Maternal Markers for Detecting Urinary Tract Infection among Pregnant Women in Port Said City, Egypt

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Abstract *Background:* Urinary tract infection (UTI) is one of the highest frequently problem caused by bacterial factors in a pregnant woman, which can lead to significant complications for both fetus and mother that hasten early detection for problems and prevention. The study aimed to identify the maternal markers for detecting urinary tract infection among pregnant women in port said City, Egypt. *Subjects and Methods:* A cross-sectional descriptive design was performed on 101 pregnant women who attend the obstetrics and gynecology clinic at Port Said general hospital with the inclusion criteria from first September 2017 to end of February 2018. The structured interviewing questionnaire and Laboratory test record were used to collect the data using a purposive sample. *Result:* In this study, 53.5 % of the studied women had positive bacteria in the urine *culture. E. coli* (39%) had the highest percentage of the isolated bacteria followed by *Staphylococcus aureus* (26%). The frequency of micturition, followed by dysuria, lower abdominal pain, urine color change, painful burning sensation, incomplete bladder evacuation were the most common maternal markers, predisposing factors associated with UTI during pregnancy were age, occupation, family income, previous treatment for UTI during current pregnancy, regular urination, diabetes mellitus, and previous urinary tract infection. *Recommendations:* A guidelines about preventive measures of UTI for pregnant women should be providing. Since the symptoms are considered reliable markers for detecting UTI during pregnancy, so suitable screening for early detection and provide proper treatment for infected cases should be implemented.

Keywords: Urinary tract infection (UTI), pregnancy, bacteria

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1. Introduction

Urinary tract infections (UTIs) are more frequent bacterial infections in humans, caused by recognized bacteria named as uropathogenic species. UTIs are considered a common health problem during pregnancy in the world, particularly in developing countries [1]. Pregnancy is considered one of the susceptibility reasons to increase the risk of urinary tract infection due to the burden of gravid uterus on the ureters producing stasis of urine flow. Moreover, urethral dilatation which occurs in 90% of pregnant women at 6 and 22-24 weeks' gestation. Hormonal and immunological responses during normal pregnancy, Sexual activity, age and the presence of genitourinary defects increase the prevalence of UTI [2,3].

The main bacteria that cause urinary tract infections are *Enterobacteriaceae*, particularly *Escherichia coli* and *Klebsiella pneumonia*. *Escherichia coli* are considered the main organism to infect the community with 80% of the infection in the urinary tract. These microorganisms increase the pregnant women risks such as premature labor and spontaneous abortion which need firm vigilance because of its great prevalence [1,4].

Maternal markers are considered medically diagnose for UTIs throughout pregnancy. It is important to determine symptoms that are the core problem during pregnancy some of them might be present, such as urinary occurrence and dysuria. Urgency urination may be present but at a lower scale, affecting approximately 1% to 5% of pregnant women. However, such indicators may also be present in cystitis and pyelonephritis by urethral irritation of the epithelium or as irradiated aching of a higher urinary tract infection process [5]. Also the presence of a microorganism that causes UTI per milliliter of urine at least 100,000 in asymptomatic pregnant women, or as over 100 organisms/ml. of urine associated with pus cells on urine (>5 WBC/HPF) in asymptomatic women throughout pregnancy [6].

Urinary tract infection in pregnancy is divided into asymptomatic (ASB) and symptomatic bacteriuria groups. Asymptomatic bacteriuria it is defined as the continued presence of bacteria in the urinary system of women who have no symptoms [1,2]. While the second group that characterized by urinary tract infection in the lower part of the urinary system like (acute Cystitis) or upper tract (acute pyelonephritis) infections. Cystitis is characterized by the presence of bacteriuria with bladder mucosal invasion, however pyelonephritis is presence of bacteriuria linked with the inflammatory process of the

kidney parenchyma and pelvis named is symptomatic urinary tract infections [7].

The prevalence of acute pyelonephritis is significantly developed in pregnant women with asymptomatic bacteriuria that ranged between 20 to 30%, if not treating during pregnancy will progress to acute pyelonephritis that considered a complication is leading to septic shock in the majority severe cases. So that, the initial antenatal urine culture is routinely performed, to decrease the occurrence of this dangerous pathology [1,8]. Pyelonephritis arises in 20-40% of pregnant women and has a relapse immediately in 23% post-natal period [7]. Although symptoms are greatest markers of UTI through pregnancy, special treatment has to be focused for asymptomatic cases [9].

