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The Prevalence of Asymptomatic Bacteriuria Between Female and Male Medical Students

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Abstract

Asymptomatic bacteriuria (ASB) is a term that describes when a microbiologically significant bacterial growth (usually >10^5 CFU/ml) in the urine occurs in people who have no signs or symptoms of a urinary tract infection.

Material and methods: This cohort study was performed in the Libyan international medical university. A total of 24 urine specimens were collected from 3rd year medical students, and it is done by using culture, wet mount test, and gram staining.

Results: Among 24 collected urine sample, 11 (45.8%) of them has showed no growth, whereas 13 (54.2%) has shown a growth.

Conclusion: The findings of this study have emphasized the need of detecting asymptomatic bacteriuria as part of the medical screening for students at the university.

Keywords: asymptomatic bacteriuria, urinary tract infection.

Introduction

Asymptomatic bacteriuria (ASB) is a term that describes when a microbiologically significant bacterial growth (usually $>10^5$ CFU/ml) in the urine occurs in people who have no signs or symptoms of a urinary tract infection. Based on the previously mentioned concepts, ASB do not get benefit with antibiotic therapy, unless in certain circumstances.[1]

It has been discovered that individuals with diabetes are more likely to become infected, and the form of infection is more harmful.[2]

Urinary tract infection (UTI) is defined as a clinical (symptomatic) or subclinical (asymptomatic) condition that affects either the lower or upper urinary tract. UTI are classified as "uncomplicated" when they arise in a healthy urinary tract with no structural, functional, or underlying host sickness, or as "complicated" when an underlying abnormality is suspected of allowing the infection to develop. Pyuria, as demonstrated by genitourinary tract inflammation, is prevalent in asymptomatic bacteriuria patients. UTI are one of the most prevalent disorders seen in medical practice today, affecting people of all ages from newborns to the elderly. *E.coli* causes 75–90% of acute uncomplicated cystitis worldwide, while *Staphylococcus saprophyticus* causes 5%–15%, mostly in younger women. The predominance and degree of incidence of one or two of these microorganisms over the other, on the other hand, are influenced by the environment. In many countries, bacterial resistance to antimicrobial drugs is on the rise. Trimethoprim-sulfamethoxazole (SXT) or trimethoprim alone have been routinely utilized as empirical treatment for *E.coli* UTIs for the past two decades. Furthermore, resistance to SXT among *E. coli* isolates from people with UTIs has developed dramatically in the United States over the last few decades, with a prevalence of more than 20% in various regions of the nation.[3]

The aim of this experiment is to study the incidence of asymptomatic bacteriuria in urine samples of males and females.

Materials and Methods

A total of 24 urine specimens were collected from 3rd year medical students at Libyan international medical university (LIMU).

Culture

This test was done by using a urine sample that collected in urine container, calibrated loop (1 or 10μl), culture media (cled agar) that's used for detection of the *E.coli.* The specimens were cultured within 2 hours of collection to ensure the integrity of the samples, and the accurate identification of the pathogens, also to avoid any possible proliferation of the pathogens and contaminations.

After taking the specimen by the calibrated loop, then spread the specimen on the culture in a form of a Z-fashions spreading, and then put it in the incubator for 24hrs.

In order to calculate the number of colonies in the sample, we use this standard equation (1×10^5 CFU/ml). If the number of colonies was equal to or higher than the specified number (1×10^5), then the bacterial growth is considered significant.

Wet mount test

In this test the author used a slide, plastic pipette, cover slip, urine sample, and microscope.

The procedure included Using the pipette to take a urine sample, then put it on the slide (one drop only), and then take the cover slip and put it in the urine sample on the slide, lastly put the slide on the microscope.

Gram staining

The gram staining materials included a slide, plastic pipette, urine sample, reagents in order included (crystal violet, iodine, alcohol, safranine, and distilled water), immersion oil, microscope.

