Urinary Tract Infections Caused by Gram Negative Bacteria and Their Level of Severity in Pregnant Women in Al Qadisiya Province, Iraq.

**Ahmed Sami Salman1, Zahraa Mohammed Yahya2**

1,2Al Qasim green university, College of science, Pathological analyzes department, Iraq

1 [ahmedsami@science.uoqasim.edu.iq](mailto:ahmedsami@science.uoqasim.edu.iq),

ORCID: 0000-0002-7669-1931

2 [zahraamohammed@science.uoqasim.edu.iq](mailto:zahraamohammed@science.uoqasim.edu.iq)

Abstract

**Background:** Any infection that is related to the urinary system as a whole is conventionally referred to as a urinary tract infection. The urinary system consists of the kidneys, the tubes called ureters, the bladder and the tube called urethra. A majority of the infections affect the bladder and the urethra, which are positioned at the ends of the long tube known as urethra.  
UTIs are more prevalent in women as compared to men According to the studies carried out the UTIs are more common in women as compared to men. If the infection is localized in the bladder, then this individual can have unbearable pain and suffering. However, should the UTI advance to the kidneys, it provides an avenue for a more serious medical problem. **Aim of study:** The study of gram-negative bacteria that causes urinary tract infections in pregnant women. **Methodology:** Participant samples were obtained from hospitals in and around Qadisiya governorate in Iraq; 100 patients with bacterial infections affecting pregnancy in patients of different ages, taken from hospitals and diagnosed with bacterial urinary tract infections from 01/01/2024 to 20/04/2024. **The results** of the study showed that bacterial infection during pregnancy is most common among women aged 21-30, the second place is occupied by women aged 31-40, while the last place, the infection is least likely to occur among women of 41-45 years. Analyzing the data collected based on the severity of infection we mainly noted that the severe infections were at the highest percentage of 35%, and the second most infected category was the moderate one with a percentage of 29%. As for the bacterial species causing urinary tract infections in pregnant women samples taken *Escherichia coli* bacteria were found to be prevalent with a percentage of 43% while the second one was *Klebsiella pneumonia* with 29% prevalence rate. **Conclusion:** The highest incidence of urinary tract infections in pregnant women was in the age groups 21–30 years and 31–40 years, and the bacteria causing urinary tract infections in pregnant women was *Escherichia coli*, followed by *Klebsiella Pneumonia.*

**Keywords: UTI, pregnant, *E. Coli, K. pneumonia*, proteus, pseudomonas, severe.**

1. **Introduction**

Urinary tract infections (UTIs) result from harmful microorganisms that make their way into those tracts and cause contamination. In most instances, the microorganisms that invade the lower urinary tract come from our body. There are many exceptional microorganisms that may cause urinary tract infection (UTI); however, the most common type is *E. coli*, which normally lives in the gut and can infect the urinary tract while the urethra is exposed to feces. And sometimes other kinds of bacteria are the reason [1, 2, 3].

**1.1. What are the most unusual signs of cystitis?**

Sensation of ache or burning during urination, Frequent urination, a regular and urgent urge to urinate, excreting small quantities of urine every time, Traces of blood in the urine, Urine is cloudy, dark in shade, or strongly smelling, feeling cold; however, it is not commonly observed via fever. [4,5]

**1.2. Sudden urinary incontinence.**

The most common kind of urinary tract infection (UTI) is considered to be irritation of the decreased urinary tract, in which bacteria contaminate the urethra and bladder. And there are very virulent strains of bacteria that, if left untreated, can spread to the ureters and kidneys, causing infection of the top urinary tract. Then the symptoms get worse appreciably, inflicting, for example, another ache, nausea, and fever. Kidney inflammation is dangerous and can harm the kidneys or cause their failure. And if left untreated, the contamination can enter the bloodstream, requiring in-depth care. [6,7,8]

Asymptomatic bacteriuria, also called "pleasant" bacteria, within the urinary tract is considered an innocent situation and should not be handled with antibiotics. This bacterium does not display any signs except for the unsightly odor of urine in some people. This approach suggests that a superb diagnostic exam (nitrite and/or leukocytes) does not establish the presence of continual urinary tract contamination (UTI). If there aren't any other signs, dehydration can also cause the production of cloudy, dark-colored, foul-smelling urine, so make certain you drink enough fluids. [7,8].