The frequency of UTIs in pregnancy are thoroughly linked with the socio-economic status of the women, predisposing factors like, repeated UTIs, diabetes mellitus, structural defects of the urinary system, etc. Among the pathogenic agents, *E. coli* registers for the largest of UTIs, subsequent by *Enterobacter and Klebsiella. Enterococci and Proteus species* source uncomplicated inflammation in the bladder and pyelonephritis. Candida species are a major reason of fungal UTIs mainly in immune-compromised patients and in patients with catheters for a long period [10]. Penicillin, Amoxicillin, celtaxidime, norfl,aoacin, and cefoxitin are the greatest important and competent antibiotics for the cure and impede the majority of the UTI bacteria [9].

The nurse has an important role for prevention, early detection and treatment of urinary tract infection during pregnancy. The prenatal assessment to detect the women and fetus at risk should do by the nurse to improve the antenatal outcome by providing the proper care. Also, nursing intervention can assists in the effective treatment of lower urinary tract infection (LUTS) and prevent the involvement of upper urinary tract. Moreover, the nurse has experience and knowledge about the proper referral and suitable patient teaching to prevent the recurrence of infection [11,12,13,14].

1.1. The Significance of the Study

Urinary tract infections are commonly spread and constitute a serious maternal and fetal risk. They are considered the costly medical complications of pregnancy, occurring in nearly 20% of all pregnancies and responsible for 10% of all admissions to the hospital during pregnancy [2,3,4]. *E. coli* released the active endotoxin component of (lipid A) into the maternal circulation. Endotoxin-induced damage includes changes in cardiovascular output and lessened peripheral vascular resistance and precipitates a surge response of pro-inflammatory histamine, cytokines, and bradykinins. This may lead to the more serious complications such as; disseminated intravascular coagulation, septic shock, respiratory insufficiency, and adult respiratory distress syndrome [15]. UTI is one of the most important and potentially preventable causes of early preterm birth, low birth weight, and higher neonatal mortality and morbidity [16,17].

In Egypt, the prevalence of urinary tract infection has been reported about 29% in Ismailia city, nearly 30.29% in Suez governorate, and in Zagazig governorate reached 22% to 35%. Urinary tract infections are responsible for the mortality of approximately 150 million annually, worldwide [2,18,19]. Therefore, women during pregnancy should be evaluated for predisposing factor and assessed for the causative organism and markers of infection throughout their regular schedule follow-up. The examination of urine for the presence of bacteria and the appropriate antibiotic treatment should be determined for maternal and fetal health safety. The sensitivity for the drug should be put into thought with their adverse reaction related to pregnancy [20].

UTI is an avoidable disease that could be simply limited through health instruction to pregnant women about its etiology, nature, predisposing factors and women high risk and preventive methods [21]. So, this study aims to identify maternal markers for detecting urinary tract infection among pregnant women in port said City, Egypt.

1.2. The Aim of the Study

This study aimed to identify the maternal markers for detecting urinary tract infection among pregnant women in port said City, Egypt.

1.3. Research Questions

1- What are the maternal markers for detecting urinary tract infection among pregnant women in PortSaid city?

2- What are the possible predisposing risk factors for urinary tract infection during pregnancy in Port Siad city?

3- What are the causative bacteria isolated from the urine culture among pregnant women?

2. Materials and Methods

2.1. Research Design & Setting

A *cross-sectional descriptive* design was performed to accomplish the indicated aim.

2.2. Setting

The study was carried out at antenatal clinic of Port Said General Hospital, where it is free healthcare was providing to maternal as well as gynecological clients. This hospital was selected because it is attended by large numbers of patients. This clinic starts at 9 a.m and ends at 1 p.m six days every week.

2.3. Subjects and Sample

The total subjects of the study sample consisted of 101 pregnant women who attend the antenatal clinic at Port Said General Hospital with the inclusion criteria. Pregnant women at the second trimester of pregnancy who suspected clinically of urinary tract infection were selected by a purposive sample. The frequency of micturition, dysuria, fever, painful burning sensation, strangury, incomplete bladder evacuation, lower abdominal pain, flank pain, urine color change and shaking chills are clinically suspected symptoms of women with urinary tract infection (UTI).

Inclusion criteria:- All clinically pregnant women at the second trimester of pregnancy suspected for UTI, be present antenatal clinic were only included.

Exclusion criteria:- sickle cell disease (renal damage), anatomic or functional congenital urinary abnormalities, under antibiotic intake within 72 hours to the study days were excluded because the antibiotic must have inhibited or destroyed the pathogens.

2.4. Tools of Data Collection

Two main tools were used to accomplish the study aims.

I- **Structured Interview questionnaire** that developed by the researchers and consists of four parts like the following:

Part 1: included socio-demographic characteristics as (age, educational level, occupation, and family income).

Part 2: included obstetrical history as (number of pregnancies, number of deliveries, abortion, number of children and Previous treatment for UTI during current pregnancy).

