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Incidence and determinants of candida infection in pregnant women - comparative study in Al-Nasiriya city

Dr. ASEEL MOSA JABBER[1]

Gynecology and Obstetrics department / college of medicine/ University of ThiQar[1]

Abstract— Background: Candida the most mutual source of urinary tract infection (UTI) as an opportunistic pathogen. Risk factors like: diabetes mellitus, pregnancy, steroids and hospitalization can promote candiduria. This study aimed to evaluates candiduria in pregnant women and their relation to social and physiological parameters. Method: Across sectional analytical study extended allover 2019 (January till December) to recruit 510 ladies, done in Bint Al-Huda public hospital- and Al-Rahman gynecology and obstetrics private hospitals Thi-Qar-Southern of Iraq, where specific age criteria that extended from 14 years till 55 years with mean age of 29±7.56 years. Results: The results showed significant differences ($p < 0.05$) in the presence of bacterial and fungal infections in a female under this study. While, there is no relations between both groups of female in pH value of urine. The presence of fungal infections was not correlated with the types of blood groups and jobs of infected women under ($P > 0.05$). Conclusion: It was noted through the study that the rate of urinary tract infections with Candiduria in Iraqi women is one of the relatively low rates in the world and is mainly affected by the state of immune debility during pregnancy and related to bacterial infections with no relationship to the urine pH, types of blood groups and the type of work with the rates of occurrence of this type of infections.

Keywords: Pregnancy, Candiduria, UTI

Introduction

Urinary tract infection is an infection that begins in the urinary system. The lower urinary tract, meaning the urethra and bladder, is the most susceptible to infection, UTIs are the most common infection in women. [1,2] These infections occur most often between the ages of 16 and 35 years, with 10% of women contracting the infection annually and 60% of them developing it at some point in their lives. Recurrence is common, with nearly half of people getting a second infection within one year. The disease occur four times more often in females than in males. [3]

Fungal infections are among the most common types of opportunistic microbial infections in immune compromised people, resulting mostly from infection with the candida genus, and the most common of these infections are genito-urinary tract infections,*Candida spp.* is the most common yeast that causes urinary tract infections in pregnant women, yeasts may be present naturally in the urogenital tract, skin and respiratory system, infection occurs due to the increase in the number of yeasts at the site of infection to the levels that leads to the occurrence of infection and the emergence of symptoms.[4,5,6]. The most common factors Contributing to these illness are diabetes mellitus, pregnancy, the use of pregnancy control materials, antibiotics, steroids, disorders and diseases that cause a weakness of immune system such as immunodeficiency disease, and meals containing high levels of sugars and yeasts[7,8.9,10].

These infections are more of a concern during pregnancy due to the increased possibility of developing kidney infections. During pregnancy, high levels of progesterone increase the possibility of a lack of strength in the muscles of the ureter and bladder, which leads to a greater possibility of

reflux, as urine flows back into the ureter towards the kidneys. While pregnant women do not have an increased risk of asymptomatic bacteriuria, but if there is bacteremia in the urine, the possibility of developing a kidney infection is 25-40%. [11,12]

Methodology

Across sectional analytical study extended allover 2019 (January till December) to recruit 510 ladies,done in Bint Al-Huda public hospital- and Al-Rahman gynecology and obstetrics private hospitals Thi-Qar-Southern of Iraq,where specific age criteria that extended from 14 years till 55 years with mean age of 29±7.56 years, occupation that addressed into its different characters (house wife, students and employers), obstetric history regarding their pregnancy status (pregnant and none), parity and gravida (one, two, three and four and more), coexisting disease such as diabetes mellitus, specific investigation such general urine examination. Inclusion criteria: all women attending the gynecology. A verbal consent was taken from all participant after explanation of the aims of the study, and full local authority permission was taken from all departments that might be engaged in the study. Data collected by well-structured questionnaires one for the pregnant and the second one for the non- pregnant obtaining full informative curriculum regarding the variables of interest listed above.The isolation and identification of yeast were performed according to standard microbiological techniques that describe by(Colleeet *al*., 2001; Forbes *et al*., 2007)[13,14].

Vaginal outer regions swabbed by sterile swab stick while sterile containers used for urine samples collection. Labeling for each specimen was done serially coded, time and date of collection, thentransported immediately Laboratory of Microbiology, Culture Media preparation of Sabouraud dextrose agar (SDA) that used for Candida species isolation growth medium . Microscopically examined specimen under magnification of x40 for isolates detection. also colonial morphologies had been identifying the isolated organisms. Microbiological Analysis culturing in SDA 48 hours at 37ºC . where pool of inoculum ready for specimens usage. After that using of sterile wire loop for any inoculum by streaking in quadrate plates to getdetached colonies. Then incubated to appear as creamy color , moist and pasty consistency and smooth border. Germ tube test for Candida albicans identification. sterile loop used , isolates of pure colonies inoculated into a human serum of 0.5 ml -sterile test tube. Resultant suspension incubated 3 hours at 37ºC. A yeast-serum suspension drop positioned on microscopic slide, cover slip for covering then microscopically examined by x10 and x40 objective lenses usage.

