Prevalence of Urinary Tract Infection among Women Attending Antenatal Care Visits at Nakuru Hospital: A Systematic Review

Mwenye Phostine Simiyu, Omodo Cecilia Lavenda, Spencer Oyugi, Jefferson Mutibo, Dorriene Cherotich Titany, Cliford Mocha

Department of Clinical Medicine, Kenya Medical Training College, Nairobi, Kenya

ABSTRACT

Urinary tract infections (UTIs) are one of the most frequent bacterial infections that occur during pregnancy. During this time, pregnant women are at a higher risk of infection because of the changes that have occurred in the body and urinary tract. Sometimes the bacteria are in the urine but does not make any symptoms apparent, which is called asymptomatic bacteraemia (ASB). ASB may progress to a more severe type of kidney infection (acute pyelonephritis) and can lead to low birth weight and preterm labour if not treated. In Kenya, prevalence of ASB has been reported in studies of pregnant women from 11% to 22%. No published data were found regarding the prevalence of ASB at Olenguruone Hospital however. The purpose of this review was to determine the evidence presented on the prevalence of uterine tract infections among womankind during their antenatal care (ANC) at Olenguruone Hospice. As there were no facility-specific data, findings from antenatal studies done in other parts of Kenya were used. This Systematic Review was carried out according to the PRISMA 2020 guidelines. The studies were searched in PubMed/PMC, Google Scholar, African Journals Online and University repositories from January 2010 to October 2026. We screened the studies according to the predesigned screening criteria and extracted the information from the studies in a structured form. The quality of the included studies was evaluated by the Joanna Briggs Institute checklist for prevalence and cross-sectional studies. The results were then summarized in a narrative fashion. The review comprised of 4 cross-sectional studies that took place in Kenya. None were carried out in Olenguruone Hospital, but met the predefined eligibility criteria however. At the health centers in Nairobi County, ASB affected 21.5% of pregnant women, at Chulaimbo Sub-County Hospital 16.3% and at Gatudu Hospital 10.8% of pregnant women. The organism found most frequently was E. coli and high levels of resistance were reported for ampicillin and trimethoprim–sulfamethoxazole. The studies also showed some factors associated with the condition, such as pregnancy trimester, employment, religion and awareness. It is yet to be determined whether there is a high prevalence of UTIs among women attending Olenguruone hospital for antenatal care. The prevalence of bacteraemia in pregnancy, however, suggests that this is experienced by some 10% to 20% of pregnant women in the region and a facility-based study and routine urine testing for asymptomatic bacteraemia during antenatal visits are needed. The study aimed to explore the prevalence of asymptomatic bacteraemia in pregnant women attending Olenguruone hospital in Kenya and determine the association between the presence of ASB and urinary tract infection in pregnant women.

KEYWORDS

urinary tract infection (UTI), pregnant women, nakuru

I. INTRODUCTION

One of the most common infections that can occur during pregnancy is a UTI. The urinary system may be affected by hormonal changes during pregnancy and the uterus, and the short urethra in females allows bacteria to more easily reach the bladder Untreated, bacteriuria can lead to acute pyelonephritis, which can result in complications like low weight delivery and premature.

UTIs are common in certain regions and health care institutions but not in others. For instance, a study in Harar, eastern Ethiopia, reported an asymptomatic women have been estimated at between 2% and 10%. Furthermore, a recent study estimated that about 11.1% of pregnant women suffer from UTI in Africa. The differences can be attributed to geographical differences, screening methods, availability to health care and the time of pregnancy when screening is undertaken. According to other Kenyan studies, 16.3% of the patients were reported at Chulaimbo Sub-County Hospital and 10.8% at Gatundu Hospital (Jenkins et al. 2012). The prevalence can differ from one setting to the other within the healthcare system, vary with the type of diagnostic test used, and fluctuate in relation to when the pregnancy is tested. Before (their study 2019) there was no published data on urinary tract infection in western Kenya Likewise, researchers conducting the Embakasi study pointed to scant evidence they found from Nairobi. It is therefore important to have local research to be conducted at the hospital like Olenguruone Hospital, which is a high antenatal attendance area, and the urine-testing practices might differ from the previous studies. This review gathers existing evidence and specifies necessary information to assess the prevalence of UTI in the hospital.

