical variables were performed using the chi-square test. *P*-value <0.05 was considered statistically significant.

Results

Out of 82 emergency and PHC physicians enrolled, 85.4% were females, 70.7% had a Saudi nationality. The mean duration since graduation was 9.42 ± 8 years; 35.4% were family physicians, and 37.8% were service residents/general practitioners. Of those participants, 58.5% had a clinical urology rotation during medical school, and 19.5% had a urology elective in the internship year (Table 1).

As for the urological knowledge (Table 2), it was found that 40.2% of the participants knew correctly that prostate-specific antigen (PSA) screening should be performed on a 60-year-old man who presents with urinary retention. In addition, 40.2% knew that patients should be referred for further urological evaluation of hematuria if they have a single episode of gross hematuria, a finding of microhematuria (≥ 3 red blood cells per high-power field) on 3 successive urine analyses, or when persistent microhematuria after treatment with antibiotics is present. Only 23.2% knew that when inserting a Foley catheter in a man, it is appropriate to inflate the balloon after the catheter has been inserted at its full length or when urine return is noted. More than half (58.5%) knew that patients should be referred to a urologist if they have a nodular prostate. Only 24.4% knew that the best test to evaluate for the presence of a kidney stone is a CT abdomen/pelvis, and 63.4% correctly defined microscopic hematuria.

Most participants (70.7%) reported that when a 52-year-old female patient is found to have microscopic hematuria, they would repeat urinalysis (Table 3). As for gross hematuria, 52.4% would obtain imaging studies. More than half of physicians (57.3%) reported that the routinely recommended age for PSA testing is 60-69 years. As for a 65-year-old female complaining of several months of urinary urgency and frequency, the majority (87.8%) would recommend urinalysis.

As for the most important areas in urology to teach in a medical school and family medicine curriculum, the participants reported urinary tract infections (90.2%), hematuria (81.7%), urinary calculus disease (62.2%) and lower urinary tract symptoms (benign prostatic hyperplasia) (51.2%) (Figure 1).

Table 1.

Distribution of studied participants according to their demographic characteristics, clinical urology rotation during medical school, urology elective in the internship year, and work-related data (n=82)

Variable	n (%)
Gender	
Female	12 (14.6)
Male	70 (85.4)
Nationality	
Non-Saudi	24 (29.3)
Saudi	58 (70.7)
Residency	
Al Badayea	7 (8.5)
Al Bukayriyah	15 (18.3)
Al Mithnab	1 (1.2)
Al Rass	8 (9.8)
Buraidah	38 (46.3)
Unaiyzah	11 (13.4)
Uyon Al Jiwa	2 (2.4)
Duration since graduation (years)	9.42 ± 8
Specialty	
ER physician	25 (30.5)
Family physician	29 (35.4)
General practitioner	28 (34.1)
What is your title?	
Consultant	14 (17.1)
R1	8 (9.8)
R3	1 (1.2)
Service resident	12 (14.6)
Service resident / General practitioner	31 (37.8)
Specialist	16 (19.5)
Did you do a clinical urology rotation during medical school?	
No	34 (41.5)
Yes	48 (58.5)
Did you do a urology elective in the internship year?	
No	66 (80.5)
Yes	16 (19.5)

The study revealed that the resident physicians (28.8%) were more likely to recommend sending urine cultures for a case of a 52-year-old female patient with microscopic hematuria. At the same time, consultants (78.6%) were more likely to recommend obtaining imaging studies for patients with microscopic hematuria (Table 4).

In response to the statement that digital rectal examination of the prostate is not necessary if the physician is ordering a serum PSA, 42.7% of the participants disagreed. At the same time, among consultants there was a significantly higher percentage of those who strongly disagreed with this statement (Figures 2 and 3).

Table 2.