**1.3. Contamination in vulnerable**

Urinary tract infections (UTIs) can affect anybody at any age, but some organizations are extra at risk. The primary reason why women are extra susceptible to urinary tract contamination (UTI) is because of their gynecological structure. Since the urethra in women is shorter than in men, it's also near the anus, from which bacteria are able to penetrate into the urinary tract. Estrogen levels in girls are additionally lower with age, which makes the partitions of the urinary tract drier. additionally, the protective mucous membrane or mucous layer becomes less acidic, which reduces its potential to fight infection. That is why estrogen therapy is suggested to prevent urinary tract infections (UTIs). [9,10]

**1.4. Bacteria in urine that are observed through symptoms**

Symptoms of harm to the lower half of the urinary system the urinary system when bacteria infect the lower half of the urinary system, that is, the bladder and urethra, are the symptoms that may appear: burning sensation within the urine, a strong scent of urine or opaque urine, the presence of blood in the urine, a frequent urge to urinate despite the fact that the smallest amounts of urine come out at a time, anal pain in men, pelvic pain in ladies. [11] There is concern about this unique case of the transmission of bacteria to the blood, as this could cause sepsis, an extreme condition that may kill the infected individual. [12]

**1.4.1. Symptoms of injury to the top half**

Pain and softness within the area of harm, chills, fever, nausea, and vomiting. [12].

**1.4.2. Risk elements for infection with urolithiasis, which might be accompanied by signs and symptoms**

Getting older, they're more commonplace with the various ages, prolonged use of tubes that might be inserted into the urethra, having diabetes and not controlling the circumstances nicely, the presence of a congenital disorder in the urinary tract, weakening of the immune gadget, having troubles with the urinary device, along with kidney stones and pregnancy. [13].

**1.5. Diagnosis and remedy**

The analysis of infection with urine bacteria is made right here by the physician, subjecting you to several tests and analyses, which include a urine exam, a urine culture, a blood count, and radiological examinations. If the infection recurs more than once, the treatment of this kind of urinary tract infection depends on its main purpose, and frequently, urinary tract infections caused by microorganisms are treated with antibiotics. [14,15]

**1.6. Bacteria in urine without the presence of signs**

This form of urinary microorganism is wherein bacteria are present in the urine without causing any signs or symptoms to the infected, a situation that regularly does not cause any troubles for the inflamed if his health is ideal. However, this kind of urine bacteria can cause trouble if the infected man or woman is, for example, a pregnant girl or someone who has undergone a kidney transplant. [16,17]

**1.7. Symptoms of asymptomatic bacteriuria**

There are not any signs and symptoms of this kind of urine microorganism, and any look of signs and symptoms means that a person might also have a urinary tract infection, no longer this form of bacteria. [17]

**1.8. Risk elements for infection with an asymptomatic urine microorganism**

Urea plasma of this kind isn't always an unusual circumstance; it affects girls more often than men, and expert’s characteristic is that a female's urethra is shorter than a person, so bacteria infiltrate easier and quicker. [18]

**Aim of study:** The study of gram-negative bacteria that causes urinary tract infections in pregnant women.

**2. Materials and Methodology**

**2.1. Samples collection**

Participant samples were obtained from hospitals in and around Qadisiya governorate in Iraq; 100 patients with bacterial infections affecting pregnancy in patients of different ages, taken from hospitals and diagnosed with bacterial urinary tract infections from 01/01/2024 to 20/04/2024.

**2.2. Statistical Analysis**

The collected data were analyzed using SPSS program to obtain the value for Chi Square with reference to the significant value calculation and to compare the significant differences found between different groups.

