

Prevalence of UTI Isolates in Different Age Group and Gender of Gaya Town

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Key words : UTIs, *E. coli*, *K. pneumoniae*, *P. aeruginosa*.

Urinary Tract Infection(UTI) is a common health problem affecting different age group and gender. The incidence varies with age and gender, being more prevalent among women. In the present investigation a simpler and practical approach is used to categorize prevalence of UTIs in different age group and gender. Females are more susceptible to UTI. It may be due to anatomical predisposition such as close proximity of the urethral meatus to the anus and shorter urethra. *E. coli* was found to be maximum in the age group of 26-40 and 41-55 in case of female. *K. pneumoniae* was maximum in male of the age group of 26-40. *P. aeruginosa* was found to be predominant in male as compared to female.

INTRODUCTION

Urinary Tract Infections (UTIs) are common clinical bacterial infection in human beings. It is important to know the possible cause of UTIs in different age groups and genders because UTI causing microorganisms are changed from time to time and from place to place. The urinary tract is divided into two major divisions, upper (the kidneys, renal pelvis and ureters) and lower(urinary bladder and urethra). Upper urinary tract infections are most commonly ascending meaning thereby that they originate in the urinary bladder and ascend through the ureters to kidneys (Tortora *et al.*, 2010, Koneman *et al.*, 1997). The clinical symptoms of UTI depend on the portion of the urinary tract affected, the causative organisms, the complication of the infection and patients ability to mount an immune response against uropathogens(Foxman and Brown,2003)

Signs and symptoms may include fever,chills, dysuria, urinary urgency and malodorous urine. It is estimated that UTI is common in both male and female but women in the age group 15-44 are more prone to this infection (Kant *et al.*, 2018). It is estimated that about 40% women and 12% of men suffer symptoms of UTI at some stages in their life (Vasudevan R.,2014).

Escherichia coli is the major causative agent of UTIs and is responsible for more than 80% of UTI. After *E. coli* the other more common UTI - pathogens include *Staphylococcus saprophyticus*, *Enterococcus* spp., *Klebsiella pneumoniae*, *Proteus* spp. and *Enterobacter* spp.(Behzadi *et al.*, 2008). The purpose of this study was to determine the distribution pattern of the causative microbial agents of UTIs in different age group and gender of Gaya town.

MATERIALS AND METHODS

1. Collection of Urine Sample

Between January and October 2016, a total of 200 urine samples of clinically diagnosed patient had been collected from different hospitals of Gaya town. Clean catch 5ml of midstream urine samples(MSU) were collected in a wide mouthed container. Containers were finally transported to laboratory in an ice-cold condition by adding boric acid at a final bacteriostatic concentration of 1.8% without delay(Porter *et al.*,1969).

2. Isolation and Identification of Bacteria causing UTI from Urine Sample

The media used have been purchased from Hi-media laboratories pvt.ltd. Mumbai. The media used in the present investigation include Nutrient Agar, MacConkey Agar and Hi-Chrome UTI Agar Medium. For isolation of UTI causing organisms loopful of urine sample was streaked on three different above said media and incubated at 37°C for 24hrs (Inabo *et al.*, 2006).

3. Identification of Bacteria

Socio-demographic variables(age, sex and other relevant clinical data such as history of catheterizationand history of UTI) were obtained using a pre-designed structural questionnaire. After incubation, colonies were selected and characterized on the basis of morphological, cultural and standard biochemical tests (lactose fermentation test, IMVic test and catalase test). Samples with colony counts equal to or more than 10⁵ cfu/ml were considered positive.

OBSERVATION

It was observed that 123 persons out of 200 cases studied had urinary tract infection. These samples were collected from persons whose age ranged from 10 to 70 years. In the present investigation all the three isolates (*E. coli*, *K. pneumoniae*, and *P. aeruginosa*) were Gram's negative agent and there were complete absence of Gram's positive bacteria. Frequency of isolation of all three main species was found to be different in male and female. *E. coli* and *K. pneumoniae* were found to be frequent in female, whereas *P. aeruginosa* was more common in male.

Table-01**Distribution of three frequently isolated Gram's negative isolates according to patient's sex.**

| Organisms | Total no. of isolates | No. of Female | Percentage | No. of Male | Percentage |
|----------------------|-----------------------|---------------|------------|-------------|------------|
| <i>E. coli</i> | 86 | 63 | 73.25% | 23 | 26.74% |
| <i>K. pneumoniae</i> | 24 | 19 | 79.16% | 5 | 20.83% |
| <i>P. aeruginosa</i> | 13 | 5 | 38.46% | 8 | 61.53% |

Table-02**Distribution pattern of *E. coli* according to age group and gender.**

| Uropathogen | Age Group | No. of male | Percentage | No. of female | Percentage |
|----------------|-----------|-------------|------------|---------------|------------|
| <i>E. coli</i> | 10-25 | 5 | 5.81% | 13 | 15.11% |
| | 26-40 | 6 | 6.97% | 18 | 20.93% |
| | 41-55 | 7 | 8.13% | 18 | 20.93% |
| | 56-70 | 5 | 5.81% | 14 | 16.27% |

