

## Urinary Tract Infection in Home Care Patients Qatar, Doha

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### ABSTRACT

**Background:** Urinary tract infection is a very common problem in general practice, but it is more prominent in elderly patients and its average prevalence is 25-40%. This is according to the most recent studies. Perfect treatment of this problem is very important because it is associated with a lot of complications like pyelonephritis and hypertension. This study was performed to determine the benefits of good diagnosis and management, depending on results of urine culture.

**Methods:** A retrospective study of homecare residents was done between September 2010 to September 2011. We reviewed the medical records and files of all patients. 132 patients of the total residents(614) had UTIs within the period of study.

**Results:** One hundred and thirty two had growth of microorganisms. Most of them were single organism (80% of the growth is due to a single organism), but about more than 50% were associated with bacteria in the urine, usually more than 100,000 organisms per ml. The most common causative organism was E.COLI (57 patients) i.e 42.5% of total patients who suffered of UTI.

**Conclusions:**

Asymptomatic bacteriuria is common in elderly patients, but it is more common in women.

Pyuria is not a reliable predictor of bacteriuria.

Dementia, incontinence, catheterization, diabetes mellitus & decreased mobility are risk factors for developing UTIs.

Residential care residents often can't give reliable histories.

Urinalysis and culture must be done for atypical symptoms, - Change in behavior , Decrease in appetite etc

**Key words:** Bacteriuria; long term care patients, urine culture; sensitivity, Foley's catheter, homecare

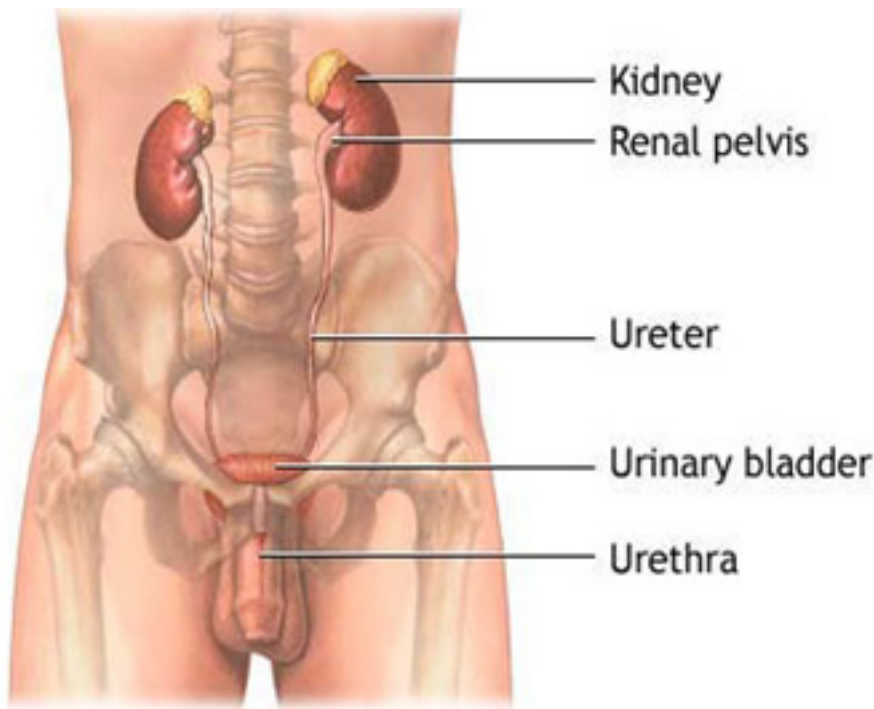


Figure 1: anatomical urinary tract system.

### Abbreviations

**APN:** acute pyelonephritis  
**ASB:** asymptomatic bacteriuria  
**CKD:** chronic kidney disease  
**CRF:** chronic renal failure  
**CVA:** cerebro vascular accident  
**DM:** diabetes mellitus  
**EGFR:** estimated glomerular filtration rate  
**ESR:** erythrocyte sedimentation rate  
**ESRD:** end-stage renal disease  
**FC:** Foley Catheter  
**GFR:** glomerular filtration rate  
**GP:** general practitioner  
**HHCS:** home healthcare service  
**IM:** intramuscular  
**IV:** intravenous  
**NHS:** National Health Service  
**LUTI:** lower urinary tract infection  
**LRTI:** lower respiratory tract infection  
**RBC:** red blood cells  
**SPC:** suprapubic catheter  
**SPA:** suprapubic aspiration  
**UTI:** Urinary tract infection  
**WBC:** white blood cell  
**WHO:** World Health Organization

### Introduction

Urinary tract infection (UTI) : By definition urinary tract infection, or UTI, means any infection that can affect any part of the urinary tract, which involves :

#### 1- Kidneys

2- Ureters - the tubes that take urine from each kidney to the bladder.

#### 3- Bladder

4- Urethra - the tube that empties urine from the bladder to outside.

Or it can be so defined: is the presence of pathogenic bacteria in the urine, urethra, bladder, kidneys or prostate. The Public Health Laboratory Service uses the criteria of 10 bacteria which are present in the urine for a diagnosis(1)

Urinary tract infection (UTI) , & lower respiratory tract infection (LRTI) are the most common problems in the elderly. Sometimes there is misdiagnosis between those two problems, and a lot of elderly patients are diagnosed as having LRTI or UTI or even both but these diagnoses are not confirmed.

The most important cause for this problem is that many elderly patients are unable to give a definite clinical history suggestive of LRTI or UTI, because they are often confused at the time of presentation. In such conditions the correct diagnoses are the corner stone in the management .This required a good clinical examination and investigation, to differentiate between these two problems.

