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MICROBIAL URINARY TRACT INFECTION IN PREGNANT WOMEN IN LOME, TOGO

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ABSTRACT

Asymptomatic bacteriuria (AB) is a Urinary Tract Infection (UTI) without clinical symptoms. It is recurrent in pregnant women and can cause severe maternofetal consequences. In fact, 87 (eighty seven) women were followed up for urinary infections examination for AB at the health center in Lome, Togo, in antenatal care session. The study aims to identify the possible germs responsible of AB among pregnant women in the center and its frequency. They did not have a presumption of UTI at the time of urine collection. The urine culture enabled us to conduct analyzes. This study has shown a frequency of 31.03 %. The age group (28-33) has been the most exposed with a percentage of 48.14%. The bacteria were isolated at all ages of pregnancy but the highest proportions were observed in pregnant women from 7 and 8th month of pregnancy with proportions respectively of 22.22% and 29.65%. By the first births and multiple births pregnant women were the most affected by the BA (29.65% and 33.33%). The frequency of positivity among retailers and seamstresses is estimated at 37.03% and 25.95% respectively. The main isolated germs were: *Staphylococcus aureus* (48, 14 %), *Streptococcus agalactiae* (14. 85 %), *Enterococcus fecalis* (11.11 %), *Escherichia coli* (7. 40 %), *Klebsiella pneumoniae* (7.40 %). The diagnosis of asymptomatic bacteriuria during pregnancy is important; it helps highlight the caused organisms to adapt better prenatal care.

Key words: Asymptomatic bacteriuria, Urinary tract infection, Pregnant women

INTRODUCTION

Urinary Tract Infections (UTI) cover various clinical realities out of which non-complicated acute cystitis, Asymptomatic Bacteriuria (AB), and also risky situations like pyelonephritis, Gonthier (2000). They are the most common bacterial infections with women. About 50% of women suffer from at least a symptomatic period in their life time. One third of women having suffered from a first period of urinary infection will suffer from recurrent ones. (François et al: 2003). They are frequent during pregnancy period, Sophia et al. (2011). Actually, an AB implies the presence of germs in the urine outside any clinical symptomatology, Mauroy et al. (1996). It is frequent with pregnant women in variable proportions, from 2-13% depending on the series, Dwyer (2002) because other studies report the frequency of UTI during pregnancy from 2 - 19% Frank et al. (2008), Godfrey et al. (2002).

The pregnancy-induced physiologic changes in the urinary tract increase the likelihood of upper UTI. Progesterone induces tonic relaxation of the ureteric smooth muscle, while blood volume and glomerular filtration rate increase markedly to support the growing fetus, creating a permissive environment for renal pelviceal and ureteral dilation, vesicoureteral reflux, and urinary stasis Elodi et al. (2011), Schnarr et al. (2008), Foxman et al. (2002). Either it can be a sign of severe mother-to-child complications during the pregnancy leading to premature birth, aneamia, miscarriages, loss of birth weight, malformation of embryo in the early stages, stillbirth. The limited socioeconomic situation, multiple births, sexual traumatism during the pregnancy is the factors of the contamination of AB. Gunes et al. (2005) found a frequency of bacteriuria was significantly associated with parity; 4.5% in nulliparous women compared with 14.5% in women with one to two deliveries and 21.4% of the AB among pregnant women whose life conditions are precarious have been reported by Campbell-Brown et al. (1987). 6.7 % among pregnant women of underprivileged social classes and 11.4% among poor multiparae have been reported by Cox et al. (1987), Mc Neeley et al. (1987). The detection of AB is done based on a urine culture, since the first antenatal care

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Ouslander et al. (1995). The study aims are to determine, the possible germs responsible for AB among pregnant women seen during antenatal

CHU-Sylvanus Olompyo microbiology laboratory and bacteriological unit where laboratory norms/rules have been followed.

Table 1: Isolated bacteria profile

Bacteria	Colonies	Characteristics			
	Coors	ß – galactosidase	ß - glucosidase	Indole	TDA
Escherchia coli	Pink	+	-	+	-
Enterococcus feacalis	turquoise Blue	-	+	-	-
Proteus mirabilis	orange-brown	-	-	-	+
Proteus vulgaris	pink	-	-	+	+
Klebsiella pneumoniea	Blue-violet	+	+	-	-
Staphylococcus aureus	white-ore	-	-	-	-
streptocoque agalactiae	orange-brown	+	-	-	-

Legend: + = positive, - = negative, TDA = Tryptophan Deaminase

care at the Lome health centre and its frequency.

