Section: OBS & Gynae

Original Research Article

THE OCCURRENCE OF SYMPTOMATIC URINARY TRACT INFECTION IN DIABETIC PREGNANT WOMEN: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Urinary tract infections (UTIs) represent one of the most prevalent bacterial infections among pregnant women, with increased risk in those with diabetes mellitus (DM). This cross-sectional study investigates the prevalence, clinical presentation, microbial etiology, and antibiotic sensitivity of symptomatic UTIs in diabetic pregnant women.

Material and Methods: A total of 108 diabetic pregnant women presenting with symptomatic UTIs were evaluated. Data on age, trimester, parity, type of diabetes, and symptoms were collected. Urinalysis and urine cultures were performed to determine infection presence and to identify bacterial pathogens. Antibiotic susceptibility testing followed standard microbiological protocols.

Results: Results showed the majority of women were in their second trimester (57.4%) and multiparous (65.7%), with gestational diabetes (82.4%) being most common. The leading symptoms were dysuria (69.4%), lower abdominal pain (58.3%), and urgency (42.6%). Escherichia coli (48.1%) was the predominant organism isolated, with high sensitivity to Nitrofurantoin (100%), Gentamicin (95.4%), and Cefixime (95.4%).

Conclusion: The findings underscore the importance of early screening and appropriate antibiotic treatment in this population to prevent maternal and neonatal complications. Culture-guided therapy is essential in preventing resistance and ensuring optimal outcomes.

Keywords: Urinary tract infection, diabetic pregnancy, Escherichia coli

INTRODUCTION

One of the most common bacterial diseases that pregnant women have is urinary tract infection (UTI). Pregnant women are at risk for UTIs due to physiological and anatomical changes that occur during pregnancy, such as ureteral dilatation, reduced bladder tone, and urine stasis. Women with diabetes mellitus (DM) are particularly vulnerable to these hazards because they already have compromised immune function and glycosuria, which promotes bacterial colonisation and proliferation in the urinary tract Delzell JE et al.[1,2] The risk of problems such as pyelonephritis, premature labour, low birth weight, and hypertensive disorders is increased during pregnancy if either pregestational diabetes or gestational diabetes mellitus (GDM) is present Gilstrap LC et al.[3] Glycosuria offers the perfect environment for the growth of bacteria, especially Escherichia coli (E. coli), the most prevalent uropathogen, while diabetes impairs neutrophil activity and chemotaxis, resulting in inadequate pathogen clearance Krcmery S et al.[4]

According to research, pregnant women with diabetes are up to four times more likely than those without the disease to get a UTI Boyko EJ et al,[5] Routine urine screening and culture are necessary to guarantee prompt diagnosis and treatment of UTIs due to their higher incidence and recurrence in pregnant women with diabetes Schnarr J et al.[6] Furthermore, considering the growing trends of antibiotic resistance worldwide, empirical therapy devoid of culture sensitivity may result in the incorrect administration of antibiotics and antimicrobial resistance.

Although this problem is widely recognised, few research have examined the precise microbiological makeup and patterns of antibiotic susceptibility of UTIs in diabetes pregnancies, especially in poor nations. In order to enhance treatment protocols and the results for both the mother and the foetus, this study is to evaluate the prevalence, clinical symptoms, bacteriological profiles, and antibiotic sensitivity of symptomatic UTIs in pregnant women with diabetes.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional observational study was conducted over a six-month period at the Department of Obstetrics and Gynecology, [Hospital Name], a tertiary care center in [Location]. The study aimed to assess the prevalence and characteristics of symptomatic UTIs among pregnant women diagnosed with diabetes mellitus.

Study Population

The study population comprised pregnant women with a confirmed diagnosis of diabetes mellitus (either pregestational or gestational) who presented with symptoms suggestive of a UTI. Inclusion criteria were:

- Singleton pregnancy
- Gestational age between 12 and 36 weeks
- Presence of one or more UTI symptoms, such as dysuria, urinary urgency, increased frequency, suprapubic pain, or hematuria

Exclusion criteria Included

- Women with known congenital anomalies of the urinary tract
- Those who had received antibiotic treatment within the two weeks preceding enrollment
- Women with chronic renal disease or other significant comorbidities

Data Collection

Participants were interviewed to gather demographic information, obstetric history, diabetes type and duration, and specific symptomatology after giving their informed permission. To evaluate vital signs and any indications of systemic involvement, clinical exams were conducted.