The first step is to take the slide and put on it a urine drop by using the pipette, then let it dry in by the room temperature. The second step is to put a drop of crystal violet (let it for 1 min), then wash the slide by distilled water, after that put one drop of iodine (let it for 1 min), then wash the slide, following this put a drop of the alcohol (let it for 10-25 sec) and wash it immediately, after that put a drop of safranine (let it for 1 min) and wash it then let it dry, lastly put the immersion oil on the slide and observe the slide by the microscope.

Statistical analysis

was done by using SPSS software (version 26). The test that the author used is Chi-Square test, and crosstabulation.

Result and Discussion

A total of 24 participants, 12 males and 12 females. The number of males whose cultures show growth was 3 (25%) and their CFU/mlCAT is 23.1%, whereas the other 9 cultures of the males show no growth (75%) and their CFU/mlCAT is 81.8%. The author found that two females have no growth (16.7%) and their CFU/mlCAT was 18.2%. On the other hand, 10 females showed growth (83.3%) and their CFU/mlCAT was 76.9% (Table 1, Figure 1).

Table 1 The number of the participants and their results

gender * CFUmlCAT Crosstabulation					
			CFUmlCAT		
			no growth	growth	Total
gender	male	Count	9	3	12
		Expected Count	5.5	6.5	12.0
		% Within gender	75.0%	25.0%	100.0%
		% Within CFUmlCAT	81.8%	23.1%	50.0%
	female	Count	2	10	12
		Expected Count	5.5	6.5	12.0
		% Within gender	16.7%	83.3%	100.0%
		% Within CFUmlCAT	18.2%	76.9%	50.0%
Total		Count	11	13	24
		Expected Count	11.0	13.0	24.0
		% Within gender	45.8%	54.2%	100.0%
		% Within CFUmlCAT	100.0%	100.0%	100.0%