II. MATERIALS AND METHODS

A. Introduction

This section describes the process of finding, gathering and analysing evidence about the prevalence of UTI in female antenatal clients of Olenguruone Hospital. The review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines, which include a clear and transparent process for identifying, screening and selection of relevant studies.

B. Research Question

- What is the rate of U.T.I among women attending antenatal care visits at Olenguruone hospital?
- What is the prevalence of UTI and AB in women in antenatal clinic in other health facilities in Kenya?
- What are the dominating causes and factors associated with these studies?

1. Strategies and selection criteria

Literature was searched from PubMed/PMC, Google Scholar, African Journals Online and university repositories from January 2010 to October 2026. Also reference lists of the included studies were examined.

Table 1. Boolean operators used

Concept	Search terms combined with OR	Boolean operation	Boolean combination
Population	"Pregnant women" OR antenatal OR ANC OR "expectant mothers"	OR	(Population AND Condition AND Outcome) AND (Location)
Condition	("Urinary tract infection" OR bacteriuria OR "asymptomatic bacteriuria")	OR	(Population AND Condition) AND (Outcome)
outcomes	Prevalence OR proportion OR frequency OR magnitude	OR	(Population AND Condition AND Outcome)
location	Alenguruone, Nakuru, Kenya	OR	(Population AND Condition AND Outcome) AND (Location)
Sample string	Full combined string	AND	("urinary tract infection" OR bacteriuria) AND (pregnan* OR antenatal) AND (prevalence) AND (Olenguruone OR Kenya)

2. *Inclusion criteria:*

- Studies were carried out, with special attention being paid to the Olenguruone Hospital in Kenya.
- 2. Investigations of women in their pregnancy during prenatal care.
- 3. Reports of the prevalence of UTI or of presence of bacteria in urine or factors associated with this.
- Full text articles or theses from January 2010 to October 2026 in English.

3. *Exclusion criteria:*

- Studies that have been done elsewhere in Kenya.
- Studies not done elsewhere in Kenya.
- Evaluation of non-pregnant women, children or hospitalised who are not attending ANC.
- Studies that included reported urinary tract infection or bacteraemia rates but did not report the necessary outcome.
- Studies that reported urinary tract infection or bacteraemia rates but did not report the necessary outcome.

C. Data Extraction Procedure

We used a structured form to capture, for each eligible study, the author(s) and year of publication, study design, setting, sample size, diagnostic method, prevalence, causative organisms, and associated factors. Two reviewers independently extracted data from the research questions and the extracted data were then presented in a way that enabled narrative synthesis. Any discrepancies were addressed by re-checking the original source.

D. Quality Appraisal

Studies included were appraised according to the Joanna Briggs Institute (JBI) critical appraisal checklist for studies reporting prevalence data and for analytical cross-sectional studies. It was not only methodological limitations that excluded the evidence, however, as the number of available Kenyan evidence was limited; they are discussed based on strengths and weaknesses.