Part 3: included questions about health habits and medical history (drinking enough water, regular urination, intake of vitamin C, frequent tea, coffee, and soft drinks consumption. Medical history as Diabetes Mellitus, hypertension, genital tract infection, kidney stones, anemia and Previous UTI).

Part 4: included data about symptoms related to urination presented by pregnant women as (Frequency of micturition, dysuria, fever, painful burning sensation, strangury, incomplete bladder evacuation, lower abdominal pain, flank pain, urine color change and shaking chills).

II- Laboratory test record:-

It includes the result of urine analysis as (presence of pus cells in urine, hematuria, and the percentage of RBC cells), urine culture to obtain types of isolated bacteria and vaginal swab to exclude vaginal infection.

2.5. The Validity of the Content

Tools of data collection were reviewed and by a jury of 5 experts in the maternity, obstetric, gynecologic nursing, and medical-surgical nursing and urology to certain applicability and of implementation of the tools.

2.6. Pilot Study

A pilot study was carried out on 10% (10) of a sample. It was conducted to test the feasibility of the study and applicability of the tools. According to the pilot study results, the tools were modified and the times needed for collecting the tools were determined. Pregnant women enrolled in the pilot study were not included in the study.

2.7. Fieldwork

A total of 101 pregnant women were recruited from the antenatal clinic at Port Said General Hospital. Data were collected through face to face interview from first September 2017 to end of February 2018. The researchers introduced themselves to pregnant women and based on the inclusion and exclusion criteria the women were excused from participating in the study. The women were recruited in the second trimester of pregnancy. Because The risk of acquiring bacteriuria during pregnancy was the highest between the 9th and 17th week and that the 16th gestational week was the best time for screening so treatment at that time would provide the highest number of bacteriuria-free gestational weeks [22]. Written consent was taken from each pregnant woman after explaining the purpose and process of the study. Data were collected from the selected governmental hospital for six days every week when it possible. The approximate time spent with each woman during the interview was 30 minutes or less to complete the questionnaire.

2.8. Vaginal Swab

According to the hospital policy, the vaginal swab was taken from each selected pregnant woman and analyzed to exclude vaginal infection.

2.9. Urine Sample Collection

Adequate clean-catch midstream urine specimen was collected by the pregnant women after given adequate and careful instructions for urine sample collection technique. The technique is as follows:

1-Wash hands with soap and water then dry.

2- Labial separate labia with one hand.

3- A Clean area around the urinary opening in the backward direction with water then dry thoroughly.

4- Spread the labia and then void the initial portion of the bladder contents into the toilet

5- Catch the remaining part of the urine in the sterile collection container

6- Cap urine Container after finish immediately with bearing in mind not to touch the inner container or the cap. The specimens were sent for evaluation at Port Said general hospital laboratory as soon as possible [23].

Urine Studies technique:-

The midstream urine was cultured immediately after first opening. The urine specimens were inoculated on blood agar (Mac Conkey agar). The plates were put under completely aerobic conditions in the incubator at 37°C for 24 hours. The culture plates were examined macroscopically after 24 hours of incubation to identify the morphology, color, appearance, and size of colonies. The isolated bacteria were diagnosed by using biochemical tests, Gram stain test and microscopic examination. Antimicrobial susceptibility of isolated bacteria was tested to identify the proper antibiotic used. The presence of leukocyte esterase (LE) and nitrite in urine were screened by using the biochemical reagent strip (dipstick). The microscope was used to examine red blood cells (RBCs) and pus cell (pyuria) in urine [24].

2.10. Ethical Consideration

The research was approved by Research Ethics committee. Written consents were obtained from the pregnant women after a brief explanation of the study with maintaining the women confidentiality of data. The pregnant women have not faced any risk as a result of the study. The results from the study assisted the pregnant women in receiving the suitable treatment.

2.11. Statistical Analysis

The raw data were coded and entered into SPSS system files (SPSS package version 19, Chicago, USA). Analysis and interpretation of data were conducted. Descriptive statistics including frequency, distribution, mean, median, standard deviation and interquartile range were used to describe different characteristics. Kolmogorov – Smirnov test was used to examine the normality of data distribution. Univariate analyses including t-test and Mann Whitney test were used to test the significance of results of quantitative variables. Chi-Square test, Monte Carlo test and Fisher's Exact test were used to testing the significance of results of qualitative variables. The significance of the results was at the 5`% level of significance.

3. Results

Table 1: The age of 101 studied pregnant women ranged from (18.0-45.0) years, (47.5%) of them in the age group between 25 to less than 35 with a mean age of 30.8±6.5years. Third of them (31.7 %) had the secondary school and university education. While the minority (7.9%) were illiterate. More than half of the study sample were housewives (55.4%), and (57.4 %) of them had a moderate income.