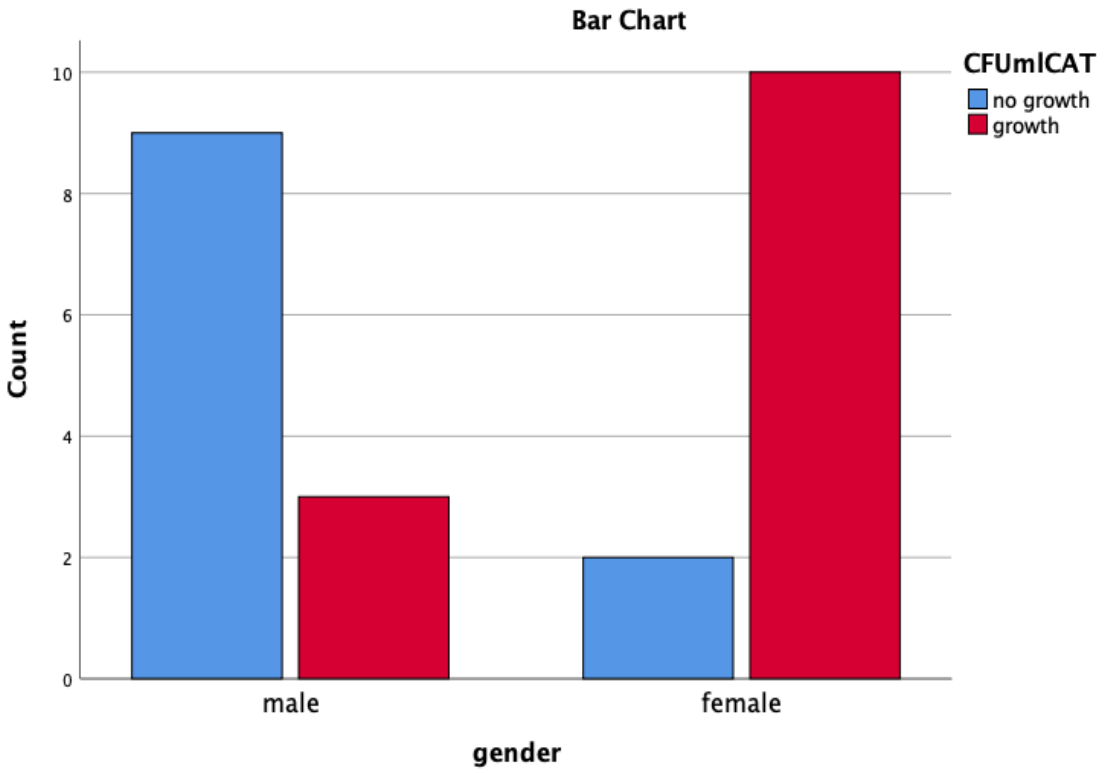

Figure 1 Growth states of bacteria among both genders

The P-value is 0.004 (significant), which is mean that there is a significant difference between males and females based on P-value because the P-value was < 0.05 (table 2). The Chi-square is the appropriate test because the assumption is met (0 cells (0.0%)) have expected count less than 5, and the minimum expected count is 5.50).

Table 2 Shows the P-value of the Chi-square test

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.224[a]	1	.004		
Continuity Correction[b]	6.042	1	.014		
Likelihood Ratio	8.795	1	.003		
Fisher's Exact Test				.012	.006
Linear-by-Linear Association	7.881	1	.005		
N of Valid Cases	24				

The prevalence of significant bacteriuria in this study of 54.2% is of high concern, especially since the students included in this study did not have complaints representative of UTI. According to the microorganisms found in this investigation, *E.coli* is the most common, and almost all of the student was of this type. *Staphylococcus aureus* was shown to be the most prevalent uropathogen isolated from individuals with ASB in both diabetics and non-diabetics in a recent investigation in Nigeria. UTIs are quite common, particularly in women Due to anatomical characteristics such as the closeness of the external urethral meatus to the anus and the shorter urethral length compared to males, the female gender is one of the primary risk factors in the development of UTIs and ASB, with an average of 50 to 60% of women experiencing one at some point in their lives. Except for a

peak period between the ages of 15 and 24, the prevalence of UTIs rises with age, with about 10% of postmenopausal women being diagnosed with one. The incidence of ASB varies greatly, ranging from 1% to 5% in healthy premenopausal women to 100% in patients with indwelling catheters. In healthy individuals, the prevalence of ASB rises with age, from 2% in children to 50% in elderly patients of long-term care institutions. Asymptomatic bacteriuria is more common in patients with diabetes (17%) than in healthy controls (10%), and it can proceed to symptomatic UTI in up to 20% of them, especially if their glycemic control is poor.[1] Untreated ASB may raise the risk of symptomatic UTIs and associated consequences, according to several observational studies. However, there is no strong evidence that bacteriuria causes these clinical consequences (particularly in the absence of a structural defect) or that early treatment has significant therapeutic advantages.[3] According to certain research, females who have recently had sexual intercourse, or are using a diaphragm or condoms pre-coated with spermicide jelly, have a greater risk of ASB. However, some researchers claim that recent sexual intercourse is not a risk factor and that there is no change in the incidence of UTI when using alternative contraceptive methods.[2] Early detection of asymptomatic infection and identification of kidney abnormalities, which will aid in the avoidance of severe infection and renal scarring, are major reasons to screen for ASB. The Canadian Investigation Team discovered ASB in 1.8% of females and an insignificant percentage of males in research.[4] According to a recent study, the pattern of ASB is shifting, with *Klebsiella* accounting for the majority of the asymptomatic bacteriuria among diabetics. The prevalence of ASB in postmenopausal women ranges from 2.8 to 8.6%. This can be explained by a decrease in *Lactobacillus* in the vaginal flora due to low estrogen levels, which causes a rise in normal pH, allowing gut bacteria to colonize the vaginal flora.[5]

Conclusion and Future direction

Finally, the findings of this study have emphasized the need of detecting asymptomatic bacteriuria as part of the medical screening for students at the university. Usually, such students would not go to a clinic, even though, as we have shown, they may be carrying an asymptomatic illness. A wide variety of studies related to asymptomatic bacteriuria have been discussed in recent publications. Further investigations identifying bacteriuria prevalence, infecting organisms, and risk factors are needed, according to observations indicating the frequency of asymptomatic bacteriuria in various developing countries. Several studies suggest that asymptomatic bacteriuria in young women, renal transplant patients, and mild urologic operations patients should not be treated.

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