

Genital tract infections among pregnant women

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Summary

One hundred fifty six high vaginal swabs were collected from 126 pregnant women and 30 non-pregnant women . Isolation and identification of microorganisms based on standard bacteriology and biochemical procedure. The results showed that 37.3% , 28.5% , 5.5% , and 6.3% of pregnant women had bacterial , *Candida albicans* , *Trichomonas vaginalis* and *Gardnerella vaginalis* infections respectively. Which are higher than their counterpart in non-pregnant women. As well as presence of vaginal discharge , case history of abortion and intrauterine contraceptive device insertion were positively correlated with increase infection rates. Routine vaginal swab examination should be introduced as mandatory procedure for all pregnant women, particularly those under certain risk factors at antenatal health care centers.

Introduction

Pregnancy is a productive process begins by conception of the ovum in the uterus with the subsequent development of the fetus . Pregnancy usually accompanied by certain physiologic , immunologic and hormonal alteration that may increase the liability for certain infection (Dolgushina *et al.*,2000). Among these vaginal infections constitute a common cause of morbidity accounting for 10 million cases annually (Quan ,2000). *C. albicans*, *T. vaginalis* and *N. gonorrhoea* are well recognized agents of specific vaginitis , accounting for 40-50 % of cases(Callahan *et al.*,2001).The bacterial (non-specific vaginitis) is the most common type of infectious vaginitis , from which staphylococci , streptococci , coliform and other intestinal bacteria may be isolated (Franklin & Monif,2002).Infection by *Gardnerella vaginalis*(bacterial vaginosis)is another cause of vaginal discharge that may be associated with premature delivery in pregnant women (Deborah & George , 2002; Mark *et al .* ,2008). This study was conducted to explore type of microorganisms and its percentage in vagina of pregnant women.

Materials and Methods

One hundred twenty six pregnant women as well as 30 non-pregnant women from those attending the primary health care centers for regular vaccination were enrolled in this study.

Collection and Processing of specimens :-

Sterile vaginal swabs were collected from each subject and submitted for the following procedures.

1. Direct wet mount examination with normal saline solution .
2. Measurement of the specimen pH , using graduated pH paper (Merk-Germany).
3. Gram's stained film examination according to standard method (Brooks *et al.*,1998).

4. Vaginal swabs were streaked aseptically on blood , MacConkey and Chocolate agar(under 5% CO₂) Plate. These were incubated at 37C⁰ for 24 h. For bacterial isolation and identification.

Culture examination and bacterial diagnosis:

Isolation and identification of bacterial isolates were based on colonial morphology and biochemical criteria (Cruickshank *et al.*, 1975 ; MacFaddin,2000).

Results:

Table 1 clearly showed that *C. albicans* , *T. vaginalis* and *G. vaginalis* infection rates were higher in pregnant women as compared to non-pregnant women. On the other hand , the presences of vaginal discharge in either pregnant or non-pregnant women was correlated positively with the rate of culture positively . The bacterial isolates recovered from pregnant women were staphylococcus coagulase positive (55.5%) , *E.coli* (14.8 %) , *Streptococcus faecalis* (12.9 %), β -hemolytic streptococci(9.2 %) ,staphylococcus coagulase negative (3.7 %) , α - hemolytic streptococci(1.8 %)and *N. gonorrhea* (1.8 %). While *Streptococcus faecalis* (50 %), staphylococcus coagulase positive (33.3%)and *E.coli* (16.6 %) were the common isolates recovered from non-pregnant women.

Table -1- Bacterial , fungal , parasitic vaginitis in relation to vaginal discharge

GROUPS	VAGINAL DISCHARGE	NO. TESTED	BACTERIAL INFECTION NO.(%)	<i>C. ALBICANE</i> NO. (%)	<i>T. VAGINALIS</i> NO. (%)	<i>G. VAGINALIS</i> NO. (%)
Pregnant	Yes	28	20(71.4)	11(39.2)	6(21.2)	2(7.1)
	No	98	27(27.5)	25(25.5)	1(1.0)	6(6.1)
	Total	126	47(37.3)	36(28.5)	7(5.5)	8(6.3)
Non-pregnant	Yes	2	2(100)	1(50)	1(50)	0(00)
	No	28	4(14.2)	1(3.5)	0(00)	1(3.5)
	Total	30	6(20)	2(6.6)	1(3.3)	1(3.3)

The results also revealed a higher bacterial infection among older age groups in both pregnant and non-pregnant women while the effect of age on the infection by *C. albicans*, *T. vaginalis* and *G. vaginalis* were unremarkable table -2-

