Comparative study between Urine Tract infection of Pregnant and Non-pregnant Women to Evaluate the Reason of Contraception in Non-pregnant Women in Al-Khums, Libya.

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Abstract :

The urinary system is one of the important systems in the body, Diseases of the urinary system example is urinary tract infections are bacteria infecting one part of the urinary system; urinary incontinence is a poor ability to control the muscles of the bladder which leads to inadvertent leakage of urine. This study aims to identify the most important categories of pregnant and non-pregnant women that are most affected by urinary tract infections. Also, to make a comparison between women who are more susceptible to infections, pregnant or non-pregnant women. On the other hand, to determine whether urinary tract infections are a reason for contraception. The location was Al-Koon Medical Clinic/ Al-Khums - Libya. Sample size, were 703 samples including 408 samples for pregnant women and 295 samples for non-pregnant women. The results observed that non-pregnant women of total size of sample if compared with pregnant women samples in sugar, uric acid, ketone, protein, albumin, bacteria percentage of blood in the urine. Also in urine's culture analysis showed that *Escherichia coli* more than the percentage of cases infected with *Klebsielle pneumonia* and the percentage of cases infected with *Klebsielle pneumonia* were more than the percentage of cases infected with *Staphylococcus spp.*

Key words: pregnant, non-pregnant women,UrineTract infection

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Introduction :

The urinary system is one of the important systems of the body. This system combined of many organs which are kidneys two ureters, the urinary bladder, and the urethra. The urinary system has several functions, including, ridding the body of many wastes through urine, such as urea and proteins. Also, kidneys have reabsorption of some nutrients such as glucose, bicarbonate, water, chlorine, magnesium, sodium, phosphate, potassium and amino acids. However, they can regulate the blood pH, blood pressure and osmosis to remain within the normal range. Although, it secretes an amount of important compounds in the body [1].

The Aim of the Study:

The study aims to:

- To identify the most important categories of pregnant and non-pregnant women that are affected by urinary tract infections.

The study objective:

- To make a comparison between women who are more susceptible to infections, pregnant or non-pregnant women.
- To determine whether urinary tract infections are a reason for contraception.
- To evaluate the most infected bacterial type of urine tract infection (UTI) of pregnant and non-pregnant women

Diseases of the urinary system example urinary tract infections are bacteria infecting one part of the urinary system

urinary incontinence is a poor ability to control the muscles of the bladder, which leads to inadvertent leakage of urine [2].

In a study by Hooton *et al* 2013, it was found that there is a significant relationship between infection with bacteria and type Gender, and he found that females are more susceptible to infection than males, and most of the infections were in the age group 27-28 years, and in his research on the virulence factors of bacteria isolated from patients with urinary tract infection from 100 samples, 65% of them were *Escherichia coli (E. coli)* [3]. Urinary tract infection affects all age groups, but women are more susceptible than men due to a short urethra, absence of prostate secretion, pregnancy, and ease of contamination of the urinary tract with fecal bacteria [4]. One study had done by Renard *et al.*, 2014 on Urinary Tract Infection confirmed that females are more susceptible to infection than males, as the percentage of infected females was approximately 69.70%, and that infection among males was 25.4% [5].

In addition, the physiological increase in plasma volume during pregnancy reduces urine concentration and up to 70% of pregnant women develop hyperglycemia, which encourages bacterial growth in the urine [6].

The risk factors for the urinary tract infection and its impact have the development of preterm labor [7]. Clinical trials have indicated that antimicrobial treatment of asymptomatic bacteriuria during pregnancy reduces the risk of subsequent pelvic nephritis from 20%-35% to 1%-4%. There are also associations between maternal pregnancy complications and pelvic nephritis including high blood pressure, pre-eclampsia, anemia, amniocentesis, and endometriosis. The most common bacteriuria pathogen is *E. coli* which accounts for 60 to 90% of infections in women. They also include *Klebsiella pneumonia*, Proteus mirabilis, and *Pseudomonas aeruginosa*. Gram-positive bacteria such as *Staphylococcus saprophyticus* also cause bacteriuria [8].

Among 300 patients the prevalence of gram positive was 53% while gram negative 21% and negative samples were 26%. *S. aureus* and *E. coli* were 11% every one of them [9].

There are several ways to diagnose a UTI, but urine culture is still the most reliable tool for diagnosing it [2]. The bacteria *E. coli* came at the forefront of the bacterial which causes UTI and isolated from the first group of pregnant women who have diabetes type two and other group of women with diabetes type two of who infected with *Klebsiella pneumonia,* and *Proteus mirabillis*.

Materials and Methods:
Sample Collection (Methodology):

Study Location :

Al-Koon Medical Clinic in ELKhoms city, ELmergib province.

Study Period:

The period of this study was from (10/01/2022) to (31/12/2022).