Table 2: Illustrates that more than half (53.5%) of the studied pregnant women had negative pyuria and most of them (83.2 %) had negative hematuria.

Table 3: Reveals that, the differences in these socio-demographic characteristics among negative and positive culture women were statistically insignificant except educational level P≤0.05. About 40.7 % of the women within the age group 35-≤45 has a positive culture, while 57.4% of the women within the age group 25 -<35 have negative culture. Nearly one-third of the positive culture women had a university education and working 57.4% with insufficient income 55.6%. The majority of the negative culture was housewives.

As shown in the Table 4, there are statistically significant differences among negative and positive culture women concerning previous treatment for UTI during current pregnancy at P≤0.05. And there were no differences with gravidity, parity, abortion and the number of living children.

Table 5: Reveals that there is a statistically significant difference between the presence of bacteria in urine culture in relation to regular urination, Diabetes Mellitus, and previous urinary tract infection.

Table 6 shows that the differences in maternal markers among infected and non-infected women were statistically significant. The frequency of micturition, followed by dysuria, lower abdominal pain, urine color change, painful burning sensation, incomplete bladder evacuation were the most common maternal markers for infected women.

Figure 1: Illustrates that, more than half of the studied pregnant women have positive bacteria (53.5%) compared to less than half have negative bacteria 46.5%.

Figure 2 shows that *E. coli* was the most frequent organism (39%) isolated from positive pregnant women

urine culture, followed by *Staphylococcus aureus* (26%), while the lowest was *staphylococcus saprophytic* (3.7%).

Table 1. Socio-demographic characteristics of the studied pregnant women (n=101)

Socio-demographic characteristics	Studied women (n=101)	
	No.	No.
Age (years)		
Less than 25	21	20.8
25-<35	48	47.5
35-≤45	32	31.7
Min-Max	18.0-45.0	
Mean±SD	30.8±6.5	
Educational level		
Illiterate	8	7.9
Read and write	16	15.8
Secondary school	31	30.7
University	31	30.7
Postgraduate studies	15	14.9
Occupation		
Work	45	44.6
Housewife	56	55.4
Family income		
Insufficient	37	36.7
Moderate	58	57.4
Enough	6	5.9

Table 2. Results of urine analysis done to the studied pregnant women (n=101)

Urine analysis results	Studied women (n=101)	
	No.	%
Pyuria		
Negative	54	53.5
Less than 20%	7	6.9
20-<40%	13	12.9
40-<60%	15	14.9
60% or more	12	11.9
Hematuria		
Negative	84	83.2
Less than 5%	10	9.9
5-<10%	3	3.0
10-<15%	1	1.0
15-<20%	3	3.0

Table 3. Relation between the presence of bacteria in urine culture and the Socio-demographic characteristics of the studied pregnant women (n=101)

Socio-demographic characteristics	Women with negative culture (n=47)		Women with positive culture (n=54)		Significance
	No.	%	No.	%	
Age (years)					
Less than 25	10	21.3	11	20.4	
25-<35	27	57.4	21	38.9	
35-≤45	10	21.3	22	40.7	
Min-Max	18.0-42.0		20.0-45.0		t=2.082
Mean±SD	29.3±5.9		32.0±6.7		P=0.040*
Educational level					
Illiterate	3	6.4	5	9.3	
Read and write	6	12.8	10	18.5	X^2=5.145
Secondary school	18	38.3	13	24.1	^{MC}P=0.280
University	16	34.0	15	27.8	
Postgraduate studies	4	8.5	11	20.3	
Occupation					
Work	14	29.8	31	57.4	X^2=7.760
Housewife	33	70.2	23	42.6	P=0.005* com
Family income					
Insufficient	7	14.9	30	55.6	X^2=18.314
Moderate	37	78.7	21	38.8	^{MC}P<0.0001*
Enough	3	6.4	3	5.6	

t: Student t-test, X^2: Chi-Square test, ^{MC}P: Monte Carlo corrected, P-value, *significant at P≤0.05.

Table 4. Relation between the presence of bacteria in urine culture and the obstetric history among the studied pregnant women (n=101)