Urinary tract infections are very common problems in general practice in all age groups, but it is more common in elderly people, with a prevalence of approximately 20% in women over 65 years old. Women have a greater prevalence than men, but the trend to increase prevalence with age in over 65 year olds is greater in men(2). This may be contributed to by many factors:

1. Immunosuppression.
2. Underlying chronic medical illnesses like DM, HTN, RF
3. Urinary and fecal incontinence.
4. Depressed mental state like dementia, delirium.
5. Associated use of devices such as urinary catheters and nasogastric tubes.
6. Medications that suppress the immune system or the central nervous system (polypharmacy).
7. Advanced age.
8. Factors that promote person-to-person transmission such as crowding and sharing of meals(3).
9. Mechanical changes involving the bladder and urethra, such as increased post void residual urine, or that allow bacterial attachment .
10. Prostatic enlargement in men .
11. Decreased estrogen in postmenopausal women.
12. Not drinking enough fluids(4).

The diagnosis of UTI in adult patients depends on the history and the physical examination. The most common signs and symptoms of UTI are fever and/or chill, dysuria (burning sensation of urine), pyuria, frequency, urgency, Hematuria Colicky pain and incontinence. Cloudy urine, foul or strong urine odor, pressure in the lower pelvis.

Diagnosis of UTI in confused elderly patients or those who cannot express themselves is usually very difficult , and sometimes may present in different ways; that is the signs or symptoms are not related, like a patient who presented with hallucination, disorientation, agitation.

The most important challenge for physicians in long term care setting is that under what conditions can they give antibiotic as a treatment for possible UTI in case of acute behavioral changes of demented patients or those who cannot report classical symptoms of UTI , which can help in making possible diagnosis.

In practice some demented elderly patients present with acute behavioral changes like agitation; most of them febrile. Those patients showed a significant improvement when they were treated for UTI with antibiotic.

The perfect management of UTI in elderly patients is very important, because it considers a serious infection and carries a big chance for severe complications. UTI in elderly patients usually differs significantly from that which occurs in the general population, in its etiology, clinical signs & symptoms, and treatment.

## Definitions

1. **Urinary tract infection** means presence of pathogenic bacteria in the urine, urethra, bladder, kidneys, or prostate.
2. **Recurrent UTI** - Repeated episodes of infection (three or more/year) by different causative microorganism.(5)
3. **Relapse** - Repeat UTI with the same strain of microorganism within two weeks. This can be called failure of the treatment.
4. **Bacteriuria** is presence of bacteria in urine revealed by microscopy or by quantitative culture. Significant Bacteriuria equal to or more than 10<sup>5</sup> cfu/ml of a single

bacterial species in a freshly voided specimen of urine.

**a-** women with symptomatic UTI  $\geq 10^2$  cfu/ml .

**b-** men  $\geq 10^3$  cfu/ml (if 80% of the growth is due to a single organism).(6)

5. Asymptomatic bacteriuria means presence of bacteria in the urine with no signs or symptoms, discovered microscopically in sample taken from patient's urine or by urine culture.
6. Bacteraemia means presence of bacteria in the blood and it is diagnosed by blood culture.
7. Empirical treatment of UTI is a treatment based on clinical symptoms or signs unconfirmed by urine culture.
8. Haematuria: it is presence of blood in the urine either visible (macroscopic haematuria) or invisible (microscopic haematuria) .
9. Catheterization: an indwelling catheter is inserted through urethra or suprapubic temporarily or permanently.
10. Short term catheter is an indwelling catheter left in place for 1-7 days.(7)
11. Long term catheterization is an indwelling catheter left in place for more than 4 weeks.
12. Pyuria : means number of white blood cells (WBC)/ml equal or more than (10<sup>4</sup> cells ) per milliliter of urine freshly voided.
13. Asymptomatic, abacteriuric patients: that means Pyuria without bacteriuria and this is most likely due to a foreign body, like urinary catheter, stones or neoplasms of urinary tract, lower genital tract infection.
14. Dysuria : means painful urination, or burning or stinging sensation and it is sometimes described as difficulty of urination. This is the most common symptom of lower UTI(8).

## Background

**Subject:** Retrospective Study of urinary tract infection ( UTI) in geriatric patient under Homecare services for the last year from 1st September 2010 until 1st September 2011.

## Goals of the study

In this proposal we will try to focus / on urinary tract infection to old age patients who live in their houses under home care services.

- 1 To determine the prevalence of urinary tract infection of the geriatric patients .
- 2 To identify the possible underlying risk factors which may be related, to cause UTI.
- 3 To recognize the most common organism.
- 4 To determine the most appropriate antibiotic for these organisms.

