Prevalence of Vaginal Infections among Diabetic and Non-Diabetic Saudi Pregnant Women

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ABSTRACT

Aim of the study: *To test the pervasiveness of vaginal infection in diabetic pregnant women and normal pregnant women; Al Dawadmi, Saudi Arabia.* ***Patients and methods:*** *The samples are obtained from Al- Dawadmi hospital, Riyad, Saudi Arabia. If vaginal swab samples positive microbial tests for any infection and culture in media, we were reported the participants and referral to the gynecologist. Vaginal swabs were gathered from 500 pregnant women divided into 250 diabetic and 250 non-diabetics. The ages were ranged from 20 to 45 years.* ***Results:*** *Total 500 women were included in this study. Of these patients, 253 (50.6%) of them diagnosed vaginal infection. 30.6% was diagnosed with diabetes and 20% was diagnosed with non-diabetes. This prevalence is comparably higher among pregnant women with diabetes.* ***Conclusion:*** *The ordinary microbiota may don't allow infection and colonization of the host and the spread of microorganisms related to urogenital infections, including those in charge of bacterial vaginosis, fungal, viral, protozoal and aerobic bacterial vaginitis, the disturbed vaginal flora, particularly when asymptomatic, could cause female and male problems, infertility and be principally connected with an adverse pregnancy outcome, as well as maternal and fetal morbidity.*

Keywords: Pregnancy, Diabetes mellitus, Vaginal microorganisms, Cervicovaginal microorganisms, Bacterial vaginoses

INTRODUCTION

Diabetes is a serious disease; potentially complicating and life-threatening state, which whenever left uncontrolled can prompt the improvement of a progression of health problems [1]. In 2015, about 285 million individuals had diabetes, with type 2 making about 90% of the cases. Its occurrence is expanding quickly, and by 2030, this number is estimated to practically twofold. Diabetes mellitus happens all through the world, however, it is progressively common (especially type 2) in the more developed countries [2]. The best increment in pervasiveness is, be that as it may, expected to happen in Asia and Africa, where most patients will likely be found by 2030 [3]. The increase in occurrence in developing countries follows the trend of urbanization and way of life changes, maybe, in particular, a "Western-style" diet. This has proposed an environmental (i.e., dietary) impact, yet there is a small comprehension of the mechanism(s) at present, however, there are many hypotheses, some of it most compellingly presented [4].

In Saudi Arabia, there is a disturbing increment of cases wherein more than 25% of the adult had diabetes and that this figure is relied upon to twofold by 2030. It is additionally, half of the general population more than 30 years are susceptible to diabetes. In a similar, accounted for that Saudi has the second most elevated rate of diabetes in the Middle East and seventh in the world as indicated by WHO [5].

Women with a diabetes are at a higher hazard for creating vaginal infections than women without diabetes, and what's more if the woman's diabetes isn't all around controlled and her glucose is reliably high, that makes a situation of high sugar in the mucous membrane and obviously, that incorporates the vagina, and this creates a good media for the rapid growth of both bacteria and yeast [6].

In pregnancy, numerous physiological changes may happen, for example, expanded hormonal discharges that impact blood glucose levels, for example, a glucose-channel to the fetus, slow emptying of the stomach, expanded discharge of glucose by the kidneys and opposition of cells to insulin [7]. It is trusted that higher estrogen levels and higher glycogen content in vaginal fluids during pregnancy increment a woman's danger of creating vulvovaginal candidiasis [8].

Infectious vaginal secretions cause complications to pregnant women and their fetus including preterm, low birth weight, chorioamnionitis, and puerperal sepsis [9]. Having diabetes and vaginal infection can potentially harm the mother and the fetus, the baby; consequently it is vital for them to get remarkable prenatal care [10]. In this ground, this research was conducted to lower the cases of diabetes and its complication [11].

MATERIAL AND METHODS

Type of Study

Observational study design was utilized in this study.

Sample Size

A convenient sample of 500 diabetic and non-diabetic pregnant women; Al-Dawadmi general hospital, were included in the study at the time of research conduction.

Inclusion criteria: It included pregnant women of 1st, 2nd and 3rd trimester of pregnancy attending antenatal clinic primiparous or multiparous women. We have taken pregnant women diabetic or non-diabetic, age between 20-45 years old, not has any disease rather than diabetes during one year from Aldwadmi Hospital, Saudi Arabia.

Exclusion criteria: Previous urinary tract infections, stone, urinary tract abnormality or chronic disease, diseases rather than diabetes as anemia, excluded from the sample.

Setting

The study was conducted at Al-Dawadmi Hospital, Kingdom of Saudi Arabia, and carried out in outpatient and inpatient department, Dawadmi General Hospital is a tertiary hospital with 150-bed capacity which provides all level of care to all types of patients, agreement obtained from women to participate in this study. About 1500 women coming to antenatal clinic, from these cases about 350 pregnant women had diabetes; type 1, type 2 and gestational diabetes.