Urological knowledge of study participants (n=82)

Questionnaire questions	n (%)
PSA screening should be performed on which of the following patients?	
A 25-year-old man with a history of prostatitis	1 (1.2)
A 50-year-old man with no family history of prostate cancer	23 (28)
A 60-year-old man who presents with urinary retention	33 (40.2)
A 79-year-old man with a history of BPH	25 (30.5)
For which of the following conditions would you refer a patient for further urological evaluation of hematuria?	
A. A single episode of gross hematuria	3 (3.7)
B. A finding of microhematuria on 3 successive urine analyses	14 (17.1)
C. Persistent microhematuria after treatment with antibiotics	18 (22)
A & C	14 (17.1)
All of the above	33 (40.2)
When inserting a Foley catheter in a man, when is it appropriate to inflate the balloon?	
A. After the catheter has been inserted into its full-length	11 (13.4)
B. After resistance is felt and the catheter cannot be advanced any further	15 (18.3)
C. When urine return is noted	26 (31.7)
A & B	11 (13.4)
A & C	19 (23.2)
For which of the following findings on rectal exam would you refer a patient to a urologist? (choose the best answer)	
An asymmetric prostate	14 (17.1)
A firm prostate	9 (11)
A large prostate	11 (13.4)
A nodular prostate	48 (58.5)
The best test to evaluate for the presence of a kidney stone is:	
CT abdomen without contrast	44 (53.7)
CT abdomen / pelvis	20 (24.4)
CT abdomen/ pelvis with IV contrast	11 (13.4)
Renal/ bladder ultrasound	3 (3.7)
X Ray KUB	4 (4.9)
Please complete the following statement: I define microscopic hematuria as (Check only 1 response):	
I do not know how to define microscopic hematuria	4 (4.9)
Positive urine dipstick for blood	6 (7.3)
The presence of 1 or more RBC/HPF	3 (3.7)
The presence of 3 or more RBC/HPF	52 (63.4)
The presence of 5 or more RBC/HPF	17 (20.7)

Table 3.

Urological knowledge of the study participants based on case scenarios

Questionnaire questions	n (%)
Assume you are seeing a real patient. A 52-year-old female patient is found to have microscopic hematuria. Please check which recommendations you would routinely make for this patient. You may check more than one answer:	
Repeat urinalysis	58 (70.7)
Urologist consult	29 (35.4)
Send urine culture	17 (20.7)
Obtain imaging studies	35 (42.7)
Prescribe Antibiotics	10 (12.2)
Send urine cytology	17 (20.7)
Assume you are seeing a real patient. A 63-year-old female patient has an episode of gross hematuria. Please check which recommendations you would routinely make for this patient. You may check more than one answer:	
Repeat urinalysis	31 (37.8)
Urologist consult	64 (78)
Send urine culture	18 (22)
Obtain imaging studies	43 (52.4)
Prescribe antibiotics	7 (8.5)
Send urine cytology	30 (36.6)
For what age group(s) do you routinely recommend PSA testing? You may check more than one answer:	
Below 40 years	1 (1.2)
40-49 years	24 (29.3)
50-59 years	4 (4.9)
60-69 years	47 (57.3)
70-74 years	25 (30.5)
75-79 years	20 (24.4)
80 years or older	17 (20.7)
Assume you are seeing a real patient. A 65-year-old healthy female sees you for the first time today. She is complaining of several months of urinary urgency and frequency. Which of the following would you routinely recommend for this patient at the initial visit? You may check more than one answer:	
Urinalysis	72 (87.8)
Urine culture	38 (46.3)
Urine cytology	9 (11)
Renal ultrasound	26 (31.7)
Overactive bladder medication	12 (14.6)
Gynecologist consult	14 (17.1)
Urologist consult	18 (22)
What areas in urology do you feel are most important to teach in a medical school and family medicine curriculum?	
Urinary calculus disease	51 (62.2)
Hematuria	67 (81.7)

Table 3 (continued).

Urological knowledge of the study participants based on case scenarios

Questionnaire questions	n (%)
What areas in urology do you feel are most important to teach in a medical school and family medicine curriculum?	
Urinary tract infections	74 (90.2)
Lower urinary tract symptoms (benign prostatic hyperplasia)	42 (51.2)
Lower urinary tract symptoms (overactive bladder)	10 (12.2)
Urinary incontinence	22 (26.8)
Prostate cancer: PSA screening and diagnosis.	24 (29.3)
Prostate cancer: treatment	2 (2.4)
Erectile dysfunction	14 (17.1)
Acute scrotal pain and swelling	20 (24.4)
Pediatric urology	5 (6.1)
Urinary Retention	21 (25.6)
Penile lesions	1 (1.2)
Kidney lesions	14 (17.1)
Bladder cancer	6 (7.3)
Male infertility	3 (3.7)
Contraception: Vasectomy	1 (1.2)
Obstructive renal failure	1 (1.2)
Testes cancer	2 (2.4)
Chronic prostatitis: chronic pelvic pain syndrome	1 (1.2)
Genitourinary trauma	7 (8.5)

