# Detection Of Proteus Species In Pregnant Women In The North Of Thi-Qar Province

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**KEYWORDS**
Urinary Tract Infection (UTI), Pregnant women, Proteus bacteria

**ABSTRACT**
The study included isolation and diagnosis of bacteria Proteus from pregnant women suffering from urinary tract infection (UTI). There are one hundred and fifty urine samples were collected in sterile procedure from pregnant women in north Thiqarprovince. with duration period from September to December 2023. Several data were recorded from such as age, pregnancyduration, occupation and residence.In general they were 40 samples detected as Gram negative bacteria (G-ve). Gram negative bacteria: (20)(13.33%) isolates were Escherichia coli, (8) (5.34%)isolates were Pseudomonas aeruginosa (7)(4.67%) isolates were Proteus mirabilis and proteus penneri and finally (5)(3.33%) isolates were Klebsiella pneumoniae.

## 1. Introduction

Urinary tract infections (UTIs) are among the most common infectious diseases, with approximately 150 million cases of illness reported each year. (1). Pregnant women have four times the chance of contracting a UTI compared to non-pregnant women. (2,3)

Proteus spp. are a group of Gram-negative bacteria known for their robust ability to cause human infections. They are part of the Enterobacteriaceae family and are closely related to pathogens such as Escherichia coli and Salmonella. The most common species associated with human disease is Proteus mirabilis These organisms are ubiquitous in the environment and are found in soil, water, and the intestinal tracts of humans and animals.(4).

Proteus species are characterized by their motility, which is facilitated by peritrichous flagella, enabling them to swarm across solid surfaces, a behavior that is not only fascinating but also contributes to their pathogenicity. The swarming differentiation is accompanied by changes in cell morphology and the production of virulence factors, making them adept at colonizing and causing disease (5). One of the hallmarks of Proteus spp. infections is their ability to form stones, known as struvite calculi, in the urinary tract. These stones can lead to complicated urinary tract infections (UTIs) which are a frequent clinical problem. The bacteria produce urease, an enzyme that hydrolyzes urea to form ammonia, elevating the pH of urine and leading to precipitation of magnesium ammonium phosphate and calcium phosphate in the urinary tract. This can cause kidney stones, which may lead to more severe kidney infections [6]. In pregnant women, Proteus spp. can be particularly problematic. UTIs caused by these bacteria can lead to serious complications including pyelonephritis, premature labor, and the potential for vertical transmission to the neonate. During pregnancy, the urinary tract undergoes physiological changes that can predispose to bacterial colonization and infection. Asymptomatic bacteriuria, which can be caused by Proteus spp., is found in a significant percentage of pregnant women and, if left untreated, can lead to acute cystitis and pyelonephritis, which are associated with increased risks for preterm birth and low birthweight infants [7]. P. mirabilis, P. vulgaris, P. penneri, P. hauseri, and P. myxofaciens are the five species that make up the genus Proteus at the moment. There are another three Proteus genomospecies that are currently unknow.: Proteus genomospecies(8). Swarming behavior is one of the most notable microbiologic traits of Proteus species. Centric rings of development originating from a single colony or inoculum are the macroscopic manifestation of swarming. Bacterial swarming occurs when they undergo a biological metamorphosis, characterized by increased flagellin synthesis and cellular

elongation, from "swimmer cells" in broth to "swarmer cells" on a surface like agar. Proteus had unrestricted shape-changing ability. BacterProteus species are facultatively anaerobic, rod-shaped, gramnegative, non-spore-forming, non-capsulated, and highly motile due to peritrichous flagella that form concentric zones on the solidified agar. They range in size from (0.4–0.8)µm in diameter to (1-3)µm in length.