Obstetric history	Women with NEGATIVE culture (n=47)		Women with POSITIVE culture (n=54)		Significance
	No.	%	No.	%	
Gravidity					
1-2	17	36.2	17	31.5	
3-4	16	34.0	24	44.4	
5 or more	14	29.8	13	24.1	
Min-Max	1-9		1-12		Z=0.618
Median (Q1-Q3)	3 (2-5)		4 (2-4)		P=0.537
Parity					
None	13	27.7	8	14.8	
1-2	22	46.8	25	46.3	
3-4	8	17.0	13	24.1	
5 or more	4	8.5	8	14.8	
Min-Max	0-8		0-8		Z=1.431
Median (Q1-Q3)	2 (0-3)		2 (1-3)		P=0.152
Abortions					
None	29	61.7	41	75.9	
1-2	16	34.0	10	18.5	
3-4	2	4.3	3	5.6	
Min-Max	0-3		0-4		Z=1.462
Median (Q1-Q3)	0 (0-1)		0 (0-0.5)		P=0.144
Number of living children					
None	13	27.7	8	14.8	
1-2	22	46.8	25	46.3	
3-4	7	14.9	13	24.1	
5 or more	5	10.6	8	14.8	
Min-Max	0-8		0-8		Z=1.410
Median (Q1-Q3)	2 (0-3)		2 (1-3)		P=0.159
Previous treatment for UTI during current pregnancy					
Yes	13	27.7	36	66.7	X^2=15.310
No	34	72.3	18	33.3	P<0.0001*

Q1-Q3: Interquartile range, Z: Mann Whitney test, X^2: Chi-Square test, *significant at P≤0.05.

Table 5. Relation between the presence of bacteria in urine culture and predisposing factors among the studied pregnant women (n =101)

Predisposing factors	Women with NEGATIVE culture (n=47)		Women with POSITIVE culture (n=54)		Significance
	No.	%	No.	%	
Health-related Habits during pregnancy					
Drinking enough water	37	78.7	34	63.0	X^2=2.989 P=0.084
Regular urination	41	87.2	33	61.1	X^2=8.755 P=0.003*
Intake of vitamin C	28	59.6	25	46.3	X^2=1.777 P=0.183
Frequent tea consumption	19	40.4	31	57.4	X^2=2.899 P=0.089
Frequent coffee consumption	19	40.4	31	57.4	X^2=2.899 P=0.089
Frequent soft drinks consumption	23	48.9	33	61.1	X^2=1.508 P=0.219
Medical history					
Diabetes Mellitus	4	8.5	19	35.2	X^2=10.147 P=0.001*
Hypertension	12	25.5	19	35.2	X^2=1.101 P=0.294
Genital tract infection	15	31.9	18	33.3	X^2=0.023 P=0.880
Kidney stones	5	10.6	8	14.8	X^2=0.391 P=0.532
Anemia	22	46.8	19	35.2	X^2=1.408 P=0.235
Previous urinary tract infection	11	23.4	36	66.7	X^2=18.904 P<0.0001*

X^2: Chi-Square test, *significant at P≤0.05.

Table 6. Relation between the presence of bacteria in urine culture and the maternal markers among the studied pregnant women (n = 101)

Maternal markers	Women with NEGATIVE culture (n=47)		Women with POSITIVE culture (n=54)		Significance
	No.	%	No.	%	
Symptoms related to urination					
Painful burning sensation	18	38.3	39	72.2	X^2=11.763 P=0.001*
Frequency of micturition	22	46.8	49	90.7	X^2=23.227 P<0.0001*
Dysuria	11	23.4	43	79.6	X^2=31.292 P<0.0001*
Strangury	10	21.3	30	55.6	X^2=12.345 P<0.0001*
Incomplete bladder evacuation	13	27.7	35	64.8	X^2=13.910 P<0.0001*
Lower abdominal pain	23	48.9	40	74.1	X^2=6.766 P=0.009*
Flank pain	16	34.0	32	59.3	X^2=6.407 P=0.011*
Urine color change	12	25.5	40	74.1	X^2=23.706 P<0.0001*
Fever	9	19.1	22	40.7	X^2=5.507 P=0.019*
Shaking chills	7	14.9	19	35.2	X^2=5.413 P=0.02*
Laboratory results					
Pyuria	6	12.8	41	75.9	X^2=40.291 P<0.0001*
Hematuria	1	2.1	16	29.6	X^2=13.577 P<0.0001*

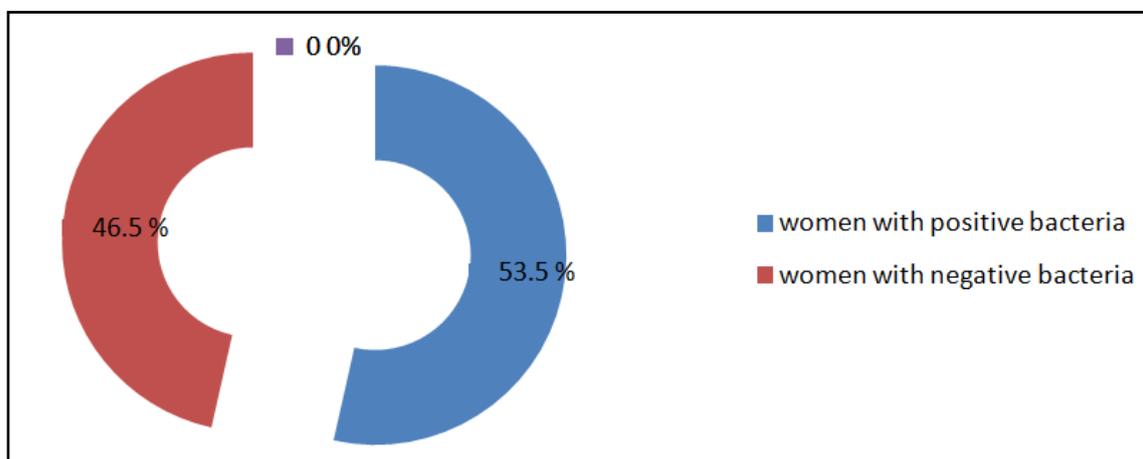X^2: Chi-Square test, *significant at P≤0.05.

