



# A PROSPECTIVE OBSERVATIONAL STUDY ON THE CLINICAL MANIFESTATION AND MANAGEMENT OF PYELONEPHRITIS IN A GOVERNMENT TERTIARY CARE HOSPITAL

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## ABSTRACT

**AIM:** The primary aim of the study was to evaluate clinical features, treatment, and prognosis in complicated pyelonephritis.

**OBJECTIVES:** The study's main objective is to assess the clinical features (signs and symptoms, risk factors, and complications) of complicated pyelonephritis. To study the prognosis of pyelonephritis. **METHODS:** A prospective observational study was conducted on 30 patients admitted to the Nephrology department of the government general hospital in Kurnool. The patients were selected based on the inclusion and exclusion criteria. Patient's demographic details, past history of present illness, and lab investigations are selected.

**RESULTS:** The results are concluded based on the 30 cases collected till now, and the cases may be complete upon further collection of the cases required for the study. Where necessary, the statistics are calculated by mean, median, interquartile range, and standard deviation.

**KEY WORD:** Pyelonephritis, prognosis, clinical features, Renal calculi, UTI cauterization

**INTRODUCTION:** Pyelonephritis is a bacterial infection that causes inflammation of the kidneys. Pyelonephritis occurs as a complication of urinary tract infections reaching the kidneys via various routes. Pyelonephritis occurs as acute and complicated pyelonephritis. Complicated pyelonephritis includes patients with

- 1) Immuno compromised conditions
- 2) Urinary tract infections
- 3) Diabetes mellitus
- 4) Pregnant women
- 5) Urinary tract anatomy abnormalities

6) Kidney transplant patients.

7) Acute kidney failure

8) Chronic kidney Failure

9) Hospital acquired conditions.

Acute pyelonephritis is a common cause of hospital admission and causes bacterial resistance, resistant causing difficulty to treat. Complicated pyelonephritis is defined as pyelonephritis occurring in any patient with a single kidney, a nephrectomy, DJ catheter, or those who have undergone any urinary tract manipulations. It becomes important to make the difference between complicated and uncomplicated pyelonephritis, as patient management depends on it.

### **ETIOLOGY:**

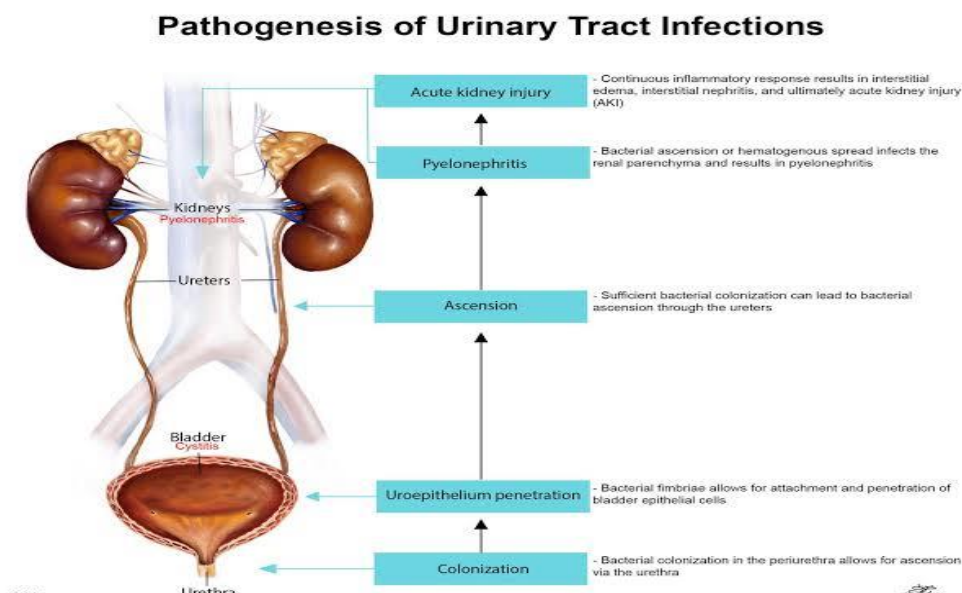
The main cause of pyelonephritis is a bacterial infection. Gram-negative bacteria, which are the most common, include *Escherichia Coli*. The gram-negative bacteria that cause pyelonephritis include *Klebsiella*, *Enterobacter*, and *Proteus*. In most patients, the infection is mainly spread by the fecal flora. The majority of patients get pyelonephritis by ascending; the ascending happens through several steps. Bacteria attach to the epithelial cells of the urethral mucosa and then reach the bladder through the urethra via instrumentation. Urinary obstruction caused by something like a kidney stone can also cause obstruction of the urine flow. Due to obstruction, the urine is not completely voided, leading to the multiplication of bacteria and kidney infections such as pyelonephritis. The cause of urinary tract infection is more common in females when compared to males due to the shorter urethral length, hormonal changes, and close distance to the anus. The less common form of pyelonephritis is the vesicourethral reflex, which is a congenital condition in which some amount of urine gets reflexed back to the kidneys from the bladder, leading to kidney infections.