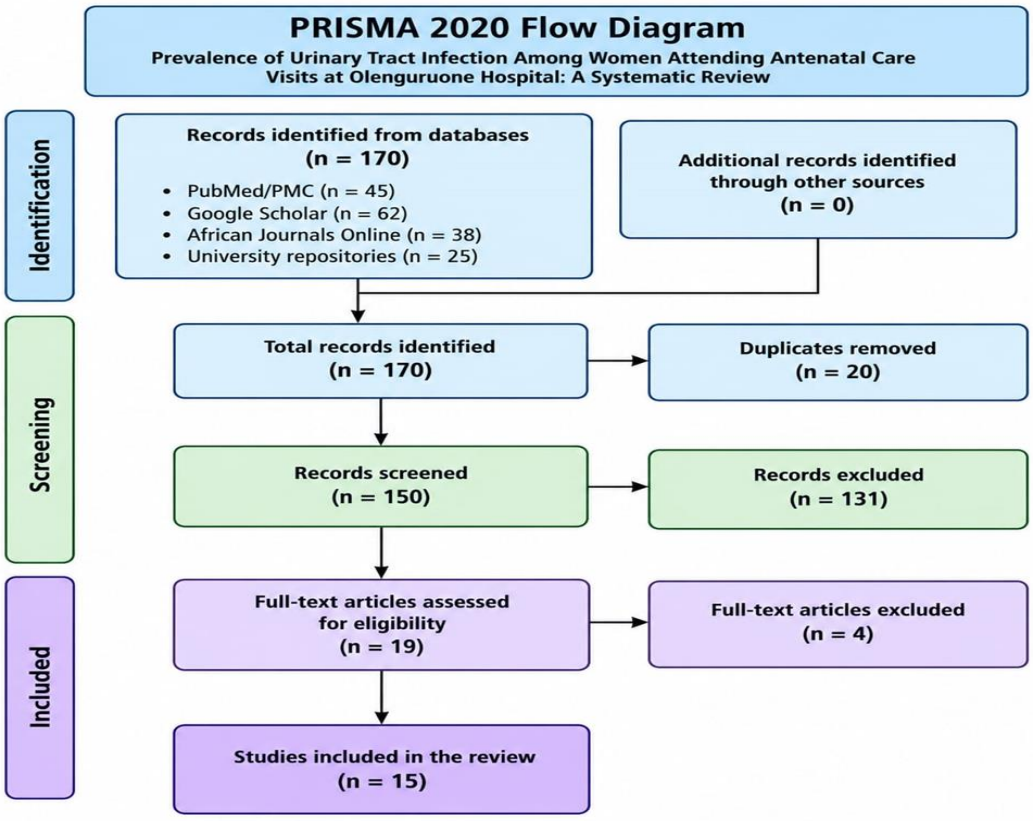


Figure 1: Prisma Style Flow Chart

III. RESULT

A total of 4 studies met the inclusion criteria.3 of the studies were facility-based, reporting prevalence (one of which was a Master's thesis), and one was analytical and examined factors associated with ASB. There were no observations at Olenguruone Hospital. The results were compiled narratively by three areas: prevalence, causative organisms and antimicrobial susceptibility, associated factors. In available draft provide the numerical

counts of the records identified are 170, duplicates removed 20, records screened 150 and full text articles excluded 110 during title and abstract screening; the final number of included studies was 4.

Table 2. The following is the summary of studies that were included in the narrative synthesis

Author(s) / Source, Year	Design & setting	Population	Key findings reported
(Ngaira et al. 2016)	Selected Nairobi County health centres	1020 women at first ANC visit	ASB prevalence 21.5% (95% CI 19.1–23.9); E. coli 38.8%, S. aureus 29.7% (age, parity, education and gestation not significantly associated)
(Jenkins et al. 2012)	Cross sectional (MSc thesis); Gatudu Level Four Hospital, Kiambu	120 pregnant women	ASB prevalence 10.8%; E. coli 69.2%, Proteus 23.1%, Klebsiella 7.7%; highest prevalence in women aged 31-35 years (33.3%)
(Oluoch Aridi et al. 2021)	Cross-sectional analytical; Embakasi Central Sub-County, Nairobi	369 ANC attendees	ASB higher in first trimester, and differed by religion and employment; higher among women who had never heard of ASB
(Odindo et al. 2025)	Cross-sectional; Chulaimbo Sub-County Hospital, western Kenya	270 pregnant women	16.3% (44/270) of women were positive for ASB, 12%, 17.7% and 19.3% in trimesters 1, 2 and 3, respectively; isolates resistant to trimethoprim-sulfamethoxazole

A. The prevalence of UTI

No study was included that reported on UTIs in women in the ANC at Olenguruone Hospital. The prevalence of bacteriuria in three studies reporting a prevalence rate ranged from 10.8% to 21.5% of women during their ante-natal period. For the abstract by Wambogo et al. (2022), an overall prevalence was not reported and so those factors were not reported. Evidence is summarized in Table 3.

Table 3. Evidence on prevalence

Setting	Finding	Source
Olenguruone Hospital	No prevalence data identified	This review
Gatundu Level Four Hospital, Kiambu	10.8% (n = 120}	(Jenkins et al. 2012).
Chulaimbo Sub-County Hospital	16.3% (44/270)	(Oluoch-Aridi et al. 2021).
Nairobi County health centres	21.5% (219/1,020)	(Oluoch-Aridi et al. 2021).
Harar, Eastern Ethiopia	19.9%	(Edae et al. 2020)

B. Causative organisms and Antimicrobial Susceptibility

Table 4: This Unit aims to enable learners to explain the factors which increase the risk of developing a UTI.

