

KAMPALA INTERNATIONAL UNIVERSITY

BACTERIAL URINARY TRACT INFECTIONS IN PREGNANT WOMEN.

By

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SUMMARY:

Urinary tract infection is widespread among pregnant women and is accompanying adverse maternal, fetal, and neonatal outcomes. Even so, no data exist regarding this problem in Bushenyi, the catchment area for KIUTH to guide specific management and thus to avert the adverse consequences. The aims is to assess the urinary tract infection among pregnant women attending ANC in KIUTH first trimester and its associated risk factors and to investigate the most common antibacterial agent used by infected pregnant women, in a total of about 350 pregnant women who attend the obstetrics and gynecology clinic with the inclusion criteria are to be included. The clinical symptoms such as frequency of micturition, dysuria, lower abdominal pain, urine color change, painful burning sensation, incomplete bladder evacuation will be utilized among the infected women. Since the symptoms are a good predictor for urinary tract infection during pregnancy, so early screening for pathogens and proper treatment for infected cases should be instituted.

CHAPTER ONE: INTRODUCTION

Urinary tract infection (UTI) is an inflammatory response in the epithelium of the urinary tract caused by any infection. UTI is a common bacterial infection causing illness in pregnant women, there has been an increasing appreciation of the urinary tract as the most frequent site of occult and serious bacterial infections (Msaki, B.P., Mshana, S.E., Hokororo, 2012).

Urinary Tract Infections (UTIs) have been a health burden throughout the history of mankind. In ancient times the Greeks thought that UTIs resulted from disharmony while the Egyptians and Romans developed different ways to palliatively manage UTIs which included use of herbs, bed rest, diet narcotics. During the ancient days in Babylon, diagnosis of UTIs was made by visual inspection of the colour and cloudiness of urine and in the 20th century diagnosis was transformed by the use of assays for white cell and bacterial counts in urine. Almost 100 years ago, the nitrite test was developed (Hyman and Mann, 1927) but had a limitation in its inability to identify the pathogen because it measures the conversion of dietary nitrate to nitrite by Gram-negative bacteria. Currently its used as a screening test where a positive nitrite test makes UTI very likely but the test may be falsely negative if the bladder is emptied frequently or if an organism that does not metabolize nitrate (including all Gram-positive organisms) is the cause of infection (Nickel, C., Sagner, A., Georgi, F., Reuter, G., Sass, H., Krauss, V. 2005).

The germ theory of diseases is a currently accepted scientific theory of many diseases proposed decades ago by Louis Pasteur, which states that invisible microorganisms termed as pathogens or “germs” can lead to disease. It further elaborates that even when a pathogen is the principal cause of a disease, other factors such as environmental, hereditary, and social factors come into play to influence the severity of the disease. The above theory determines whether the potential host individual becomes infected when exposed to the pathogen. Hence, this theory was directed towards this study to identify different bacterial isolates as the possible causes of UTIs and the significant clinical predictors which contributed to the morbidity in the infected individuals (Meyer, 2003).

The above is supplemented by the biomedical model of diseases which focuses purely on biological factors. It focuses on physical processes such as pathology, biochemistry and physiology of diseases and this was postulated by the Rudolf Virchow that all diseases contained

structural changes at the cell level. Therefore, in regard to this study it is demonstrated how clinical features of UTIs come about as a result of interaction between the host and the causative agents at cell level and in turn these clinical features can be used as predictors for development of UTIs. Many diseases can undoubtedly be treated and cured according to the biomedical model, for example; infectious diseases and diseases demanding surgical operation, thus making it a basis for the medical management (Porter, 1999).

Globally, Gram-negative colonic bacteria are responsible for the majority (91%) of UTIs with *E.coli* being the most prevalent bacterial uropathogen (Festo, Kidenya, Hokororo, & Mshana, 2011) and other Gram negatives such as *Klebsiella* and *Proteus* have been reported by Garout and colleagues (2015) to be among the common uropathogens. Bacteria may also be present in the urinary tract without causing signs of infection, referred to as asymptomatic bacteriuria. Viruses (adenovirus), fungi (candida species) and protozoa (*Schistosoma*, *enterobius vermicularis*) also contribute to the burden of UTIs (Balighian & Burke, 2019).

Antibiotic resistance is a serious threat to public health in Europe and has led to increased healthcare costs, prolonged hospital stays, treatment failures and sometimes death. From 2010 to 2013, there was reported resistance of the commonly isolated uropathogens to fluoroquinolones, third-generation Cephalosporins and aminoglycosides, and combined resistance to all three antibiotic groups had increased significantly as reported by European Center for Disease Prevention and Control (ECDC) (2014). Carbapenems had become an important group of last-line antibiotics for treatment of infections involving multidrug-resistant Gram-negative bacteria such as *K. pneumoniae* and *E. coli* but at the end of 2013 there was a large inter-country variation in antimicrobial susceptibility to the mentioned drugs in Europe. High percentages (>25%) of isolates with combined resistance to fluoroquinolones, aminoglycosides and Carbapenems were reported from southern and south-eastern Europe by ECDC (2014).

Several factors have been reported by different studies to be predictive of UTIs in women among which include fevers, diarrhea, age, sex, vomiting, immuno-suppression, among others, and in developing countries, the prevalence of UTIs among women of low social economic status.

