



Prevalence and Gender Related Etiology of Asymptomatic Bacteriuria in Medical Student of the Libyan International Medical University

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Abstract

Questioning whether asymptomatic bacteriuria can be manifested affecting the health of young individuals this report was written based on the standard diagnostic methods for diagnosing asymptomatic bacteriuria. 63 males and female participants of the 3rd year medical students of the Libyan international medical university was the target of the diagnostic experiment which was done on March of 2022 using bacteria culture test and Gram staining to detect the presence of different bacterial species in urine specimens taken from majority of healthy young individuals who weren't complaining of any urinary tract infection symptoms. The major findings were that 16.7% of the female students had a great rate of prevalence of asymptomatic bacteriuria and 0% growth in the specimens taken from male students, proving the elevated risk of asymptomatic bacteriuria being manifested in females.

Introduction

Urinary tract infections (UTIs) are infections of any part of the urinary system, including the kidneys, ureters, bladder, and urethra. The different types of UTIs include: cystitis, urethritis, pyelonephritis, vaginitis and prostatitis. Urinary tract infection can be considered one of the most frequent bacterial infections in the community of patients presented with urinary tract complains to health care facilities as well as that the causative agents that medical laboratory workers have found in cultured urine specimens related to patients can be any of these pathogens: *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Enterococcus faecalis* and *Staphylococcus saprophyticus*. The previously mentioned Uropathogens obtain special priorities which gives them the ability to colonize and proliferate in the urinary system these priorities can be: the synthesis of adhesins, siderophores (iron chelators and their primary function is to sequester iron from the host and deliver this important metal nutrient to the microbes) and toxins, they spread from person to person and possibly by food or water ⁽¹⁾. Antibiotics are the first line of treatment in the confirmed cases of UTIs in both children and adults. Asymptomatic bacteriuria is a condition in which a urine specimen were collected from an individual without the manifestation of symptoms or signs related to having a urinary tract infection. Asymptomatic bacteriuria is one of the most prevalent clinical complains in the clinical practice and it's prevalent rises with age in addition to this it is far more common in women than in men due to the short length of the female urethra which in turn makes it easier for the causative microorganism to escape to the bladder ⁽²⁾. Asymptomatic bacteriuria in a pregnant woman is caused by group B *Streptococcus*. In women and men aged 65 to 80 years, the incidence is 15% or more, and it can reach 40% to 50% after that ⁽³⁾.

Materials and Methods

Urine samples were collected to detected the prevalence of asymptomatic bacteriuria in a number of third year medical students of the Libyan international medical university in two lab groups separately. Group A1 and group A2 the total number of the participants were 63. 33 females and 30 male participants. Mainly two detecting methods were used: Bacteria culture test and Gram staining. The purpose of using bacteria culture test is for studying the morphology and the identification of the type of bacteria in a given specimen the process was

as follows: a plastic loop was submerged into the urine sample and a zigzag motion was drawn in the goal of spreading the sample from a starting point to an end point on a blood agar the sample was incubated for 24 hours. In contrast the gram staining is a technique for identifying gram positive and gram-negative bacteria by coloring them red if the bacteria were a gram-negative due to the presence of thin peptidoglycan layer in it's cell wall or violet if the bacteria were a gram-positive bacterium which is attributed to its thick peptidoglycan layer. The technique is done as follows: firstly, a drop of the urine sample was pipetted and placed on a glass strip then the glass strip was placed upon an open flame in the aim for it to dry. Secondly, a drop of crystal violet dye was added for sixty seconds then washed afterwards. Thirdly, a drop of iodine solution was added for another sixty seconds then washed. fourthly, a decolorizing agent: ethyl alcohol was added to the sample for 10 seconds and finally the sample was stained red with a water-insoluble safranin counterstain for 45 seconds. It should be noted that the glass slide was placed upon the fire flame to aid it dry after the washing of each added chemical substance.