## Epidemiology

**PLACE:** QATAR / DOHA/ HOMECARE

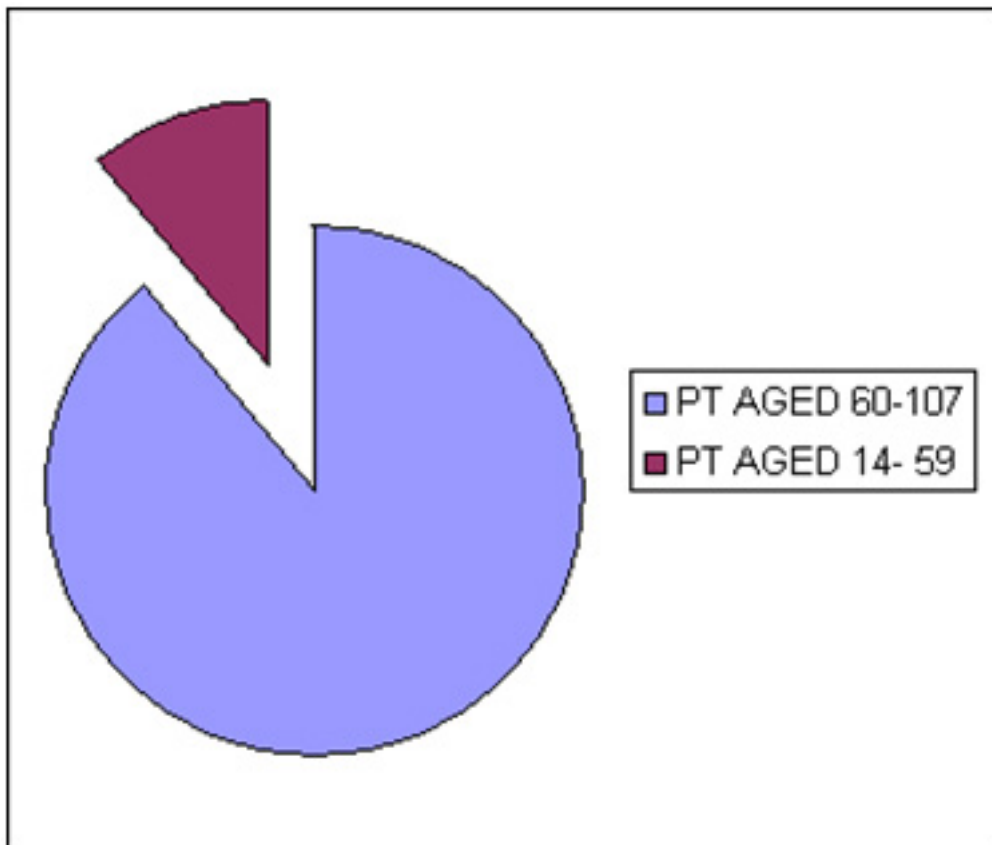
**PATIENTS NUMBER:** 614

**DATE:** 1st September 2010- 1st September 2011

**METHOD OF COLLECTION OF DATA:** PATIENT FILES AND/ OR MEDICOM.

**DURATION:** 6 MONTHS

Collection data started at October 2011 retrospectively For last year (1st September - 1st September 2011) .



**Figure 2: Distribution of patients according to age**

Total patients under home care for this period was 614 patients, most of them were old age.

The ages were between 14-107 years.

67 patients aged between 14 -59 = 12.24%

547 patients aged between 60-107 = 87.76%

**Figure 3: distributed patients according to gender :**

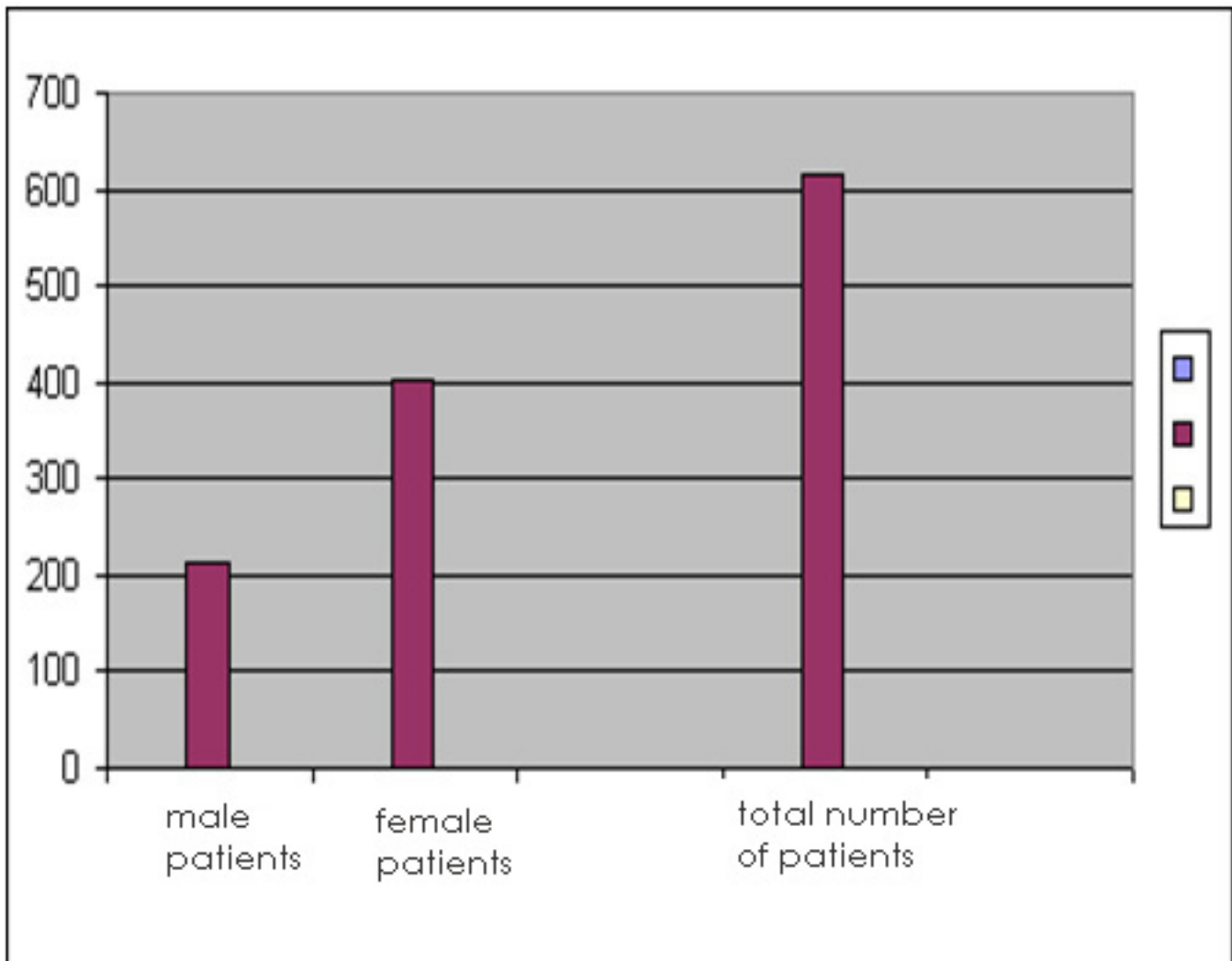


Figure 3 (previous page) shows the distribution of patients according to their genders.