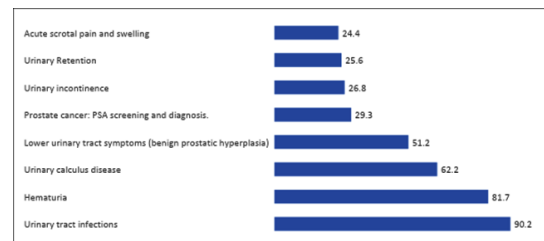


Fig. 1. The most important areas in urology to teach in a medical school and family medicine curriculum.

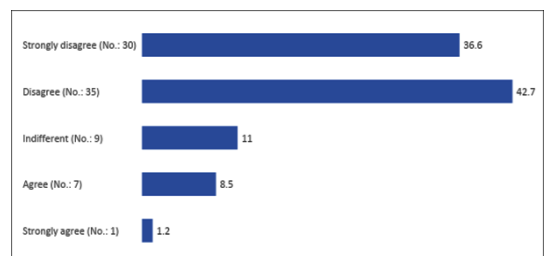


Fig. 2. The statement that digital rectal examination of the prostate is not necessary if the physician is ordering a serum PSA

Table 4.

Relationship between the participant title and recommendations for microscopic hematuria, gross hematuria, and recommend age for routine PSA testing (n=82).

Questionnaire questions	Title			χ^2	P-value
	Consultant n (%)	Specialist n (%)	Resident n (%)		
Assume you are seeing a real patient. A 52-year-old female patient is found to have microscopic hematuria. Please check which recommendations you would routinely make for this patient. You may check more than one answer:					
Repeat urinalysis	12 (85.7)	13 (81.3)	33 (63.5)	0.37	0.15
Urologist consult	5 (35.7)	5 (31.3)	19 (36.5)	0.15	0.927
Send urine culture	2 (14.3)	0 (0.0)	15 (28.8)	6.62	0.036
Obtain imaging studies	11 (78.6)	4 (25)	20 (38.5)	9.79	0.007
Prescribe Antibiotics	0 (0.0)	4 (25)	6 (11.5)	4.41	0.11
Send urine cytology	2 (14.3)	4 (25)	11 (21.2)	0.53	9.765
Assume you are seeing a real patient. A 63-year-old female patient has an episode of gross hematuria. Please check which recommendations you would routinely make for this patient. You may check more than one answer:					
Repeat urinalysis	5 (35.7)	7 (43.8)	19 (36.5)	0.3	0.86
Urologist consult	12 (85.7)	10 (62.5)	42 (80.8)	2.96	0.227
Send urine culture	2 (14.3)	1 (6.3)	15 (28.8)	4.22	0.121
Obtain imaging studies	11 (78.6)	6 (37.5)	26 (50)	5.38	0.068
Prescribe antibiotics	0 (0.0)	1 (6.3)	6 (11.5)	2.01	0.365
Send urine cytology	8 (57.1)	5 (31.3)	17 (32.7)	3.08	0.214
For what age group(s) do you routinely recommend PSA testing? You may check more than one answer:					
Below 40 years	0 (0.0)	0 (0.0)	1 (1.9)	0.58	0.747
40-49 years	4 (28.6)	8 (50)	12 (23.1)	4.28	0.117
50-59 years	3 (21.4)	1 (6.3)	0 (0.0)	10.99	0.004
60-69 years	6 (42.9)	6 (37.5)	35 (67.3)	5.88	0.053
70-74 years	5 (35.7)	4 (25)	16 (30.8)	0.41	0.815
75-79 years	5 (35.7)	4 (25)	11 (21.1)	1.27	0.529
80 years or older	5 (35.7)	3 (18.8)	9 (17.3)	2.32	0.313

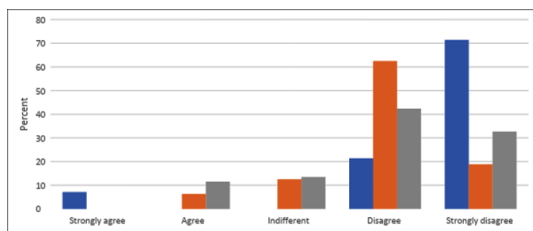


Fig.3. Relationship between participants' titles and agreement that digital rectal examination of the prostate is not necessary if the physician is ordering a serum PSA ($\chi^2 = 17.77$, P-value = 0.023).

