AFJHMS
African Journal of Health
and Medical Sciences

Original Article

PREVALENCE, ANTIMICROBIAL SUSCEPTIBILITY BACTERIURIA AMONG PREGNANT WOMEN AT SOS HOSPITAL, MUQDISHO SOMALIA

Abdirahman Mohamed[1], Husain shurie[2], Aniso A. Osman[3], Mohamed S. Hussein[4], Nasteho I. Afrah[5], Ali Omar Hassan[6], Hassan M. Dirie[7].

[1] Department of Medical Laboratory Sciences, Faculty of Medicine and Health Sciences, Jamhuriya University of Science and Technology, Mogadishu, Somalia
[2] Advance Medical Research, Jamhuriya Research Center, Jamhuriya University of Science and Technology, Mogadishu, Somalia

Abstract

Objective: the aim of this study is to isolate the prevalence, of antimicrobial susceptibility bacteriuria among pregnant women at SOS hospital.

Methods: Descriptive cross-sectional study during the time frame between Dec 2020 at SOS hospital in Hilawa distract Muqdisho.The urine sample was collected using the midstream clean-catch urine method and tested bacteriologically following standard procedure. An antimicrobial susceptibility test was also performed for the isolated organism using the Kirby disk diffusion method according to the clinical laboratory standard institute (CLSI).

For data analysis and interpretation we used the SPSS tool and interpretation was presented in frequencies and percentages in tables.

Result: of the 102 samples collected 34 showed no growth 68 was growth. of the 68 demonstration organisms Staphylococcus aureus 46 (41.1%). E.coli were 8 (7.8%) and pseudomonads aeruginosa 8(7.8%) Proteus mirabiliss 3(2.9%), K.Pneumonia 3(2.9%). the most sensitive drug was Levofloxacin 51(75%). while Nitrofurantoin was the highest resistant pattern 58(85.29%) followed by Ceftriaxone 48(70.6%) amoxicillin 38(55.9%) ciprofloxacin 24 (35.29%) respectively.

Keywords: Antimicrobial susceptibility, Bacteriuria, pregnant women.

Address for correspondence: Shafie AbdulkadirHassann, Department of medical laboratory sciences, Faculty of medicine and Health Sciences, Jamhuriya University of Science and Technology, Mogadishu, Somalia. Email: Shafie@just.edu.so

Introduction

Urinary tract infection is the commonest bacterial infection in pregnancy. It occurs more frequently in developing countries among the low socioeconomic populations. In the USA surveys, it is estimated that there are about 8 million cases of UTI annually with huge economic implications. Found prevalence rate of UTI in pregnant women in America to be 2.5–8.7% whereas Valiquez et al. estimated the prevalence of UTI in pregnant women to be 12–40% in developing countries [1]. Urinary tract infection (UTI) refers to the existence and increase of bacterial pathogens in the organs of the urinary tract. It is characterized by a wide spectrum of symptoms ranging from mild irrelative voiding to bacteremia, sepsis, or even death]. About 50 to 60% of women knowledge at least one period of UTIs during their lifetime because of the short length of the urethra along with proximity to the absence of bactericidal prostatic secretion and moist anal canal region [2].

Urinary tract infections (UTIs) belong to the most common bacterial infections worldwide, mainly affecting women and are a repeated indication for antibiotic therapy. In difference, asymptomatic bacteriuria (ABU), is often benign and does not need antibiotic therapy in nonpregnant and otherwise healthy women. However, during pregnancy, 25–30% of pregnantwomen with ABU are at risk of developing acute pyelonephritis, associated with complications such as preterm birth. Although screening for and antibiotic treatment of ABU in pregnant women to reduce the risk of acute pyelonephritis is common in developed countries[3].

Saudi Arabia the current think about was to study the predominance of UTI and to explore the most frequent causative specialists and sedate resistance profiles related with such contaminations among pregnant ladies going to Obstetrics and Gynecology clinics at the most Maternity and Children Clinic in Makkah, KSA. Anti-microbial sensitivity tests were fcarried out for the recouped bacterial isolated from UTI cases. The result of the sensitivity tests were appeared in. The study revealed that amoxicillin, cefoxitin, celtaxidime, norflaoacin, penicillin and fusidic corrosive are the most useful anti-microbials for treatment of UTI [4]. In Somalia, antibiotics are widely used in the empirical treatment of

clinically diagnosed Urinary tract infections. Thus, there might be an increasing incidence of microbial resistance to commonly used antibiotics for the treatment of UTIs. Thus, knowing the magnitude of drug resistance is of critical importance since the changing levels of antibiotic resistance have a large impact on the empirical therapy of

