

BACTERIAL PROFILE AND ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF URINARY TRACT INFECTION IN PREGNANT WOMEN AT THQ SWABINilofar¹, Nadia Rani², Hina Safdar³, Arifa⁴, Alina Khalid⁵**How to cite this article**

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ABSTRACT**OBJECTIVES**

This study aimed to determine bacterial isolates, antimicrobial susceptibility patterns, and selected factors associated with culture-positive urinary tract infection among pregnant women presenting at Tehsil Headquarters Hospital, Swabi.

METHODOLOGY

This descriptive cross-sectional study included 102 pregnant women with suspected urinary tract infection from May to November 2023 using non-probability consecutive sampling. Clinical and obstetric information, urinalysis findings, and recent antibiotic exposure were recorded. Clean-catch midstream urine specimens were processed for culture, bacterial identification, and antimicrobial susceptibility testing in the laboratory. Associations with culture positivity were evaluated using chi-square or Fisher's exact tests, followed by binary logistic regression.

RESULTS

The mean age was 28.10 ± 6.00 years. Significant bacterial growth was detected in 78 (76.5%) specimens. Escherichia coli was the predominant isolate, accounting for 36 (46.2%) culture-positive samples, followed by Klebsiella pneumoniae in 17 (21.8%) and Staphylococcus saprophyticus in 8 (10.3%). Overall susceptibility was highest to fosfomycin (89.7%), nitrofurantoin (85.9%), and amikacin (85.9%), whereas resistance was highest to ampicillin (83.3%) and cotrimoxazole (69.2%). On multivariable analysis, more than five pus cells per high-power field remained independently associated with culture-positive infection (AOR 3.262, 95% CI 1.073–9.916; $p=0.037$).

CONCLUSION

Culture-positive urinary tract infection was common in this selected antenatal population, with E. coli predominating. High resistance to commonly used agents supports culture-guided treatment, antimicrobial stewardship, and periodic local antibiogram surveillance, while pregnancy-specific safety considerations should guide final antibiotic selection in routine antenatal care settings.

KEYWORDS: Pregnancy, Urinary Tract Infection, Bacterial Profile, Antimicrobial Susceptibility, Escherichia Coli, Fosfomycin, Nitrofurantoin

INTRODUCTION

Urinary tract infection (UTI) is a common bacterial infection during pregnancy and may range from asymptomatic bacteriuria to cystitis and pyelonephritis. Pregnancy-related anatomical and physiological changes-including ureteric dilatation, urinary stasis, altered bladder emptying, and changes in immune response-can increase susceptibility to bacterial colonization and ascending infection.^{1,2,3,4} Untreated or inadequately treated infection is clinically important because it may progress to pyelonephritis and contribute to maternal morbidity and adverse pregnancy outcomes. Clinical diagnosis can be challenging because urinary frequency and mild lower-abdominal

discomfort may occur in normal pregnancy, while some women with significant bacteriuria have few or no symptoms. Urinalysis, including pyuria, nitrite, and leukocyte esterase, can support clinical assessment, but urine culture remains the confirmatory method for identifying significant bacterial growth and provides the basis for organism-directed antimicrobial therapy.^{1,3,4} This is particularly important in pregnancy, where unnecessary exposure to ineffective drugs should be avoided. The bacterial profile of UTI varies by geography, patient population, healthcare setting, and prior antibiotic exposure. Enteric Gram-negative organisms predominate in most series, with Escherichia coli generally the leading isolate, followed by Klebsiella, Proteus, and other uropathogens; Gram-

positive organisms such as *Staphylococcus saprophyticus* and *Enterococcus* species may also occur.^{5,6,7} Because the distribution of organisms and resistance phenotypes changes over time, local microbiological surveillance is necessary to support rational empirical therapy while culture results are pending. Antimicrobial resistance further complicates management. Repeated empirical prescribing, incomplete courses, non-prescription antibiotic use, and community exposure can reduce the activity of commonly used agents. Studies in pregnant and reproductive-age women have reported substantial resistance to older drugs such as ampicillin and cotrimoxazole, whereas nitrofurantoin and fosfomycin often retain useful in vitro activity for lower urinary tract isolates.^{8,9,10} Nevertheless, susceptibility alone does not determine treatment in pregnancy; drug safety, gestational age, renal function, allergy history, and whether infection is confined to the lower tract must also be considered. District-level hospitals serve large urban and rural antenatal populations but may have less published resistance surveillance than tertiary referral centres. Local data from THQ Swabi were therefore needed to characterize the organisms encountered in pregnant women with suspected UTI and their antimicrobial susceptibility patterns. The present study also examined selected clinical, obstetric, and urinalysis factors associated with culture positivity, with the aim of supporting culture-guided management and antimicrobial stewardship in routine antenatal care.