### **SYMPTOMS:**

The most common symptoms of the pyelonephritis include:

- 1) Fever (38\*c/100.4°F)
- 2) Flank pain with tenderness
- 3) Uni/Bilateral loin pain
- 4) Nausea
- 5) Vomiting
- 6) Burning micturition
- 7) Increased frequency of the urine
- 8) Urgency of urine
- 9) Dysuria
- 10) Hematuria
- 11) pedal edema
- 12) Facial puffiness

The majority of the pyelonephritis are managed in an outpatient department with most of the patients improving with oral antibiotics. Usually young women's are the mostly treated as out patient department.. Despite most of the cases treated as outpatient there is still significant increase in the mortality and morbidity rates of this pyelonephritis.



## MATERIALS AND METHODS:

- ✧ This was a prospective observational study carried out over a period of 6 months from August 2022 to January 2022 in the inpatient department of the Nephrology unit of a tertiary care hospital. Patients with complicated pyelonephritis of both sexes.
- ✧ Patients with age more than 20yrs.
- ✧ Patients with diabetes mellitus and hypertension.
- ✧ Patients with past history of pyelonephritis.

## II. AIM AND OBJECTIVES:

### AIMS:

The primary aim of the study was to evaluate clinical features, treatment, and prognosis in complicated pyelonephritis. The secondary aim is to educate patients regarding the disease, due to which further complications of the disease can be decreased.

### OBJECTIVES:

The study's main objective is To assess the clinical features ( signs and symptoms, risk factors, and complications ) of complicated pyelonephritis. To study the prognosis of pyelonephritis.

## INCLUSION CRITERIA:

- Patients with complicated pyelonephritis of both sex.
- Patients with age more than 20yrs.
- Patients with diabetes mellitus and hypertension.
- Patients with past history of pyelonephritis.

## EXCLUSION CRITERIA:

- ✧ Patients below 20yrs of age.
- ✧ Patients were excluded from the study if they had any kidney transplantation's.
- ✧ Patients with pregnancy.
- ✧ Patients with Alzheimer's, Psychotic and schizophrenic disorder.

### III.METHODOLOGY:

- ✧ All the patients were satisfying the inclusion criteria were selected from the Nephrology department of Government General Hospital ,Kurnool.
- ✧ All the data of the patient was collected using the patient collection proforma .
- ✧ The data collection includes the demographic data, history of present illness ,treatment history , past psychiatric or medication history, family history , personal history , and allergies, laboratory investigations , diagnosis , signs and symptoms , risk factors , complications and prognosis .

#### STAISTICAL ANALYSIS:

- ✧ Parametric data were summarized as the mean and standard deviation for the continuous variables .
- ✧ C a t e g o r i c a l   v a r i a b l e s   w e r e   s u m m a r i z e d   a s   p e r c e n t a g e .