Tools

Interviewing questionnaire completed by the researchers and includes data collection as:

Tool I: Woman profile which includes: A structured interview questionnaire contained demographic and obstetric data of pregnant women (age, residence, level of education, duration of diabetes, type of diabetes (type 2, gestational, type 1), other co-morbidities that make infections likely, use of antibiotics or steroids, socioeconomic status was measured.)

Tool II: Woman investigations: The study included Swab samples were obtained from the vagina and tested. Investigate vaginal infections, for all samples.

Methods of Data Collection

1. Permission was obtained from the director of the Dawadmi General Hospital and Dawadmi MCH, Kingdom of Saudi Arabia

2. Informed Consent was obtained from women.

Procedure:

- The sample was ordered to two gatherings, first, diabetic pregnant women and second, non-diabetic pregnant women

- The investigation begins from January 2017 to December 2017, and affirmed by the ethical-unit and written informed consent was taken from women

- Women were included in the study, healthy pregnant women and pregnant women with diabetes in total, Swab samples were obtained from the vaginal cavity and tested for species identification during labor

- Investigate the presence of vaginal infection in pregnant women with and without diabetes. The causative organism was isolated and tested

Vaginal swab samples collection and investigation: Vaginal swab samples were obtained from women during labor in Al-Dawadmi hospital, Riyad, Saudi Arabia. If vaginal swab samples positive microbial tests for any infection and culture in media, we were reported the participants and referral to the gynecologist.

Mycological examination: Candida albicans disease was investigated by taking a high vaginal swab and culturing it on Sabouraud's medium. Disease with *T. vaginalis* was recognized by its trademark morphology and motility in a wet mount inspected microscopically following gathering.

Phenotypic Identification of *Candida* Isolates

All samples were cultured on to Sabouraud's Dextrose Agar (SDA) plates enhanced with chloramphenicol. The plates are brooded at 37ºC for 24-48 hours. *Candida* spp. demonstrates typical creamy white pasty colonies with characteristic yeast odor.

Germ-test: Little inoculum of suspected *Candida* cultures was inoculated into 1 ml of human serum in a Little tube and incubated at 37ºC for 2 hours. After the ideal time of incubation, a loop-full of culture is put on a glass slide and overlaid with a cover-slip and inspected microscopically for the presence or absence of germ development. The present of germ tubes is seen as long tube-as projections extending from the yeast cells with no constriction at the point of attachment to the yeast cells. The germ tube is characteristic of long stretches of *C. albicans* or *C. dubliniensis*.

Procedure: Sample conducted from January 2017 to December 2017, among pregnant women at Al-Dawadmi Hospital, Riyadh, Saudi Arabia. A structured, anonymous checklist was used to collecting demographic and obstetric characteristics of pregnant women (age, residence, age of menarche, duration of menstruation, type of diabetes (type 2, gestational, type 1), other co-morbidities that make infections likely, vaginal hygiene, use of antibiotics or steroids, socioeconomic status will be measured.), and sheet which was altered by the specialist, The questionnaire was created after a careful survey of the writing and the component validity of the tool was tried by 3 specialists in nursing.

Data was collected by the researcher, Prior to the distribution of the questionnaire, Questionnaire tool was filling by investigators, it takes 20-30 minutes to complete the questionnaire; for each pregnant woman participant. Prior to administration of the questionnaire, the point of the investigation was discussed to pregnant women and she was assured about the confidentiality of the data. Informed consent for participation was obtained from each pregnant woman.

The pregnant women were met in their class during their activity time according to their schedule. The researchers have explained the study's aim to the pregnant woman and reassure them that privacy will be maintained.

Ethical considerations: The research proposal was sent to the director of Al-Dawadmi General Hospital, Kingdom of Saudi Arabia in order to gain approval, the anonymity and confidentiality of the responses, voluntary participation and the rights to refuse participation was emphasized. Risk benefits assessment, there is no risk at all during the application of the research. Confidentiality, this research was carried out by using codes of names and information was used only for the research work.

Pilot Study

After the update, the sheet was piloted on a group of pregnant women about 10% of the sample who was avoided from

the actual investigation and requested to fill out the questionnaire and return it back with their comments and criticism. Changes were then made to the last material and any fundamental alterations will be finished.

Statistical Analysis

The statistical analysis was broke down and arranged to utilize SPSS-20 statistical software package and excels for figures. Descriptive statistics in the form of numbers and rates for data was utilizing and chi-square was applied for quantitative variables. Statistical significance was considered at ($p<0.05$), high significance if less than 0.01, or not significant if more than 0.05.

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RESULTS

Table 1 Number and percent distribution vaginal infections cases reported

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Variables	N=500	
	N	%
Vaginal infection n=500	253	50.60%
Vaginal infection with diabetes n=250	153	30.60%
Vaginal infection without diabetes n=250	100	20%

Total 500 women were included in this study. Of these patients, 253 (50.6%) of them diagnosed vaginal infection. 30.6% was diagnosed with diabetes and 20% was diagnosed with non-diabetes. This prevalence is comparably higher among pregnant women with diabetes (Table 1).