Figure 1. Distribution of pregnant women according to urine culture of bacteria
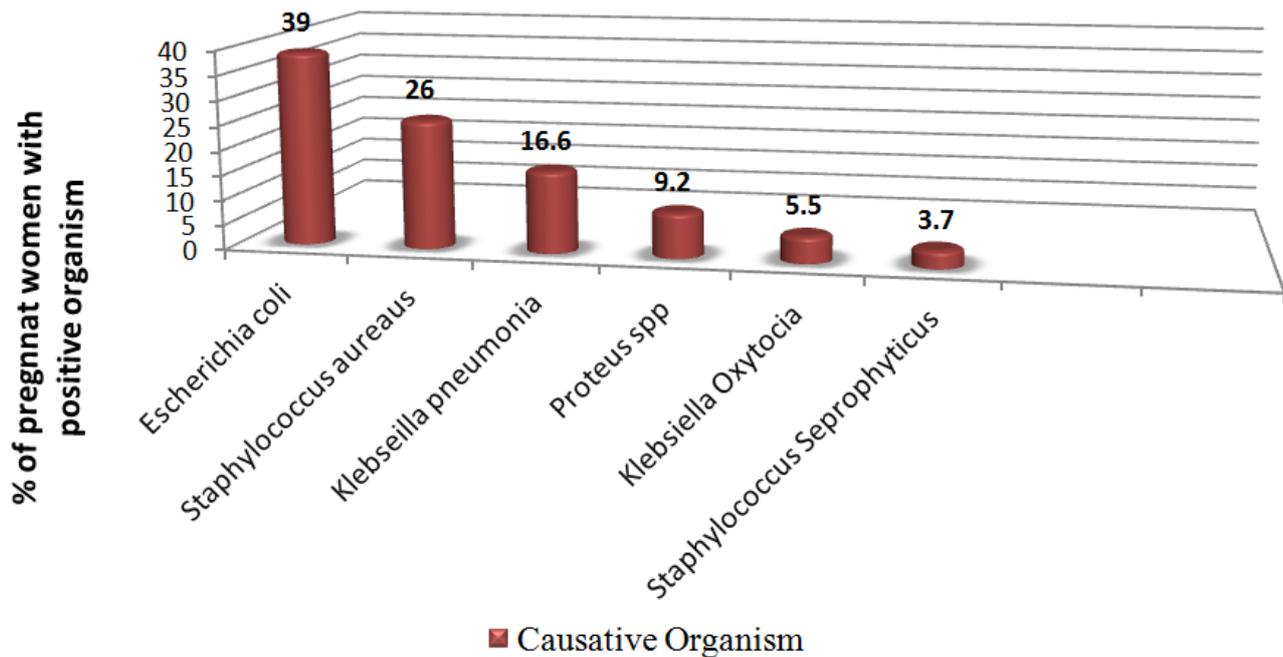
Figure 2. Distribution of bacteria isolated from the urine culture among positive pregnant women (n= 54)

4. Discussion

Urinary tract Infection (UTI) is considered commonly greatest medical health problem during pregnancy and have varieties from no presence symptoms to pyelonephritis. Women during pregnancy are at more risk of UTIs, mainly because of the physiological and anatomic changes that occur in usual pregnancy which lead to maternal disease and diminish fetal health outcomes [25,26].

The results of the present study showed that most of the pregnant women in the age group between 25 to ≤35. However, this anticipated because it is the suitable and ideal age of childbearing. This result correlates with finding made by Mokube et al., [27]. In addition, most of the women have secondary and university education. It is remarkable that in developing countries, women with secondary and university education are more possible to follow antenatal care than women with low education. Illiterate women may believe that pregnancy is a normal stage and does not require special attention. This result is in line with the result of Habib et al., [28]. Moreover, more than half of the women were housewives. This is expected because during working hours women not find the chance to visit the antenatal clinic. This result is congruent with the results of Elsaba [29].