### ETHICAL CLERANCE:

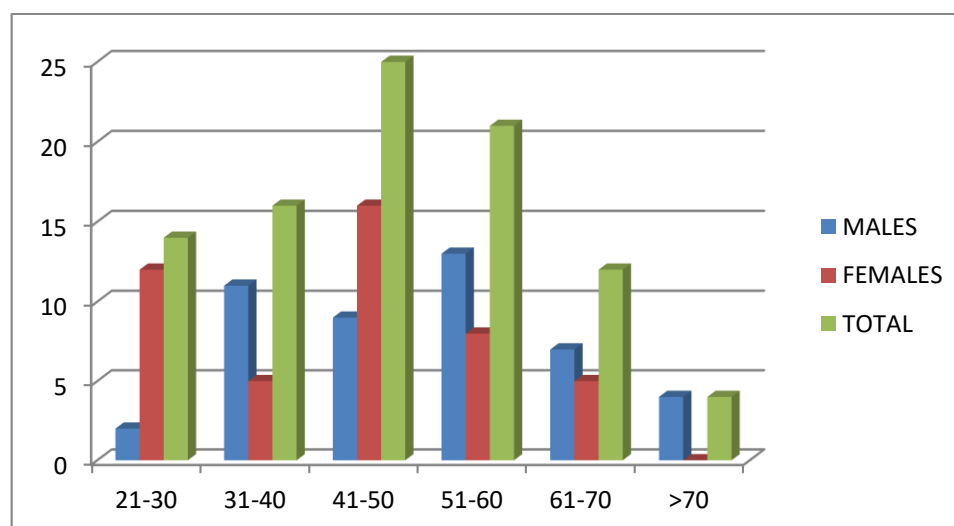
Ethical clearance for the study was obtained from the Institutional Ethical Committee  
( Ref N O:KVSP/IRB/2021-2022/Pharm.D/PROJ/024)