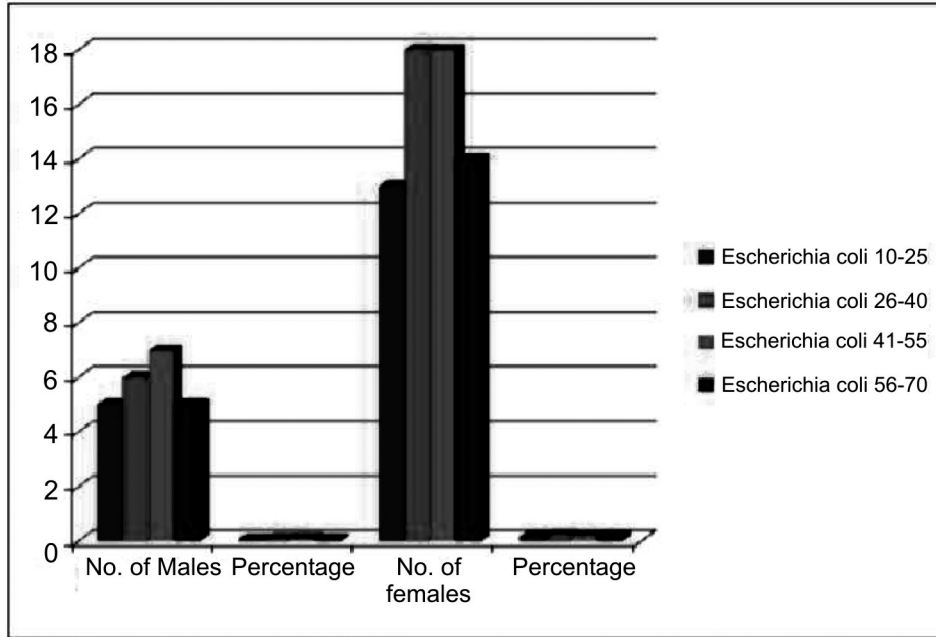
Table-03**Distribution pattern of *K. pneumoniae* according to age group and Gender.**

| Uropathogen | Age group | No. of Male | Percentage | No. of female | Percentage |
|----------------------|-----------|-------------|------------|---------------|------------|
| <i>K. pneumoniae</i> | 10-25 | Nil | - | 4 | 16.66% |
| | 26-40 | 3 | 12.50% | 6 | 25.00% |
| | 41-55 | 1 | 4.16% | 6 | 25.00% |
| | 56-70 | 1 | 4.16% | 3 | 12.50% |

Table-04**Distribution pattern of *P. aeruginosa* according to age group and gender.**

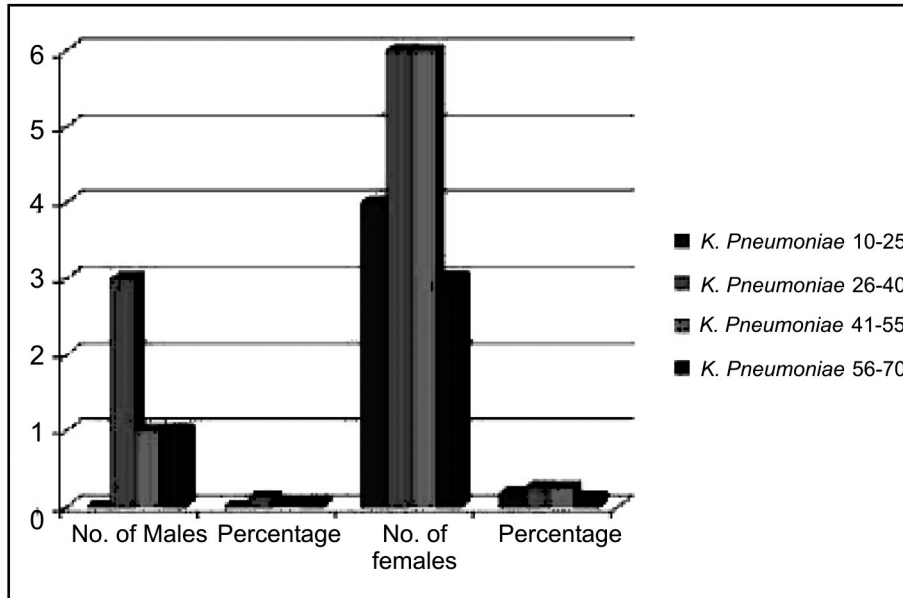
| Uropathogen | Age group | No. of Male | Percentage | No. of female | Percentage |
|----------------------|-----------|-------------|------------|---------------|------------|
| <i>P. aeruginosa</i> | 10-25 | Nil | - | 1 | 7.69% |
| | 26-40 | 4 | 30.76% | 3 | 23.07 |
| | 41-55 | 3 | 23.07% | 1 | 7.69% |
| | 56-70 | 1 | 7.69% | Nil | - |