Table -2- Bacterial infection in pregnant and non-pregnant women by age group

AGE GROUPS (YEARS)	PREGNANT WOMEN		NON-PREGNANT WOMEN	
	NO. tested	NO. positive	NO. tested	NO. positive
16 – 20	19	6(31.5)	3	1(33.3)
21 - 25	53	16(30.1)	10	2(20)
26 - 30	28	11(39.2)	12	1(8.3)
31 - 35	22	11(50)	3	2(66.6)
36 - 40	4	3(75)	2	0(00)
Total	126	47(37.3)	30	6(20)

Concerning the residence , the result showed that the bacterial , candidal , trichomonal and *G. vaginalis* infection in pregnant women from rural area (38 % , 42% , 8% & 4% respectively) were higher than those from urban area (36.8% , 19.7 % , 3.9 % & 7.8 % respectively).In non-pregnant women from rural areas the bacterial , trichomonal and *G. vaginalis* infection rates were 33.3% , 16.6% and 16,6% respectively , and none of them were infected with *C. albicans*. Alternatively , non pregnant women from urban areas showed bacterial infection in 16.6% and *C. albicans* infection in 3.8%,while none of them were infected with *T. vaginalis* and *G. vaginalis*. Our data also found that bacterial , *C. albicans* and *T. vaginalis* infection in pregnant women were higher at 31 – 34 weeks of gestation and *G. vaginalis* infection was slightly higher at 19 – 24 weeks of gestation , table -3-. Regarding the past history of abortion . table 4 revealed that that the bacterial *C. albicans* and *T. vaginalis* infection rates were higher in pregnant and non pregnant women who had past history of abortion . whereas, the infection by *G. vaginalis* did not effected markedly by the past history of abortion in both pregnant and non pregnant women.

Table 3- the rate of infectious vaginitis by gestation period in pregnant women

GESTATION PERIOD(WK S)	NO. TESTED	BACTERIAL INFECTION NO.(%)	<i>C. ALBICANS</i> NO.(%)	<i>T. VAGINALIS</i> NO.(%)	<i>G. VAGINALIS</i> NO.(%)
12 – 18	30	11(36.6)	5(16.6)	0(00)	2(6.6)
19 – 24	43	14(32.5)	12(27.9)	4(9.3)	4(9.3)
25 – 30	24	8(33.3)	8(33.3)	0(00)	1(4.1)
31 - 34	29	14(48.2)	11(37.9)	3(10.3)	1(3.4)
Total	126	47(37.3)	36(28.5)	7(5.5)	8(6.3)

Table (4):Impact of previous a abortion on vaginal infections.

HISTORY OF ABORTION		NO. TESTED	BACTERIAL INFECTION NO.(%)	<i>C. ALBICANS</i> NO.(%)	<i>T. VAGINALIS</i> NO.(%)	<i>G. VAGINALIS</i> NO.(%)
Yes	pregnant	55	23(41.8)	21(38.1)	5(9.0)	3(5.4)
	Non pregnant	10	3(30)	1(10)	1(10)	0(00)
No	pregnant	71	24(33.8)	15(21.1)	2(2.8)	5(7.0)
	Non pregnant	20	3(15)	1(5)	0(00)	1(5)
total	pregnant	126	47(37.3)	36(28.5)	7(5.5)	8(6.3)
	Non pregnant	30	6(20)	2(6.6)	1(3.3)	1(3.3)

Table (5) showed that bacterial vaginitis was higher in pregnant and non-pregnant women who had past history of intrauterine contraceptive device (IUCD). Likewise infection by *C. albicans* In pregnant and non-pregnant women was markedly affected by the past history of IUCD . However, slight different in relation between *T.vaginalis* and *G.vaginalis* infection and the past history of IUCD had been obtained.

Table -5- Impact of IUCD on bacterial and candidal infections

HISTORY OF IUCD		NO. TESTED	BACTERIAL VAGINITIS NO.(%)	CANDIDAL VAGINITIS NO.(%)
Yes	Pregnant	19	10(52.6)	6(31.5)
	Non-pregnant	7	3(52.8)	1(14.2)
NO	Pregnant	107	37(34.5)	30(28.8)
	Non-pregnant	23	3(13.0)	1(4.3)

Discussion:

The proper management of pregnant women throughout their gestation period is one of the main goals of antenatal health care center. The relationship between the incidence of genital tract infection and pregnancy has always been subjected of interested. We conducted this study to explore the prevalence of genital tract infection among pregnant women and their correlation with certain predisposing factors. In our study , higher bacterial vaginitis was found in pregnant women as compared to non-pregnant women. These results were consisting with previous study ,which attributed this increment to hormonal and immunologic alterations that collectively increase the liability of vaginal tissues for such infections (Dolgushina *et al.*,2000 ; VanSchalkwyk & Mony,2006). On the other hand , the low percentage of pregnant women with vaginal discharge obtained in his study was in agreement with the fact the majority of bacterial vaginitis is asymptomatic (Quan , 2000). However the strong correlation between the present of vaginal discharge and culture positivity in pregnant and non-pregnant women affirms that vaginal discharge is the commonest predictor of infectious vaginitis (Klufio *et al.*,1995 ; Callahan *et al.*,2001). The high candidal infection among pregnant women in the current study was concordant with previous reports, most probably due to the reduction in the local cell-mediated immune defense or antibiotic therapy (Sarwal ,2006). Likewise , our results regarding trichomoniasis were goes with previous studies which documents a higher infection rate in pregnant women who had frank vaginal discharge compared to non-pregnant women (Franklin & Monif ,2002 ; Sarwal,2006). The rate of non-specific vaginitis which is usually associated with *G. vaginalis* infection , was higher in pregnant women . However , the negative correlation between the infection rate and the presence of vaginal discharge in both pregnant women and non-pregnant was consistent with previous report. (Deborah & Georg,2002). The staphylococcus coagulase positive , *E. coli* and other bacteria of normal vaginal flora constitute the bulk isolates in this study, as did the previous reports(Ison & Hay 2002)It has been documented that some of this bacteria may become pathogenic during pregnancy due to the reduction in the local immunity of genital tract(Dolgushina *et al.*,2000 Callahan *et al.* , 2001).

Concerning the age pattern of bacterial vaginitis , the current study was consistent other in that higher infection rate was recorded in older age group (Jamil *et al.*,1986 ; Callahan *et al.*, 2001). Moreover ,the high bacterial ,candidal and trichomonal

infection in rural pregnant women may be attributed to the low health education, poor personal hygiene and neglect in seeking medical advice (Quan ,2000). A part from *G. vaginalis* infection , the positive correlation between bacterial ,candidal, trichomonal infection and gestation period may be multifactorial . the maximum immunosuppression at the end of gestation , the synergistic relationship between vaginal pathogens ; and malnutrition during pregnancy may weaken the local cell-mediated immune response and subsequently flourish of preexisting microorganisms (Dolgushina *et al .* , 2000 ; Mark *et al.*, 2008). The results clearly showed that the history of previous abortion act as a predisposing factor to increase bacterial, candidal and trichomonal infections. This is may be due to trauma or damage of genital tract tissue as result of abortion itself or to the subsequent management procedures. Moreover, this process may introduce a new pathogen that may lead to genital tract infection.

The results also revealed that in either pregnant or non-pregnant women, the previous history of IUCD insertion was a risk factor that increase the rate of bacterial vaginitis. These results are consistent with those obtained by other worker (AL-Murayaty,1996 ; Goldenberg *et al.*,2000). On the other hand , the positive correlation between candidal infection and previous history of IUCD in both pregnant and non-pregnant women,which is inconsistent with other reports, may be due to contamination of genital tract by external candida brought by aseptic insertion of IUCD (AL-Murayaty,1996 ; Callahan *et al.*,2001). It has been reported that the use of IUCD was significantly associated with *G. vaginalis* ,Gram's negative anaerobic and *T. vaginalis* infection(Goldacer *et al.*,1979 ; Ness *et al.*, 2005). However the present study was failed to find appositve correlation between these pathogens and past history of IUCD in pregnant women, probably due to miss diagnosis of these pathogens in this study.

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التهابات القناة التناسلية بين النساء الحوامل

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الخلاصة :-

استهدفت هذه الدراسة عزل وتوصيف الأحياء المهجرية المسببة لآخماج القناة التناسلية لدى النساء الحوامل . اعتمدت الدراسة على إجراء الفحوص المختبرية المباشرة والفحوص الزرعية لمسحات المهبل المأخوذة من 126 أمراه حامل بالإضافة إلى 30 أمراه غير حامل كمجموعة سيطرة . أظهرت النتائج أن معدل انتشار الآخماج الجرثومية بين النساء الحوامل هي 37.3 % وداء المبيضات 28.5% والمشعرات المهبليّة 5.5 % والغاردنيليا المهبليّة 6.3 % وهذه النسب هي أعلى من مثيلاتها في النساء الغير الحوامل . فضلا عن ذلك بينت النتائج أن وجود النجيح المهبلي ، تقدم فترة الحمل ، الأجهزة السابقة واستعمال موانع الحمل داخل الرحم تناسب طردي مع معدل انتشار الآخماج المهبليّة الجرثومية والفطرية والطفيلية بين النساء الحوامل دون النساء الغير الحوامل . من الضروري إخضاع كافة النساء للفحوصات المهبليّة المختبرية ومتابعة الحالات الموجبة في مراكز رعاية الحوامل.