### IV.RESULTS:

#### AGE AND GENEDER DISTRIBUTION

GENDER	21-30	31-40	41-50	51-60	61-70	>70
MALES	2	11	9	13	07	04
FEMALES	12	5	16	8	05	00
TOTAL	14	16	25	21	12	04

**Tab. IV.1 AGE AND GENEDER DISTRIBUTION**

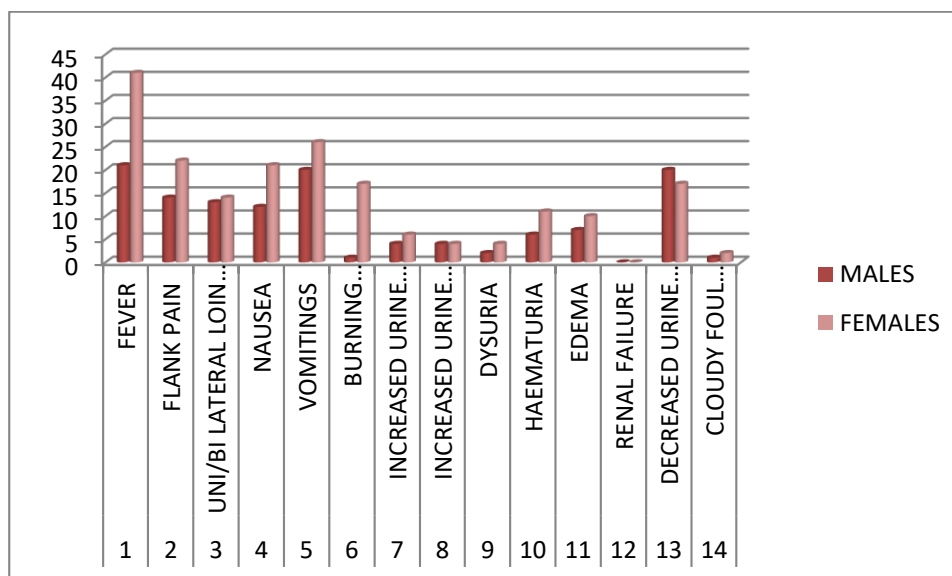


**Fig. IV.1 AGE AND GENEDER DISTRIBUTION**

**DISTRIBUTION OF PATIENTS BASED ON THE SIGNS AND SYMPTOMS:**

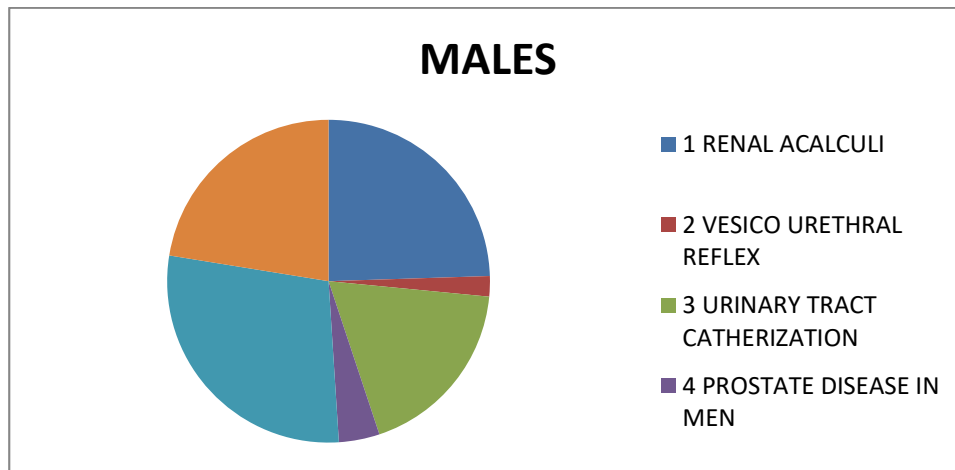
<b>S.NO</b>	<b>SIGNS AND SYMPTOMS</b>	<b>MALES</b>	<b>FEMALES</b>
<b>01</b>	<b>FEVER</b>	<b>21</b>	<b>41</b>
<b>02</b>	<b>FLANK PAIN</b>	<b>14</b>	<b>22</b>
<b>03</b>	<b>UNI/BI LATERAL LOIN PAIN</b>	<b>13</b>	<b>14</b>
<b>04</b>	<b>NAUSEA</b>	<b>12</b>	<b>21</b>
<b>05</b>	<b>VOMITINGS</b>	<b>20</b>	<b>26</b>
<b>06</b>	<b>BURNING MICTURATION</b>	<b>01</b>	<b>17</b>
<b>07</b>	<b>INCREASED URINE FREQUENCY</b>	<b>04</b>	<b>06</b>
<b>08</b>	<b>INCREASED URINE URGENCY</b>	<b>04</b>	<b>04</b>
<b>09</b>	<b>DYSURIA</b>	<b>02</b>	<b>04</b>
<b>10</b>	<b>HAEMATURIA</b>	<b>06</b>	<b>11</b>
<b>11</b>	<b>EDEMA</b>	<b>07</b>	<b>10</b>
<b>12</b>	<b>RENAL FAILURE</b>	<b>00</b>	<b>00</b>
<b>13</b>	<b>DECREASED URINE OUTPUT</b>	<b>20</b>	<b>17</b>

<b>14</b>	<b>CLOUDY FOUL SMELLING URINE</b>	<b>01</b>	<b>2</b>
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**Tab.IV.2 DISTRIBUTION OF PATIENTS BASED ON THE SIGNS AND SYMPTOMS****Fig.IV.2 DISTRIBUTION OF PATIENTS BASED ON THE SIGNS AND SYMPTOMS****DISTRIBUTION OF THE PATIENTS BASED ON THE RISK FACTORS**

S.NO	RISK FACTORS	MALES	FEMALES
<b>01</b>	<b>RENAL ACALCULI</b>	<b>12</b>	<b>07</b>
<b>02</b>	<b>VESICO URETHRAL REFLEX</b>	<b>01</b>	<b>01</b>
<b>03</b>	<b>URINARY TRACT CATHERIZATION</b>	<b>09</b>	<b>09</b>
<b>04</b>	<b>PROSTATE DISEASE IN MEN</b>	<b>02</b>	<b>00</b>
<b>05</b>	<b>DIABETES MELLITUS</b>	<b>14</b>	<b>15</b>
<b>06</b>	<b>HYPERTENSION</b>	<b>11</b>	<b>05</b>

**Tab. IV.3 DISTRIBUTION OF THE PATIENTS BASED ON THE RISK FACTORS**

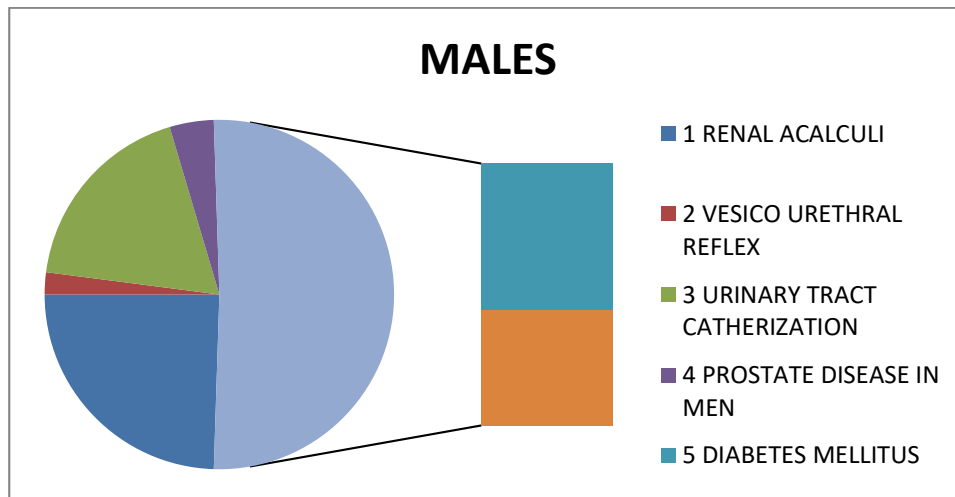


**Fig. IV.3. DISTRIBUTION OF THE PATIENTS BASED ON THE RISK FACTORS**

The distribution of the risk factors were done with the statistical analysis of mean and was indicated in the table below