(9). Proteus smell like fish. (10). The optimal conditions for growth are 37 oC and a pH of 7.4. It is characterized by its chemoorganotrophic diet. It uses two different processes—fermentation and aerobic respiration—to produce energy. (11). Proteus mirabilis's virulence factors Enzyme Urease obstructs the urinary tract or accelerates the development of kidney and bladder stones.(12 Hemolysin is an enzyme toxin that penetrates eukaryotic cells' target membranes to produce holes that allow ion efflux to disrupt cells and cause cell lysis. (13). Proteus toxic agglutinin (Pta) is a protein that is recognized as the outer membrane auto-transporter that can lyse kidney and bladder cells and promote cell aggregation. (14) One of the most crucial stages in colonization and infection development for Proteus mirabilis is fimbriae adhesion. (15) The lipopolysaccharide (LPS) endotoxin plays a crucial role in bacteremia and host invasiveness because it is resistant to normal serum proteins, which can be fatal to bacteria. (16) Biofilm The product is the result of microbiology adhering to the host cell surface and aggregating in an aqueous medium surrounded by extracellular polymers (many sugars), with the membrane playing a role. Flagella are responsible for the motility of bacteria, which influences the invasion and dissemination of illnesses in the urinary tract. ion of infection, antibiotic resistance, and microbial surface adhesion. (16). The motility of bacteria that affects the invasion and spread of infections in the urinary tract is attributed to flagella. (17). The protease enzyme It functions by killing the patient's cells, releasing resources from them to meet the bacterial nutritional needs, and weakening the injured person's defense mechanisms. (18). The siderophores For iron ions that are drawn from host proteins, they contend with host cells. (19).

Aim of study : To detect proteus spp. In urian samples of pregnant women who are suffering from urinary tract infection.

## 2. Methodology

One hundred and fifty (150) urine samples from pregnant women from north ThiQar were collected by sterile method to detact of proteus bacteria. The bacterial isolates were detection by culturing on bacteriological media, colony morphology, biochemical reactions and final diagnosed by Vitek system.

Cross-section study design was adopted hospitals and Women’s clinic in north ThiQar were the focal setting of this study. General urine examination for the infected women by urine culture by plates MacConcky and blood agar. On MacConkey agar, the Proteus spp. converted the color to yellow, and that's because this bacterium was lactose non-fermented.

A small amount of urine samples was cultured on the media using sterile swabs by streaking method then incubated for 24 hours . The pure colonies from the growing bacteria were taken and send these samples to VITEK 2.

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samples to VITEK 2.

## 3. Results and discussion

### Identification Of Isolated Bacteria From Pregnant Women

The Current Results Were Noted The Most Isolated Bacteria Were Gram Positive Bacteria 60%, Followed By *E. Coli* 13.33%, Followed By *Pseudomonas Spp* 5.34%, In The Other Hand The Lowest Isolated Bacteria Were *Klebsiella Spp* 3.33%, And *Proetus Spp* 4.67%, The Current Results Also, Recorded A Significant Difference At P. Value < 0.005, According To Species Of Bacteria, Figure 4-1

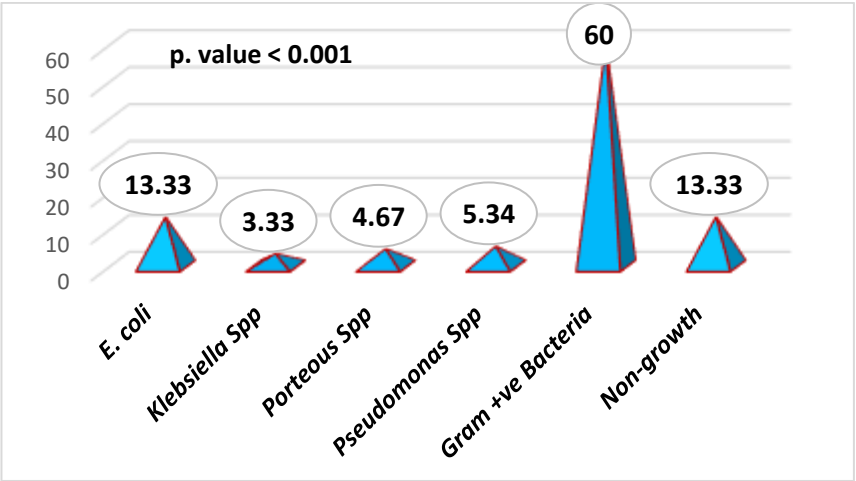


Figure 4-1: Identification Of Bacteria

### Percentge Of *Proetus Spp* To Other Gram-Negative Bacter

The Percentage Of *Proetus Spp* Among Gram Negative Bacteria Was 5.38%, With Significant Difference At P. Value < 0.05, As In The