Finding	Detail	Source
Common isolate	Escherichia coli (38.8% Nairobi; 69.2% Gatundu	(Ayoyi et al. 2017a)
Another isolate	Staphylococcus aureus 29.7% (Nairobi), Proteus 23.1% and Klebsiella 7.7% (Gatundu)	(Ayoyi et al. 2017a).
Resistance	Ampicillin resistance (Nairobi) 83.3–100%	(Ayoyi et al. 2017a)
Resistance	All isolates resistant to trimethoprim-sulfamethoxazole (Chulaimbo)	(Odindo et al. 2025)
Susceptibility	: Imipenem and gentamicin most active (Nairobi); azithromycin, meropenem and tobramycin 100% (Chulaimbo)	(Ayoyi et al. 2017a)

C. Factors Associated with Urinary Tract Infection

Table 5: Factors Associated with Urinary Tract Infection

Factor	Finding	Source
Trimester	Higher in the first trimester (Embakasi); rose from 12% to 19.3% across the trimesters (Chulaimbo)	(Edae et al. 2020).

Age	Highest age group (31-35 years) (Gatundu); not significant (Nairobi)	(Ayoyi et al. 2017a)
Parity and education	No significant association (Nairobi)	
Religion and employment	There is a significant difference observed in ASB (Embakasi)	(Oluoch-Aridi et al. 2021).
Awareness of ASB	More likely in women that had never heard about ASB	(Oluoch-Aridi et al. 2021).

IV. DISCUSSION

According to this review there is clear evidence gap as there was no study of UTI or bacteriuria among antenatal women at Olenguruone Hospital (Kiiru et al. 2023). Only a handful studies have been conducted in Kenya, in Nairobi, Kiambu, and western Kenya at the facilities.

In these studies, one in every 10–20 antenatal women had bacteriuria. This is higher than the global range of 2–10% reported by Edae et al. (2020) and the African estimate at the top end of 11.1% (Awoke et al. 2021) and is similar to that of Harar at 19.9%. The study by Ayoyi et al (2017) employed routine urine microscopy, whereas Embakasi study used routine urine microscopy (Ayoyi et al. 2017a) therefore, the prevalence at Olenguruone may be anywhere within or beyond this range and should be determined rather than assumed.

There are two findings of importance to clinical practice. The most common isolate was E. coli, which is in keeping with its status as the most common cause of UTI. Secondly, the resistance levels to commonly used drugs were high, for example ampicillin resistance level was 83.3–100% in Nairobi and trimethoprim-sulfamethoxazole was 100% resistant at Chulaimbo (Ayoyi et al., 2017; Odindo et al., 2025). Therefore, the treatment of an empirical nature that is given to patients at Olenguruone should be based on the local culture and susceptibility data when available.

Only four studies were found, with one of those being an unpublished thesis. The numbers in the samples were not large, and the methods were variable, so figures cannot be pooled. There was no overall prevalence reported in the Abstract of the Embakasi study. The studies included in this review invited ANC attendees at ANC sites, but may not include women who are not attending ANC. This review was also only in English.

V. CONCLUSION

The burden of UTI among Women attending ANC at Olenguruone Hospital has not been quantified (Mbuvi, Musila, and Nyamache 2024). Other studies in Kenya have reported between 10.8% and 21.5% of bacterial contamination of the urine in antenatal women, with E. coli the commonest bacterium, and high resistance to common antibiotics (Ayoyi et al. 2017b). A urine culture study at the facility level would address this.

RECOMMENDATIONS

- Measure prevalence locally. Olenguruone Hospital should undertake a cross-sectional study of women attending ANC using midstream culture of urine to determine its prevalence rate.
- Check urine for a test at the first antenatal visit. The prevalence reported here in other ANC facilities should make routine urinalysis (and culture if available) recommended for all new ANC attendees.
- Develop a local antibiogram. It is important for culture and susceptibility results to be recorded and used for guiding treatment based on local resistance patterns.
- Strengthen health education. Women should be educated on hygiene and the concept of bacteriuria should be introduced during ANC as it was associated with reduced awareness, which in turn was associated with ASB in Embakasi (Wambogo et al., 2022).
- Improve record keeping. The urinalysis results and treatment should be documented in ancillary records at the facilities, so that it will be possible to monitor it regularly.

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D. *Ethical Approval:* There was no need for ethical approval because this review was based on data and information from previously published studies and public sources. No new data was gathered with any humans involved and there was no access to personally identifiable information.

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