Total number of patients : ( 614)

Male patients : ( 212)

Female patients : (402 )

In this diagram we will try to show the distribution of patients according to their nationalities:

<b>QATARI</b>	<b>541</b>
<b>NON QATARI</b>	<b>73</b>
1- PALESTINE	20
2- BAHRAIN	10
3- PAKISTAN	6
4- IRAN	6
5- SUDAN	5
6- YEMEN	5
7- UAE	4
8- JORDAN	3
9- SOMALIA	3
10- UK	2
11- USA	2
12- BANGLADESH	2
13- PHILIPPINES	2
14- CANADA	1
15- SUDAN	1
16- OMAN	1

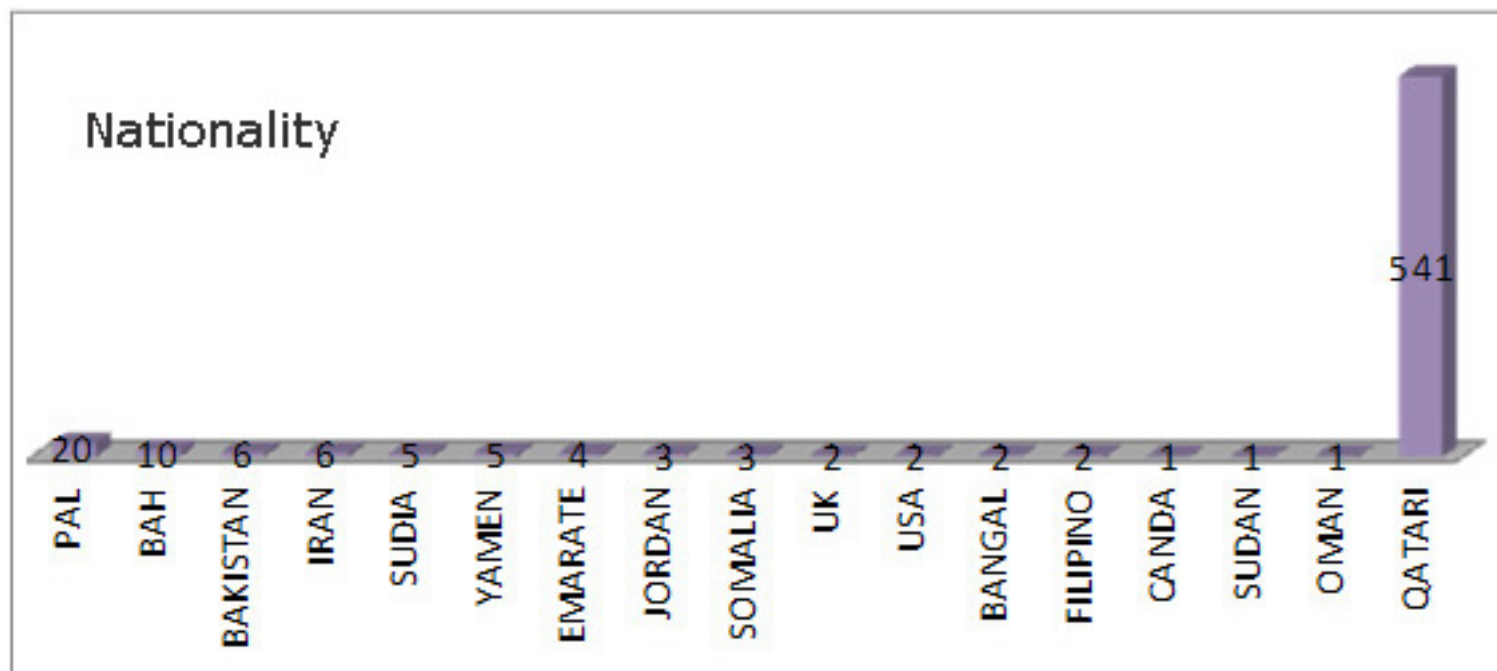


Figure 4: patients according to nationality

### Methods

We traced electronic medical records and patients' files during last year to collect these data. We depended on result of urine culture and urine analysis.

## Results and Statistical Analysis

During data collection we found a lot of valuable things.

Here we will mention the most important findings :

### A :

None of total number of patients suffered from UTI 131.

Two (2) patients were on intermittent catheter.

Three(3) patients were on condom catheter.

Five(5) patients were on suprapubic catheter.

Twenty nine(29) patients on Foley catheter.

Total catheterization patients had UTI ( 38 ).

This / means that 29% of total no. of UTI patients.

This means as we mentioned above, catheterization considered as an important risk factor for UTI, and increases the chance of infection.

All chronic catheter users have bacteriuria. Its treatment does not improve mortality or morbidity but does increase the risk of antibiotic-related side effects and the development of infection with resistant organisms .(9)