MATERIALS AND METHODS

Subjects

Prospective and transversal studies were carried out, from 1st February to 30th March, 2011 at the Lome health center. It included pregnant women enrolled during antenatal care who did not show any symptoms considered as UTI at the time of the visit. The pregnant women included in the study were subjected to obstetrical antecedent based on their education, profession, party and residence.

Sample collection

Their urines were collected in a sterile flask of 10 ml at the health centre between 7:30 a.m. and 9:00 a.m. Sponge saturated with desinfecting soap

Table 2: Distribution of pregnant women according to age group

Age group	Number	Percentage (%)
18 – 23	16	18.4
23 – 28	27	31.03
28 – 33	30	34.48
33 – 38	12	13.79
38 – 42	2	2.3
Total	87	100

Min = 18.00: Max = 40.00: Average = 27.00:
Quarter type = 04.78

has been used for cleaning the vulva and the area in-between the anus and the genital organ. The conveying of the samples to the laboratory has been done with the aid of vaccine holder. All the urines have been kept in Uri select. The pregnant women involved in the study have received detailed explanations on the prevailing conditions. The urine examination has been realized at the

Media use for culture

The center of culture Uriselect 4 is a chromogenous center where the reading of colonies was based on their color. Uri Select4 is a chromogenic medium. A chromogenic medium is a culture medium which enables to bring out a specific enzyme of a bacterial species or a group of species. It uses specific substrates and enzymes that form colored products after degradation. The species or the group is identified by the coloration of the colonies. The uriSelect4 enabling to isolate all the germs factor of the UTI, is a non-selective agar medium. It is composed of a rich nutritive base containing peptones, assuring the culture of all urinary germs; two chromogenic substrates for the detection of the bacterial enzymes (β – galactosidase and β – glucosidase); tryptophan for the display of the activity of tryptophanase (production of indole) and of disaminase tryptophan.

The Culture steps are as follow:use the öse calibrated at 10 µl. After Hold the öse vertically and submerge it in the urine. Discharge the öse to

Table 3: Distribution of germs according to age of pregnancy

Age of pregnancy (month)	Number	Percentage (%)
3	3	11.11
4	2	7.40
5	4	14.8
6	3	11.11
7	6	22.22
8	8	29.65
9	1	3.70
Total	27	100

Min = 03.00 : Max = 09.00 : Aver = 06.29 :
Quarter type = 01.79

create a streak on a ray of the petri dish from the top of deposit and without recharging the öse, apply tight streaks on the surface of the agar, perpendicularly to the ray drawn at the beginning of the culture. A numbering after 18 to 24 hours of incubation at 37°C , the density of the colonies present on the upper half of the petri dish will be compared with the number of germs per millimeter (ml) of urine (10^3, 10^4,10^5,10^6 ,10^7). A numbering ≤10^4 germs/ml corresponds most of the time to a contamination. However, we interpret this result according to the leucocyturia and a numbering ≥10^4 germs/ml probably corresponds to an infection. The identification is done according to the color of the colonies and the enzymatic activities. The use of indole (Kovacs) enables the precision of the colors of the bacteria. After applying a drop of the reactant on the colonies quite isolated in 15 seconds maximum, we can notice a change in color, Bio-Rad laboratory (3; Boulevard Raymond pointeur, 92430 Marnes- La-Coquette; France).

Table 4: Distribution of pregnant women infected according to number of births

No of births	Number	Percentage (%)
Multiple births	8	29.65
No births	5	18.51
Fourr births	5	18.51
First births	9	33.33
Total	27	100.00

Data treatment

The data have been analyzed with the software Epi info version 2007 and the significance level fixed at $p < 0.05$.

