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Research Article

Detection of Vaginosis causing by *Gardnerella vaginalis* among Pregnant Women attending a Khartoum State Hospitals by using conversional method

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ABSTRACT

Background: Bacterial vaginosis (BV) is the most common cause of unpleasant vaginal odor and discharge in women of reproductive age. It is induced by an imbalance in naturally occurring microflora. Any change in the resident flora including reduction of lactobacilli allows for different anaerobic bacteria to gain a foothold and multiply. Nevertheless the process is multifactorial and the initial mechanism of replacement of normal lactobacillary flora by opportunistic pathogens. In pregnancy, certain complications such as preterm delivery, premature rupture of the membranes, and so on could ensue from Bacterial vaginosis.

Objective: This study aimed to determine the frequency of *Gardnerella vaginalis* among pregnant women at Khartoum state hospitals, and to find out risk factors predisposing to the infection.

Material and methods: A total of 140 of high vaginal swab were collected and examined by using wet preparation, Amsel criteria and culture method for detection of *Gardnerella vaginalis* from 70 pregnant women attended to Khartoum hospitals.

Results: The overall prevalence of the studied *Gardnerella vaginalis* among pregnant women at Khartoum hospitals was as follows:

Gardnerella vaginalis was isolated from 20 pregnant women (28.5%). The most frequent age group was 21-30 years (71.4%) and the most frequent group was second trimester (61.5%).

Conclusion: The highest rate with *Gardnerella* was detected from pregnant women that came from Khartoum, followed by Omdurman. The most infections were detected in second trimester of pregnancy. The rate of *Gardnerella* was found to be higher within age group 21-30 years.

Keywords: Pregnant Women, vaginosis, Gardnerella vaginalis, Sudanese

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BACKGROUND

The female genital tract (FGT) provides a satisfactory environment for many pathogenic microorganisms and multiple infections are therefore common. It is colonized by a variety of species of commensal bacteria causing no harm except under abnormal conditions. At birth, vagina of the newborn is colonized initially by anaerobic and aerobic bacteria acquired during passage through birth canal. The epithelium of the vagina at this time is rich in glycogen as a result of the influence of placental and maternal estrogens. This results in a low pH (3.7-6.3). Several weeks after birth the epithelium becomes thin, atrophic and largely devoid of glycogen, the pH rises to 6-8 (remaining so until puberty)

and the predominant flora are Gram-positive cocci and bacilli. At puberty the estrogen increases the proliferation of vaginal epithelial cells and glycogen deposit in it. Lactobacillus proliferation and cause enzymatic breakdown of cellular glycogen, resulting in lactic acid and H₂O₂ which lower the pH to 3.5-4.5. This indicates normal vaginal environment, which inhibits the growth of pathogenic organisms.¹

Vaginal discharge is a fluid or semisolid substance that flows out of the vaginal opening. Most women have vaginal discharge to some extent, and a small amount of vaginal discharge is a reflection of the body's normal cleansing process. The amount and type of vaginal discharge also

varies among women and with the woman's menstrual cycle. A change in vaginal discharge (such as an abnormal odor or color), or the presence of vaginal discharge associated with irritation or other uncomfortable symptoms, can signal that an infection is present. The vaginal walls and uterine cervix contain glands that produce a small amount of fluid that helps to keep the vagina clean. This normal vaginal discharge is typically clear or milky white in color and does not have an unpleasant odor. Normal vaginal discharge may be physiologic, such as occurs during pregnancy, sexual arousal or at specific period in the menstrual cycle. On the other hand, abnormal vaginal discharge may be green, yellow, brown or red in colour with foul smelling odor, pruritus, irritation, dysuria or dyspareunia depending on the type of infection.^{2,3}

Bacterial vaginosis is very common, with the exact prevalence varying widely depending on the patient population. There are several risk factors for the acquisition of bacterial vaginosis. It has been associated with racial origin, smoking, sexual activity, and vaginal douching. Bacterial vaginosis is more common in black women, women who smoke, women who are sexually active compared with virginal women, and those who use vaginal douches.⁴

Microbial agents that cause abnormal vaginal discharge

Microorganisms affecting the cervix: *Nisseria gonorrhoeae*, *Chlamydia trachomatis*, Group B- *streptococcus*, *Ureaplasma urealyticum*, *Herpes simplex virus*.