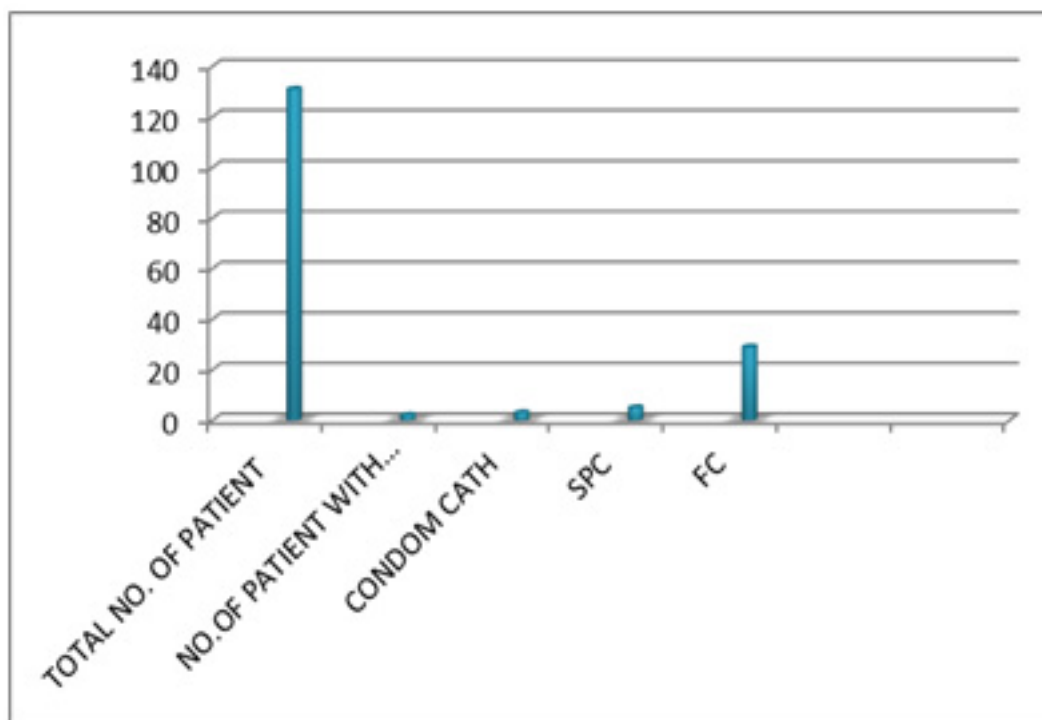


Figure 5: catheterization patients

### B : Causative microorganism :

**a-** E coli , it was the most common microorganism

(57 patients ) i.e 42.5% of total patients who suffered from UTI .

**b-** 2nd common causative organisms :

They were

**1- pseudomonas aeruginosa.**

**2- klebsiella ssp.**

**3- enterococcus faecalis.**

These three organisms affected 36 patients.

About 27.27% of UTI patients. (12) had all of them.

These microorganisms form about 70% of total patients suffering from UTI in this study. This is supported by A retrospective analysis of urine culture results issued by the microbiology department, Teaching Hospital, Karapitiya(10)

The common etiological agents are Escherichia coli, Pseudomonas spp., Proteus spp., Klebsiella spp. and Enterococcus spp.

- c- Mixed growth : 16 urine samples of patients showed mixed growth.
- d- No growth : 7 urine samples showed no micro organism had been found .
- e- fungal infection especially candida ssp plays a role in this problem  
Candida ssp grows from 7 urine samples that had been taken from patients. All of them females
- f- the rest of causative organisms varied (5 patients) acitinebacter buammanii, Citrobacter koseri' & streptococcus feacalis , are affected (2 patients) for everyone of them.
- g- others : (3 patients) other organism.

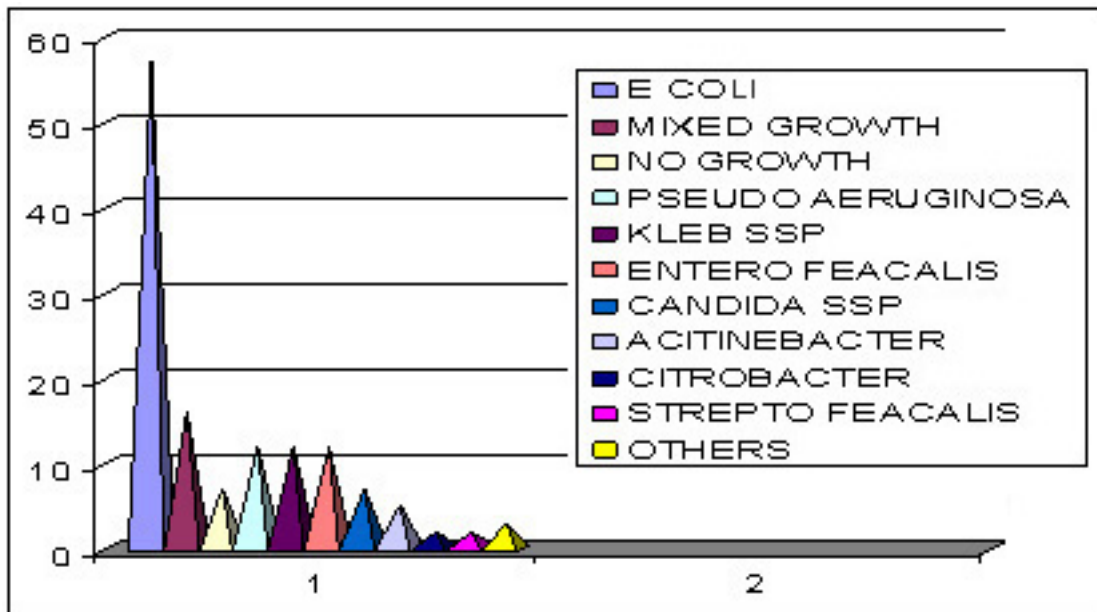


Figure 6: organisms found in urine culture samples.

C : In the table below we choose more common causative organisms of UTI. and sensitivity and resistance. (E COLI , KLEPS ssp , ENTEROCOCCUS feacalis, PSEUDO MONAS aeruginosa)

These organisms form around 70% of cases.

- 1st
  - a- Ecoli (54 cases) 53 cases of them sensitive to nitrofurantion, only one case is resistant. 28 cases (50% of cases) sensitive to septrin, 22 of cases (40%) sensitive to Tazocin.
  - b- 32, 34, 38 cases, ie about (60% - 70% of cases) are resistant to (cephalothin augmentin, ampicillin) respectively.

		E.COLI		KLEPS SSP		ENTERO feacalis		PSEUDO Aeruginosa	
ANTIBIOTIC		S	R	S	R	S	R	S	R
1	NITROFURANTION	53	1	7	5	-	-	-	1
2	CIPROFLOXACIN	14	25	6	6	8	4	12	-
3	TAZOCIN	22	5	3	-	-	-	12	1
4	AMPICILLIN	12	38	3	9	9	1	-	1
5	AUGMENTIN	10	34	8	4	-	1	-	1
6	SEPTRIN	28	16	1	1	3	1	1	1
7	CEPHALOTHIN	14	32	6	5	2	-	-	1
8	CEFUROXIME	15	14	5	7	-	2	-	12

**2nd**

(12 cases) of pseudomonas aeruginosa , 100% of them are sensitive to Tazocin & ciprofloxacin .