Distribution pattern of *E. Coli* according to age group and gender



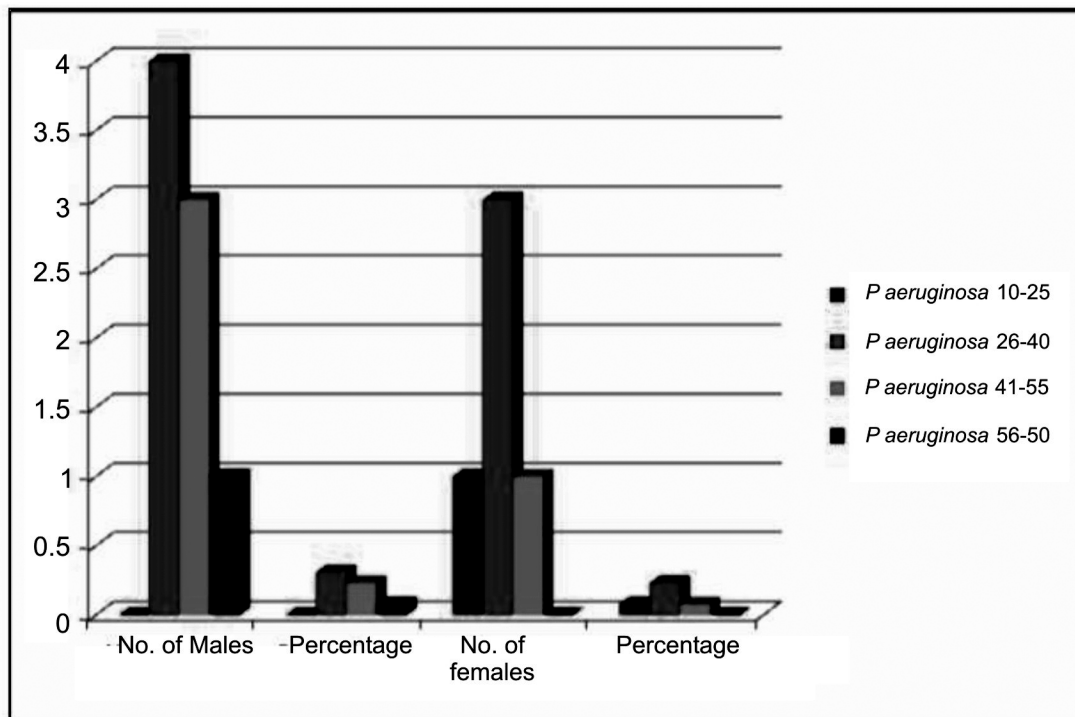
Histogram-01

Distribution pattern of *K. pneumoniae* according to age group and gender



Histogram-02

Distribution pattern of *P. aeruginosa* according to age group and gender



Histogram-03

The females belonging to the age group 26-55 years constituted 20.93% of urinary tract infection due to *E. coli*. The urinary tract infection caused by *K. pneumoniae* in various age group of male and female has also been found to exhibit variations. *P. aeruginosa* was found to be predominant in male as compared to female.

DISCUSSION

Urinary Tract Infections (UTIs) are one of the leading causes of health care expenditures in persons of all ages and are serious infections worldwide (Bano *et al.*, 2012). It has been calculated after viewing most of the data related to UTI that infections are 14 times more common in female than male (Anonymous, 2001). Analysis of the results according to patient gender indicated that *E. coli* is the predominant isolated pathogen from both sexes. Sex wise break-up revealed that *E. coli* was common in females (73.25%). Similar observations were made by Obi *et al.* (1996). In this study *K. pneumoniae* has emerged as second most common cause of UTIs. Current finding supports the finding of Manjula *et al.* (2013). They have demonstrated the second commonest uropathogen as *Klebsiella* species. In the present investigation the highest number of *P. aeruginosa* infected UTI cases were confined to males (61.53%). Interestingly the prevalence of UTI in females due to *P. aeruginosa* was 38.46%. According to Kiffer *et al.* (2007) the incidence of UTI due to *P. aeruginosa* was higher in those men (14.7%) who were more than 60 years old, as compared to females of the same age group.

Data according to age group and gender showed that differences in the frequency of isolation of uropathogens between males and females. *E. coli* was found to be less prevalent in the age group of 10-25 years and 56-70 years. Kiffer *et al.* (2007) also found a lower percentage of *E. coli* in younger or older than 60 years. It was also recorded that *Klebsiella pneumoniae* was second most common cause of UTI in different age group and gender. The highest occurrence was in the age group 26-40 years of both males (12.5%) and females (25%). The females of the age group 41-55 years also showed a high prevalence of UTI due to *K. pneumoniae*. These findings can be correlated with previous studies (Akram *et al.*, 2007) which have demonstrated a high prevalence of UTI in individuals less than 50 years of age.

The study also revealed that majority of the *P. aeruginosa* related UTI cases occurred in males. The males of the age group 26-40 were most affected.

The females of the age group 26-40 years showed UTI due to *P. aeruginosa* with percentage contribution of 23.07%. Other reports have shown that incidence of UTI in females due to *P. aeruginosa* in the age group of 20-40 years ranges from 25-30 % (Jarvis et al., 1992). *P. aeruginosa* is the third most common pathogen associated with hospital acquired catheter associated UTIs (Jarvis et al, 1992).

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