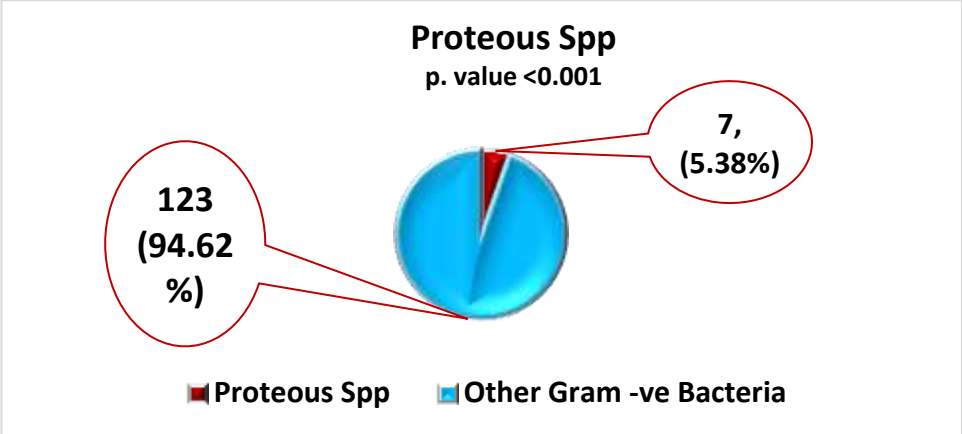


Figure 4-2: Percentage Of *Proetus Spp* To Other Gram-Negative Bacteria

### Prevalence Of *Proetus Spp* According To Age Groups

The Present Study Was Noted The Most *Proetus Spp* In The Second Age Group 90.48%, Followed In The First Age Group 28.57%, While The Lowest *Proetus Spp* In The Third Age Group 14.29%, The Results Also, Indicated A Significant Difference At P. Value < 0.05 According To Age Group, As In The Table 4-1.

Table 4-1:Prevalence Of *Proetus Spp* According To Age Groups

| **Age** Groups | ***Proetus Spp*** | |
|---|---|---|
| | **No.** | **%** |
| 18-27 Years | 2 | 28.57 |
| 28-37 Yeas | 4 | 57.14 |
| 38-45 Years | 1 | 14.29 |
| **Total** | 7 | 100 |
| **Calx$^2$=28.5 Tabx$^2$=5.99 DF=2 P. Value <0.001** | | |

## Prevalence Of *Proetus Spp* According To Habitation

The Present Study Was Noted The Most *Proetus Spp* In The City Resident 57.14%, While The Lowest *Proetus Spp* In The Village Resident 42.86%, The Results Also, Indicated A Non-Significant Difference At P. Value < 0.05 According To Habitation, As In The Table 4-2.

Table 4-2: Prevalence Of *Proetus Spp* According To Habitation

| **Habitation** | ***Proetus Spp*** | |
|---|---|---|
| | **No.** | **%** |
| **City** | 4 | 57.14 |
| **Village** | 3 | 42.86 |
| **Total** | 7 | 100 |
| **Calx$^2$=1.96 Tabx$^2$=3.84 DF=1 P. Value 0.162** | | |

## Prevalence Of *Proetus Spp* According To Residency

The Present Study Was Noted The Most *Proetus Spp* In The Al-Refai Resident Women 42.86%, While The Lowest *Proetus Spp* In Both Al-Nasar And Al-Shatrah Resident 28.75%, In Addition Not Isolate *Proetus Spp* From Women In The Qlaat Sekar 0.0%, The Results Also, Indicated A Non-Significant Difference At P. Value < 0.05 According To Residency, As In The Table 4-3.