**3rd** ( 12 cases) of enterococcus feacalis , (8, 9 of them) are sensitive to ciprofloxacin & ampicillin respectively .

**4th** (12 cases) of klepseilla ssp, (6, 7, 8) are sensitive to ciprofloxacin Nitrofurantion & augmentin respectively

**D : UTIs associated with chronic medical problems.**

70 patients from those who had UTI / suffered from DM for a long time. i e 53.43%

- 1- Diabetes mellitus is usually cited as increasing the risk of infection all over the body
- 2- Patients with diabetes mellitus (DM) have an increased risk of UTI, but data explains truly linking a diabetic condition to infectious risk is still not enough and needs more studies in future.
- 3- Uncontrolled Hyperglycemia appears to affect the function of neutrophils with impairment of phagocytosis, chemotaxis/migration as well as intracellularlysis of organisms, and its affect on tissue perfusion leading to peripheral vascular disease and microcirculatory abnormalities.
- 4- Diabetic peripheral neuropathy is a risk factor for diabetic foot infection, Cellulitis and osteomyelitis,
- 5- Amputation in DM 15x > non-DM.
- 6- Patients with abnormal bladder function due to neuropathy are at higher risk of UTI.
- 7- In US, 10% of all hospital discharges have a DM diagnosis and therefore DM patients admitted more commonly than non-diabetic patients(11).

**8-** Pneumonia and UTIs are the most common causes of Diabetic ketoacidosis (DKA) and the hyperosmolar hyperglycemic state (HHS) .

**9-** Data supports increased risk of UTI or pyelonephritis, Candidal UTI, Candidal vulvovaginitis is still little and needs more and more.

**E : 71 patients developed MDRO i.e 54.19% .**

The prevalence of resistance in organisms isolated from UTI is well-recognized in old patients.

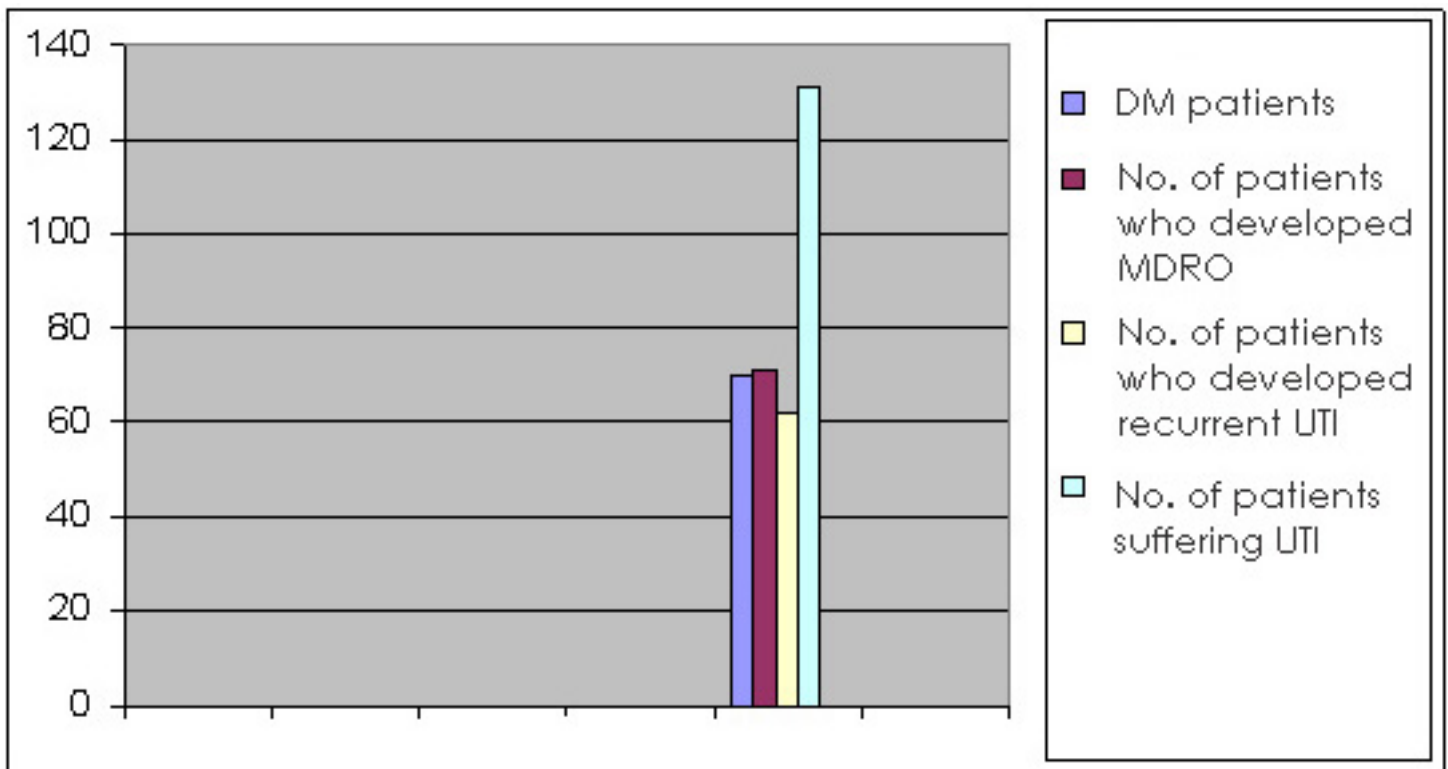
The mechanism of how organisms develop resistance to anti microbials is not fully clear.

A few researchers tried to clarify and evaluate the importance of potential factors contributing to resistance.