Results and Statistical analysis

	Male %	Female %
Significant Growth (N=3)	0 %	2 females about 16.7 %
No Growth (N=11)	9 Males about 75%	2 females about 16%
No Significant Growth (N=11)	3 Males about 35%	8 females about 66.7%

Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)	Point Probability
Pearson Chi-Square	8.727 ^a	2	.013	.019		
Likelihood Ratio	9.949	2	.007	.015		
Fisher's Exact Test	8.180			.019		
Linear-by-Linear Association	8.065 ^b	1	.005	.007	.004	.003
N of Valid Cases	24					

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

b. The standardized statistic is -2.840.

The hypothesis that was created to be proven right or wrong after the urine analysis lab was that the spread of ABU has a gender association and that women have more tendency to experience asymptomatic bacteriuria urinary tract infections than men, in interpretation of the spss program calculated results:

- With the use of Fischer’s Exact test the P value result was shown to be significant equaling = 0.019 and the hypothesis made was proven to be right hence 16.7% of female participants (100,000 CFU/mL) demonstrated substantial growth which is an expected result relating to the previously mentioned information in the introduction of this report that females will complain far more than males from asymptomatic bacteriuria due to the reasons that we will go through furthermore in the discussion.
- There was no growth noted in 75% of the male participants which was expected as the prevalence of asymptomatic bacteriuria in healthy young men participants is almost 0%.
- In 25% of male participants and 66.7% of female participants, no substantial growth (100,000 CFU/mL) was observed.

Discussion

In discussion of the pervious statistical results which have proven the made hypothesis right, there is a percentage of 16.7% of female students confirmed to have asymptomatic bacteriuria, ⁽⁵⁾ ABU can be a condition affecting any part of the urinary system spawned by various species of bacteria at specific quantities. ABU also has a different allotment between different populations of both genders and this distribution can be dependent on certain factors such as: age and underlying disorders for an e.g. (history of urinary tract infection, diabetes millets and excessive antibiotic use) but most frequently is the population of both genders

that has been on long-term catheter use due to the catheter's ability to permit the passage of different bacteria to enter the body causing the patient to undoubtedly experience polymicrobial ABU then the second most affected population will be individuals with spinal cord injury, SCIs patients suffer from neurogenic malfunctioning lower urinary tract correspondingly the storage and discharge function are both hindered furthermore the stasis of urine in the urinary tract due to this dysfunction will allow the bacteria to accumulate increasingly in the urinary tract and the third most affected population will be elderly women that are residence in health care facilities. Another major category affected by UTIs and asymptomatic bacteriuria are pregnant women and this can be related to few factors: Weakening of the immune system during pregnancy, presence of a higher amount sugar in the urine of pregnant women (which is an essential factor for the bacterial survival), the psychological increase in size and enlarging of the uterus causing it to press on the bladder making the process of emptying the bladder a bit harder and leading to urine stasis. ⁽⁶⁾ therefore, all pregnant women must be screened for asymptomatic bacteriuria. ⁽⁵⁾ Going deeper into the microbiology world of ABU there is a frequently found microbial agent in the urine specimens taken for diagnosis of both healthy and with a medical condition individual and this will be: Escherichia coli. Other bacterial agents include: Enterococcus species and group B Streptococcus in women while in men the causative agent can be Enterococcus species and gram-negative bacilli. When it comes to the treatment of UTIs and asymptomatic bacteriuria as mentioned in the introduction of this medical scientific report antibiotics are the standard and the first line of treatment whereas the commonly prescribed antibiotics depending on the type of bacteria after diagnosis with culturing method include: Amoxicillin/Augmentin, Ceftriaxone, Cephalexin, Ciprofloxacin, Fosfomycin, Levofloxacin, Nitrofurantoin and Trimethoprim/sulfamethoxazole.

Conclusion

To recapitulate the urine analysis diagnostic experiment of both genders that has been done on the 3rd year medical students of the Libyan international medical university on March of 2022. Female student had a higher incidence rate of asymptomatic bacteriuria due to functional and anatomical related factors this leads us to believe in the importance of screening for asymptomatic bacteriuria in females in general and pregnant women in specific.

References

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