METHODOLOGY

This descriptive cross-sectional study was conducted at Tehsil Headquarters Hospital, Swabi, in collaboration with the Department of Pathology, MTI-GKMC/BKMC Swabi, Khyber Pakhtunkhwa, from May to November 2023. Ethical approval was granted by the Office of the Chairman, Ethical Review Board, MTI-GKMC/BKMC Swabi (F.No. 2258/Ethical Board/GKMC; 20 May 2023). Written informed consent was obtained, and participant information was kept confidential. The required sample was estimated using the WHO single-population proportion formula with a 95% confidence level, an anticipated prevalence of 50% because no setting-specific estimate was available, and a 10% margin of error. The minimum calculated sample was 96; allowing approximately 5% for incomplete records or sample loss produced a final target of 102. Non-probability consecutive sampling was used. Pregnant women in any trimester with symptoms suggestive of urinary tract infection or suspected asymptomatic bacteriuria were eligible. Women with contaminated specimens, known chronic renal disease, incomplete records, or refusal to provide urine were excluded.

Recent antibiotic exposure was retained as a measured variable rather than an exclusion criterion. A structured proforma recorded age, residence, trimester, gravidity, previous urinary tract infection, recent antibiotic exposure, dysuria, urinary frequency, urgency, lower abdominal pain, fever, flank pain, and relevant urinalysis findings including pus cells, red blood cells, nitrite, and leukocyte esterase. Clean-catch midstream urine was collected in sterile wide-mouthed containers after patient instruction and transferred promptly to the microbiology laboratory. Culture-positive urinary tract infection was defined in the submitted protocol as significant bacterial growth. Bacterial identification used colony morphology, Gram staining, and relevant biochemical tests. The source document does not state the quantitative culture threshold, culture media/incubation conditions, or complete identification workflow; these should be added from laboratory records before publication. Antimicrobial susceptibility testing was performed on culture-positive isolates using the laboratory's standard procedures. Tested agents were fosfomycin, nitrofurantoin, amikacin, meropenem, ceftriaxone, amoxicillin-clavulanate, cefixime, gentamicin, ciprofloxacin, cotrimoxazole, and ampicillin. The submitted manuscript records susceptibility as sensitive or resistant but does not specify the disk-diffusion/automated method, CLSI or EUCAST interpretive standard and version, handling of intermediate results, or quality-control strains. These methodological details require author/laboratory verification. Data were analyzed using IBM SPSS Statistics version 26.

RESULTS

A total of 102 pregnant women were included. The mean age was 28.10 ± 6.00 years; 67 (65.7%) participants were from rural areas, 46 (45.1%) were in the second trimester, and 63 (61.8%) were multigravida. Significant bacterial growth was found in 78 (76.5%) specimens. *Escherichia coli* was the most frequent isolate, followed by *Klebsiella pneumoniae* and *Staphylococcus saprophyticus*. Overall susceptibility was highest to fosfomycin, nitrofurantoin, and amikacin, while resistance was highest to ampicillin and cotrimoxazole. Among culture-positive samples, *E. coli* accounted for 46.2%, *K. pneumoniae* 21.8%, and *S. saprophyticus* 10.3%, with less frequent *Proteus*, *Enterococcus*, *Pseudomonas*, and *S. aureus* isolates. Fosfomycin was sensitive in 70/78 isolates (89.7%); nitrofurantoin and amikacin were each sensitive in 67/78 (85.9%). Ampicillin was resistant in 65/78 (83.3%) and cotrimoxazole in 54/78 (69.2%). On bivariate testing, nitrite positivity and >5 pus cells/HPF were associated with culture positivity. In multivariable

analysis, >5 pus cells/HPF remained independently associated with culture-positive infection (AOR 3.262, 95% CI 1.073–9.916; $p=0.037$), whereas previous UTI, recent antibiotic use, and nitrite positivity did not retain statistical significance.