S.NO	RISK FACTORS	MALES	FEMALES
01	RENAL ACALCULI	12	07
02	VESICO URETHRAL REFLEX	01	01
03	URINARY TRACT CATHERIZATION	09	09
04	PROSTATE DISEASE IN MEN	02	00
05	DIABETES MELLITUS	14	15
06	HYPERTENSION	11	05

**Tab.IV.4 The distribution of the risk factors were done with the statistical analysis of mean**



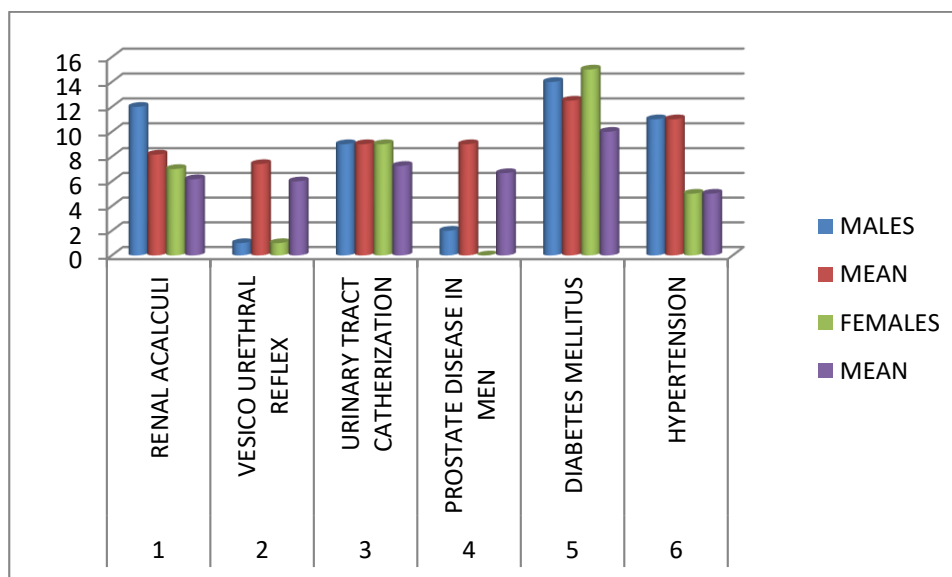
**Fig.IV.4** The distribution of the risk factors were done with the statistical analysis of mean

#### **DISTRIBUTION OF PATIENTS BASED ON RISK FACTORS USING MEAN**

S.NO	RISK FACTORS	MALES	MEAN	FEMALES	MEAN
01	RENAL ACALCULI	12	8.166667	07	6.166666667
02	VESICO URETHRAL REFLEX	01	7.4	01	06
03	URINARY TRACT CATHERIZATION	09	9	09	7.25
04	PROSTATE DISEASE IN MEN	02	9	00	6.666666667
05	DIABETES MELLITUS	14	12.5	15	10
06	HYPERTENSION	11	11	05	5

