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Study the Association between UTI and Diabetes in Pregnant Women Attended Al- Fallujah Teaching Hospital

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ABSTRACT

The study was conducted in the city of Fallujah\ Anbar\ Iraq in the period from September 2019 to January 2020, which included 100 pregnant women in th 3rd trimester of pregnancy and suffered from type 2 diabetes and 100 people intact and without any chronic disease. The study included the laboratory examination of the reaction's samples, where close quantities of median reactions were collected for both groups. After collecting the calories, the calories were examined microscopically, and then the reactions were transplanted into the available culture media to isolate the aetiology of urinary tract infections such as blood agar and MacConkey agar, and the CLED agar to isolate and diagnose bacteria of all kinds. In addition, the sensitivity test for antibiotics was applied by the feeding medium where the methods were relied upon Global standard bacteriological culture procedure, isolation and diagnosis by biochemical tests. Type 2 diabetes has been defined as any person with diabetes who is over 15 years old and who uses oral treatment, not insulin. The study also included collection of five ml of venous blood from each subject in the study for determination of fasting blood sugar, HbA1c and blood urea. Among diabetes mellitus patients included in this study, 80 % were positive for UTI patients, while 20 % were negative for UTI. Patients without DM showed no positivity for UTI. The study showed that majority of patients with UTI were suffered from G+ve and G -VE bacteria as compared with DM patient without UTI. According to the distribution of the isolated bacteria among the study groups, the common isolated bacteria among DM was *E. coli* which constituted 26.36% followed by *K. pneumoniae* which constituted 17.27%, S. *aureus* and *P. mirabilis* which constituted 8.18% and the lowest percentage was *Enterobacter cloacae* for 1.81%. The study showed that 40.65% of pregnant women with DM have increased HbA1c level comparing with 2% of the control group, Table 5. The result was highly significant (P:0.001). The highest mean levels of fasting blood sugar and blood urea were recorded among DM pregnant women infected with UTI and suffered from DM comparing followed by those without UTI and the lowest means were found in healthy control group. There was positive correlation between FBS and HbA1c in DM pregnant

Keywords: UTI; Type 2 Diabetes; Escherichia coli; S. aureus

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INTRODUCTION

Urinary tract infections are a common disease in the population. It has been estimated that half of all women are likely to suffer from at least one episode of UTIs in their life and one third will require an antibiotic treatment (1). Bacterial contamination of the urine inside the urinary tract (bacteriuria) is normal and can now and again bring about microbial attack of tissue answerable for the development, transport and capacity of pee, Pathogen-related conditions, (for example, the nearness of intrusion or harmfulness factors) influence the seriousness of the disease and its protection from anti-microbial treatment, yet additionally unique host related qualities have been individuated, that assume a job specifically in the plausibility of contamination recurrence(1). Urinary tract contamination may include just the lower urinary tract or both the upper and the lower tracts (3). The term cystitis has been utilized to depict the disorder including dysuria, recurrence, and at times suprapubic tenderness. More than 95% of urinary tract contaminations are brought about by a solitary bacterial animal category. Escherichia coli is the most continuous contaminating living being in intense disease (4). Other organisms that can be responsible for UTIs include Gram positive cocci, such as *Enterococcus faecalis, Staphylococcus aureus* and coagulase negative staphylococci (CoNS). Other Gram negative organisms responsible for causing UTIs include *Klebsiella* species, *Proteus* species, *Pseudomonas aeruginosa* and *Enterobacter* species (5). Technological advances have made HbA1c a more standardized and user-friendly test with broad availability; however, in general, previous studies have been consistent with previous unsuccessful attempts (6). The aim of the study was to evaluate the relation of UTI with type 2 diabetes in pregnant women.

MATERIAL AND METHODS

The study was conducted in the city of Fallujah\ Anbar\Iraq in the period from September 2019 to January 2020, which included 100 pregnant women in th 3rd trimester of pregnancy and suffered from type 2 diabetes and 100 people intact and without any chronic disease. The study included the laboratory examination of the reaction's samples, where close quantities of median reactions were collected for both groups. After collecting the calories, the calories were examined microscopically, and then the reactions were transplanted into the available culture media to isolate the aetiology of urinary tract infections such as blood agar and MacConkey agar, and the CLED agar to isolate and diagnose bacteria of all kinds .. In addition, the sensitivity test for antibiotics was applied by the feeding medium where the methods were relied upon Global standard bacteriological culture procedure, isolation and diagnosis by biochemical tests. Type 2 diabetes has been defined as any person with diabetes who is over 15 years old and who uses oral treatment, not insulin. The study also included collection of five ml of venous blood from each subject in the study for determination of fasting blood sugar, HbA1c (i-chroma co, Korea) and blood urea

FINDING

Among diabetes mellitus patients included in this study, 80 % were positive for UTI patients, while 20 % were negative

for UTI. Patients without DM showed no positivity for UTI(Table 1).