Table 1: Demographic, Obstetric, Clinical, and Urinalysis Characteristics

Variable		n (%age)
Age, years		28.10 ± 6.00
Age range, years		18–40
Age Group	≤20 years	14 (13.7%)
	21–30 years	60 (58.8%)
	31–40 years	28 (27.5%)
Residence	Rural	67 (65.7%)
	Urban	35 (34.3%)
Trimester	First trimester	18 (17.6%)
	Second trimester	46 (45.1%)
	Third trimester	38 (37.3%)
Gravidity	Primigravida	39 (38.2%)
	Multigravida	63 (61.8%)
Previous history of UTI	Yes	28 (27.5%)
	No	74 (72.5%)
Recent antibiotic use	Yes	19 (18.6%)
	No	83 (81.4%)
Clinical and Urinalysis Findings		
Clinical Symptoms	Dysuria	72 (70.6%)
	Increased urinary frequency	63 (61.8%)
	Urgency	41 (40.2%)
	Lower abdominal pain	44 (43.1%)
	Fever	22 (21.6%)
	Flank pain	16 (15.7%)
	Asymptomatic bacteriuria	11 (10.8%)
Urine routine findings	Pus cells >5/HPF	81 (79.4%)
	Pus cells/HPF	19.53 ± 14.08
	RBC present in urine	78 (76.5%)
	RBC/HPF	3.42 ± 3.27
	Positive nitrite test	49 (48.0%)

Table 2: Urine Culture Results and Distribution of Bacterial Isolates

Culture Result	Frequency	%age
Significant bacterial growth	78	76.5%
No significant growth	24	23.5%
Total	102	100%
Bacterial Isolates among Culture-Positive Samples		
Bacterial isolate	n (%)	
Escherichia coli	36 (46.2%)	
Klebsiella pneumoniae	17 (21.8%)	
Staphylococcus saprophyticus	08 (10.3%)	
Proteus species	06 (7.7%)	
Enterococcus species	05 (6.4%)	
Pseudomonas aeruginosa	04 (5.1%)	
Staphylococcus aureus	02 (2.6%)	
Total	78 (100.0%)	

Table 3: Overall Antimicrobial Susceptibility Pattern among Culture Positive Isolates

Antibiotic	Sensitive n (%)	Resistant n (%)
Fosfomycin	70 (89.7%)	8 (10.3%)
Nitrofurantoin	67 (85.9%)	11 (14.1%)
Amikacin	67 (85.9%)	11 (14.1%)
Meropenem	62 (79.5%)	16 (20.5%)
Ceftriaxone	50 (64.1%)	28 (35.9%)
Amoxicillin-clavulanate	48 (61.5%)	30 (38.5%)
Cefixime	44 (56.4%)	34 (43.6%)
Gentamicin	39 (50.0%)	39 (50.0%)
Ciprofloxacin	44 (56.4%)	34 (43.6%)
Cotrimoxazole	24 (30.8%)	54 (69.2%)
Ampicillin	13 (16.7%)	65 (83.3%)

Table 4: Factors Associated with Culture-Positive Urinary Tract Infection

Variable		Culture Positive n (%age)	Culture Negative n (%age)	p-value
Age group	≤20 years	08 (57.1%)	06 (42.9%)	0.087
	21–30 years	50 (83.3%)	10 (16.7%)	
	31–40 years	20 (71.4%)	08 (28.6%)	
Residence	Rural	53 (79.1%)	14 (20.9%)	0.386
	Urban	25 (71.4%)	10 (28.6%)	
Trimester	First trimester	14 (77.8%)	04 (22.2%)	0.309
	Second trimester	38 (82.6%)	08 (17.4%)	
	Third trimester	26 (68.4%)	12 (31.6%)	
Gravidity	Primigravida	29 (74.4%)	10 (25.6%)	0.692
	Multigravida	49 (77.8%)	14 (22.2%)	
Previous history of UTI	Yes	25 (89.3%)	03 (10.7%)	0.061
	No	53 (71.6%)	21(28.4%)	
Recent antibiotic use	Yes	17 (89.5%)	02 (10.5%)	0.229*
	No	61 (73.5%)	22 (26.5%)	
Nitrite test	Positive	42 (85.7%)	07 (14.3%)	0.034
	Negative	36 (67.9%)	17 (32.1%)	
Pus cells >5/HPF	Yes	66 (81.5%)	15 (18.5%)	0.040*
	No	12 (57.1%)	09 (42.9%)	