**Tab. IV.5. DISTRIBUTION OF PATIENTS BASED ON RISK FACTORS USING MEAN**

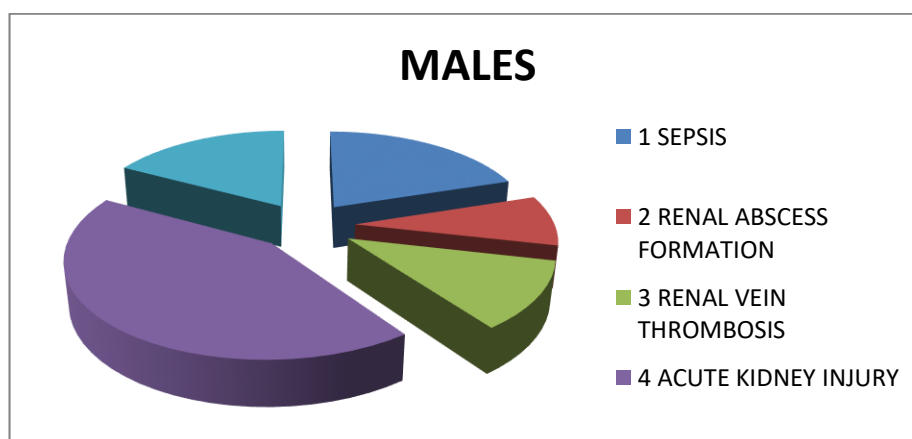




**Fig. IV.5. DISTRIBUTION OF PATIENTS BASED ON RISK FACTORS USING MEAN**  
**DISTRIBUTION OF PATIENTS BASED ON COMPLICATIONS:**

S.NO	COMPLICATIONS	MALES	FEMALES
01	SEPSIS	07	11
02	RENAL ABSCESS FORMATION	03	04
03	RENAL VEIN THROMBOSIS	04	00
04	ACUTE KIDNEY INJURY	15	12
05	CHRONIC KIDNEY DISEASE	06	05

