



Prevalence of Urinary Tract Infections in Pregnant Women Attending Antenatal Consultations at the General Reference Hospital of Makiso in Kisangani, Democratic Republic of Congo

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Infections during pregnancy are a source of premature onset of labour, of ectopic pregnancy in women and of infections, especially of the eyes and lungs, in newborns. A third of women usually suffer from urinary tract infection before the age of 24. Bacteria are the cause of most urinary tract infections. Women are much more affected than men because their urethra is shorter and facilitates the entry of bacteria into the bladder. These infections rank 2nd (15%) among the contributing causes of maternal deaths worldwide. This descriptive-analytical study aims to determine the prevalence of urinary infection in pregnant women by the presence of white blood cells and epithelial cells in the urinary sediment. Of 215 pregnant women who came to the Makiso Reference General Hospital for Prenatal Consultation, Only 85 have agreed to give their urine for microscopic examination in the laboratory during the period from September 10 to December 10, 2021. This analysis shows that out of a total of 85 respondents, 56.5% of cases are positive compared to

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43.5% of negative cases. High infection was observed in pregnant women from the Makiso commune (62.5%); the most affected age group was 32-41 years (37.5%); the age group 42 years and over had only one case (2%). 32.9% of infected pregnant women have no level of study; This study provides more information on urinary tract infection in pregnant women who came for Prenatal Consultation.

Keywords: *Urinary tract infection; pregnant women; prenatal consultation; Reference General Hospital; R.D. Congo.*

1. INTRODUCTION

Lower urinary tract infection (cystitis) is defined by the presence of clinical symptoms such as urgency, urinary frequency, dysuria and even haematuria. In contrast, upper urinary tract infection (pyelonephritis) may be associated with the above symptoms, or may present only as a febrile state with pain on shaking the renal pelvis. The presence of leukocyturia and a positive urine culture can confirm these diagnoses [1].

Studies show that 2 – 15% of pregnant women suffer from a type of urinary tract infection with the presence of bacteria in the urine in the absence of symptoms. If left untreated, this type of infection can become complicated and reach the kidneys; then 1 to 4% of pregnant women suffer from bladder infection (cystitis) and finally 1 to 2% of pregnancies have a complication due to kidney infection (pyelonephritis). In 80-90% of cases, it would occur in the second or third trimester [2].

In 2006, urinary tract infections in the United States accounted for 11 million physician visits, 500,000 hospital admissions and \$3.5 billion in costs [1]. Studies in America and elsewhere show that up to 55% of women use herbal remedies during the gestational period [3].

Urinary tract infection (UTI) can have adverse consequences for both mother and fetus and can manifest itself in three forms: gravidic urinary tract colonisation (also known as asymptomatic bacteriuria), acute gravidic cystitis and acute pyelonephritis (AP). Any urinary tract infection in pregnant women is by definition at risk of complications [4].

For this reason, the doctor or midwife in charge of monitoring the pregnancy can ask the mother-to-be to perform monthly urine tests to detect a possible urinary tract infection (cystitis). In addition, transient diabetes (gestational diabetes) is sometimes observed during pregnancy. Gestational diabetes can increase the risk of UTIs in women who have frequent UTIs outside

of pregnancy, as well as women with uncontrolled diabetes (whose urine may contain sugar, which is conducive to bacterial growth) or sickle cell disease who are at higher risk of UTIs during pregnancy [5].

The onset of urinary tract infections in women is favoured by the hormonal changes of pregnancy (in particular the increase in progesterone levels) which reduce the tone of the urinary tract from the first trimester of pregnancy. In short, they become "lazy": the urine flow is reduced and the urine stagnates a little too long in the bladder, which weakens its defences against microbes. On the other hand, when the uterus of the pregnant woman becomes too large (from the second trimester onwards), it is difficult for her to empty her bladder completely, which further increases the risk of urinary tract infections [6].

A urine cytobacteriological examination (UCE) is used to determine whether a urinary tract infection exists, and if so, to identify the bacteria responsible and to assess the extent of inflammation. The aim is to collect and analyse the first morning's urine to determine the number of red blood cells and leukocytes, the presence of crystals and germs [7].

Numerous studies also show that the main germs found in urinary tract infections are: *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis* and enterococci [8,9]. However, the aetiological and antibiotic susceptibility patterns of the germs responsible for UTIs are likely to vary from region to region [10].

In Africa, the presence of bacteria in urine is found in 2.5 to 12% of pregnant women [11].

In Senegal, a study carried out in 2006 and 2009 on pathological pregnancies showed a 6.6% frequency of urinary tract infection, 81% of which was due to *Escherichia coli* [12].

A study conducted in Cameroon on the bacteriological analysis of urinary tract infections at the Cammeroon Pastor's Center in 2008, also

revealed that women had more urinary tract infections than men [13].

In the Democratic Republic of Congo, a 2008 study found that 15% of pregnant women face complications during delivery that can lead to death. To avoid this, gynaecologists make a series of recommendations. These include medical examinations and monitoring of the pregnancy [14].

