

Prevalence of urinary tract infections in pregnant women attending antenatal consultations at the General Reference Hospital of Makiso in Kisangani, Democratic Republic of Congo

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 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. Upper urinary tract infection (pyelonephritis) may be associated with these symptoms or may present only as a febrile state with pain when the renal pelvis is shaken. The presence of leukocyturia and a positive urine culture confirm these diagnoses [1].

Studies show that 2-15% of pregnant women suffer from a type of UTI with 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 pregnancy [3].

Urinary tract infection (UTI) is the most common form of UTI in pregnancy and 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, every month the doctor or midwife in charge of monitoring the pregnancy may ask the mother-to-be to perform urine tests in order to detect a possible urinary infection (cystitis). In addition, transient diabetes (gestational diabetes) is sometimes observed during pregnancy. This diabetes may favour the occurrence of a urinary tract infection. Women who frequently suffer from urinary tract infections outside the home. Pregnancy, as well as those with uncontrolled diabetes (whose urine may contain sugar, which is conducive to the multiplication of bacteria) or sickle cell disease, have a higher risk of UTIs during pregnancy [5].

The onset of UTIs in women is favoured by the hormonal changes of pregnancy (especially the increase in progesterone levels) which reduce the tone of the urinary tract in 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. It aims to collect and analyse the first morning's urine. It will 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 frequency of 6.6% of urinary tract infections, 81% of which were due to *Escherichia coli* [12].

A study carried out in Cameroon by the bacteriological analysis of urinary tract infections at the Centre Pasteur du Cameroun 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, a study conducted in the city of Kisangani, in the Kabondo area, showed that the mortality rate due to urinary tract infections in children under 12 years of age is 8.5%, in contrast to the study in Biyanga which found a mortality rate due to urinary tract infections of 11%. In general, 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 we initiated this study to determine the prevalence of UTI in pregnant women by the presence of white blood cells and epithelial cells in the urine sediment.

2. METHOD AND MATERIAL

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 Avenue Abbé MUNYORORO N° 245/15. It is bordered to the East by the Centre d'Approvisionnement en Médicaments Essentiels de Kisangani 'CAMEKIS' in acronym and the Institut Supérieur de Commerce de Kisangani; to the West by the Centre de Santé AL-WALEED and the SIMISIMI military airport; to the North by the ZINIA block and to the South by the Cliniques Universitaires de 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.

3.1. 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.

3.2 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.

Procedure

- Collect urine in $\frac{3}{4}$ of a sterile bottle (24 hour urine);
- 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 by itself;
- Open the apparatus and remove the sample;
- Pour off the supernatant and mix the pellet;
- Place a drop of the mixed pellet on the slide of the slide holder;
- Cover with a slide and read (observe) under a low magnification microscope (10x or 40x);
- Record the results.

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

4. RESULTS

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

This table shows that 50 cases or 58.8% of the respondents live in the Makiso commune, 22 cases or 25.9% live in the Mangobo commune, 8 cases or 9.4% in the Tshopo commune, 2 cases or 2.4% in the Kabondo commune and 1 case or 1.1% in the Kisangani commune.

Table 2. Age distribution of respondents.

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

The table shows that the majority of pregnant women were in the age group 22 – 31 years with 34 cases or 40%; followed by 30 cases or 35.3% of the age groups between 32 – 41 years; followed by 20 cases or 23.5% of 12 – 21 years and finally, Respondents aged 42 and over were the least frequent with a single pregnant woman, with a score of 1.2%.

Table 3. Overall positive result

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

Overall, out of 85 samples examined, 48 samples were positive, with a score of 56.5% versus 37 negative cases, or 43.5% negative.

Table 4. Distribution of positive outcomes by age of respondents

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

From this table, the high positivity in the gestant of cutting-edge age ranges from 22 to 31 years or 33.3%; followed by 32 to 41 years or 37.5% and that of 12 to 21 years or 27.1%. The age group of 42 years and over closes the sleeve with 1 single case or 2.1%

Table 5. Distribution of positive results by municipality of origin

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

The analysis of this table shows that the commune Makiso beats record with 30 positive cases or 62.5%; then follows the commune of Mangobo with 8 cases or 16.7% and the Tshopo with 5 cases or 10.4%. He noticed again that the commune of Kabondo and that of Lubunga each have 2 cases or 4.2% and the commune of Kisangani is found at the bottom of the scale with the only case being against 2%

Table 6. Distribution of respondents by municipality by level of study Common

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

From this table, a total of 28 cases (32.9%) of those surveyed have no level of study and were from the Mangobo commune. Gestants with a primary and secondary study are tied with 26 cases (30.6%) all from Makiso. And finally, the 5 cases (5.9%) were found for the university level and come from the commune Makiso.

DISCUSSIONS

5.1. Frequency:

From of a total of 85 pregnant women, we recorded 48 cases of UTI, 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, there are few studies on this subject. However, we can point out the work of Biayi et al, in 2015 in Mbuji-Mayi, where they showed that during pregnancy, the prevalence of UTI was 66.36% with a predominance of E. coli (53.5%) and staphylococcus (30.98%) alone or in association with candida albicans [15]

5.2. Age of respondents:

The 85 pregnant women who attended the antenatal consultations ranged in age from 12 to 43 years, 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%).

5.3. Overall positivity

The results of this study revealed that 56.5% of pregnant women had a UTI. This result is higher than the study carried out by MEYHER which indicated that the frequency in pregnant women was 2.3 to 17.5%; especially in primiparous pyelonephritis which was 20 to 40% with possible abortion [16]. The argument for this result is that this study focused only on a single examination of urine sediment without performing urinoculture for pathogen identification.