Laboratory Investigations

Midstream clean-catch urine samples were collected from each participant under sterile conditions. The samples underwent the following analyses:

- **Urinalysis:** Assessed for the presence of leukocytes, nitrites, proteinuria, and hematuria using dipstick methods.
- **Microscopy:** Examined for pyuria, defined as ≥5 white blood cells per high-power field.
- **Urine Culture:** Performed on blood agar and MacConkey agar plates, incubated at 37°C for 24-48 hours. Significant bacteriuria was defined as the growth of $\geq 10^5$ colony-forming units per milliliter of a single uropathogen.

Antibiotic Sensitivity Testing

Isolated pathogens were subjected to antibiotic susceptibility testing using the Kirby-Bauer disk diffusion method, in accordance with Clinical and Laboratory Standards Institute (CLSI) guidelines. The antibiotics tested included:

- Nitrofurantoin
- Gentamicin
- Cefixime
- Ciprofloxacin
- Amoxicillin-clavulanate

RESULTS

Participant Characteristics

A total of 108 pregnant women with diabetes and symptomatic UTIs were enrolled in the study. The mean age of the participants was 30.92 years (SD ± 4.5 years). The majority were in their second trimester (57.4%) and were multiparous (65.7%). Gestational diabetes mellitus was the most prevalent type of diabetes, accounting for 82.4% of cases.

Table 1. Demographic and Clinical Profile of Participants

Characteristic	Frequency (%)
Age (mean ± SD)	30.92 ± 5.6 years
Second Trimester	62 (57.4%)
Multiparous	71 (65.7%)
Gestational Diabetes	89 (82.4%)

Table 1: Demographic and Clinical Profile of Participants

This table summarizes the demographic characteristics and obstetric profile of the study participants. The majority of women were in their second trimester of pregnancy (57.4%) and were multiparous (65.7%). The mean age was 30.92 years, indicating that most participants were in their early thirties. A significant majority (82.4%) were diagnosed with gestational diabetes rather than pregestational diabetes, suggesting a higher burden of UTI risk associated with gestational metabolic changes.

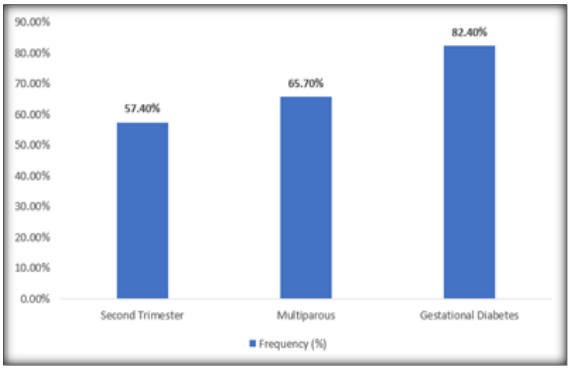

Figure 1A

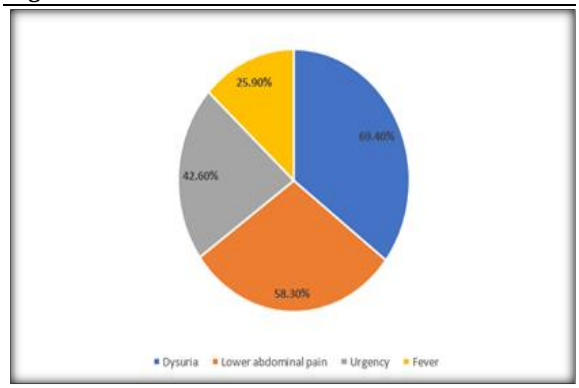

Figure 2

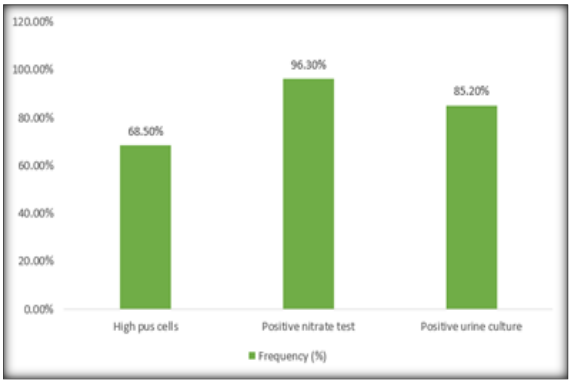

Figure 3

Table 2: Presenting Symptoms

Symptom	Frequency (%)
Dysuria	75 (69.4%)
Lower abdominal pain	63 (58.3%)
Urgency	46 (42.6%)
Fever	28 (25.9%)

Table 2: Presenting Symptoms This table outlines the primary clinical manifestations reported by participants. Dysuria was the most common symptom, affecting 69.4% of women, followed by lower abdominal pain (58.3%) and urgency of micturition (42.6%). Fever was noted in 25.9% of the cases, indicating systemic involvement in a smaller proportion of women. These symptoms highlight the typical presentation of UTIs in diabetic pregnancies.