Table 4-3: Prevalence Of *Proetus Spp* According To Residency

| **Residency** | ***Proetus Spp*** | |
|---|---|---|
| | **No.** | **%** |
| **Al-Nasar** | 2 | 28.57 |
| **Al-Refai** | 3 | 42.86 |
| **Al-Shatrah** | 2 | 28.57 |
| **Qlaat Sekar** | 0 | 0.00 |
| **Total** | 7 | 100 |
| **Calx$^2$=3.88 Tabx$^2$=5.99 DF=2 P. Value 0.144** | | |

## Prevalence Of *Proetus Spp* According To Months Of Pregnant

The Present Study Was Noted The Most *Proetus Spp* In Third Month Of Pregnant 28.55%, Followed In The Other Months Of Pregnant 14.29%, In Contrast Non-Isolated *Proetus Spp* From Women In Both Fifth And Eighth Months Of Pregnant 0.0%, The Results Also, Indicated A Significant Difference At P. Value < 0.05 According To Month Of Pregnant, As In The Table 4-4.

Table 4-4: Prevalence Of Bacterial Results Culture According To Month Of Pregnant

| **Residency** | ***Proetus Spp*** | |
|---|---|---|
| | **No.** | **%** |
| 2$^{nd}$ **Months** | 1 | 14.29 |
| 3$^{rd}$ **Month** | 2 | 28.55 |
| 4$^{th}$ **Month** | 1 | 14.29 |
| 5$^{th}$ **Month** | 0 | 0.00 |
| 6$^{th}$ **Month** | 1 | 14.29 |
| 7$^{th}$ **Month** | 1 | 14.29 |
| 8$^{th}$ **Month** | 0 | 0.00 |

| | | |
|---|---|---|
| 9th **Month** | 1 | 14.29 |
| **Total** | 7 | 100 |
| **Calx²=11.3 Tabx²=11.07 DF=5 P. Value 0.045** | | |

**Discussion:**

Utis Are the Widely Spread Infections Seen In Hospital Settings, And The Second Commonest Infections Seen In The General Population. (20).

In This Study, Show That Bacterial Infections with Proteus Bacteria In Pregnant Women Are One Of The Causes Of Urinary Tract Infections. This Study Has Shown That the Infection Rate of This Bacteria Is (5.34%). The Genus Proteus Currently Consists of Five Species: P. Mirabilis, P. Vulgaris, P. Penneri, P. Hauseri And P. Myxofaciens. (8). Two Types of Proteus Bacteria Have Been Identification (Proteus Mirabilis And Proteus Penneri) Considering the Pregnant Woman's Age, Her Residency, And The Length Of Her Pregnancy The Present Study Was Noted The Most Proetus Spp. In the Second Age Group 90.48%, Followed In The First Age Group 28.57%, While The Lowest Proetus Spp. In the Third Age Group (14.29%).

The Present Study Was Noted the Most Proetus Spp. In the City Resident 57.14%, While The Lowest Proetus Spp. In The Village Resident 42.86%.In Third Month Of Pregnant 28.55%, Followed In The Other Months Of Pregnant 14.29%, In Contrast Non-Isolated Proetus Spp. From Women In Both Fifth And Eighth Months Of Pregnant 0.0%.

The Outcomes Of This Study Are Contradicted By Different Results Reported In The Scientific Literature, Which Necessitates Reevaluating The Interpretations And Conclusions Made. In Al-Muthanna Governorate, A Study Was Conducted By The Researcher." (Nahab Et Al.,2021) The Researcher Found That Incidence Rate By Proteus Amount To (12.7%). Another Study By Academics (Pinar Et Al ,2022) In The Region Of Kirkuk Showed A Similar Percentage. A Different Study Conducted In The Province Of Kirkuk By Researchers (Chateen Et Al.,2002) Revealed That The Infection Rate With This Particular Bacteria Has Reached (20.68%). this Difference In Ratios May Be Due To The Variation In Environments As Well As The Number Of Samples Taken From Pregnant Women.

## 4. Conclusion and future scope

Urinary tract infections are regarded as a prevalent illness in women, particularly in those who are pregnant both the mother and the fetus may be at risk from this. Infection with various microorganisms, including viruses, bacteria, and fungi, is the cause of these (UTI). Bacterial infection as proteus spp. In pregnant women, Proteus spp. can be particularly problematic. UTIs caused by these bacteria can lead to serious complications including pyelonephritis, premature labor, and the potential for vertical transmission to the neonate. Therefore, in order to resolve these issues, it is imperative that a pregnant woman with these infections have tests and treatmen.

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