Methodology

The study is cross-sectional and conducted at SOS hospital, Mogadishu, Somalia, during – 2ndt December 2020 to Aug 20/2021. A total of 102 sample clean catch-midstream urine samples were collected from outpatients suspected of UTI and then tested through microbiological investigations such as gram staining, microscopic identification, identifying colony morphological appearance, and biochemical tests following the Clinical Laboratory Standard Institute (CLSI) procedure [5] of the pregnant women were collected in sterile containers at the laboratory of sos hospital the sample were well maintained and transported with thirty minutes while storing in 4° C at the laboratory department faculty of medicine & health sciences of Jamhuriya University of science and technology for further processing and analysis.

Culture specimen

All specimens were directly cultured on standard media of Cystine lysine electrolyte deficiency (CLED) (HiMedia laboratory Pvt ltd in India) agar. A wire loop of (0.001 mL) deep in urine was used to inoculate on the CLED agar media, making a zigzag distribution then, plates were incubated aerobically at 37° C for 24 hours. Urine samples with colony $\geq$ 105 Cfu/mL were taken as significant growth (Positive urine culture = 105 CFU/mL). Significant single colonies were gram stained. The significant growth was identified further using biochemical tests such as Indole, Citrate Utilization and triple Sugar Iron (TSI) [6].

Antimicrobial Susceptibility testing

Antimicrobial susceptibility testing was performed on using using Mueller Hinton agar disc diffusion method. diffusion method

following the Clinical laboratory standard institute (CLSI) guideline [10]. Briefly, a 3-5 of well-isolated colonies of the bacteria were collected in a sterile wire loop and emulsified into a tube containing 3-5 mL sterile physiological saline. In good light, the turbidity of the suspension was matched to the turbidity of the standard. Using a sterile dry cotton swab, a sample of the inoculums with adjusted turbidity was streaked on the surface of the semi-dried Mueller– Hinton agar plate in well-distributed directions, after removal of the excess by pressing against the sides of the test tube. Using sterile forceps, the selected antibiotics disks of Levofloxacin, Nitrofurantoin, Ciprofloxacin, Ceftriaxone, and Amoxicillin were placed on the plates and incubated at 37°C for 24 hours. The sensitivity and resistance were determined by measuring the diameter of zones of bacterial growth inhibition with a meter rule and then compared against zone diameter breakpoints and interpretative of susceptibility according to CLSI [7].

Statistical data analysis

After this information was collected, we used a quantitative method for analyzing and interpreting data. The data were analyzed using the statistical package for the Social Science technique (SPSS) program (version 20.0). Cross-tabulation analysis and odds ratio (OR) with 95% confident interval (CI) was used to determine the association of demographic characteristics and UTI.

Ethical consideration of the study

The study obtained approval from the research ethics committee of Jamhuriya University of Science and Technology (Reference: DES 2020, Dated: 20th AGU 2021) for these research activities to be carried out. Besides, SOS hospital administration granted permission to access the hospital. The research was conducted respecting the ethical values, confidentiality, and moral expectations of the respondents after their verbal consent.

Results

Results 102 samples were collected 34 showed no growth 68 was growth. of the 68 demonstration organisms Staphylococcus aureus 46 (41.1%). E. coli were 8 (7.8%) and pseudomonads aeruginosa 8(7.8%) Proteus mirabiliss 3 (2.9%), K.Pneumonia 3(2.9%). the most sensitive drug was Levofloxacin 51(75%). while Nitrofurantoin was the highest resistant pattern 58(85.29%) followed by Ceftriaxone 48(70.6%) amoxicillin 38(55.9%) ciprofloxacin 24 (35.29%) respectively.

Table 1.1: Shows the frequency of samples isolated from pathogens
According to the organism growth, 68(66.7%) of the samples were grown, while 34(33.3%) not grew.

Table 4.9: show the frequency of isolated organisms

Isolation organisms	Frequency	Percent
E. coli	8	7.80%
Klebsiela pneumonia	3	2.90%
Proteus mirabilis	3	2.90%
P. aeruginosa	8	7.80%
S. aureus	46	45.10%
Total	102	100

The above table indicated that S. aureus 46(45.1%) was the most isolated organism, followed by E.coli 8(7.8%) and P. aeruginosa 8(7.8%) whereas Klebsiela pneumoniae 3(2.9%) and P. mirabilis 3(2.9%) were the least isolated.