**3. Results**

**Table No.1: samples distributed according to age intervals**

|  |  |  |
| --- | --- | --- |
| **Age interval** | **No.** | **%** |
| 15-20 | 23 | 23 |
| 21-30 | 43 | 43 |
| 31-40 | 28 | 25 |
| 41-45 | 6 | 6 |
| Total | 100 |  |
| X2 |  | 27.92 |
| P value |  | \*0.001≥ |
| \*Significance difference at p≤0.05 |

**Table No .2: samples distributed according to Severity of infection**s

|  |  |  |
| --- | --- | --- |
| **Severity degree** | **No.** | **%** |
| Mild | 19 | 19 |
| Moderate | 29 | 29 |
| Severe | 35 | 35 |
| Very severe | 17 | 17 |
| total | 100 |  |
| X2 |  | 8.64 |
| \*Significance difference at p≤0.05 | | |

**Table No.3: Types of bacteria causes UTIs**

|  |  |  |
| --- | --- | --- |
| **Type of bacteria** | **No.** | **%** |
| *E. coli* | 43 | 43 |
| *Klebsiella pneumonia* | 29 | 29 |
| *Proteus mirabilis* | 16 | 16 |
| *Pseudomonas aeruginosa* | 12 | 12 |
| *Total* | 100 |  |
| *X2* | 20.24 |  |
| \*Significance difference at p≤0.05 | | |

**Table No.4: Bacterial infections and severity degree**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of bacteria** | **severity degree** | | | |
| **mild** | **moderate** | **severe** | **Very severe** |
| *E. coli* | 12 (27.90%) | 9 (20.93%) | 17 (39.53%) | 5 (11.16%) |
| *Klebsiella pneumonia* | 13 (44.82%) | 4 (13.79%) | 8 (27.58%) | 4 (13.79%) |
| *Proteus mirabilis* | 2 (12.5%) | 7 (43.75%) | 6 (37.5%) | 1 (6.25) |
| *Pseudomonas aeruginosa* | 2 (16.6%) | 2 (16.6%) | 5 (41.6%) | 3 (25%) |
| *X2* | 23.644 | | | |
| \*Significance difference at p≤0.05 | | | | |

**Table No.5: interaction between types of bacteria and age intervals**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of bacteria** | **Age interval (years)** | | | |
| **15-20** | **21-30** | **31-40** | **41-45** |
| *E. coli* | 8 (18.6%) | 15 (34.88%) | 18 (41.86%) | 2 (4%) |
| *Klebsiella pneumonia* | 5 (17.24%) | 12 (41.37%) | 11 (37.39) | 1 (3%) |
| *Proteus mirabilis* | 2 (12.5%) | 9 (56.25%) | 5 (31.25%) | 0 |
| *Pseudomonas aeruginosa* | 3 (25%) | 6 (50%) | 2 (16.6%) | 1 (8.3%) |
| X2 | 35.65 | | | |
| \*Significance difference at p≤0.05 | | | | |

**4. Discussion**

From Table No. 1 age groups we can easily identify the vulnerable age by analyzing the percentages and the result shows that age group 21 - 30 years’ percentage is still high and the second highest 31- 40 the reason can be due to hormonal instability during these two age periods, while the minimum percentage was found in 41 – 45, this age group comes after they gained their menopause period, from the Table No. 2 depicting the severity of infection, it observed that the messages related to severe infections had the highest percentage as compared to moderate and very severe infection messages and the reason for this may be variety of bacterial species with fungal and other also and messages for very severe infection and mild infection were nearly equal, It is clear from equation no. 3 of bacteria which are present in natural settlement and high prevalence Escherichia coli stands first the *Klebsiella pneumonia* in second intention because of above mention reason while *Proteus mirabilis* come in third intention may be due to kidney stone in infected women while *Pseudomonas aeruginosa* come in fourth intention which is a hospital infection may be this is the main reason in presence of it other reason, these totals have, therefore, given very significant statistical difference among themselves as presented in the tables (4,5) containing the severity/age intervals of the infection and the bacterial species infecting the urinary tract respectively.

**Conclusion**

The highest incidence of urinary tract infections in pregnant women was in the age groups 21–30 years and 31–40 years, and the bacteria causing urinary tract infections in pregnant women was *Escherichia coli*, followed by *Klebsiella Pneumonia.*

**Recommendations**

Expand the study area to include a larger number of regions and increase the time required for data collection in order to obtain more comprehensive data.

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