Microorganisms affecting the vagina: *Candida albicans*, *Trichomonas vaginitis* and *Gardnerella vaginalis*.⁵

The vagina, ectocervix and endocervix all are susceptible to various pathogens, depending on the type of epithelium present and other factors in the microenvironment. The stratified squamous epithelium of the vagina and ectocervix is susceptible to infection with *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. *Herpes simplex virus* may infect both types of epithelium.⁶

MATERIAL AND METHODS

The study design was cross-sectional descriptive study. The study was conducted during the period from February 2018 to June 2018, at Khartoum State Hospitals. The target population consisted of pregnant women of different age group, include 70 pregnant women. The data collected by questionnaires. A sample was taken by the gynecologist. One swab was used for High Vaginal Swab (HVS). The other was rubbed and rotated in post vaginal fornix. Data was analyzed by computer using pandprism program, the significant level of predictive value is less than 0.05.

Data Collection

Collection of information was done by utilizing personal interview questionnaires (age, duration of pregnancy).

Ethical Consideration

After approval of the competent authority, the approval of the pregnant women on their own free will without using any means of pressure and taking into account all the Professional ethics. Samples will be taken by the gynecologist.

Specimen Collection

A sample was taken by the gynecologist. One swab was used for High Vaginal Swab (HVS). The other was rubbed and rotated in post vaginal fornix.

Data Analysis

Data was analyzed by computer using pandprism program.

The significant level of predictive value is less than 0.05.

Specimen Processing and Lab Examination

Two swabs collected from each pregnant woman. One of these swabs was used immediately for macroscopic examination (color, Consistency, odor of the discharge, and pH also checked using pH paper that was held with forceps and dipped into the vaginal discharge. Care was taken to avoid contamination with cervical secretion as it falsely change pH). The same swab was used to prepare a wet mount for microscopic examination with one to two drops of normal saline on a glass slide covered by cover glass and was examined by light microscopy using lens x10 and x40 for pus cells, RBCs, bacteria, and clue cells (Epithelial cell of the vagina that get their distinctive stippled appearance by being covered with bacteria). The other swab was transported and delivered to the lab in sterile Amies transport medium. Each specimen was inoculated into the following culture media

Blood agar, Chocolate agar, MacConkey agar. The inoculated culture media were incubated at 37C° for 24-48 hrs, except Chocolate agar that was incubated in candle jar to provide an increased CO₂ tension 5-10% for optimum growth of Gonococci and *Gardenerella vaginalis*. Furthermore it was used instead of Thayer Martin media because the availability is diminished.

After incubation the isolated organisms were identified by: colonial morphology, cultural characteristics, indirect Gram stain, and biochemical tests.

RESULTS

A total of 140 of high vaginal swab were collected from 70 pregnant women attended to difference Khartoum hospitals distributed as followed, most of them were from Khartoum (64.2%) then Khartoum Bahri (12.8%), Omdurman (18.5%) and some of them collected from difference hospitals (4.5%) (Table 4-1).

The highest frequently rate belonged to the age group of (21-30) years (71.4%), followed by the age group (31-40) years (18.5%) (Table 4-2).

The pregnant women were categorized according to their duration of pregnancy into three groups, the most frequent group was second trimester (61.5%) followed by third trimester (28.5%) then the first trimester (10%) (Table 4-3).

Candida albicans was the highest rate of detected microorganism; out of 70 samples from pregnant women 23 (32.8%), followed by *Gardnerella vaginalis* 20(28.5%) then *Trichomonas vaginalis* 12 (17.1%) by using wet preparation and culture method. More than 40 4(5.7%) and Less than 20 years 3(4.4%) (Table4-4).

The clinical indications for bacterial vaginosis was observed in current study were shown in (Table 1). A large number of the pregnant women 30(42.8%) had vaginal discharge 23(32.8%) presented with vaginal odor discharge (table 4-5). The frequent detected microorganism among women with vaginal discharge was *Candida albicans* (66.6%) then *Tricomonas vaginalis* (20%), *Gardnerella vaginalis* (13.4%). regarding vaginal odor discharge the frequent detected microorganism among women was *Tricomonas vaginalis* (43.6%) then *Gardnerella vaginalis* (30.4%), *Candida albicans* (26%) . Vaginal itching or irritation was found among patient with *Candida albicans* (58.7%) then *Tricomonas vaginalis* (16.5%) (Table 4-6).

The detected microorganism was distributed according to gestational of pregnancy, out of 7 pregnant women in the first trimester *Candida albicans*, *Gardnerella vaginalis* and *Staphylococcus spp* have same rate of detection (28.5%) and one isolate of *Trichomonas vaginalis* (14.2%) . from 43 sample collected from female in second trimester *Gardnerella vaginalis* was found (46.5%), *Candida albicans* found (25%). *Trichomonas vaginalis* (18.6%) and *Staphylococcus spp* 4(9.3%).and Out of 20 female in the Third trimester *Trichomonas vaginalis* the most isolated microorganism (40%) followed by *Gardnerella (35%) vaginalis*, *Candida albicans* (15%) and *Staphylococcus spp* (10%) (Table 4-7).

