

Libyan International Medical University

Faculty of Applied Medical Sciences

*The prevalence of asymptomatic bacteriuria in the
Libyan population*

Microbiology

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Abstract

A urinary tract infection (UTI) is a common medical condition affecting both genders and can either present as the symptomatic or asymptomatic type. This study aims to determine the prevalence of asymptomatic bacteriuria and the affected gender in Libya. According to the microbiological examination at *Libyan International Medical University Microbiology Lab* which included a comprehensive physical, chemical, morphological examination, and urine culture. It was concluded that UTIs are mostly caused by *Escherichia coli* and *Pseudomonas*. Further statistical analysis was performed and determined that females are more affected with UTIs than males with 16.7% significant growth of bacteria in the samples collected. This data is represented in the various graphs and tables with statistical analysis proving the significance of the findings. These results are essential in understanding the epidemiological and etiological status of this disorder amongst the Libyan population. The findings can guide diagnostic and treatment plans for patients affected.

Introduction

The renal system is the waste and excess water drainage system in human body therefore any infection involving any part of the urinary tract could lead to imbalanced function of the system and a variety of complicated diseases. (1)

Urinary tract infection (UTI) is one of body's most prevalent infection, affecting any part of the urinary tract. Each year, bacterial urinary tract infections affect millions of people in the United States, causing symptomatic or asymptomatic bacteriuria, predominantly girls and women (whether pregnant or not). It is commonly caused by *Escherichia coli*, a gram-negative bacterium that causes about 70% of cases, as well as *Pseudomonas* bacteria. (2)

Asymptomatic bacteriuria (ASB) is widespread in many individuals, including healthy women and those with underlying urologic abnormalities, although it is uncommon in infants and men with a normal urinary tract. Even though women with ASB are at a greater risk of symptomatic UTI, ASB does not appear to be linked to any negative outcomes, and there is no evidence that depicts any correlation of episodes of symptomatic UTI being caused by ASB. However, pregnant women with ASB have a risk of symptomatic UTI and specially pyelonephritis. (3)

Thus, routine screening for ASB is recommended according to the management guidelines from the *Infectious Diseases Society of America* (IDSA) which confirmed that the only population that should be tested for and treated is pregnant women or an individual prior to undergoing invasive urological operations. This is done to reduce problems and identify women who are at high risk of premature delivery. (4)

A recent study has found that asymptomatic bacteriuria is more common in women than men. (4) This study's goal is to assess the frequency of asymptomatic bacteriuria in the Libyan population and compare the results and trends to the current international data available.

Methods and Materials

In the early morning 24 mid-stream specimens of urine were collected from both sexes and were sent to the *Libyan International Medical University laboratory* for microbiological analysis. The urine analysis was performed according to the recommended basic examinations including:

Physical examination: the urine sample had shown clear light-yellow color with no signs of turbidity and mild smell

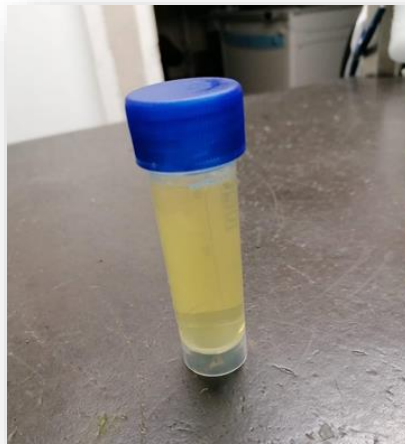


Figure1: Urine sample

Chemical examination: A dipstick test was done and showed a change in color only in specific gravity

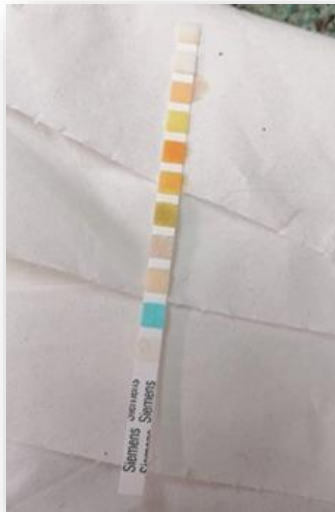


Figure2: Dipstick test

Morphological examination: The urine sedimentation under the microscope had shown crystals of uric acid and calcium oxalate with less than 2 WBCs/hpf while there was no evidence of bacteria or yeast.