Table 5: Multivariable Logistic Regression For Culture-Positive Urinary Tract Infection

Predictor	Adjusted OR	95% CI	p-value
Previous history of UTI: Yes vs No	3.304	0.834–13.089	0.089
Positive nitrite test: Positive vs Negative	2.571	0.914–7.230	0.073
Pus cells >5 /HPF: Yes vs No	3.262	1.073–9.916	0.037
Recent antibiotic use: Yes vs No	2.888	0.595–14.025	0.188

DISCUSSION

The present study evaluated the bacterial profile and antimicrobial sensitivity pattern among pregnant

women with suspected urinary tract infection at THQ Swabi. In this study, 76.5% of urine samples showed significant bacterial growth, indicating a high burden of culture-positive UTI among the enrolled pregnant women. This high culture positivity may be related to the fact that the study included women presenting with suspected UTI rather than a general antenatal screening population. Similar hospital-based studies have reported variable culture positivity depending on inclusion criteria, symptom status, urine collection method, and local microbiological practices. For example, Amin et al. in Pakistan reported *Escherichia coli* as the predominant organism among pregnant women with suspected UTI,¹¹ while Dube et al. reported a lower prevalence of symptomatic UTI in a broader pregnant population.¹² Most of the participants were in the age group 21-30 years, with the highest number of culture-positive patients in this age group in the current study. This finding is biologically plausible given that this age group is the most common age group for childbearing and has the highest percentage of those who attend antenatal classes. In the current analysis, however, there was no significant correlation between culture positivity and age group. Also, Gupta et al. carried out a study on antenatal women in an urban resettlement colony and a slum in Delhi.¹³ They highlighted the variation in UTI patterns in pregnancy based on local population characteristics, health-seeking behavior, and background risk factors.⁹ In the present study, dysuria, shortened micturition interval, low abdominal pain, and urgency were the four most common symptoms. The listed symptoms are often associated with LUTI, but urinary frequency is also a common feature during pregnancy, caused by the physiological and anatomical changes during pregnancy. Dube et al. reported that the most common clinical presentation of a symptomatic UTI in pregnancy is lower urinary symptoms, and that clinical signs along with urine microscopy and culture are important, not just clinical signs.¹² Additionally, ACOG notes that UTI is a spectrum of disease ranging from asymptomatic bacteriuria to UTI with pyelonephritis and that it is important to have the correct diagnosis, as UTI is linked to poor pregnancy outcomes - including low birth weight and preterm delivery.¹⁴ Both pus cells >5/HPF and positive nitrite test were significantly associated with culture positivity in bivariate analysis in the present study. However, following multivariable adjustments, only pus cells >5/HPF were an independent predictor of culture-positive UTI. This indicates that nitrite positivity was a good starting point but on its own was not a strong predictor once other factors were taken into account. This is not unusual as nitrite tests could be negative in infections due to non-nitrite-producing organisms or in infections with a short bladder incubation time. The