Table 4.10: Show Antimicrobial susceptibility pattern of isolated organisms

Name of antibiotics	Sensitivity pattern			
	Sensitive (%)	Intermediate (%)	Resistance (%)	Total (%)
Levofloxacin	51(75%)	2(2.94%)	15(22.6%)	100
Amoxicillin	27(39.70%)	3(4.76%)	38(55.9%)	100
Ciprofloxacin	31(45.6%)	13(19.11%)	24(35.29%)	100
Ceftriaxone	12(17.6%)	8(11.8%)	48(70.6%)	100

The table above shows that the most sensitive drug was Levofloxacin 51(75%). while Nitrofurantoin was the highest resistant pattern 58(85.29%) followed by Ceftriaxone 48(70.6%).

Conclusion

In this study, staphylococcus aureus were the highest number of organisms isolated 46 (41.1%). E.coli were 8 (7.8%) and pseudomonads aeruginosa 8(7.8%) out of the total 102 isolates which determines it as the second predominates urinary tract infections, and the rest as follows Proteus mirabiliss 3(2.9%), K.Pneumonia 3(2.9%) respectively as demonstrated in In our study we found out the most sensitive drug was Levofloxacin 51(75%). while Nitrofurantoin was the highest resistant pattern 58(85.29%) followed by Ceftriaxone 48(70.6%).

In this study it revealed that the age of group with the highest prevalence was above 30--39 years were the age of interval infected with UTI 50(49%).

According to our study the gestational period of participants of the patients _were found significantly associated with higher rate of the third trimester 69(67.6%) 27 This was in contrast to other studies, S. Aureus was the most common bacteria isolated in this study and this Similar finding was also reported in another study. (14)

were detected with an overall detection rate of 78.4% (257/328). Among the bacterial pathogens isolated from clinical specimens, 152 (46.3%) were Staphylococcus aureus, 60 (18.3%) were E. coli, 10 (3.1%) Proteus vulgaris, 6 (1.8%) Klebsiella pneumonia, and 1 (0.3%) isolate was found to be Salmonella spp we agree with this study.

In our study similar to another study and wase also reported in Nigeria (13) the most common bacteria isolated Staphylococcus aereus (52 cultures, 20.6%), deferent other previously bacteria was isolated such as. Proteus mirabilis (24 cultures, 9.5%), Klebsiella spp. (4 cultures, 1.6%), and Pseudomonas spp. (3 cultures, 1.2%).

Escherichia coli was the most predominant isolate (47.95%), followed by Staphylococcus aureus (18.1%), and Klebsiella pneumoniae (13.45%) which showed high prevalence of Also other previously study that different our study that considered it E.coli as the main causing urinary tract infection We therefore, differed in these studies with study carried out in India (6).

Similar finding have been reported from previously studies in Nigeria (13) Levofloxacin

had the highest overall antibiotic sensitivity of 92.5%. Others with overall antibiotic sensitivity pattern greater than 50% included ciprofloxacin (66.7%).

CONCLUSION

To summarize, the results from the study showed prevalence of staphylococcus aureus were the highest number of organisms isolated 46 (41.1%).in our finding.

The highest sensitive drug was Levofloxacin 51(75%).while Nitrofurantoin was the highest resistant pattern 58(85.29%) in our study.

Urinary tract infection is the commonest bacterial infection in pregnancy. It occurs more frequently in developing countries among the low socioeconomic populations. Therefore, the urological community has a responsibility in careful use of available antibiotics in order to reduce the development of resistance.

References

1. Bacterial Uropathogens in Urinary Tract Infections and antibiotic Susceptibility patterns in Banadir Hospital, Mogadishu-Somalia. (n.d.). ResearchGate. Retrieved February 8, 2021, from

2. Bacterial Uropathogens in Urinary Tract Infections and antibiotic Susceptibility patterns in Banadir Hospital, Mogadishu-Somalia. (n.d.). ResearchGate. Retrieved February 8, 2021,

3. Urinary tract infection: Causes, symptoms, diagnosis and it's management. (n.d.). ResearchGate. Retrieved February 9, 2021, from

4. Urinary tract infection: Causes, symptoms, diagnosis and it's management. (n.d.). ResearchGate. Retrieved February 9, 2021,

5. 1: Demilie, T., Beyene, G., Melaku, S., & Tsegaye, W. (2012). URINARY BACTERIAL PROFILE AND ANTIBIOTIC SUSCEPTIBILITY

PATTERN AMONG PREGNANT WOMEN IN NORTH WEST ETHIOPIA. 22(2), 8.