Urine culture: The urine was cultured by a calibrated loop (0.01ml) across the plate, after incubation for 24hr at 37°C, the colonies were seen.



Figure3: Bacterial growth on urine plate

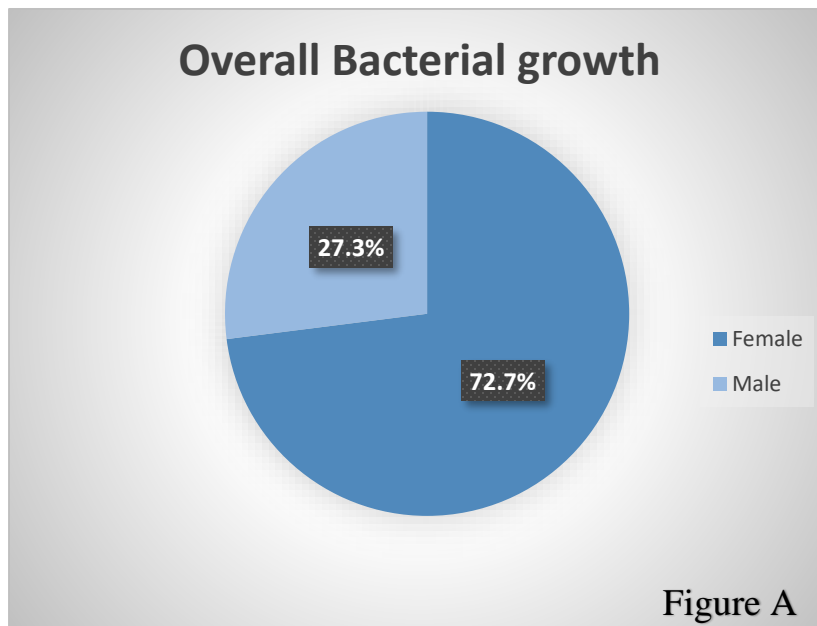
Statistical methods

SPSS statistics for windows version (28.0.1.1) program was used for statistical analysis. Tables of the raw data were inputted into the program and analysis of the data was done using the Fisher's exact test to find the prevalence differences of affected genders with asymptomatic bacteriuria.

Results

In 2022, Libyan females had high prevalence of bacterial growth according to the Libyan International Medical University laboratory examinations depicted that overall bacterial growth in female samples was a total of 8 samples (72.7%) while only 3 (27.3%) of male's samples were recorded out of total 11 ([FIG.A](#)). Within gender the overall bacterial growth

was 8 samples (66.7%) out of 12 in females. However, the overall bacterial growth in males was only 3 samples (25%) out of total samples 12. ([Table.2](#))



Based on Fishers exact test, the null hypothesis was rejected because statistically significant association were found concerning the effects of gender differences on the prevalence of asymptomatic bacteriuria, as it is indicated by the P value of 0.020, which is lesser than the normal alpha value of 0.05 ([Table.1](#)). The patient's samples that contained significant growth of bacteria indicating UTI were about 2 samples (100.0%) in females, unlike the males that did not have significant bacterial growth 0 (0%). On the other hand, the samples that showed no bacterial growth in both genders were 11 (45.8%) from 24 samples, males were only 8 samples (75.0%) out of 12 and were lesser in females about 2 samples (16.7%) out of total 12. ([Table.2](#))

	Value	df	Asymptotic Significance (2-sided)	Monte Carlo Sig. (2-sided)		
				Significance	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Square	Chi-8.727 ^a	2	.013	.020 ^b	.016	.023
Likelihood Ratio	9.949	2	.007	.016 ^b	.013	.020
Fisher's Exact Test	8.180			.020 ^b	.016	.023
Linear-by-Linear Association	8.065 ^c	1	.005	.008 ^b	.006	.010
N of Valid Cases	24					

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.00.

b. Based on 10000 sampled tables with starting seed 221623949.