significant result for pyuria in our own regression analysis would suggest that urine microscopy is a useful simple screening test in the antenatal setting, though urine culture is the confirmatory test; the women with >5/HPF had 3.26 times greater odds of having UTI than women with ≤5/HPF. As for the type of bacteria, *Escherichia coli* was the predominant bacterium, with a total of 46.2% in this study, followed by *Klebsiella pneumoniae* at 21.8%. This pattern is expected from the accepted microbiology of UTI in pregnancy and is dominated by Gram-negative enteric flora as a result of ascending infection and periurethral colonization. The same was found in the *E. coli* isolates of pregnant women by Amin et al. from Pakistan, and a 2024 study by Taha et al.¹¹ also identified *E. coli* as the predominant uropathogen in pregnant women.¹⁰ Mohamed et al. further highlighted the importance of uropathogenic *E. coli* and antimicrobial resistance among pregnant women.¹⁵ The second most common organism is *Klebsiella pneumoniae*, which has also been supported by recent literature. Bacterial isolates identified in pregnant women attending antenatal care in Ethiopia included *Klebsiella pneumoniae*.¹⁶ In contrast, other recent studies in various regions have demonstrated that *Klebsiella* spp., *Proteus* spp., *Enterococcus* spp., *Pseudomonas* spp. and *Staphylococcus* spp. can also cause UTI during pregnancy.¹⁷ Both Gram-negative and Gram-positive isolates were found in the present study, indicating that a local antibiogram-based treatment decision is needed rather than a pattern of just one organism. Fosfomycin was the most sensitive drug, followed by nitrofurantoin and amikacin in the present study. This is significant as empiric antibiotic selection in pregnancy should take into account both the effect of the antibiotic on the fetus and its antimicrobial effect. According to the susceptibility results, Taha et al. reported that fosfomycin, meropenem and nitrofurantoin were useful in treating UTI.¹⁰ ACOG also notes that nitrofurantoin and fosfomycin are not appropriate agents for pyelonephritis because neither agent reaches adequate levels in renal tissue and thus may not be suitable for lower UTI in pregnancy. These drugs are thus only recommended for lower UTI or cystitis when there is evidence of culture sensitivity.¹⁸ The high susceptibility in the current study is in agreement with other recent reports of retained susceptibility of nitrofurantoin against the common urinary pathogens. Among the pregnant women in Ghana, *E. coli* has been reported to be susceptible to nitrofurantoin, while Al-Hinai et al.¹⁹ reported high susceptibility to nitrofurantoin in urinary isolates.²⁰ Overall, these results support the value of nitrofurantoin as an oral treatment in many clinical situations, as long as gestational age, contraindications, and clinical severity are taken into account. Ampicillin

and Cotrimoxazole were the most resistant in the present study. This is in accordance with the trend of increasing resistance observed in recent studies that have been carried out in Pakistan and elsewhere. High antibiotic resistance to amoxicillin and cotrimoxazole was noted among pregnant women, and a report from Pakistan in 2024-2025 also revealed a high frequency of UTI with *E. coli* and *Klebsiella* as major isolates, which further emphasized the need for local antimicrobial surveillance.^{11,21} Empirical treatment, self-treatment, administration of incomplete courses of antibiotics, and community-level antibiotic pressure may be contributing factors to the high level of resistance to commonly used antibiotics. The moderate sensitivity of ceftriaxone, cefixime, amoxicillin-clavulanate, ciprofloxacin and gentamicin suggests these drugs do not have a consistent efficacy profile for empirical therapy in this context. Ciprofloxacin is not recommended as first-line treatment in pregnancy unless indicated, and aminoglycosides should be used with caution due to the potential for toxicity. In view of this, the present results should not be considered as a recommendation for empirical treatment in all pregnant women, but rather as a confirmation that empirical therapy should be guided by the pregnancy safety profile, severity of the infection, trimester and local culture sensitivity profile. Current obstetric guidance suggests that culture-based treatment should be considered as standard treatment wherever possible and that caution should be applied to the use of inappropriate antibiotics in pregnancy.¹⁴ The present study also revealed that culture positivity was associated with the previous history of UTI and recent antibiotic use in logistic regression analysis, although the association was not statistically significant after adjustment. Amin et al. had previously found a UTI history to be a predictor, and our results indicated that a history of UTI had a similar direction of association, albeit with broader confidence intervals.¹¹ This discrepancy could result from the small size of the sample, population differences in the setting or from the fact that only a few culture-negative cases were included. Previous history of UTI, therefore, should be treated as a clinically important factor even though it was not statistically significant for the adjusted model. The results of this study are of practical relevance in relation to antenatal services in low-resource areas such as Swabi. Pregnant women who have urinary symptoms and also those suspected of having asymptomatic bacteriuria should be encouraged to have routine urine testing. *E. coli* and *Klebsiella pneumoniae* were the predominant organisms, indicating that empirical use of ampicillin and/or cotrimoxazole is not always the best strategy. Hospital antibiograms are essential as patterns of resistance differ from region to region and are