In the province of Tshopo, in the city of Kisangani, in the Kabondo area, a study was carried out and showed that the mortality rate due to urinary tract infections in children under 12 years of age was 8.5%, in contrast to Biyanga, which found a mortality rate due to urinary tract infections of 11%. In general, urinary tract infections are in first place in the DRC with a prevalence of 6% after malaria which is at 8%. Infections in general are at 31.1% [15].

It is in this context that this study was initiated to assess the profile of urinary tract infection in pregnant women by the presence of white blood cells and epithelial cells in the urine pellet.

2. METHODS AND MATERIALS

2.1 Description of the Study Site

The laboratory of the General Reference Hospital of Makiso-Kisangani served as the setting for the analysis of our samples. This laboratory was run by a trained medical biologist and equipped with the equipment recommended by the secondary level of the national primary health care policy.

2.2 Geographical Location

The General Reference Hospital of Makiso is located in the commune of Makiso, in the city of Kisangani, in the Plateau Medical District, on Street Abbé MUNYORORO N° 245/15. It is bordered to the East by the Essentials Drugs's Supplies Center of Kisangani ' EDSCKis ' in acronym and the Kisangani Higher Institute of Commerce; to the West by the AL-WALEED Health Center and the SIMISIMI military airport; to the North by the ZINIA block and to the South by the university clinics of Kisangani.

2.3 Study Population and Sample

The study population consisted of all pregnant women who attended antenatal clinics at the Makiso General Reference Hospital during the study period. A non-probability convenience sample of 85 pregnant women. From these

subjects, we collected 85 urine samples and submitted them for microscopic examination of urine sediments.

2.4 Methodology

This is a descriptive cross-sectional study conducted at the Makiso General Referral Hospital during the period 10 September to 10 December 2021.

Data collection technique

The register, biros and indelible pen were used to identify the bottles containing the samples in the list of materials used. The variables used were: age, sex, address and level of education of the pregnant women.

Inclusion criteria:

All pregnant women who had reached the pregnancy age of 13-36 months.

Exclusion criteria:

All pregnant women with pregnancy age less than 13 months.

2.5 Materials

The sample to be analysed in the laboratory was specifically the 24-hour urine of pregnant women.

To achieve this, the following laboratory equipment was used:

- Microscope ;
- Sterile vials;
- Centrifuge;
- Conical bottom tubes;
- Object slides;
- Object slides;
- Stopwatch;
- Logbook and biros for recording.

2.6 Procedure

- Collect urine in $\frac{3}{4}$ of a sterile bottle (24 hour urine) ;
- Using an indelible pen, identify the sample to avoid confusion;
- Then transfer $\frac{3}{4}$ of the sample into the conical tube;
- Place in the centrifuge, balancing the conical tubes;

- Centrifuge at an average speed of 2500 rpm for 5 minutes;
- Allow the centrifuge to stop on its own;
- Open the apparatus and remove the sample;
- Discard the supernatant and mix the pellet;
- Place a drop of the mixed pellet on the slide of the slide holder;
- Cover with a coverslip and read (observe) under a low magnification microscope (10x or 40x);
- Record the results.

2.7 Statistical Analysis of Data

After we collected our microscopically examined samples, we grouped them into different variables and expressed them as a percentage using the formula:

$$\% = (F0 \times 100) / Ft$$

Caption

% = Percentage
F0 = Observed frequency
Ft = Total frequency

3. RESULTS

This table shows that 50 cases or 58.8% of the respondents come from the Makiso commune, 22 cases or 25.9% from the Mangobo commune, 8 cases or 9.4% from the Tshopo commune, 2 cases or 2.4% from the Kabondo commune, and the Kisangani commune closes the round with only 1 case or 1.1%.

This table shows that the majority of pregnant women are in the 22-31 age group with 34 cases or 40%; followed by 30 cases or 35.3% of the 32-41 age group; followed by 20 cases or 23.5% of the 12-21 age group and finally pregnant women aged 42 and over who close the round with a score of 1.2%.

In total, out of 85 samples examined, 48 samples were positive, with a prevalence of 56.5%, compared to 37 negative cases (43.5%).

From this table, a predominance of UTIs in pregnant women in the age range 22 - 31 years (33.3%), followed by the age range 32 - 41 years (37.5%). The age group 42 years and over closes the sleeve with only 1 case (2.1%).