			Gender		Total
			Male	Female	
bacterial growth	1.00	Count	9	2	11
		% Within bacterial growth	81.8%	18.2%	100.0%
		% Within Gender	75.0%	16.7%	45.8%
	2.00	Count	3	8	11
		% Within bacterial growth	27.3%	72.7%	100.0%
		% Within Gender	25.0%	66.7%	45.8%
	3.00	Count	0	2	2

		% Within bacterial growth	0.0%	100.0%	100.0%
		% Within Gender	0.0%	16.7%	8.3%
Total		Count	12	12	24
		% Within bacterial growth	50.0%	50.0%	100.0%
		% Within Gender	100.0%	100.0%	100.0%

Discussion

Urinary Tract Infections are categorized as symptomatic and asymptomatic bacteriuria. This study focused on asymptomatic bacteriuria amongst the Libyan population. It has been shown that the prevalence of bacterial growth in samples collected from asymptomatic females was 72.7% which is much greater than that found in males, which was 27.3%. These findings are similar to the data collected in the United States population, which suggest that females are more affected than males. The reason for the high prevalence of bacterial growth in asymptomatic females could be either a true UTI or contamination with normal flora whilst the samples were being collected. Unlike males which are due to contamination because the male's samples were less than the recommended threshold 10^5 CFU/ml.

Based on evidence and many reports show that a urine culture is positive if there is growth of $\geq 10^4$ CFU/ml for identifying acute cystitis in young outpatient women. However, according to multiples studies that have shown this threshold may not be appropriate and that a urine specimen obtained noninvasively by a clean-catch voided or indwelling catheter with a 10^5 CFU/ml is the most sensitive indicator for detecting a clinically significant UTI in inpatients. (5)

Although, our data did not show significant bacterial growth in males, UTI could frequently occur in both genders depending on which one is having higher risk factors that includes elderly, pregnancy in females, patients with spinal cord injuries, diabetes mellitus and

catheters. Moreover, high rates of UTIs could suggest that antibiotics are not an effective therapy for all UTIs.

The two types of bacteria that determined causing asymptomatic bacteriuria in our laboratory examinations were *Escherichia coli* and *Pseudomonas* bacteria. Both bacteria are known to cause a variety of complications in both genders. In pregnancy, an *E. coli* infection is unlikely to result in a miscarriage as well as *pseudomonas*. However, since having *E. coli* infection can induce diarrhea, which causes the body to lose a lot of fluids, a pregnant woman who has an *E. coli* infection can become dehydrated. It is essential that all pregnant women are warned of these symptoms and encouraged to seek emergent medical advice. They must be evaluated and treated if necessary. Another important complication to note is the ability of *pseudomonas* to form biofilms on catheters and damage bladder tissue through several mechanisms.

Our study's key strengths were demonstrating the gender differences in asymptomatic bacteriuria. While it was limited by its laboratory examination nature, resulting in information bias due to missing data and loss of follow-up. Despite this limitation, our study featured patients of similar type of infection (asymptomatic bacteriuria) in both genders, therefore these limitations need to be processed for better future results.

Conclusion

This study's findings coincide with the international data available, and the recommendations are based on international guidelines. It was found that an overall prevalence of 16.7% of UTI was observed in this report and all of them were females while there was no significant growth of bacteria confirmed in any of the male samples collected. *Escherichia coli* and *Pseudomonas* bacteria were the predominant cause of asymptomatic bacteriuria in females. Finally, substantial effort should be put into future clinical infection (symptomatic bacteriuria), which will be more essential than asymptomatic bacteriuria for translating the antivirulence therapies into new treatments to reduce the suffering associated with UTIs.

References

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