RESULTS AND DISCUSSION

The epidemiological data concerning all the pregnant women were shown in table 2. The results showed that, the average age of pregnant women was 27 years, the minimum age was 18 years and the maximum age was 40 years. The 28 – 33 age bracket was highly represented with a percentage of 34.46%, followed by 23-28 estimated at 31.03%. The high number of pregnant women represented in these age brackets can be explained by the period of the decision of procreation and also the period of an intense sexual activity. We notice that the desire of procreation decreases with the age. Only 2.3% of pregnant women in the 38-42 age bracket were subjects of the study. Among, eighty seven (87) pregnant women urine examined with a percentage of 31.03%. The tables 3,4,5,6 and 7 showed the frequency of germs the age of

pregnancy, according to parity, according to profession.

The average age of pregnancy was estimated at 6 months, the minimum and the maximum ages represented 3 and 9 months respectively. We noted a high frequency of quarantined germs among pregnant women whose pregnancy age was between 7 and 8 months. The isolation of germs in all pregnancy ages can be explained first by the compression the bladder which begins in the first three months and progresses up to the last trimester if in the bladder, the bacterial increase is very fast. Pregnant women might not let the urine finish during the urinations yet the residue post-mictional is favorable to the development of the germs. Moreover, pregnancy brings about physiological immuno-depressant state responsible for a considerable reduction of the production of antibodies. The only release of interleukins in reaction to the presence of bacteria in the urinary tract does not limit the proliferation of bacteria.

Table 5: Infected pregnant women and their profession

Profession	Number	Percentage (%)
Hairdresser	3	11.11
Merchant	1	3.70
Seamstress	7	25.95
Student	1	3.70
Nurse	1	3.70
Housewife	1	3.70
Retailer	10	37.03
Secretary	3	11.11
Total	27	100.00

The frequency rate of isolated germs among pregnant women who have given birth for the first time is estimated at 33.33%, followed by multiple births (29.65%).The percentage of urinary infections in pregnant women increases with the gestational age, multiple births, a bad socioeconomic context.

Retailers have been the most exposed to the isolated germs with a percentage of 37.03%. In Togo, retailers belong to the group of women whose purchase power is very low, the germs tolerance/ causes follow the hygienic conditions of toilets and hand washing. The percentage of asymptomatic bacteria comes in the second position among seamstresses (25.95 %). The bacteria in this group of women can be caused by continuous maceration of clothes causing a modification of the vaginal flora yet these factors may cause the development of the infection.

We have isolated five germs among pregnant women who have committed abortion and have

had premature birth and stillbirth. *Streptococcus agalactiae* was the origin of these obstetrical backgrounds.

Staphyloccus aureus was the most isolated germ with a percentage of 48.10%, followed by *Streptococcus agalactiae* (14.8%), *Enterococcus fecalis* (11.1%), *E. coli* (7.4%), *Klebsiella pneumonia* (7.4%).These isolated germs among pregnant women are the main cause of the urinary infections.

Table 6: Pregnant women and their obstetrical antecedents

Obstetrical antecedent	Number	Percentage (%)
Premature birth	1	3.70
Abortion	3	11.11
Stillbirth	1	3.70
Without antecedent	22	81.49
Total	27	100.00

DISCUSSION

More than 65 % of the pregnant women who are included in this study were between 23 and 33 years against 66 % in Bamako as has been reported by Issa et al. (2008). The predominance of pregnant women in this age group would be in line with the age group of intense sexual activities which decreased between 21 and 44 years and the desire to have children at this period Neugerten (1996). In relation to our results in Togo, the sexual activities decrease with age. The rate of participation of pregnant women whose numbers fall between 38 and 42 was 2.3 %. The percentage of AB among pregnant women has been 31.03% in our series, basically in 28-33 age groups (34.48%). Our results are slightly above the studies done in Nigeria (47.5%). Okonko et al. (2010) and Awonuga et al. (2011) reported 10.7%. In Turkey, the frequency of AB was 5.7% Gunes et al. (2005). The AB among pregnant women could be explained not

only by shortness of the urethra, the proximity of the anal and vaginal cavities, but also by the hormonal modifications, urinal physic chemistries during the pregnancy and the no observance of hygienic conditions.