CHAPTER TWO: LITERATURE REVIEW

Urinary tract infection and its associated complications are the cause of nearly 150 million deaths per year worldwide. The disease can be developed in 40% - 50% of women and 5% of men. After anemia, UTIs are the second common complications in pregnant women, which if not controlled well, can adversely affect the health of infant or the pregnant mother. Pregnancy UTI is classified into two categories of symptomatic and asymptomatic: A) the involvement of the lower urinary tract, leading to asymptomatic bacteriuria is the most common cause of UTI during pregnancy. B) The involvement of the upper urinary tract can lead to symptomatic bacteriuria and is characterized by acute Pyelonephritis. Based on performed researches, the prevalence of symptomatic urinary tract infection in pregnant women has been 17.9% and asymptomatic form in 13%. If asymptomatic infection is not treated, it leads to some clinical manifestations in mother and newborn (Amiri, Lavasani, Norouzirad, Najibpour, Mohamadpour, Nikpoor, & Marzouni, 2015).

Increased age, number of childbirths, number of intercourses per week, diabetes, recessive sickle cell anemia, previous history of UTI, immunodeficiency and urinary tract abnormalities can increase the risk of UTI in pregnant women (15, 16). Bacterial organisms, which cause this disease, include *Escherichia coli*, *Klebsiella pneumonia*, *Proteus*, *Acinetobacter*, *Saprophyticus Staphylococcus*, *Streptococcus* Group B and *Pseudomonas aeruginosa*. The incidence of UTI increases by pregnancy. Based on previous researches, the probability of UTI initiated by the sixth week. This probability peaks at 22 - 24 weeks of gestational age. The reasons for increased probability of infection in pregnant women are probably increased bladder volume and its expansion and expanded ureter. Anatomical and physiological changes occurring during pregnancy alter the course of bacteriuria and make pregnant women more susceptible to UTI complications such as pyelonephritis (Amiri, Lavasani, Norouzirad, Najibpour, Mohamadpour, Nikpoor, & Marzouni, 2015).

Studies have indicated that 25% - 40% of untreated pregnant women with asymptomatic bacteriuria will eventually develop to acute pyelonephritis as the most common cause of predelivery hospitalization. Furthermore, even if pyelonephritis is treated immediately, the condition significantly increases mortality and the number of infants with low-birth weights. In addition, anemia, preeclampsia and premature rupture of fetal membranes, respiratory failure and risk of septicemia and shock are other risk factors in UTI pregnancy. Moreover, children born with mothers with pyelonephritis are much more prone to impairment of mental and motor development (Amiri, Lavasani, Norouzirad, Najibpour, Mohamadpour, Nikpoor, & Marzouni, 2015).

There is a significant statistical correlation between UTI and congenital retardation. In addition, according to some studies, UTIs are associated with premature delivery, low-birth-weight infants, cesarean delivery, morphological abnormalities and infant mortality. It should be noted that according to the studies, UTI in pregnant women begins in the 6th week of pregnancy and reaches its peak in weeks 22 - 24 and about 90% of these women develop urethral dilation. In pregnant women, due to an increase in the volume of urine and dilation of urethra, the disease causes increased stasis of urine in the bladder, reflux of the urine to the urethra and causes a

physiological increase in plasma volume, which will eventually reduce the urinary concentration (Amiri, Lavasani, Norouzirad, Najibpour, Mohamadpour, Nikpoor, & Marzouni, 2015).

Another common reason is glycosuria, which is present in 70% of pregnant women, increases the urinary level of estrogen and progesterone, and decreases the patient's ability to fight invasive bacteria. All these factors may contribute to the development of UTI in pregnancy. In the recent studies, different reasons were mentioned for this disorder in pregnancy. The commonest microbial agent for this disease has been *E. coli* resistant species, which needs special attention (Amiri, El-Mowafi, Chahien, Yousef & Kobeissi, 2020).

In the sub Saharan region, the prevalence of UTIs is higher compared to the one reported in different studies in the developed world. In Nigeria, a study conducted among 12,458 urine samples, reported prevalence of community-acquired and nosocomial UTIs to be 12.3% and 9.3%, respectively (Ruben & Schaeffer, 2013). Another study done in the same country, West, (2019) found a prevalence of 36.7% among 169 febrile under-fives attending an outpatient clinic. In this study, children aged 12-23 months were more likely to have a UTI, with a prevalence of 42.1%. A much lower prevalence of 4.6% was reported in another study in children aged 6-59 months where UTIs were found to be among the common three causes of fever in children under five (Ocheke, John, Ogbe, Donli & Oguche, 2016

In East Africa and its proximity, the prevalence of UTIs is higher than in developed world but averagely similar to the one reported in other sub-Saharan countries. A cross section study in DRC by Many and colleagues (2019).

CONCLUSION AND RECOMMENDATIONS:

Urinary tract infection is widespread among pregnant women and is accompanying adverse maternal, fetal, and neonatal outcomes. Even so, no data exist regarding this problem in Bushenyi, the catchment area for KIUTH to guide specific management and thus to avert the adverse consequences.

Several factors have been reported to be predictive of UTIs in women among which include fevers, age, immuno-suppression, among others, and in developing countries, the prevalence of UTIs among women of low social economic status.

The aims is to assess the urinary tract infection among pregnant women attending ANC in KIUTH first trimester and its associated risk factors and to investigate the most common antibacterial agent used by infected pregnant women, clinical symptoms such as frequency of micturition, dysuria, lower abdominal pain, urine color change, painful burning sensation, incomplete bladder evacuation will be utilized among the infected women. Since the symptoms are a good predictor for urinary tract infection during pregnancy, so early screening for pathogens.

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