Table 4-1: Distribution of the examined pregnant women according to their residence

Residence	Frequency	Percentage
Khartoum	45	64.2%
Khartoum Bahri	9	12.8%
Omdurman	13	18.5%
Others	3	4.5%
Total	70	100%

Table4-2: Distribution of the study population according to age interval

Age group	Frequency	Percentage
Less than 20 years	3	4.4%
21---30	50	71.4%
31---40	13	18.5%
More than 40	4	5.7%
Total	70	100%

Table4-3: Distribution of pregnant women according to the duration gestational

Duration	Frequency	Percentage
First trimester	7	10%
Second trimester	43	61.5%
Third trimester	20	28.5%
Total	70	100%

Table4-4: Distribution of the microorganisms among pregnant women

Microorganism	Frequency	Percentage
<i>Gardnerella vaginalis</i>	20	28.5%
<i>Candida albicans</i>	23	32.8%
<i>Trichomonas vaginalis</i>	12	17.1%
<i>Staphylococcus species</i>	5	7.1%
Total	60	85.5%

Table 4-5: Distribution of genital symptoms in pregnant women with Bacterial vaginosis

Symptoms	Frequency	Percentage
Vaginal discharge	30	42.8%
Vaginal odor	23	32.8%
Vaginal itching or irritation	12	17%
Null	5	7.4%
Total	70	100%

Table 4-6: Correlation between symptoms and microorganism infection

Symptoms	<i>Gardnerella vaginalis</i>		<i>Candida albicans</i>		<i>Trichomonas vaginalis</i>		<i>Staphylococcus species</i>	
	Fr	%	Fr	%	Fr	%	Fr	%
Vaginal discharge	4	13.4%	20	66.6%	6	20%	0	0%
Vaginal odor	7	30.4%	6	26%	10	43.6%	0	0%
Vaginal itching or irritation	1	8.3%	7	58.7%	2	16.5%	2	16.5%
Null	2	40%	0	0%	0	0%	3	60%
P. Value	0.003							

Fr = frequency % = percentage

Table 4-7: Distribution of different microorganisms according to trimester of pregnancy

Duration	Total examined	<i>Gardnerella vaginalis</i>		<i>Candida albicans</i>		<i>Trichomonas vaginalis</i>		<i>Staphylococcus species</i>	
		Fr	%	Fr	%	Fr	%	Fr	%
First trimester	7	2	28.5%	2	28.5%	1	14.2%	2	28.5%
Second trimester	43	20	46.5%	11	25%	8	18.6%	4	9.3%
Third trimester	20	7	35%	3	15%	8	40%	2	10%
Total	70	29	41.4%	16	22.8%	17	24.2%	8	11.4%

P value = 0.005

DISCUSSION

The frequency of *Candida albicans* among the pregnant women was 32.8 %, such high prevalence was observed by Ajani *et al* (2012) and Abdelaziz *et al* (2014). This might be due to immunosuppression and microbial colonization of vagina due to increased circulating estrogen and deposited glycogen in the vagina during pregnancy.⁷ The prevalence of bacterial vaginosis increased in second trimester, this observation similar to Ralph *et al* (1999) in which the prevalence of BV was higher at the second trimester of pregnancy. Bacteria vaginosis was most prevalent among the pregnant women within the age range of 21-30 years; this observation was in line with the findings of Gergova *et al* (2013). The Distribution of most genital symptoms in pregnant women was vaginal itching or irritation was observed by Ajani *et al* (2012), I disagree with Ajani's results.

Adequate laboratory facilities should be provided and laboratory personnel should be trained for the diagnosis of BV since the method is convenient and reliable. This will aid prompt and adequate diagnosis of BV in pregnancy. Effort should be made to discourage promiscuity among sexually-active age group and self-diagnosis/medication among pregnant women.

There are strong correlations between the age (21-30) and the distribution of *Gardnerella vaginalis*, this is due to the sexual activity. Also the second trimester of pregnancy is more susceptible to infections due to immune system status.

CONCLUSION

The highest rate with *Gardnerella* was detected from pregnant women that came from Khartoum, followed by Omdurman. The most infections were detected in second trimester of pregnancy. The rate of *Gardnerella* was found to be higher within age group 21-30 years.

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