Study Sample:

The sums of urine samples were 703 samples were taken from females between 18-50 years, including 408 samples for pregnant women and 295 samples for non-pregnant women, all those women are following up treatment in Al-Koon Medical Clinic.

Materials:

The materials and the devices were used in this study were (Microscope, urine analysis strips (comb screen), centrifuge device glass slides, cover slides, sterile tubes for urine sample collection (container), recorder sheet for recoring the results of both normal urine samples and urine bacterial cultures, specific tubes for urine

sample sedimentation, bacterial culture media dishes (blood agar dishes, nitrite agar dishes), incubator, swap survey, antibiotic minor paper desks (Cephalexin, fosfomycin, amoxicillin, doxycycline, ciprofloxacin, Augmentin, Erythromycin, and Tetracycline).

The Methods:

Urine analysis, urine cultures, Gram stain and antibiotic sensitivity test. In this study, the method of (Hamdan, 2011) was followed up, with some modifications for preparing urine samples for a complete urine analysis and urine cultures.

The samples were divided into two parts (pregnant women and non-pregnant women). Urine analysis does not require fasting before undergoing the test, if the person can eat foods and drink liquids before that. It is necessary to inform the doctor of the nature of any medications or vitamin supplements that the person uses before undergoing the test procedure, as some of them have an effect on the results of the analysis.

Methods of collecting a urine sample for analysis and care must be taken to collect the urine sample in a correct manner in order to avoid contamination of the urine sample to prevent inaccurate results. For that, the urine was collected in a sterile vial designated for collecting saved urine samples.
Urine samples and those vials were delivered to the laboratory. The samples were dealt with them by examining them in three different ways as fallow examination methods.

Visual Examination:

This test plays an important role in evaluating the colour of urine, its purity and its smell, as this forms the substances that may be present in the urine.

Urine Analysis:

The urine samples must be sediment for the process of urine analysis test as fallow,

Fill the sterilised tube with urine.

Tube centrifuged with 4000 rapid per minute for 10 minute. The urine sediment contents were separated and deposited at the bottom.

The tube is transferred from the centrifuge to microscopic test.

The urine sample was emptied on a glass slide. The slide was covered with cover`s slide and placed under the microscope to be examined.

The results observed under the microscope lens were recorded as follow presence of bacteria (few / moderate / many / plenty), presence of white blood cells (1-3 / 2-4/ 4-6/ many cells), presence of red blood cells (1-3/ 2-4/ 4- 6/ many cells), presence of calcium salts nil or (+/ ++/ +++/ ++++ positive), presence of an amount of albumin (Few / moderate / many/ plenty mucous) presence of amorphous urate or amorphous phosphate ratio nil or (+/ ++/ +++ positive) presence of epithelial cells (Few / moderate/ many).

Urine Culture:

The sedimentation tube is placed in a centrifuge for ten minutes until the contents of the urine were sediment.

The urine sample was emptied and taken the precipitate.The precipitate is grown using an inoculation needle on a Petri dish with blood agar and MacConky agar. The dish is placed in the incubator for 24 hours at a temperature of 37 °C.

Place the dish in the incubator for 24 hours, then take it out to find out the type of bacteria in the dish, whether it is *Klebsiella, Staphylococcus spp, E. coli* , or any other type.

Results and Discussion:

Medical Sanatorium, the number was 703 samples, including 408 samples for pregnant women and 295 samples for

non-pregnant women who are following treatment with the obstetrics and gynaecology doctor in the sanatorium, during the period starting from (1-10-2022 to 31- 12-2022).

Complete urine analysis results from urine analysis of samples and bacterial cultures in pregnant and non-pregnant women, by department of Obstetrics and Gynaecology.

Table 1- Results of urine analysis of pregnant and non-pregnant of 703 samples

Type of urine analysis	Total abnormal cases	Pregnant abnormal cases		non-pregnant abnormal cases	
Glucose	8	5	62.5%	3	37.5%
Ketone	5	3	60.0%	2	40.0%
Blood	120	50	41.7%	70	58.3%
Protein	148	60	40.5%	88	59.5%
Bacteria	148	60	40.5%	88	59.5%
Nitrate	3	1	33.3%	2	66.7%
Leukocytes	120	55	45.8%	65	54.2%
Mucus	148	60	40.5%	88	59.5%
Calcium oxalate	3	1	33.3%	2	66.7%
Total	703	295	41.96%	408	58.03%

Table No. (1) Showed the results of urine analysis of pregnant women and non-pregnant, which observed that 408 (58.03 %) of non-pregnant women of total size of sample if compared with pregnant women which was 295 (41.96%) in total size of sample.

The urine at a rate of 5 (62.5%) compared to non-pregnant women, who had a high rate of sugar in the urine at a rate of (37.5%). Also, the increase in the percentage of ketone in the urine of pregnant women was unnoticed, reaching 5 (60%), compared to only 2 (40%) for non-pregnant women.