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Table 2 Association between age group, residence, and education level with status of diabetes (with and without) among pregnant women with vaginal infection

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Variables	Pregnant Diabetic and Non-diabetic Women				
	Pregnant Diabetic n=250		Pregnant without Diabetes n=250		χ^2
Age Group					
>25	49	19.60%	44	17.60%	
25-35	102	40.80%	96	38.40%	0.466
<35	99	39.60%	110	44%	
Education					
Primary and Secondary	73	29.20%	77	30.80%	
University	145	58%	142	56.80%	0.229
Postgraduate	32	12.80%	31	12.40%	
Residence					
Rural	75	30%	97	38.80%	0.398
Urban	175	70%	153	61.20%	
Gravida					
Primigravida	67	26.80%	60	24%	0.53
Multigravida	183	73.20%	190	76%	

However, there were no statistically significant between age and vaginal infection in all pregnant women with and without diabetes. Also, the residence or education level did not show influence on the frequency of vaginal infection in all pregnant women (Table 2).

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Table 3 Prevalence of microorganisms isolated in pregnant diabetic and non-diabetic women

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Microorganisms	Pregnant Diabetic and Non-diabetic Women				
	Pregnant Diabetic n =250		Pregnant Non-diabetic n =250		χ^2
Bacteria	46	18.40%	23	9.20%	p=0.012
Gardnerella vaginalis	63	25.20%	31	12.40%	p=0.014
Candida	37	14.80%	17	6.80%	p=0.05
Chlamydia trachomatis	7	2.80%	20	8%	p=0.053
Total	153	61.20%	100	40%	

The results of the microbiologic research are shown in Table 3. Comparing the two groups of women examined, a considerably higher prevalence of bacterial infection was found in the diabetic patients18.4% by MH/UU (χ^2-test, p=0.012). Contrarily, the percentage of *Chlamydia trachomatis* infection showed to be higher in diabetic women (χ^2-test, p=0.053). There were statistically significant differences were found between the two groups when tested for *Gardnerella vaginalis* (GV) (χ^2-test, p=0.014), *Candida* spp. (χ^2-test, p=0.05). The prevalence of microorganisms was obtained by cervicovaginal swabs from diabetic pregnant women and non-diabetic pregnant women.

DISCUSSION

Diabetes mellitus is increasing the risk of obstetric complications. The previous literature states that with aging and in the second half of pregnancy, women show higher glycemic levels and a greater appearance of glucose intolerance. The higher frequency of cervicovaginal infections is, indeed, associated with a multitude of factors related to the elevated glucose concentrations in the vaginal mucosa.

Of these patients, 253 (50.6%) of them had a vaginal infection. the pervasiveness of vagina infection among pregnant women determined to have diabetes was 30.6% and commonness of vagina infection among women without diabetes was 20%. This predominance is equivalently higher among pregnant women with diabetes. The pervasiveness of infection in the present research was lower than that detailed by Lukic, et al., in Rome, Italy [12]; agreement with Iylia, et al., in Malaysia [13], additionally was lower than that announced by Nelson, et al., for a study conducted in Kenya (42.7%) [14].

In this study, demonstrate no significant connection between age group and the event of vaginal infection among pregnant women with and without diabetes. Also, we found that residence or education level did not show influence on the frequency of vaginal infection in pregnant women with and without diabetes.

Jombo, et al., [15] and Nelson, et al., [14], detailed comparable outcomes, there was no significant connection between age and vaginal yeast infection cases. According to this study, the results of the microbiologic research are shown a considerably higher prevalence of bacterial infection was found in diabetic patients 18.4% by MH/UU (χ^2-test, p=0.012). Contrarily, the percentage of *Chlamydia trachomatis* infection showed to be higher in diabetic women (χ^2-test, p=0.053). There were statistically significant differences were found between the two groups when tested for *Gardnerella vaginalis* GV (χ^2-test, p=0.014), *Candida* spp. (χ^2-test, p=0.05).

The prevalence of microorganisms was obtained by cervicovaginal swabs from diabetic pregnant women and non-diabetic pregnant women. This result agreement to some extent with Lukic, et al., in Rome, Italy [12], found that higher prevalence of bacterial infection was found in diabetic patients by MH/UU (χ^2-test, p=0.012).

Furthermore, Nowakowska, et al., reported that the risk of vaginal mycoses in pregnant women with diabetes mellitus type I was more than four times higher than in controls, and in pregnancies, with gestational diabetes mellitus the infection rate appeared nearly two times higher than in controls [16]. Our results do not meet these conclusions. In accordance with Nowakowska et al., [16] and Parveen, et al., [17] in the present study, the prevalence of fungi in diabetic pregnant women was not influenced by gestational ages.

CONCLUSION

The normal microbiota may prevent infection and colonization of the host and the spread of microorganisms related to urogenital infections, including those responsible for bacterial vaginosis, fungal, viral, protozoa and aerobic bacterial vaginitis, the disturbed vaginal flora, especially when asymptomatic, could cause female and male diseases, infertility and be primarily associated with an adverse pregnancy outcome, as well as maternal and fetal morbidity. There is no significant relationship between age, residence, and educational level and the status of diabetes among pregnant women who suffer from vaginal infection.

DECLARATIONS

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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