Table 1. Distribution of respondents by municipality of origin

Adress	Frequency	%
Mangobo	22	25.9
Makiso	50	58.8
Lubunga	2	2.4
Tshopo	8	9.4
Kabondo	2	2.4
Kisangani	1	1.1
Total	85	100

Table 2. Distribution of pregnant women by age group

Age	Frequency	%
12 – 21 ans	20	23.5
22 – 31 ans	34	40
32 – 41 ans	30	35.3
40 et plus	1	1.2
Total	85	100

Table 3. Overall positive result

Résultats	Frequency	%
Positif	48	56.5
Négatif	37	43.5
Total	85	100

Table 4. Distribution of positive pregnant women according to their ages

Age	Frequency	%
12 – 21ans	13	27.1
22 – 31ans	16	33.3
32 – 41ans	18	37.5
42 et plus	1	2.1
Total	48	100

Table 5. Distribution of positive testes according to their origin by municipality

Adress	Frequency	%
Mangobo	8	16.7
Makiso	30	62.5
Lubunga	2	4.2
Tshopo	5	10.4
Kisangani	1	2.0
Kabondo	2	4.2
Total	48	100

Table 6. Distribution of positive pregnant women by municipality and level of education

Commune	Mangobo	Makiso	Lubunga	Tshopo	Kisangani	Kabondo	Total	%
Study Level								
Without level	12	10	2	2	1	1	28	32.9
Primary	8	15	0	2	0	1	26	30.6
Secondary	2	20	0	4	0	0	26	30.6
Academic	0	5	0	0	0	0	5	5.9
Total	22	50	2	8	1	2	85	100

Analysis of this table shows that the commune of Makiso is the record holder with 30 positive cases of pregnant women, i.e. 62.5%; then comes the commune of Mangobo with 8 positive cases, i.e. 16.7% and Tshopo with 5 cases, i.e. 10.4%. The communes of Kabondo and Lubunga are tied with 2 cases each, i.e. 4.2%, and the commune of Kisangani is at the bottom of the scale with only 1 case (2%).

The table shows that, of the 85 pregnant women examined, 28 cases (32.9%) have no level of education and come from the Mangobo municipality; 26 cases (30.6%) have primary and secondary education and come from Makiso; finally, 5 cases (5.9%) are pregnant women from the Makiso municipality.

4. DISCUSSION

4.1 Frequency

Out of a total of 85 pregnant women, we recorded 48 cases of urinary tract infections, a

prevalence of 56.5%. Our rate is much higher than that of Aminta TOURE in a study conducted in Mali, who found 48 positive cases out of 492 pregnant women, i.e. a prevalence of 9.8% [13]; and that of Togo A. and Diassana HK. who obtained 8.8% and 8.54%. This difference could be explained by the inclusion criteria in the different series and by the fact that the number of our samples was lower than that of the others.

In the Democratic Republic of Congo, the work of Biayi et al, in 2015 in the city of Mbuji-Mayi, showed that during pregnancy, the prevalence of urinary tract infection was 66.36% with a predominance of *Escherichia coli* (53.5%) and *staphylococcus* (30.98%) alone or in association with *candida albicans* [15].

4.2 Age of Pregnant Women

85 pregnant women who attended the antenatal consultations were between 12 and 43 years old, with an average age of 25 years. The most represented age group was 22 - 31 years (40%),

followed by 32 - 41 years (35.3%), then 12 - 21 years (23.5%) and 42 years and over (1.2%).

4.3 Overall Positivity of Pregnant Women

The results of this study revealed that 56.5% (48/85 cases) of pregnant women had a urinary tract infection. These results are higher than the study conducted by Habib N'TCHERI which indicated that the frequency among pregnant women was 38% (21/55 cases) 21/55 cases [16]. The argument for this result is explained by the fact that this study focused only on a single examination of urinary sediments without performing a urinoculture for the identification of pathogens.

4.4 Positivity of Pregnant Women by Age Group

It was shown in this study that the prevalence of UTI is higher in young pregnant women in the age group 22-31 years (40%) compared to those 40 years and above (1.2%).

These results are slightly lower than the study carried out in Mali by IBRAHIM CISSE, who found that the majority of pregnant women with UTIs in pregnancy were in the 26-34 age group, i.e. 42.46%, with extremes between 15 and 41 years [17]; and much lower than that of Demba COULIBALI, who showed that the 20-34 age group was the most represented, i.e. 66% of cases [18]. This could mean that urinary tract infection occurs at any age in pregnant women, particularly in women of sexual activity.

4.5 Origin of Pregnant Women

The commune of Makiso has the highest incidence of urinary tract infection in pregnant women with a score of 62.5%, followed by Mangobo (16.7%) and Tshopo with 10.4%. These results could be explained by the fact that there is promiscuity of the inhabitants in these communes where there are commercial activities of all kinds. For some women, a lack of financial means that they have the opportunity to engage in prostitution during pregnancy to meet social needs, which is a factor in the genesis of urinary tract infection (STI).

4.6 The Level of Education of Pregnant Women

Among the pregnant women examined, 32.9% had no level of education and came from the

Mangobo commune. The Makiso commune had an equal number of women with primary and secondary education (30.6% each). On the other hand, the infected women with a university level of education had a score of 5.9%. This difference is explained by the fact that the level of education of this last category of women helps them to observe the notion of body and sexual hygiene.

5. CONCLUSION AND RECOMMENDATIONS

In the city of Kisangani, urinary tract infection is common during pregnancy. Early diagnosis and appropriate treatment of the infection will help to avoid complications related to pyelonephritis: threat of premature delivery, premature delivery, death in utero. The clinician must be able to recognise the different entities of urogenital tract infections. Despite a well-identified clinical syndrome, empirical treatments may become increasingly ineffective due to increasing bacterial resistance.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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