While the percentage of cases that suffer from a high percentage of (protein, albumin, and bacteria) in the urine of non-

pregnant women increased by 88 (59.5%), while the percentage of pregnant women was 60 (40.5%). Also, the percentage of cases that suffer from a high percentage of blood in the urine in non-pregnant women reached 70 (58.3%), while in pregnant women the percentage was 50 (41.7%).

A significant increase was also found among non-pregnant women in urine samples that contain uric acid, and the percentage of cases reached 2 (66.7%) compared to 1 (33.3%) for pregnant women.

Also, an unnoticeable increase was observed in non-pregnant women who suffer from the presence of calcium oxalate salts in the urine, reaching a percentage of 2 (66.7%) compared to pregnant women, who had a percentage of 1 (33.3%). There was also a rise in the percentage of white blood cells in urine samples of non-pregnant women, which reached 56 (54.2%), compared to urine samples of pregnant women, which was 55 (45.8%).

In this study, it was found that the number of non-pregnant women had higher levels of blood, bacteria, albumin, uric acid salts, protein, and white blood cells in urine than pregnant women, and this explains One of the reasons for their inability to get pregnant, as a result of having a complaint of urinary tract infection, while in pregnant women, although they are less infected with urinary tract infection, it affects some of them either by miscarriage of the fetus, premature birth, or the birth of a child with a relatively very low weight. This is similar to a study by Almaghlouth *et al* 2023 on pregnancy and abortion in Switzerland in women with acute and chronic UTIs [8].

Table 2- The Results of Urine Culture of 179 Samples of Pregnant and Non-Pregnant

Type of Bacteria	Total samples	Pregnant		Non-pregnant	
Klebsielle pneumonia	91	40	44.00%	51	56.00%
Staphylococcus spp	55	25	45.50%	30	54.50%
Escherichia coli	33	10	30.30%	23	69.70%
Total	179	75	42.89%	104	58.10%

Table No (2). Showed, the results of urine culture analysis of 179 urine samples of pregnant and non-pregnant. The results were carried out after confirming the presence of a women large number of bacteria in the urine by examining the urine sediment under the microscope.

The results of urine cultures showed that the percentages of non-pregnant women samples infected with *Klebsielle pneumonia, Staphylococcus spp* and *Escherichia coli* were more than pregnant women samples; as fallow *Klebsielle pneumonia* was 56.00% and 44.00% for non-pregnant and pregnant women respectively. Similarly, *Staphylococcus spp* was 54.50% and 45.50% for non-pregnant and pregnant women respectively. Also, *Escherichia coli* were 69.70% and 30.30% for non-pregnant and pregnant women respectively. On the other hand, the total was 58.10% in cases non-pregnant and 42.89% in cases of pregnant women; this was agreed with Yaser *et al* 2023 [7]. But, Mudassir *et al* 2019 was found that 61% infected with *Escherichia coli,* which was more than 19% of cases infected with *Klebsielle pneumonia* and more than 2.7% of cases infected with *Staphylococcus spp* of 300 cases of pregnant women [10].

which was agreed with this study because this study also the percentage of cases infected with *Escherichia coli* more than the percentage of cases infected with *Klebsielle pneumonia* and the percentage of cases infected with *Klebsielle pneumonia* were more than the percentage of cases infected with *Staphylococcus spp* Table No (2).

Also, this study was agreed with Delzell and Lefevre (2008), and Smaill and Vazquez (2007) claimed in their research that mostly Gram negative bacteria developed UTI like *Escherichira coli* which spread in pregnant women [11], [12].

Conclusions and Recommendations:

Urinary tract infections are incurable diseases that many pregnant and non-pregnant women suffer from. This study reached the following conclusions

Conclusions:

- The non-pregnant women are more susceptible to UTI than pregnant women.
- The urinary tract infections due to the accumulation of bacteria in non-pregnant women are one of the reasons for contraception.
- The urinary tract infections in pregnant women cause some of them to have miscarriages, while others cause them to give birth prematurely, and others cause them to give birth to a fetus with a relatively low weight.
- *Escherichia coli*e infected more cases than other types of bacteria, as *Klebsielle pneumonia* and *Staphylococcus spp.*

Recommendations:

Through the results and conclusions of this study, we recommend the following:
Increasing health awareness among pregnant women and non-pregnant women, especially with regard to UTI.

1- The laboratory doctor determined for the urologist of the effective antibiotics against the bacteria that infect the patient. Urologist, descript the antibiotic to treat the patient.
2- Newly married women should follow their obstetrician and gynaecologist to ensure that there are no urinary tract infections that may prevent pregnancy.
3- Conduct more research and studies on urinary tract infections in pregnant and non-pregnant women regarding

these bacteria to know the patterns and ways of responding to it, to reduce its danger in the future.

4- Avoid indiscriminate use of antibiotics, use them regularly when prescribed by a doctor, and avoid using them as a regular preventive measure.
5- More researches are needed in UTI of pregnant and non-pregnant women.

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