Table 1: Relation of UTI with diabetes.

Characteristics	Diabetic		Control group	
	No.	%	No.	%
With UTI	80	80	0	0
Without UTI	20	20	100	100
Total	100	100	100	100

P. value 0.003

The study showed that majority of patients with UTI were suffered from G+ve bacteria as compared with DM patient without UTI.

Table 2: Results of urine culture among study groups.

Results of urine culture	DM patients			
	With UTI		Without UTI	
	No.	%	No.	%
Positive Bacterial culture	50	62.5	5	25
Negative Bacterial Culture	30	37.5	15	75
Total	80	100	20	100

P. value 0.002

In the present study the ages of the patients ranged between 16 and 45 years old. As shown in Table 3, the highest percentage of the patients among DM women were within the age group 26-35 years old constituted 44%. The lowest percentage was within the age group of 16-25 years old which constituted 31.03%.

Table 3: Distribution of positive urine culture among pregnant and non-pregnant women according to age groups.

Age group (years)	%
16-25	31.03
26-35	44
36-45	42.10
≤ **45**	34.69

According to the distribution of the isolated bacteria among the study groups, as shown in Table 4, the common isolated bacteria among DM was *E .coli* which constituted 26.36% followed by *K. pneumoniae* which constituted 17.27%, *S. aureus* and *P. mirabilis* which constituted 8.18% and the lowest percentage was *Enterobacter cloacae* for 1.81%.

Table 4: Distribution of isolated bacteria among studied patients.

Isolated Bacteria	DM	
	No	%
Escherichia coli	29	26.36
Staphylococcus aureus	9	8.18
Streptococcus faecalis	8	7.27
Serratia murcescens	5	4.54
Klebsiella pneumoniae	19	17.27
Enterobacter cloacae	2	1.81
Proteus mirabilis	9	8.18
Proteus vulgaris	6	5.45
Staphylococcus epidermidis	7	6.36
Staphylococcus saprophyticus	8	7.27
Pseudomonas aeruginosa	8	7.27
Total	110	100

P. value 0.048

The study showed that 40.65% of pregnant women with DM have increased HbA1c level comparing with 2% of the control group, Table 5. The result was highly significant (P:0.001).

Table 5: Frequency of HbA1c levels in pregnant women.

HbA1c level	Pregnant women +DM		Control group	
	No.	%	No.	%
Normal	2	2	99	99
Increased	98	98	1	99
Total	100	100	100	100
X^2: 59.39 *P.* value: 0.00001 Highly significant				

Normal range of HbA1c: 4.2-6.2%

The highest mean levels of fasting blood sugar and blood urea were recorded among DM pregnant women infected with UTI and suffered from DM comparing followed by those without UTI and the lowest means were found in healthy control group, Table 6.

Table 6: Levels of fasting blood sugar and blood urea in the study groups

Parameters	Studied groups		Control group	p. value
	DM Pregnant women with UTI	DM Pregnant women without UTI		
No.	100	100		
FBS (Mean±SD) mg/dl	164±12.8	153±8.9	90±7.3	0.001
B. urea (Mean±SD) mg/dl	54.1±4.6	48.4±4.2	33.4±4.1	0.041

Normal range of HbA1c: 4.2-6.2%

There was positive correlation between FBS and HbA1c in DM pregnant, Figures 1.