5.4. Positivity by age group :

Biological analysis of the samples showed that 48 cases or 56.5% were positive for UTIs in pregnant women. These results are superior to the study conducted in Mali by IBRAHIM CISSE on the bacteriological profile of urinary tract infections in pregnancy in the gynecobstetric department of the SOMINE DOLO hospital in MOPTI. In his study, the 26-34 age group represented the majority of pregnant women, i.e. a rate of 42.46% with extremes of 15 to 41 years [17]. Furthermore, Issa Diarra showed that the 20-34 age group is the most represented, i.e. 66% of cases [18]. However, it was found that the frequency of UTIs is higher in young pregnant women with 40% in the 22-31 age group compared to 1.2% in those over 40. This shows that UTIs occur at any age in pregnant women; especially in women of sexual age.

5.5. Source:

The Makiso commune is dominated by urinary tract infections in pregnant women with a score of 62.5%, followed by Mangobo (16.7%) and the Tshopo commune 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, an opportunity, due to lack of financial means, to engage in prostitution during pregnancy to meet social needs, which is a favourable factor in the genesis of urinary tract infection (UTI).

5.6. Level of education:

Among the respondents examined, it was found that 32.9% of the pregnant women had no level of education and came from the Mangobo commune. It should also be noted that the Makiso commune was full of pregnant women with equal levels of primary and secondary education (30.6%). In addition, 5.9% of women with a university education were infected. This can be explained by the fact that these women have a higher level of education that allows them to respect the notion of body and sexual hygiene.

6. CONCLUSION AND RECOMMENDATIONS

Urinary tract infection is common in pregnancy. Early diagnosis and appropriate treatment of the infection will prevent complications related to pyelonephritis: threat of preterm 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 AND ETHICAL APPROVAL

Adherence to the study depended on informed consent and confidentiality of the study. Prior authorization has been obtained from local health and administrative authorities.

From the above, we suggest the following:

- Health authorities: that all laboratories (public and private) must be equipped with competent technicians and adequate equipment; ensure that all laboratories are regularly checked by those responsible for the health inspection department.
- To medical staff: sensitize pregnant women with hygienic-dietary advice during prenatal consultations (CPN) as by illustration: empty the bladder after sexual intercourse, drink plenty of water in the morning, take foods containing a lot of fiber, eat fruit regularly; ensure proper monitoring of fat during urinary tract infection.
- For pregnant women: regular NHC, follow the advice of health care providers and avoid self-medication.
- To the future researcher: continue and further research on other parameters related to this study.

REFERENCE

1. S. Emonet, C. Van Delden, S. Harbarth, Adult urinary tract infection, Swiss medical journal, 27 April 2011
2. <https://naitreetgrandir.com/fr/grossesse/trimestre1/grossesse-infection-urinaire> having lower abdominal pain or contractions (accessed 20 April 2022)
3. NAMA MWENGU Cécile, Practice of uterotonic herbal medicine in the 3rd trimester of pregnancy by pregnant women from MUKABE-KASARI, UNILU, 2018-2019
4. <https://www.infectiologie.com/UserFiles/File/spilf/recos/infections-urinaires-grossesse-spilf-2015.pdf> (accessed 18 April 2022).
5. <https://www.vidal.fr/maladies/reins-voies-urinaires/infection-urinaire-cystite/grossesse.html> (accessed 18 April 2022).
6. <https://www.femmeactuelle.fr/enfant/grossesse/infection-urinaire-grossesse-2009/5/21>
7. Pascal Dieusaert, Practical guide to medical analyses, 6th edition - Editions Maloine - April 2015
8. Mbuya KJ et al, Bacteriological Profile of Diagnosed Urinary Infections at the University Clinics of Lubumbashi, DRC, IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) Date of (April. 2020), PP 01-08 www.iosrjournals.org (<https://www.iosrjournals.org/iosr-jdms/papers/Vol19-issue4/Series-2/A1904020108.pdf>)
9. Lara A. Friel, MD, PhD, University of Texas Health Medical School at Houston, McGovern Medical School (Last total review Oct 2021)
10. Jacques Saizonou et al, Pan Afr Med J. 2014 ;17 :89. Published online 2014 Feb. 4. English. DOI: 10.11604/pamj.2014.17.89.2857
11. <https://www.memoireonline.com> (consulted on 02/15/2022)
12. Aminta TOURE, Urinary tract infection and pregnancy at the reference health center of the commune II, 03/2012
13. Kenkouo GA, Bacteriological analysis of urinary tract infections, Pasteur Center of Cameroon, 2008
14. Dr. Banga, Pregnancies: recommended examinations and medical surveillance, tropical.com health, Congo-Kinshasa, 04/23/2008

15. C. Kadima Mutombo, A. Mumba Mukandila, J. Biayi Mikenji, G. Ntambwe Katumbayi, F. Mulowayi Kashi. Bacteriological profile of gravidic urinary tract infection (Case of Bonzola hospital in Mbujimayi, DR Congo). Rev. med. Madag. 2015; 5(3): 626-633
16. https://www.passeportsante.net/fr/Maux/Problemes/Fiche.aspx?doc=infection_urinaire_pm
17. Ibrahima Cisse. Bacteriological profile of urinary tract infections in pregnancy in the gyneco-obstetric service of Somine Dolo hospital in Mopti. [Thesis: medicine and odonto-stomatology]. Bamako : Universite des sciences des techniques et des technologies de Bamako ; 2021
18. Issa DIARRA, S. SOGOBA, D. COULIBALY, S.A.SOW. Urinary tract infection and pregnancy in the reference health center of commune II (CSREF C.II). Mali médical. 2008 Volume XXIII; n°3