

RESEARCH ARTICLE

Asymptomatic bacteriuria among pregnant women attending antenatal care at Mbale Hospital, Eastern Uganda

Julius Nteziyaremye^{1,2}, Stanley Jacob Iramiot³, Rebecca Nekaka⁴, Milton W. Musaba², Julius Wandabwa², Enoch Kisegerwa⁵, Paul Kiondo^{1*}

1 Department of Obstetrics and Gynecology, College of Health Sciences, Makerere University, Kampala, Uganda, **2** Department of Obstetrics and Gynecology, Faculty of Health Sciences, Busitema University, Mbale, Uganda, **3** Department of Microbiology and Immunology, Faculty of Health Sciences, Busitema University, Mbale, Uganda, **4** Department of Community and Public Health, Faculty of Health Sciences, Busitema University, Mbale, Uganda, **5** Department of Obstetrics and Gynecology, Mulago Hospital, Kampala, Uganda

* kiondop@yahoo.com



Abstract

Background

Asymptomatic bacteriuria in pregnancy (ASBP) is associated with adverse pregnancy outcomes such as pyelonephritis, preterm or low birth weight delivery if untreated. The aim of this study was to determine the prevalence of asymptomatic bacteriuria, the isolated bacterial agents, and their antibiotic sensitivity patterns in pregnant women attending antenatal care at Mbale Hospital.

Methods

This was a cross sectional study in which 587 pregnant women with no symptoms and signs of urinary tract infection were recruited from January to March 2019. Mid-stream clean catch urine samples were collected from the women using sterile containers. The urine samples were cultured using standard laboratory methods. The bacterial colonies were identified and antibiotic sensitivity was done using disc diffusion method. Chi squared tests and logistic regression were done to identify factors associated with asymptomatic bacteriuria. A p value < 0.05 was considered statistically significant.

Results

Out of the 587 pregnant women, 22 (3.75%) tested positive for asymptomatic bacteriuria. Women aged 20–24 years were less likely to have ASBP when compared to women aged less than 20 years (AOR = 0.14, 95%CI 0.02–0.95, $P = 0.004$). The most common isolates in descending order were *E. coli* (n = 13, 46.4%) and *S. aureus* (n = 9, 32.1%). Among the gram negative isolates, the highest sensitivity was to gentamycin (82.4%) and imipenem (82.4%). The gram positive isolates were sensitive to gentamycin (90.9%) followed by imipenem (81.8%). All the isolates were resistant to sulphamethoxazole with trimethoprim

OPEN ACCESS

Citation: Nteziyaremye J, Iramiot SJ, Nekaka R, Musaba MW, Wandabwa J, Kisegerwa E, et al. (2020) Asymptomatic bacteriuria among pregnant women attending antenatal care at Mbale Hospital, Eastern Uganda. PLoS ONE 15(3): e0230523. <https://doi.org/10.1371/journal.pone.0230523>

Editor: Clive J. Petry, University of Cambridge, UNITED KINGDOM

Received: November 5, 2019

Accepted: March 2, 2020

Published: March 19, 2020

Peer Review History: PLOS recognizes the benefits of transparency in the peer review process; therefore, we enable the publication of all of the content of peer review and author responses alongside final, published articles. The editorial history of this article is available here: <https://doi.org/10.1371/journal.pone.0230523>

Copyright: © 2020 Nteziyaremye et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All the relevant data are within the manuscript and its supporting information files.

Funding: The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: The authors have declared that no competing interests exist

(100%). Multidrug resistance was 82.4% among gram negative isolates and 72.4% among the gram positive isolates.

Conclusion

There was high resistance to the most commonly used antibiotics. There is need to do urine culture and sensitivity from women with ASBP so as to reduce the associated complications.

Introduction

Urinary tract infection is a common bacterial infection in women because of the short urethra which can easily be contaminated with microorganisms from the gastrointestinal tract [1]. Pregnant women are at an increased risk of urinary tract infection because of anatomic and physiological changes of pregnancy that give a conducive environment for bacterial proliferation. Under the influence of progesterone, there is smooth muscle relaxation, dilatation of the ureters and renal pelvis especially the right due to compression from the enlarging dextro-rotated uterus. In addition to the relative stasis of the urine due to reduced peristalsis of the ureters, there is glycosuria of pregnancy and general decline in the immunity [2].

Women with urinary tract infection may present with symptoms or may remain asymptomatic. Asymptomatic bacteriuria in pregnancy (ASBP) is defined as presence of bacteria in urine of quantitative counts of 10^5 colony forming units/mL without signs and symptoms of urinary tract infection [1]. Globally the prevalence of ASBP is estimated to be 2–11%, although higher rates have been reported in Uganda [3, 4]. Women at increased risk of ASBP include women with diabetes mellitus and gestational diabetes, women of low socioeconomic status and past history of urinary tract infection [5]. Women with ASBP are at an increased risk of adverse maternal outcomes such as 30–40% incidence of pyelonephritis and this will lead to adverse fetal outcomes like premature birth and low birth weight [6].

Treatment of ASBP prevents pyelonephritis and reduces the risk of preterm deliveries [7]. Many authorities have adopted routine screening and treatment for ASBP as part of antenatal care guidelines. There is a debate on whether treatment of ASBP improves neonatal outcomes and whether antibiotic treatment is associated with adverse pregnancy outcomes. However, there is insufficient evidence to support these associations [8, 9]. It is important therefore to screen pregnant women and offer treatment to mothers diagnosed with ASBP. This will prevent later development of obstetric complications [10, 11].

In Uganda, previous studies reported prevalence of asymptomatic bacteriuria among pregnant women to range from 12.2%–13.1% [3]. *E. coli.*, *Staphylococcus epididymis*, *Staphylococcus aureus*, and *Klebsiella pneumoniae* were the most common bacteria isolated from women with ASBP [4, 12]. However, in Uganda like many other low and middle income countries, screening for ASBP is not done routinely during antenatal care. Little is known about the burden, bacterial aetiology and, sensitivity pattern of ASBP in women in Eastern Uganda. Moreover, the emergence of antimicrobial drug resistance by most uropathogens presents a challenge to the treatment of the women affected [13]. This is further complicated by the surge in the multi-drug resistant organisms which do not respond to the most commonly used antibiotics [14].

The purpose of this study was to establish the prevalence of asymptomatic bacteriuria in pregnancy and the sensitivity patterns of the isolated uropathogens in women attending antenatal care at Mbale Hospital in Eastern Uganda.