**Tab.IV.6. DISTRIBUTION OF PATIENTS BASED ON COMPLICATIONS**

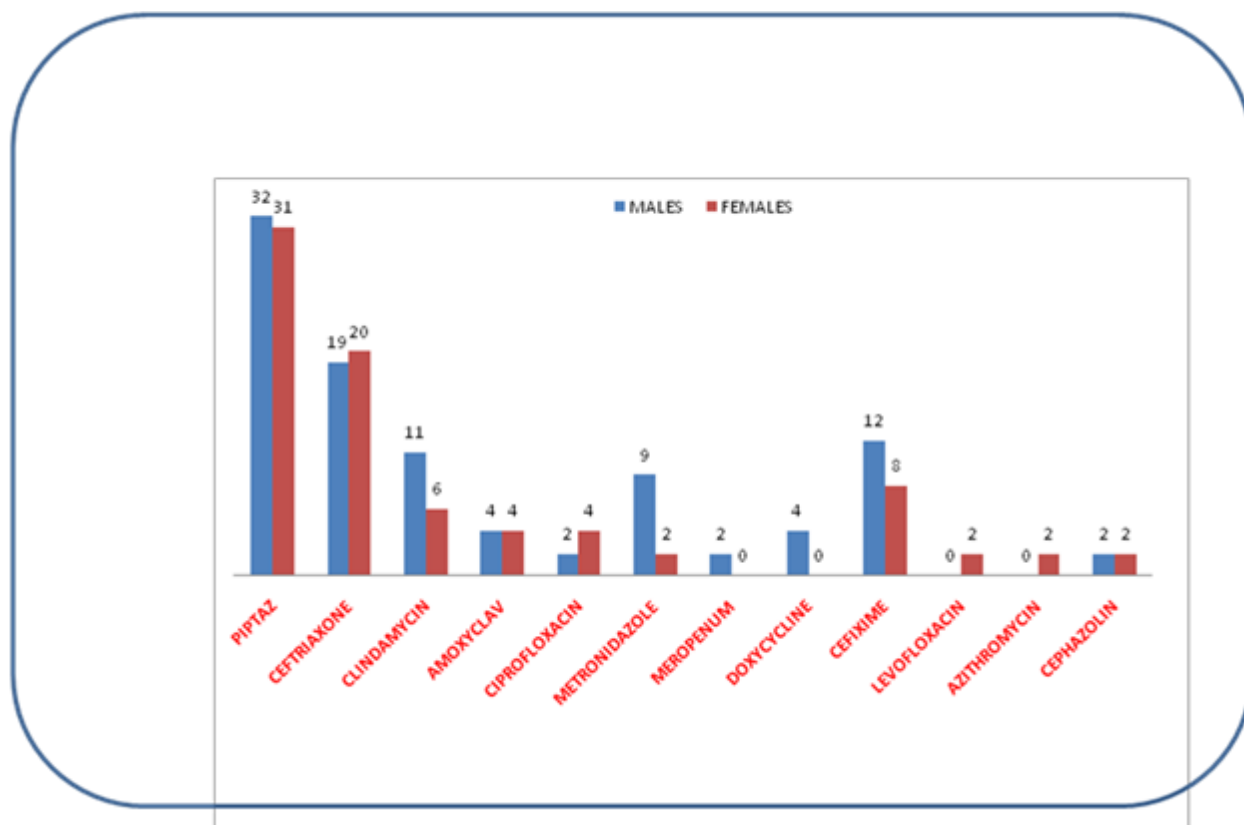


**Fig.IV.6. DISTRIBUTION OF PATIENTS BASED ON COMPLICATIONS**

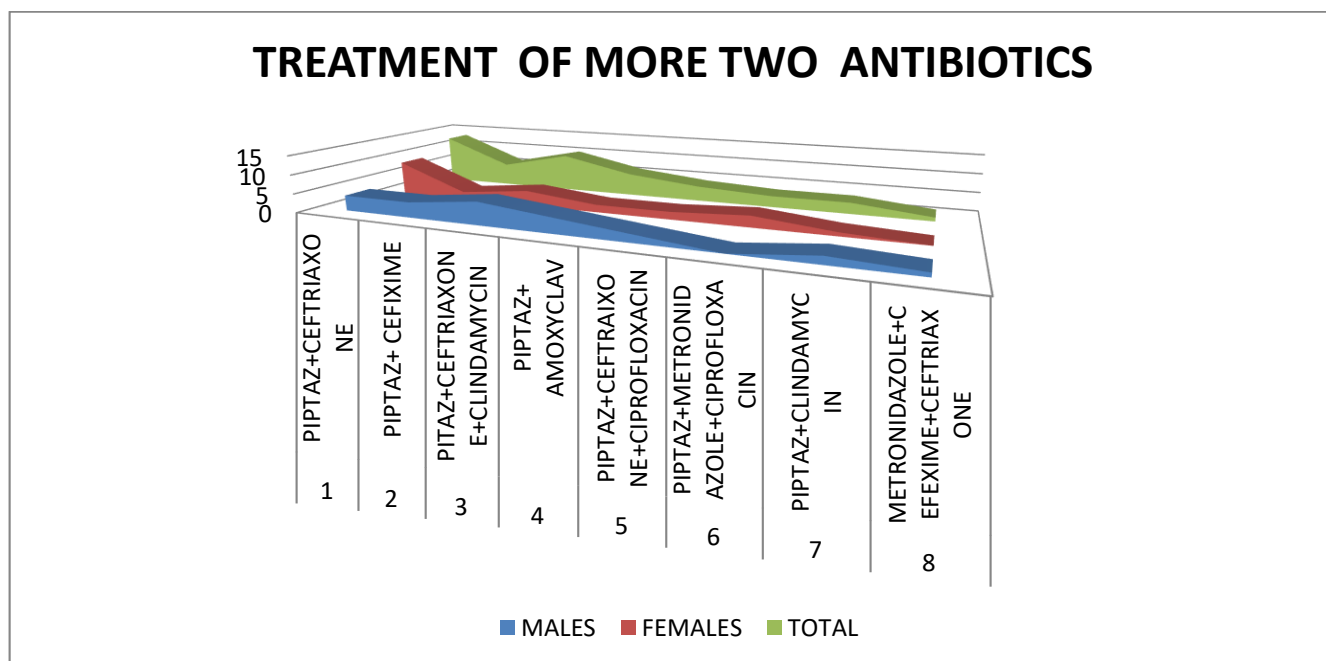
**PROGNOSIS OF THE TREATMENT :**

The table below indicates the distribution of patients treated with different antibiotics:

S.NO	ANTIBIOTICS	MALES	FEMALES
01	PIPTAZ	32	31
02	CEFTRIAZONE	19	20
03	CLINDAMYCIN	11	06
04	AMOXYCLAV	04	04
05	CIPROFLOXACIN	02	04
0607	METRONIDAZOLE	09	02
08	MEROPENUM	02	00
09	DOXYCYCLINE	04	00
10	CEFIXIME	12	08
11	LEVOFLOXACIN	00	02
12	AZITHROMYCIN	00	02
13	CEPHAZOLIN	02	02
<b>SURGICAL TREATMENT:</b>			
14	DJ STENTING	04	00
15	PCN	00	00
16	NEPHRECTOMY	00	00
17	DEATH	00	00

**Tab.NO- 7 DISTRIBUTION OF DIFFERENT ANTIBIOTIC TREATMENT****FIG NO 7 : DISTRIBUTION OF DIFFERENT ANTIBIOTIC TREATMENT****DISTRIBUTION OF PATIENTS BASED ON TREATMENT OF MORE TWO ANTIBIOTICS:**