Statistical analysis: SPSS version 25 had been used for the analysis of the collected data, frequency, percentages, and proper statistical test used for the determining the differences and to relate the variables independently with outcome.

Epidemiological analysis:

No. of new cases per time and place * SMF (slandered multiplication factor)

Incidence rate=----------

Total population at risk at same place and time.

Result

18 * 100

IR among pregnant =……. =45%

40

22 * 1000

IR among non - pregnant =……. = 46.8/1000= 4.7%

470

Five hundred ladies screened for the presence of candida infections with age mean of 29±7.56 years , distributed as in the figure bellow.

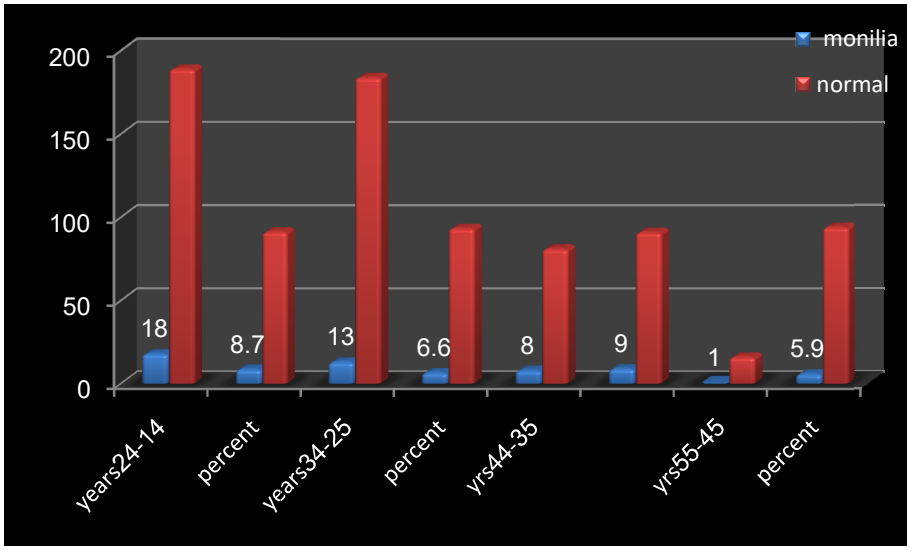

Figure1: Age distribution of studied population:

The results showed significant differences ($p < 0.05$) in the presence of bacterial and fungal infections in a female under this study. While, there is no relations between both groups of female in pH value of urine as illustrated in table (1).

Table (1):The relationships between fungal colonization and UTI, bacteria and pH of urine in female.

Fungi	Bacteria		Urine pH		Total
	Yes	No	A[a]	K[b]	
Present	11 (13.4%)	29 (6.8%)	39 (8%)	1 (4.2%)	40 (7.8%)
Absent	71 (86.6%)	399 (93.2%)	447 (92%)	23 (95.8%)	470 (92.2%)
Total	82 (100%)	428 (100%)	486 (100%)	24 (100%)	510 (100%)
Statistic	.050[d]		0.288[e]		

[a] acidic, [b] alkaline, [c] X2 P value, [d] Fisher's Exact Test P value, [e] Pearson Chi-Square P value

The presence of fungal infections was not correlated with the types of blood groups ($P > 0.05$). The types of blood Rh of fungal infected female was showed significant differences ($P < 0.05$) when compared with on infected female (table 2).

Table (2): The blood groups and Rh association with fungal colonization in female.

		Candida						Statistic
		Present		Absent		Total		
		No.	%	No.	%	No.	%	
Blood group	A	11	8.5	118	91.5	129	100	0.320[a]
	B	12	7.6	146	92.4	158	100	0.390
	AB	4	9.3	39	90.7	43	100	
	O	13	7.2	167	92.8	180	100	
Rh	Positive	36	7.8	425	92.2	461	100	0.008[b]
	negative	4	8.2	45	91.8	49	100	0.214
Total		40	7.8	470	92.2	510	100	

[a] Pearson Chi-Square[b] X2 P value

Table 3 showed significant differences (P < 0.05) between the diabetic and pregnant states and the frequency of fungal infections in both groups of women.

Table (3): The relationships between fungal colonization, diabetes and pregnancy.