changing over time. Ethiopia, Ghana, India, Pakistan and other regions have recently demonstrated that the distribution and sensitivity patterns of local bacteria are essential for rational prescribing during pregnancy.^{9,16,19} The susceptibility profile should be interpreted as a local laboratory guide rather than a universal prescribing hierarchy. In pregnancy, selection of therapy must integrate culture results with gestational age, allergy history, renal function, site and severity of infection, and established obstetric guidance. Agents appropriate for uncomplicated lower urinary tract infection may not be suitable for pyelonephritis or systemic infection. The high resistance observed to ampicillin and cotrimoxazole reinforces the importance of avoiding uncritical empirical reuse of commonly available antibiotics and of updating institutional antibiograms at regular intervals.

LIMITATIONS

This was a single-centre study of pregnant women with suspected urinary tract infection and therefore does not estimate the prevalence of bacteriuria among all antenatal attendees. The sample size was modest, and recent antibiotic exposure was recorded but not used as an exclusion criterion, which may have influenced culture yield and susceptibility patterns. Organism-specific susceptibility matrices, extended-spectrum beta-lactamase status, multidrug-resistance phenotypes, treatment response, recurrence, and maternal or neonatal outcomes were not evaluated. The submitted manuscript did not provide the full laboratory reproducibility details for the culture threshold, media and incubation conditions, antimicrobial-susceptibility method, or interpretive standard/version; these details require author verification before publication. Larger multicentre surveillance with standardized microbiological methods would strengthen the generalizability of the findings.

CONCLUSIONS

Culture-positive UTI was frequent among this selected group of pregnant women with suspected infection. *E. coli* was the leading isolate; fosfomycin and nitrofurantoin showed high overall in vitro activity, while ampicillin and cotrimoxazole showed substantial resistance. More than five pus cells/HPF independently predicted culture positivity. These findings support culture-guided therapy, periodic local resistance surveillance, and pregnancy-specific antimicrobial stewardship rather than indiscriminate empirical prescribing.