S.NO	ANTIBIOTICS	MALES	FEMALES	TOTAL
01	PIPTAZ+CEFTRIAXONE	04	09	13
02	PIPTAZ+ CEFIXIME	04	02	06
03	PITAZ+CEFTRIAXONE+CLINDAMYCIN	06	04	10
04	PIPTAZ+ AMOXYCLAV	04	02	06
05	PIPTAZ+CEFTRAIXONE+CIPROFLOXACIN	02	02	04
06	PIPTAZ+METRONIDAZOLE+CIPROFLOXACIN	00	03	03
07	PIPTAZ+CLINDAMYCIN	02	01	03
08	METRONIDAZOLE+CEFEXIME+CEFTRIAXONE	01	00	01

**Tab.No:8** DISTRIBUTION OF PATIENTS BASED ON TREATMENT OF MORE TWO ANTIBIOTICS**Fig.No:-8** DISTRIBUTIONS OF PATIENTS BASED ON TREATMENT OF MORE TWO ANTIBIOTICS

## DISCUSSION

Our prospective observational study was carried out among 90 patients in Nephrology inpatient department shows that majority of the pyelonephritis is occurring in males and females of age group 41-50 yrs and among them also females are more prone to infection due to shorter urethral length. In our study conducted among 90 patients of Nephrology department shows that major complication was of Acute Kidney Injury 27 patients among that males were 15 and females 12 were affected with the complication. In our study the drugs used in the management of the Hypertension is calcium channel blocker - Amlodipine , Angiotensin II receptor blocker - Telmisartan , alpha 2 adrenergic antagonist - clonidine loop diuretic such as furosemide and alkalizing agent such as sodium bicarbonate, Antibiotics used are piptaz ,cephalosporins ,aminoglycosides , metronidazole , and fluoroquinolones etc. In the present study the commonly occurring symptoms are fever, nausea , vomiting , loin pain , flank pain , burning micturition , decrease urine output , haematuria , edema , increased urine frequency , decrease urine urgency etc . Among these symptoms triad of fever nausea and vomitings are the commonly seen signs and symptoms among both males and females. The patients were classified based on the age and gender distribution and was found to be more affecting between the age group of 41 - 50 yrs of age followed by 51-60 yrs of age . Among those females were found to be more affected than males . Statistical data was analyzed for the outcome of data based on age group, signs and symptoms , risk factors , complications and the prognosis of treatment using mean , median and standard deviation for the data where ever important .

## CONCLUSION:

The study was carried out in an attempt to find out the signs and symptoms, risk, factors, and complications for the progression of the complicated pyelonephritis at government general hospital . The study showed an active involvement of clinical pharmacist at the Nephrology department. Most of the patients attending in the inpatient department were suffering with more than three or four symptoms and were under the age group of 41 - 50 yrs .We studied the signs and symptoms in detailed

and found that patient present with triad of symptoms. The most commonly occurring symptoms were fever, nausea vomiting and decrease urine output.

**LIMITATIONS:** The study is conducted in the Nephrology Department of the government general hospital. Our study had certain limitations such as it was small sizes and observational study.it was prospective observational study of case reports where notes on the past medical and medication history were lacking.

**ACKNOWLEDGEMENT:** We would like express our sincere gratitude to our guides Dr.K.Chandra Sekhar, Department of medicinal chemistry, Dr. Soma Anath , Department of Nephrology for their support and guidance.We sincerely thank our principal sir Dr.B.V.Ramana principal Department of Pharmaceutical analysis.We also thank our colleagues for their assistance and support.

**ABBREVIATIONS:** **ARF** -Acute Renal Failure,**CRF** Chronic Renal Failure,**GFR** Glomerular filtration rate,**eGFR** estimated glomerular filtration rate **BUN** - Blood Urea Nitrogen,**UTI** -Urinary tract infection,**U Na** - Urinary excretion of sodium **APN** - Acute pyelonephritis ,**cPN** - chronic pyelonephritis, **ANA** - Anti nuclear antibodies ,**ANCA** - Antineutrophil cytoplasm auto antibodies,**AVF**- Arterio-venous fistula,**HTN**-Hypertension, **T2DM** - Type 2 diabetes mellitus,**HD**-Hemodialysis,**PD**Peritoneal dialysis,**NSAIDS**-Non steroidal anti inflammatory .

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