As for the participants' urological skills (Table 5), 70.7% agreed that they were proficient in performing a digital rectal examination and 76.9% said they performed male genitourinary examinations; 87.8% agreed that they are proficient in taking

sexual history, 23.2% performed digital rectal examination >20 times, and 31.7% performed male genitourinary examination >20 times. During medical training, 67.1%, 62.2%, and 70.8% of the participants agreed to receive sufficient clinical training in performing digital rectal examination and male genitourinary examination, as well as taking sexual history, respectively. As for interpreting investigations, 96.3% agreed that they were proficient at interpreting urine analysis, 47.6% at interpreting semen analysis, 67% at interpreting CT-KUB, and 63.4% were proficient at interpreting renal ultrasound. As for urological practice, 79.3% agreed they were proficient in performing male urinary catheterization, while 79.3% were proficient in performing female urinary catheterization. Only 24.4% were proficient in the insertion of a suprapubic catheter. As for the practice frequency, 37.8% performed male urinary catheterization more than 20 times, while only 12.2% performed it for females at the same frequency.

Table 5.

Urological skills of the study participants (n=82)

Questionnaire questions	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
	n (%)	n (%)	n (%)	n (%)	n (%)
Please describe your agreement with the following statement: "I am proficient in performing":					
Digital rectal examination	20 (24.4)	38 (46.3)	16 (19.5)	7 (8.5)	1 (1.2)
Male genitourinary examination	14 (17.1)	49 (59.8)	15 (18.3)	4 (4.9)	0 (0.0)
Sexual history	32 (39.0)	40 (48.8)	7 (8.5)	3 (3.7)	0 (0.0)
	Performance frequency				
Approximately how many of the following have you performed? (times)	0	(1-5)	(6-10)	(11-20)	>20
Digital rectal examination	14 (17.1)	33 (40.2)	12 (14.6)	4 (4.9)	19 (23.2)
Male genitourinary examination	13 (15.9)	27 (32.9)	13 (15.9)	3 (3.7)	26 (31.7)
Sexual history	7 (8.5)	26 (31.7)	6 (7.3)	8 (9.8)	35 (42.7)
During my medical training, I received sufficient clinical training in performing:	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
Digital rectal examination	24 (29.3)	31 (37.8)	15 (18.3)	10 (12.2)	2 (2.4)
Male genitourinary examination	15 (18.3)	36 (43.9)	20 (24.4)	7 (8.5)	4 (4.9)
Sexual history	24 (29.3)	34 (41.5)	16 (19.5)	5 (6.1)	3 (3.7)
Please describe your agreement with the following statement. "I am proficient at interpreting the following investigations":	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
Urine analysis	48 (58.5)	31 (37.8)	3 (3.7)	0 (0.0)	0 (0.0)
Semen analysis	13 (15.9)	26 (31.7)	20 (24.4)	17 (20.7)	6 (7.3)
CT KUB	28 (34.1)	27 (32.9)	17 (20.7)	9 (11)	1 (1.2)
Renal ultrasound	20 (24.4)	32 (39)	20 (24.4)	9 (11)	1 (1.2)
Please describe your agreement with the following statement: "I am proficient in performing."	Strongly agree	Agree	Indifferent	Disagree	Strongly disagree
Urinary catheterization (male)	46 (56.1)	19 (23.2)	9 (11)	7 (8.5)	1 (1.2)
Urinary catheterization (female)	25 (30.5)	15 (18.3)	22 (26.8)	13 (15.9)	7 (8.5)
Insertion of suprapubic catheter	10 (12.2)	10 (12.2)	23 (28)	15 (18.3)	24 (29.3)
	Performance frequency				
How many of the following procedures have you performed? (times)	0	(1-5)	(6-10)	(11-20)	>20
Urinary catheterization (male)	17 (20.7)	20 (24.4)	7 (8.5)	7 (8.5)	31 (37.8)
Urinary catheterization (female)	42 (51.2)	22 (26.8)	6 (7.3)	2 (2.4)	10 (12.2)