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REFERENCES

- Dube R, Al-Zuheiri STS, Syed M, Harilal L, Zuhaira DAL, Kar SS. Prevalence, clinico-bacteriological profile, and antibiotic resistance of symptomatic urinary tract infections in pregnant women. *Antibiotics* (Basel). 2023;12(1):33. doi:10.3390/antibiotics12010033. PMID: 36671233.
- Chelkeba L, Fanta K, Mulugeta T, Melaku T. Bacterial profile and antimicrobial resistance patterns of common bacteria among pregnant women with bacteriuria in Ethiopia: a systematic review and meta-analysis. *Arch Gynecol Obstet*. 2022;306(3):663-686. doi:10.1007/s00404-021-06365-4. PMID: 35032208.
- Derebe MM, Roy Paladhi U, Workneh F, Munshea A, Yismaw G, Yibeltal K, et al. Prevalence, bacterial etiology, and antimicrobial susceptibility patterns of urinary tract infections among pregnant women in rural West Amhara, Ethiopia. *Sci Rep*. 2025;15(1):39040. doi:10.1038/s41598-025-25655-4. PMID: 41203733.
- Ali AH, Reda DY, Ormago MD. Prevalence and antimicrobial susceptibility pattern of urinary tract infection among pregnant women attending Hargeisa Group Hospital, Hargeisa, Somaliland. *Sci Rep*. 2022;12(1):1419. doi:10.1038/s41598-022-05452-z. PMID: 35082366.
- Barnawi Y, Alghamdi A, Ibrahim A, Al-Anazi L, Alhumaida G, Alotaibi R, et al. Prevalence of urinary tract infections in pregnant women and antimicrobial resistance patterns in women in Riyadh, Saudi Arabia: a retrospective study. *BMC Infect Dis*. 2024;24(1):502. doi:10.1186/s12879-024-09385-y. PMID: 38762526.
- Seid M, Markos M, Aklilu A, Manilal A, Zakir A, Kebede T, et al. Community-acquired urinary tract infection among sexually active women: risk factors, bacterial profile and their antimicrobial susceptibility patterns, Arba Minch, Southern Ethiopia. *Infect Drug Resist*. 2023;16:2297-2310. doi:10.2147/IDR.S407092. PMID: 37095780.
- Mazumder MM, Uddin Noman M, Hasan AKMT, Ahammod T, Abdullah Rafique A, Rahman M. Bacteriological profile and antibiotic sensitivity pattern of urinary tract infection. *East West Med Coll J*. 2025;13(1):23-27. doi:10.3329/ewmcj.v13i1.77626.
- Al-Shahrani GS, Belali TM. Frequency of drug-resistant bacterial isolates among pregnant women with UTI in maternity and children's hospital, Bisha, Saudi Arabia. *Sci Rep*. 2024;14(1):7397. doi:10.1038/s41598-024-58275-5. PMID: 38548851.
- Gupta D, Singh MM, Basu S, Garg S, Baveja CP, Mala YM. Prevalence, determinants, and antibiotic resistance patterns of urinary tract infections in antenatal women in an urban resettlement colony and slum in Delhi, India: a cross-sectional study. *Indian J Community Med*. 2025;50(1):81-89. doi:10.4103/ijcm.ijcm_689_23. PMID: 40124802.
- Taha AB. Bacteriological profile, antimicrobial susceptibility, and factors associated with urinary tract infection in pregnant women. *J Infect Dev Ctries*. 2024;18(3):391-398. doi:10.3855/jidc.18239. PMID: 38635608.
- Amin S, Anser R, Memon H, Faisal H, Tarique S, Rehan M, et al. Bacterial profile, antimicrobial susceptibility pattern and associated risk factors of urinary tract infection among pregnant women. *Pak J Med Health Sci*. 2023;17(9):201-204. doi:10.53350/pjmhs20231709201. PMID: not available.
- American College of Obstetricians and Gynecologists. Urinary tract infections in pregnant individuals. ACOG Clinical Consensus No. 4. *Obstet Gynecol*. 2023;142(2):435-445. doi:10.1097/AOG.0000000000005269. PMID: 37473414.
- Mohamed FY, Dahie HA, Mohamoud JH, Adam MH, Dirie HM. Prevalence, antimicrobial susceptibility profile, and associated risk factors of uropathogenic *Escherichia coli* among pregnant women attending Dr. Sumait Hospital Mogadishu, Somalia. *Front Public Health*. 2023;11:1203913. doi:10.3389/fpubh.2023.1203913. PMID: 38328535.
- Getie M, Gebre-Selassie S, Getu Y, Birara S, Tirunch C, Abebaw A, et al. Bacterial profile and extended spectrum beta lactamase screening of urinary tract infection among asymptomatic and symptomatic pregnant women attending antenatal care in ALERT Hospital, Addis Ababa, Ethiopia. *SAGE Open Med*. 2023;11:20503121231197587. doi:10.1177/20503121231197587. PMID: 37933290.
- Tesfa K, Belete D, Mulu M, Gelaw A. Antimicrobial susceptibility patterns and associated risk factors of bacterial isolate among urinary tract infection suspected patients at University of Gondar Comprehensive Specialized Hospital North west Ethiopia. *BMC Infect Dis*. 2025;25(1):1723. doi:10.1186/s12879-025-12125-5. PMID: 41408173.
- Opere-Asamoah K, Vicar EK, Sosu JX, Nyarko E, Mustapha SZ, Mumuni KA, et al. Prevalence of urinary tract infections and antibiotic susceptibility patterns of bacterial isolates in first-time ANC attendees at a secondary health facility in Ghana: a cross-sectional study. *BMC Pregnancy Childbirth*. 2025;25(1):483. doi:10.1186/s12884-025-07614-z. PMID: 40275216.
- Al-Hinai U, Al-Habsi N, Kościuszko Z, Al-Busaidi I. Microbiological and antimicrobial susceptibility pattern of asymptomatic bacteriuria in pregnant women attending SQUH. *Oman Med J*. 2024;39(2). doi:10.5001/omj.2024.58. PMID: 38988794.
- Waheed A, Mumtaz A, Munir QA, Arshad A, Yousaf Z, Akhtar R. Frequency of urinary tract infections and antimicrobial susceptibility profile among pregnant females. *Professional Med J*. 2025;32(1):119-124. doi:10.29309/TPMJ/2025.32.01.8597.

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.



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