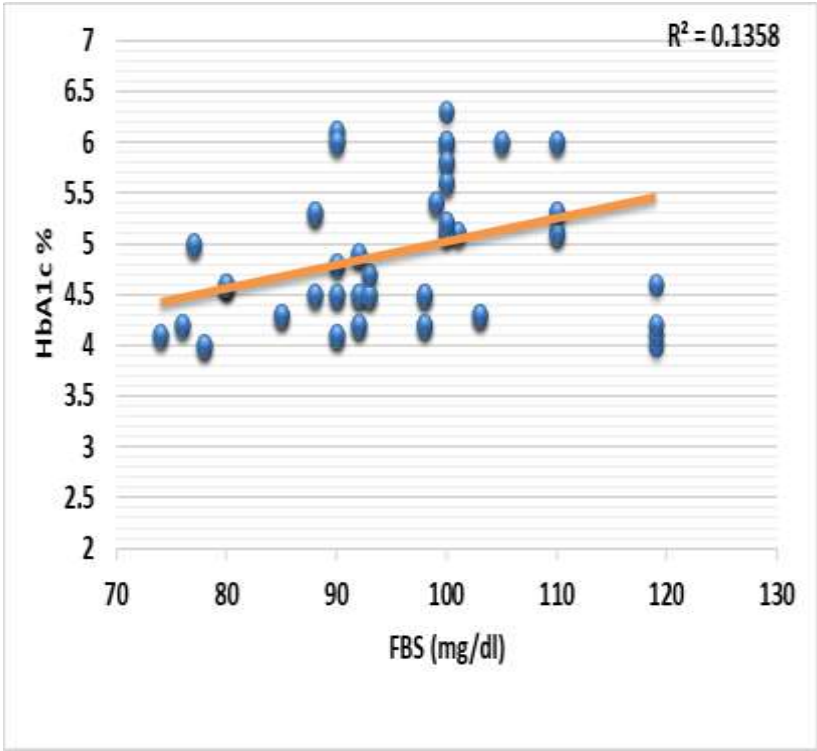

Figure 1: Correlation between HbA1c and FBS levels in pregnant women.

DISCUSSION

Urinary tract infection (UTI) in pregnant women with DM have special importance due to complication that results from its which can be dangerous to both mother and baby [6]. Diabetes mellitus has long been considered to be a predisposing factor for urinary tract infection [7]. Among DM patients included in this study, 82.14 % were positive for UTI among married women. This clarifying the significance of the relation between DM and the occurrence of UTI among married women in this study which supported by other study, which showed that urinary tract infection is more prevalent among married women with DM [8,9]. Nasir in his study found that there is an increase in the prevalence of asymptomatic pyuria among diabetic females with complications of retinopathy and nephropathy [10]. Preexisting diabetes is associated with a broad range of complications for mother and child [11]. Similarities and contrasts between gestational and pregestational diabetes will depend on differences in the biochemical abnormality—with women with pregestational diabetes, at least potentially, having more abnormal blood glucose values on average—the effects of the stage of gestation at which these complications develop, and finally, the competing effects of long-term complications of diabetes [12]. Nasir resemble study found that blood sugar and blood urea were significantly elevated in pregnant women with UTI especially who in women with DM [10]. HbA1c investigation was as of late supported as a screening test for unrecognized diabetes in both the all-inclusive community and in early pregnancy [13]. HbA1c examination is increasingly helpful and more reproducible with less preanalytical mistake than proportions of blood glucose. We know from pregnancy information in ladies with previous diabetes, that severe glucose control and HbA1c levels as near ordinary as conceivable improve pregnancy outcomes [14]. Be that as it may, while considering HbA1c as a screening test in early pregnancy to identify huge glucose heights in ladies without known diabetes, there are barely any information to illuminate clinicians about what HbA1c limit ought to be utilized for intervention [15]. Hashimoto et al [16] showed that HbA1c level displays biphasic changes, with diminishes between the principal trimester and mid-pregnancy, trailed by increments in the third trimester which might be connected to GDM and unfavorable pregnant results. Be that as it may, in the second-trimester and later pregnancy, the HbA1c level couldn't supplant the oral glucose resistance test (OGTT) for GDM finding [14]. Claesson et al [17] demonstrated that the HbA1c level in mid-pregnancy was explored as an indicator of diabetes following GDM. Moreover, there were a few favorable circumstances of mid-pregnancy HbA1c contrasted and the previous stage HbA1c, for example, consistency with the time purpose of the OGTT, eagerness of pregnant ladies to get the test, and an ideal planning of intercession. Sengupta *et al* [18] found that Hb1c level was increased in 3rd trimester pregnant women, especially those with uncontrolled diabetes. Other last studies also *indicated* that HbA1c levels are significantly higher in late pregnancy than those and correlate positively with blood sugar levels [19,20]

CONCLUSION

It was concluded that there was a significant relation of UTI with T2D in pregnant women and E. coli plus S. aureus were the predominate causes. HbA1c level was also elevated in these patients

ETHICAL CLEARANCES

The consent of the patient has been taken in the hospital.

CONFLICT OF INTEREST

None

SOURCE OF FUNDING

Self

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