Discussion

Although emergency and PHC physicians play a crucial role in diagnosing and managing urological health problems, a substantial knowledge gap exists. Many physicians in these settings receive limited training in urology, which hinders their ability to recognize and appropriately manage urological conditions. This lack of specialized knowledge can result

in misdiagnoses, delayed treatment, and adverse patient outcomes.^{10,11}

The current study showed insufficient urological knowledge among the participating physicians, with less than half demonstrating knowledge of basic diagnostic procedures, urological evaluations, and diagnosis of common urological conditions. Less than half of the participants, 33(40.2%), knew the appropriate age for performing PSA screening and related

patient presentations. A similar proportion were aware of the conditions requiring referral for further urological evaluation of hematuria.

Surprisingly, only 19(23.2%) participants knew the correct method for inserting a Foley catheter through the urethra into the bladder, including the appropriate insertion length and when to inflate the balloon in men. These findings are consistent with other studies by Cohen et al.¹² and Liu et al.,¹³ which reported inadequate catheterization skills and knowledge among non-urologist physicians. Furthermore, nearly one-quarter of the participants (24.4%) recognized that the best test to evaluate for a kidney stone is a CT scan of the abdomen/pelvis. These studies point to a lack of formal training and exposure to catheterization techniques in many medical curricula, especially for non-specialists.

A notable proportion of the participants demonstrated considerable urological knowledge, with more than half (58.5%) recognizing that a patient should be referred to a urologist for a nodular prostate. This suggests a reasonable understanding of the importance of specialist care in cases where there are potential malignancies or other prostate-related concerns, such as benign prostatic hyperplasia. Additionally, a majority (63.4%) correctly defined microscopic hematuria as the presence of three or more red blood cells per high-power field. In contrast, a study by Barayan and Nassir,¹⁴ conducted in Jeddah, Saudi Arabia, revealed that a significant portion of participants lacked awareness of key urological issues, including the recognition of conditions such as microscopic hematuria. For example, 37% of participants were unaware of its definition and implications.

The participants demonstrated knowledge by reporting correct recommendations for patients with various conditions. These responses show a strong understanding of diagnostic protocols, particularly distinguishing between benign and more serious urological conditions.

The study revealed that the resident physicians were more likely to recommend sending urine cultures for a case of a 52-year-old female patient with microscopic hematuria. At the same time, consultants were more likely to recommend obtaining imaging studies for patients with microscopic hematuria. Furthermore, it was observed that consultant physicians were more likely to recommend PSA testing for patients aged 50-59 years, with the majority agreeing on the necessity of digital rectal examination of the prostate even though the physician ordered a serum PSA. This observation was reinforced by other studies that stressed the importance of digital rectal examination when obtaining a PSA.^{15,16}

The most frequent clinical training received by most physicians included taking a sexual history, digital rectal examination, and male genitourinary examination. The most common urological practice was male urinary catheterization, with a considerable proportion of 37.8% having performed the practice more than 20 times. These findings are encouraging, as they reflect the participants' exposure to fundamental aspects of urological care, where taking a comprehensive sexual history and performing digital rectal examinations are essential skills in diagnosing a wide range of urological conditions.¹⁷

The main limitations of this study include the use of a cross-sectional study design, which can identify relationships between attributes but cannot establish causalities. Additionally, the reliance on self-administered questionnaires may introduce bias, as participants could incorrectly record their answers without verification. Furthermore, since the study was conducted in a single region, the findings may not be generalizable to the other healthcare settings of Saudi Arabia.

Conclusion

The general knowledge of emergency and PHC physicians in the Qassim region appears insufficient. A notable proportion of physicians lacked knowledge regarding the appropriate method for inserting a Foley catheter in male patients. The study identified significant gaps in urological knowledge among these physicians, highlighting the need for adequate training programs to bridge these gaps. Medical training institutes must prioritize urological education to enhance future physicians' knowledge and skills, ultimately improving patient outcomes.

Competing Interests

The authors declare that they have no competing interests.

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