Some reports describe that resistance is derived from older populations in long term care facility (LTCFs)(12), But we still need more studies to answer many questions like :

- 1. *What is the prevalence of resistance?*
- 2. *Is resistance associated with increasing age?*
- 3. *What are other associations of resistance in older people ?*
- 4. *What is the appropriate management of UTI in older People known or suspected to have symptomatic Infection with a resistant organism?*
- 5. *Do older individuals with UTI with resistant organisms have a poorer outcome than those with susceptible organisms?*
- 6. *How should bacterial resistance in UTI in older people be defined?*

(From: Resistant Pathogens in Urinary Tract Infections) Lindsay E. Nicolle, MD JULY 2002-VOL. 50, NO. 7, SUPPLEMENT)



**Figure 7: UTI associated DM patients**



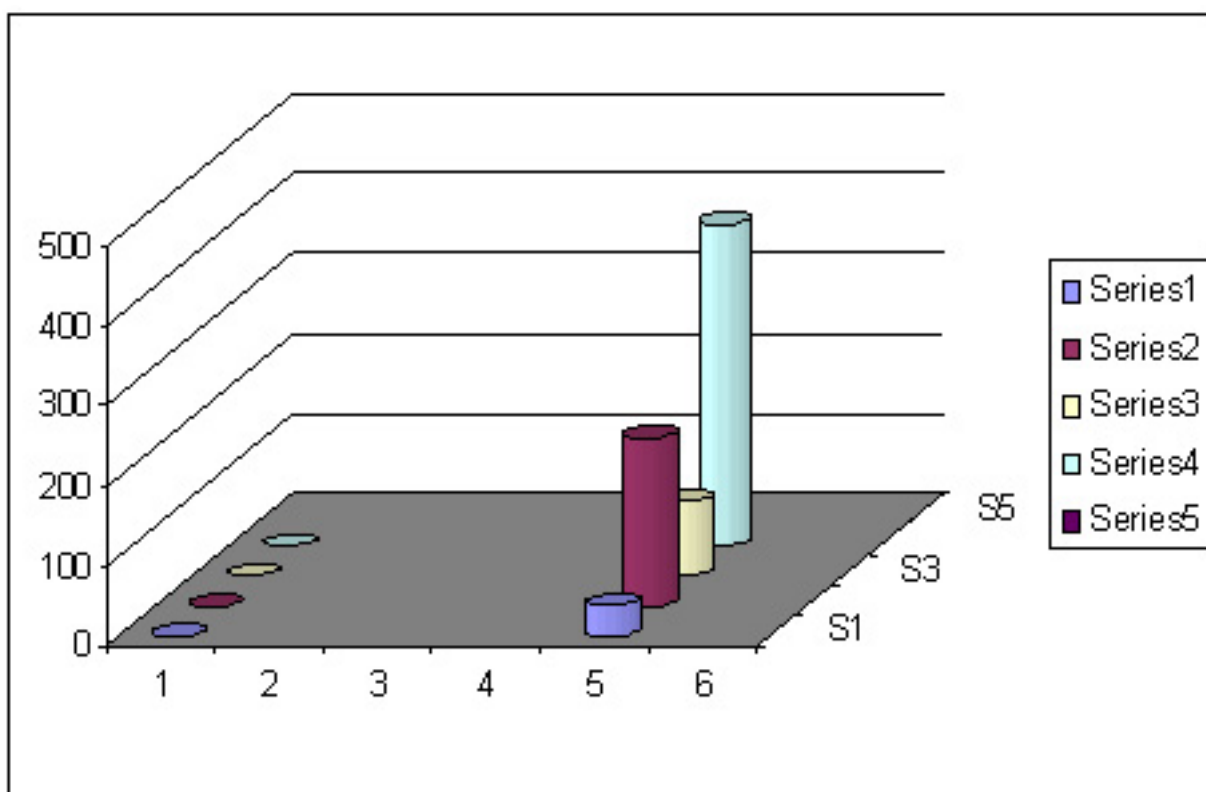
**F:** 62 patients suffered from recurrent UTI (relapse 10 cases) .

**G :** -in 53 patients WBC in blood increased (10.700- 31.000) 4 cases showed decrease in no. of WBC less than normal.

**H :** only 62 urine analyses had been done, 64.51 % of them support the diagnosis of UTI .

**I:** This slide will show us percentage distribution of males to females suffering from UTI:  
 1- 39 male patients suffered from UTI, this means that 18.39% of total No. of male patients,  
 2- 92 female patients suffered UTI , this means that 22,88 % of total No. of female patients.

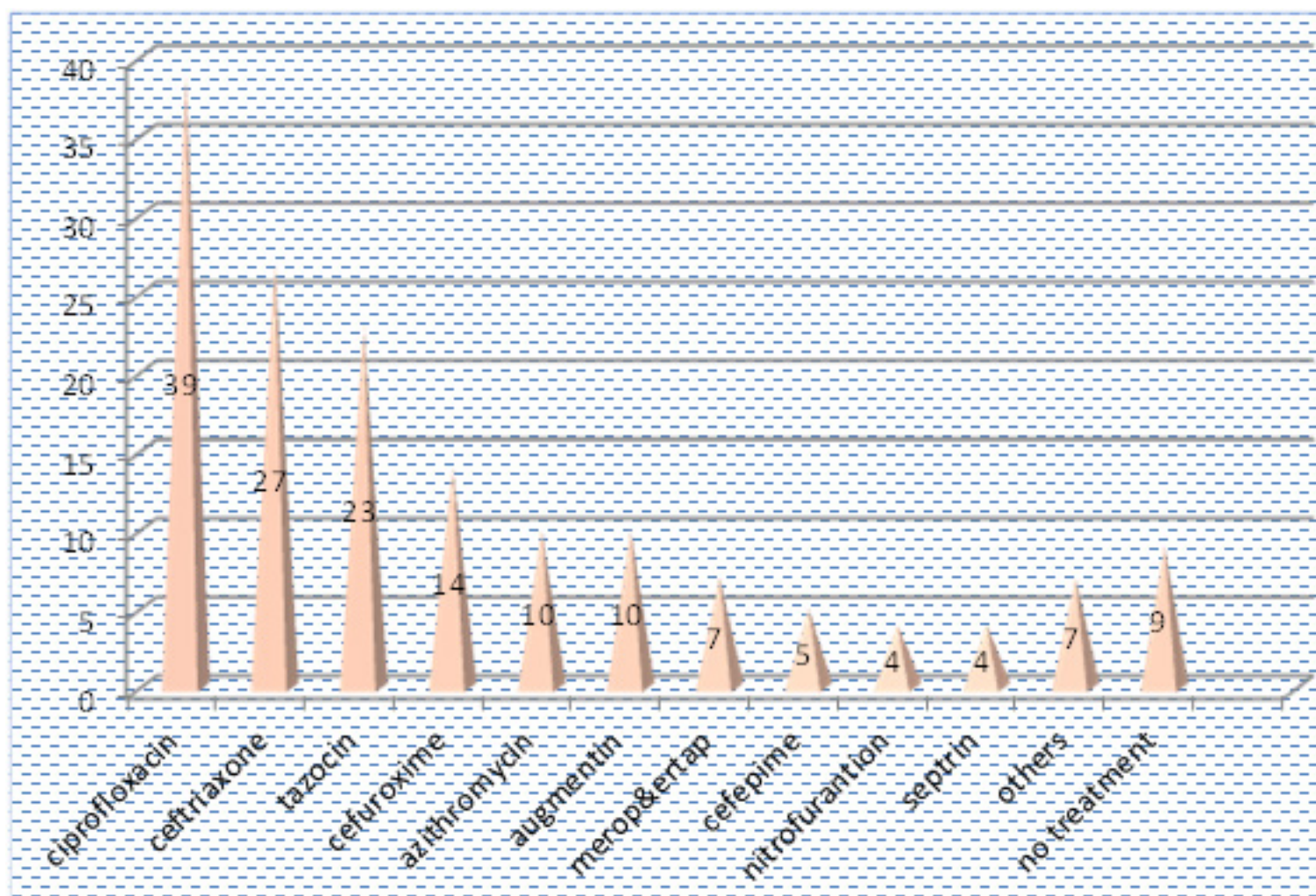
\*Women suffered with UTI more than men; this fact has been proved by a lot of studies, but the causes are still not clear