6. 1Abate, D., Marami, D., & Letta, S. (2020). Prevalence, Antimicrobial Susceptibility Pattern, and Associated Factors of Urinary Tract Infections among Pregnant and Nonpregnant Women at Public Health Facilities, Harar, Eastern Ethiopia: A Comparative Cross-Sectional Study. The Canadian Journal of Infectious Diseases & Medical Microbiology = Journal Canadien Des Maladies Infectieuses Et De La Microbiologie Medicale, 2020, 9356865.

7. Derese, B., Kedir, H., Teklemariam, Z., Weldegebreal, F., & Balakrishnan, S. (2016). Bacterial profile of urinary tract infection and antimicrobial susceptibility pattern among pregnant women attending at Antenatal Clinic in Dil Chora Referral Hospital, 30 Dire Dawa, Eastern Ethiopia. Therapeutics and Clinical Risk Management, 12, 251–260

8. Forson, A. O., Tsidi, W. B., Nana-Adjei, D., Quarchie, M. N., & Obeng-Nkrumah, N. (2018). Escherichia coli bacteriuria in pregnant women in Ghana: Antibiotic resistance patterns and virulence factors. BMC Research Notes, 11(1), 901

9. Hamdan, H. Z., Ziad, A. H. M., Ali, S. K., & Adam, I. (2011). Epidemiology of urinary tract infections and antibiotics sensitivity among pregnant women at Khartoum North Hospital. Annals of Clinical Microbiology and Antimicrobials, 10(1), 2.

10. Abate, D., Marami, D., & Letta, S. (2020). Prevalence, Antimicrobial Susceptibility Pattern, and Associated Factors of Urinary Tract Infections among Pregnant and Nonpregnant Women at Public Health Facilities, Harar, Eastern Ethiopia: A Comparative Cross-Sectional Study. The Canadian Journal of Infectious Diseases & Medical Microbiology = Journal Canadien Des Maladies Infectieuses Et De La Microbiologie Medicale, 2020, 9356865.

11. Bhavsar, S., & Krilov, L. (2015). Escherichia coli Infections. Pediatrics in Review /

American Academy of Pediatrics, 36, 167–171

12. Bhavsar, S., & Krilov, L. (2015). Escherichia coli Infections. Pediatrics in Review / American Academy of Pediatrics, 36, 167–171.

13. Definition of %1$s—Glossary term %1$s. (n.d.). Synbiosis. Retrieved February 9, 2021, from

14. Definition of %1$s—Glossary term %1$s. (n.d.). Synbiosis. Retrieved February 9, 2021, 31 Demilie, T., Beyene, G., Melaku, S., & Tsegaye, W. (2012). URINARY BACTERIAL PROFILE AND ANTIBIOTIC SUSCEPTIBILITY PATTERN AMONG PREGNANT WOMEN IN NORTH WEST ETHIOPIA. 22(2), 8.

15. Derese, B., Kedir, H., Teklemariam, Z., Weldegebreal, F., & Balakrishnan, S. (2016). Bacterial profile of urinary tract infection and antimicrobial susceptibility pattern among pregnant women attending at Antenatal Clinic in Dil Chora Referral Hospital, Dire Dawa, Eastern Ethiopia. Therapeutics and Clinical Risk Management, 12, 251–260.

16. Hamdan, H. Z., Ziad, A. H. M., Ali, S. K., & Adam, I. (2011). Epidemiology of urinary tract infections and antibiotics sensitivity among pregnant women at Khartoum North Hospital. Annals of Clinical Microbiology and Antimicrobials, 10(1), 2.

17. Lee, A. C., Mullany, L. C., Koffi, A. K., Rafiqullah, I., Khanam, R., Folger, L. V., Rahman, M., Mitra, D. K., Labrique, A., Christian, P., Uddin, J., Ahmed, P., Ahmed, S., Mahmud, A., DasGupta, S. K., Begum, N., Quaiyum, M. A., Saha, S. K., & Baqui, A. H.

(2019). Urinary tract infections in pregnancy in a rural population of Bangladesh: Population-based prevalence, risk factors, etiology, and antibiotic resistance. BMC Pregnancy and Childbirth, 20(1), 1.

18. Lee, A. C., Mullany, L. C., Koffi, A. K.,

Rafiqullah, I., Khanam, R., Folger, L. V.,

Rahman, M., Mitra, D. K., Labrique, A.,

Christian, P., Uddin, J., Ahmed, P.,

Ahmed, S.,