Table 3: Urinalysis and Culture Results

Parameter	Frequency (%)
High pus cells	74 (68.5%)
Positive nitrate test	104 (96.3%)
Positive urine culture	92 (85.2%)

Table 3: Urinalysis and Culture Results This table presents findings from laboratory investigations. A high pus cell count in urine microscopy was observed in 68.5% of cases, while the nitrate test was positive in 96.3%, indicating a high probability of bacterial infection. Positive urine cultures were obtained in 85.2% of cases, validating the clinical suspicion and underscoring the importance of culture-confirmed diagnosis in managing UTIs in diabetic pregnant women.

Table 4: Isolated Organisms and Antibiotic Sensitivity

Organism	Frequency (%)	Sensitivity (%) (Nitrofurantoin / Gentamicin / Cefixime)
E. coli	50 (48.1%)	100 / 95.4 / 95.4
Klebsiella spp.	23 (21.3%)	91.3 / 82.6 / 87.0
Proteus spp.	10 (9.3%)	80.0 / 90.0 / 70.0

Table 4 is Isolated Organisms and Antibiotic Sensitivity This table identifies the uropathogens isolated from positive urine cultures and their antibiotic susceptibility profiles. Escherichia coli was the predominant isolate (48.1%), followed by Klebsiella spp. (21.3%) and Proteus spp. (9.3%). E. coli demonstrated 100% sensitivity to Nitrofurantoin and over 95% sensitivity to Gentamicin and Cefixime, supporting the continued use of these antibiotics as effective empirical treatments.

However, variation in resistance patterns among other isolates highlights the need for culture-guided therapy.

DISCUSSION

Our analysis confirms that pregnant women with diabetes have a high incidence of symptomatic UTIs, which is consistent with other studies showing that this population is more susceptible to infection because of immunological changes and glycosuria Krcmery S et al.; Boyko EJ et al.[4,5] According to Schnarr & Smaill,[6] who noted heightened vulnerability because of peak hormonal changes and anatomical modifications during this time, the majority of infections were seen during the second trimester.

According to the worldwide pattern of UTI aetiology, E. coli was the most often isolated bacterium Delzell JE et al.[1] Notably, every E. coli sample in our group showed great sensitivity to cefixime, gentamicin, and nitrofurantoin. This shows that these antibiotics are still effective first-line therapies for simple UTIs in diabetic pregnancies and confirms findings by Gupta K et al.[7] Antimicrobial resistance is still a serious issue. Given the dangers of therapeutic failure and problems associated with empirical treatment, our findings highlight the need of culture-based therapy. Ciprofloxacin and amoxicillin-clavulanate resistance increased, indicating a change in regional sensitivity profiles and urging recurring antibiogram evaluations Kahlmeter G et al.[8] Among UTI cases, mid-trimester gestation and multiparity were most common. The significance of focused screening methods in higher-risk categories is shown by these correlations. In women with symptoms, routine urinalysis and culture are essential. Hooton TM et al.[9] Prompt treatment can help avoid ascending infections like pyelonephritis, which can be extremely dangerous for the mother and foetus. Nicolle LE et al.[10]

In the end, our research fills a significant information vacuum about symptomatic UTIs in pregnant diabetic women living in environments with restricted resources. The results can help influence national policies and motivate prenatal clinics to use culture-based management practices and systematic UTI screening. Foxman B & Colgan R.[11,12]

CONCLUSION

The increased frequency and importance of symptomatic UTIs in pregnant women with diabetes are highlighted by this cross-sectional investigation. According to our research, most afflicted people are in their second trimester and have typical UTI symptoms including urgency, lower abdomen discomfort, and dysuria. The most common uropathogen is still E. coli, which shows encouraging sensitivity to first-line antibiotics like cefixime and nitrofurantoin.

In order to enable prompt and efficient therapy, the results highlight the significance of regular screening and culture-based diagnosis in diabetes pregnancies. In addition to lowering maternal morbidity, early intervention helps avoid foetal problems including low birth weight and premature labour. Reliance on empirical therapy without sensitivity testing is discouraged due to the patterns of antibiotic resistance that have been found.

Healthcare professionals should implement customised treatment plans based on local sensitivity patterns and continue to keep a close eye out for UTI symptoms in pregnant diabetic women. Results will be greatly enhanced by the inclusion of routine urine screens in prenatal care, especially for high-risk groups. Microbial diversity, resistance mechanisms, and long-term impacts on newborn health should all be the focus of future studies.

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