**Figure 8: Males to females patients**

**J :** The most antibiotics used in the treatment of UTI were as following:

1	ciprofloxacin tab 500 mg oral bid 7- 14 days	39
2	ceftriaxone 2 gr vial iv once daily 5-10 days	27
3	tazocin 2.250- 4.5 vial iv gr tid 5-10 days	23
4	cefuroxime tab 250- 500 mg oral bid 7-14 days	14
5	Azithromycin 250 -500 mg od oral 3-7 days	10
6	Augmentin tab 625mg oral bid 10- 14 days	10
7	Meropenem & Ertapenem 0,5-1 gr bid or tid according to creatinine serum iv 7- 10 days	7
8	Cefepime 1-2 gr iv bid 7- 10 days	5
9	Nitrofurantoin tab 100mg bid oral 7 days	4
10	Seprtrin tab 960 mg bid oral 7-10 days	4
11	Others	7
12	No treatment	9



**Figure 9: Antibiotics most used in treatment of UTI**

### Summary

- The prevalence of resistant bacteria causing urinary tract infection (UTI) from antimicrobials has increased in the last decades especially in elderly patients in the community.
- Patients in long-term care facilities, are more liable to develop this problem than others .
- Resistant bacteria isolates include common uropathogens, such as Escherichia coli and organisms with higher levels of intrinsic resistance, such as Pseudomonas aeruginosa(13).
- It is essential to send urine specimens for culture and susceptibility before starting antimicrobial therapy. This gives the clinician a chance to select specific antimicrobials for causative organisms and avoids empirical therapy which is usually broad-spectrum antimicrobial.
- Antimicrobial therapy should be avoided unless there is a clear clinical indication.
- Generally speaking asymptomatic bacteriuria should not be treated with antimicrobials.
- In case empirical therapy is essential, before isolated organisms recent antimicrobial therapy is the drug of choice until result of culture is available .
- Within ( 48- 72 hours) empiric therapy must be reassessed.
- UTI is commonly over diagnosed and over treated on the basis of nonspecific clinical signs and symptoms .(14)
- Urinary tract infections are a very common presentation in general practice in all age groups, with or without catheters(15),
- The risk of infection will be increased if there is any urological problem like abnormal structure of the urinary tract
- Incomplete bladder emptying and urinary stasis increases the incidence of bacteriuria especially with increasing age and disability.(16)
- A high percentage of patients with indwelling catheters (IDC) acquire bacteriuria each day even with the application of best practice for insertion and care of the catheter.
- In general, acute uncomplicated lower UTI is usually due to one organism like Ecoli, or streptococcus ssp ( 90-95%)(17)
- In patients with repeated infection, instrumentation or recent hospitalization, MDRO must be suspected.(18)
- All patients with long-term catheters are bacteriuric with urine samples and usually positive for two or more organisms.
- Urinary tract infections (UTI) are the most common infections acquired in hospitals and long-term care facilities. Early studies estimate the incidence of healthcare associated UTIs at around 2-3 patients per 100 admissions and this is supported by the more recently published Plowman Report. (Plowman et al, 1999)(19)

- Recently a number of risk factors for healthcare associated UTI have been established. The most important predisposing factor for healthcare associated UTI is the presence of an indwelling urethral catheter, and chronic medical problem like DM (70 patients of 131) as shown in our research .
- In elderly women (over 65 years of age), treatment of asymptomatic bacteriuria does not reduce mortality or significantly reduce symptomatic episodes. so no need to treat these cases.

Harrison edition 16 2005 page 1718 .  
 (Plowman et al, 1999) .  
[www.whfoods.org](http://www.whfoods.org)

## Prevention

- 1- Drink plenty of water is an important prevention strategy.
- 2- Wipe from front to back.
- 3- Keep genital area clean and dry.
- 4- Do NOT drink fluids that irritate the bladder, like alcohol and caffeine.
- 5- Drink cranberry juice or use cranberry tablets, but NOT if you have a personal or family history of kidney stones(20).
- 6- Use of low-dose antibiotics like Nitrofurantoin 100mg once daily on a daily basis may be recommended to prevent UTIs if patient gets frequent infections.
- 7- A good control of DM and treatment of other chronic problems may play a role in decreased chance of getting UTI .
- 8- Frequent emptying of the bladder and prevention of congestion of urine is important to prevent growth.
- 9- Care giver must be able to pick up any changes in patient behavior.
- 10- Early treatment of symptomatic patients with UTI as soon as possible can be prevent more complications .

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