As a matter of fact, exterior conditions can also lead to rapid changes in pili expression, allowing the bacterium to modify its adhesion capacity. It is possible that the association with the surface mucus other than the tissue itself, that is to say the first stage bacterial colonization of the urinary track can lead to changes in pili expressions too. Thus, after being attached to the mucus, the bacterium attaches itself to vesicular cells, causing a symptomatic urinary infection; it could complicate itself in chronic inflammation of the cystic duct, even in acute pyelonephritis and in a long term, it can result in shortage of renal fluid in the mother Godfrey et al. (2002), Mauroy et al. (1996), Sobota et al. (1994), Lejeune, (1994). The results have shown that the germs have been isolated in all three months of the pregnancy. The predominant percentages have been seen in the last trimester of pregnancy between the 7th and 8th months 22.22 % and 29.65 %. The AB study could develop with pregnancy age. A study conducted in the United States has shown that the rate of AB in the last trimester is 0.8 % and at the tail end of pregnancy is estimated at 1.93% Stenkvist et al. (1987). With regard to the number of births, we have found that 33.33% of first births and 29.65% of multiple births are infected. It has been found in Turkey that a 30% of first births and 14.5% of no births are infected with AB. The pregnant women in their last trimester of pregnancy would be the most vulnerable. We have isolated a lot of germs among retailers and seamstresses between 37.03% and 25.95% respectively. Between 6.5% and 11.4% of AB have been found among pregnant women of social classes who are more disadvantaged in the United States. In Turkey, it has been found that this

Table 7: Percentage of isolated germs

	Quarantined colonies	Number	%	% accumulated
Germ to GRAM negative	*Enterobactercloacae*	1	3.7	
	Escherichia coli	2	7.4	18.5
	Klebsiella pneumoniae	2	7.4	
	Enterococcus feacalis	3	11.1	
Cocci to GRAM positive	*Staphylcoccus aureus*	13	48.1	77.8
	Staphylcoccus negative coagulase	1	3.7	
	Streptococcus agalactiae	4	14.8	
Yeast	*Candida albicans*	1	3.7	3.7
	Total	27	100	100

situation is predominant among pregnant women who have a low level of education and who live in remote areas Gunes et al. (2005). In fact, the study of AB could not only be a weak socio-economic determinant marker, but also attached to a non-observance of hygiene. A total of 18.51% of pregnant women are suffering from obstetrical antecedents which basically constitute the main cause of premature birth delivery, abortion and stillbirths.

The isolated germs among these women were as follow: *Streptococcus agalactiae* (14.8%) and *Staphylococcus aureus* (3.7%). 16% of obstetrical antecedents have been reported in a study carried out among pregnant women in Bamako, Issa et al. (2008). Also, 15% of pregnant women who had an AB have had a threat of spontaneous premature birth. This mechanism could be in part linked to the production of phospholipids by microorganisms Cox et al. (1987). In normal conditions of birth delivery, it is phospholipase A2 of amniotic and chronic origins which would release from phospholipids membrane which would trigger the delivery process. However, the presence of germs in the urinary track will trigger abnormal processes which are going to result in mother-to-child transmitting consequences. In this study 77.80% cocci GRAM positive have been isolated. The percentages of these bacteria were the following: *Staphyloccus aureus* (48.18%), *Streptococcus agalactiae* (14.85%), *Entericoccus fecalis* (11.11%) and *Staphyloccus to coagulase negative* (11.11%). 18.50% of germs to Gram negative have been isolated of which are *Escherichia coli* (07.40%), *Klebsiella pneumoniae* (07.40%) and *Enterobacter cloacae* (03.70%). In relation to the percentage of *Streptococcus agalactiae* (14.85%), two studies have brought about high percentages of this germ in the fork of 10 to 15% and 5 to 40%, Stenkvist et al. (1987), Schmarr et al. (2008) *Klebsiella pneumonia* and *Enterobacter cloacae*, a study has estimated the frequency of germs between 1 - 2% and 5 – 15%, Cox et al. (1987).

The detection of AB among pregnant women in prenatal consultation at Lome health centre has given a percentage of 31.03%. The model age group is 28-33. We have observed a percentage of 37.03% among the retailers and 18.51% of obstetrical antecedents. The germs were isolated at all the ages of pregnancy. In effect, these results could attract the attention of all the players in charge of pregnant women in prenatal consultation to the importance of systematic detection of AB in order to diagnose early the possible germs in question and to follow through an efficacious maternity.

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