The result of the present revealed that more than half of the examined pregnant women had positive urinary tract infection (53.5%) compared to less than half have a negative one. This study is supported by Worie & Eze [30] who presented nearly the similar percentage but it was lower than from Niger about 75%. However, prevalence was lower in Ismailia city, Egypt where nearly more than one-fourth of the pregnant women had UTIs [2]. Also, Mohammad, [18] reported the prevalence of UTI was less than one-third of the studied pregnant women at El Sadat Family Health Unit in Suez Governorate, and Tamalli et al., [6] reported similar percentage in Libya. On the other hand, the prevalence of UTI during pregnancy was less than one-fifth of other studied sample [31,32,33]. While,

Almushai et al., [21] & Haider et al., [34] found that the majority of the pregnant women had no bacteria and had <5 WBC/HPF on urine specimens. The variation in the prevalence of urinary tract infection during pregnancy could be due to a different population and geographic characteristics. In addition, the availability of screening test during pregnancy, medical services, and educational program offered to pregnant women. Worie, & Eze, [30] reported that change in the studied subjects that combined rise participants from rural areas with high levels of reduced housing states and hygienic practices affects the prevalence of UTI during pregnancy.

Concerning bacteria isolated from the urine culture among pregnant women that found the highest isolated organisms were E. coli (39%) and Staphylococcus aureus (26%) while the lowest was staphylococcus saprophytic (3.7%). These results may be attributed to rises urine pH in pregnancy to a range suitable for the growth of E.coli. Glycosuria gets advanced due to diminished re -sorption by the collecting loop and tubule of Henle. About 5% of the filtered glucose leaks proximal complicated tubular re-sorption [35]. These results are supported by findings of other studies results which they found that staph aureus was the second most prevalent organism following E.coli. [2,6,25,36]. E.coli has been well documented as the most ordinary traditional causative agent of UTI in different studies results [33,37,38,39,40,41]. While Staphylococcus aureus infection more prevalent among asymptomatic pregnant women in another study [3].

In the present study, the prevalence of UTI was higher in the age groups of 35-≤45 years followed by 25-<35. In this respect, Eriksson [42] and Rahiman et al., [35] reported that Urinary tract infection (UTI) is a common bacterial infection in women of all ages but the incidence and prevalence increase with age. These age patterns are Similar to age pattern were observed in studies by Ankur et al., [43] & Imade et al. [44]. These finding may be due to the women of this age are more likely to be multiparous, and that is a risk factor for acquiring urinary tract

pathogens. While this result inconsistent with Almushai et al., [21] & Ebidor et al., [25] who proposed no relationship between age, number of children and UTI prevalence.

Also, there is statistically significant between family income and presence of bacteria with a high percentage for insufficient income in positive culture for pregnant women. This could be due to the association of low the socioeconomic status with nutrition status and immunity especially in pregnant women. This result is in line with the outcome of Tamalli et al., [6] who found that prevalence of bacteriuria in "good" status women is found to be 9%, and 21% in case of poor pregnant women. Also, Kolawole et al., [45] stated that socioeconomic status is highly predictor for the presence of bacteria in urine and this result from reduced housing and drainage system, deficit proper environmental and personal cleanliness, sincere population susceptibility since it is that such as economic status, sexual intercourse and pregnancy in Nigerian. In contrast to these findings, Almushai et al., [21] found monthly income was not a factor that might affect the UTI prevalence because all subjects were recruited from antenatal governmental hospital visited by patients not economically able to use private sector health facilities. Moreover, more than half (57.4%) of the positive culture women were a worker. These results may refer to the working women may not find the chance to drink enough water or to have regular urination during working hours.

As regards relation between the presence of bacteria in urine culture and the obstetric history among the studied pregnant women proposed that, there are no statistically significant differences concerning gravidity, parity, abortion numbers and number of living children with urinary tract infection in the present study. These are in agreement with Mohamed et al., [2] who reported the similar results. In Khartoum North hospital, Hamadan et al.., 2011 [31] found that gestational age and parity were not associated with UTI during pregnancy. Almushait et [21] reported that there was no statistical difference between the mean number of children and previous history of abortion with the prevalence of urinary tract infection during pregnancy in Saudi Arabia. Also, Mohammad, [18] found that primigravidas have an increased risk of urinary tract infection during pregnancy with no statistical differences between the infected and non-infected group, in Egypt. In contrast to these findings, Onuoha & Fatokun [41] and Alvarez et al., [46] showed that the prevalence of UTI during pregnancy increased with parity. Besides, 66.7% of positive culture women have previous treatment for UTI during current pregnancy with P≤0.05. In this respect, it was reported that, 23% of women experiencing a recurrence of infection in the same pregnancy. This may be attributable to the modification of maternal immune system during pregnancy to help the implantation and development of the embryo. So, the immune response is modified from a cell-intermediated to a humoral reaction which results in less efficient reactions to bacterial cell surface proteins and probably easing pathogenicity. These modifications permit uro-pathogens to penetrate, multiply and arise proximally [47].