Candida	Diabetes			Pregnancy		
	yes	No	Total	Yes	No	Total
Present	4 (20%)	36 (7.3%)	40 (7.8%)	18 (6.2%)	22 (10%)	40 (7.8%)
Absent	16 (80%)	454(92.7%)	470(92.2%)	273(93.8%)	197(90%)	470 (92.2%)
Statistic	4.256[a] 0.048			2.75[a] 0.037		

[a] X2 P value

The results of the study showed no relationships between the fungal infections and occupation of female under (P < 0.05).

Table (4): The relationships between fungal colonization and jobs of female.

			Candida		Total	Chi-Square P value
			Present	Absent		
Job	House wife	No.	33	401	434	.203
		%	7.6	92.4	100	
	Student	No.	0	20	20	
		%	0.0	100	100	
	Employed	No.	7	49	56	
		%	23.5	87.5	100	
Total		No.	40	470	510	
		%	7.8	92.2	100	

Table 5 : Fungal infection according to number of children

Kids number		Candida		Total	Fissure Exact P value
		Yes	No		
None	N	13	134	147	9.548
	%	8.8%	91.2%	100.0%	0.036[b]
One	N	8	78	86	
	%	9.3%	90.7%	100.0%	
Two	N	6	93	99	
	%	6.1%	93.9%	100.0%	
Three	N	5	53	58	
	%	8.6%	91.4%	100.0%	
≥ Four	N	8	112	120	
	%	6.7%	93.3%	100.0%	
Total	N	40	470	510	
	%	7.8%	92.2%	100.0%	

There was significant statistical association between number of children delivered and presence of fungal infection

Discussion

Infections of the urinary tract and genitals are among the most common infections in the world, which have increased significantly in recent years. These infections are an inflammatory reaction resulting from exposure to a bacterial, fungal or viral pathogen, which is determined by detecting the pathogen in urine samples [15]. Urinary tract infections with the Candida fungus is one of the controversial topics in the treatment of patients. What made the matter more complicated is the lack of special protocols or criteria to diagnose this type separately, as most studies and methods have laid the foundation for the diagnosis of bacterial urinary system infections and then fungal infections incidentally. Also, the presence of Candida naturally in this region of the body made its presence in the urine samples is distortion [16].

Greatest number UTIs caused by Candida spp. ensue in community and in hospitalized patients especially those with bladder catheters [16,17]. Symptomatic candiduria, is rare in healthy persons at all ages nearly with no predictable risk factors, and the presence of candida in the urine samples denotes contamination in the large proportions of cases. [18], Risk factors included diabetes mellitus, bedridden status, steroids, weakness of immune state and current management by using antibiotics. A meaningfully higher ratio of pregnant women had community candiduria. Which may be occurs in many cases due to contamination of urine specimens by candida from urethra or vagina [19].

The rate of infection with Candida in the current study was (7.8)%. Therefore, the study coincided with the findings of a number of researchers, as they obtained rates (6.12)% [20,21], while the results were in contrast to other studies in which the infection rate was high, ranging (36-71)% [22,23]. These differences may be due to the size of the specimens in different studies and the different methods of diagnosis and isolation and to customs and traditions in societies, the difference or heterogeneity of the natural colonization status of these yeasts, which may differ according to societies and races.

It has been observed through the study that there are significant differences and the frequency of infection between the immunocompromised patients included in the study, which are women with diabetes and pregnant women, and this is consistent with many studies. Incidence, recurrence and spread of injury [16,21].

The distribution of blood groups varies between different societies, and 34 types of blood groups have been distinguished in humans, and a number of studies have confirmed the existence of a relationship between the type of blood group and the occurrence of various diseases and its association with increased sensitivity of the host to these infections[24]. The current study did not notice a relationship between the different blood groups and the occurrence of urinary infection with Candida, and this may be due to the fact that the infection is extracellular in the urinary tract, and there is no real contact with blood cells, or there is no relationship at all between these groups and Candida infections, surface antigens of some blood groups have an important role in the development of a number of infections because they are receptors or co-receptors for a number of microbes, through which they facilitate the process of bacterial colonization and evade the patient's immune response[24,25].

There were no significant differences or relationship between the rate of infections and the type of patients jobs in the current study, despite the type and pattern of work that plays an important role in the occurrence of several types of infections. More studies are needed to determine the causes of UTI, the risk factors causing it, and how to deal with it and activate it in a way that helps women who suffer from frequent urinary tract infections.

Conclusion

It was noted through the study that the rate of urinary tract infections with Candiduria in Iraqi women is one of the relatively low rates in the world and is mainly affected by the state of immune debility during pregnancy and related to bacterial infections with no relationship to the urine pH, types of blood groups and the type of work with the rates of occurrence of this type of infections.

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