The current study results showed that UTI was significantly associated with pregnant women who didn't follow regular urination. This result agrees with Mohamed et al., [2] who reported that highly significant factors predisposing for the development of urinary tract infection during pregnancy were decreased frequency of urination per day. These results are supported by Rahiman et al., [35] who stated that emptying of the bladder during urination is the dominant defense against UTI so, emptying the bladder completely while urinating and not ignoring the desire to urinate can help women to evade urinary tract infections in most occasions. According to medical history, the current study findings showed that UTI was significantly associated with pregnant women who have diabetes mellitus and previous UTI. This may be attributable to increase urine glucose, and faulty immune host factors prejudice to infection during pregnancy. Increase blood glucose causes a neutrophil disturbance by excessing calcium inside the cells levels and restrict with actin and, thus, diapedesis and phagocytosis. Candidiasis in the vaginal and vascular disease also show a role in repeated infections [34,48]. Also, this is due to the stasis of the urinary pregnancy caused by physiological and anatomical changes in the urinary tract, such as compression effect by the uterus on the ureters and the impact of relaxation of progesterone on the urinary tract muscles [49]. Moreover, Emiru et al., [50] proved that diabetes mellitus, recurrent UTI is critical disposing factors for UTI, and the frequency and the severity of UTI rises in pregnancy.

The current study revealed that, a statistically significant difference between presences of bacteria in urine culture in relation to symptoms related to urination. This result consistent with Almushait et al., [21] who found that those total women during pregnancy with current UTI experience a UTI associated complaints while none of the pregnant women without current UTI experience any UTI associated complaints, with a highly significant statistical difference.

As regards presenting symptoms most pregnant women have signs and symptoms such as frequency of micturition, dysuria, lower abdominal pain, urine color change, painful burning sensation, incomplete bladder evacuation (90%, 79.6%, 74.1, 74.1, 72.2, 64.8% respectively) related to presence of bacteria with statistically significant relation which is agreement with El Lawindi et al.., [51], who reported that common utmost present symptoms among cases were dysuria, frequency, loin pain 55.2%, 43.9%, 42.2% respectively. Similar studies such as that by detected dysuria in only 25% of cases, which is not in agreement with Khamis., [52] Painful burning sensation was the most specific at 71 % ` this is supported by El Lawindi et al., [51]. On the other hand, this study not supported with these results of the study in Egypt by Mohammad, [18] who stated that two-fifths of pregnant with UTI had asymptomatic of urinary tract infection. This high percentage can cause a delay in diagnosis and treatment and the rise of complication. From the researcher's Mohamed et al., [2] fact of view, this could be clarified as the occurrence of urinary symptom is a public urinary complain described during a healthy pregnancy due to pregnancy alterations in addition to the bacteria of UTI, resulted in rising incidence of complaints about it. In this respect, it was reported that urgency, dysuria, frequency of urination, cloudy and strong odor urine sometimes be tainted with blood are the most common signs of urinary tract infection. Moreover that if the pathogens reach the ureter and extent to the kidney

symptoms may also include nausea, vomiting, back pain and chills [53].

There is a statistically significant difference between the presence of bacteria in urine culture in relation to laboratory results such as pyuria and hematuria P≤0.05. This study result is in line with Michelim et al., [54] who found that Pyuria is present in a majority of women with pyelonephritis, and its absence suggests an alternative diagnosis or complete obstruction. This could white blood cells or leukocytes are essential cells of the immune system that defend our body from all sorts of infections and foreign materials. The existence of white blood cells in urine is an indication of inflammation and infection of one or several kinds. Here are some of the reasons that might increase the level of leukocytes in urine during pregnancy.

5. Conclusion and Recommendation

The study concluded that 46 .5% of the 101 women participating in the survey were positive urine culture. In this study, the chance of UTI was higher among pregnant women in the presence of predisposing factors such as age, occupation, family income, history of UTI, diabetes mellitus, a frequency of urinary tract infection, and previous treatment for UTI. Beside maternal marker include signs and symptoms were a frequency of micturition, dysuria, lower abdominal pain, urine color change, painful burning sensation and incomplete bladder evacuation. To minimize the hazards of pregnancies, regular prenatal care should be engaged and to confirm a healthy pregnancy with delivery of a good healthy baby from a healthy woman. Furthermore, guidelines about preventive measures of UTI for pregnant women should be providing. Since the symptoms are considered reliable markers for detecting UTI during pregnancy, so that proper screening for early detection and provide adequate treatment for infected cases should be implemented.

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