Original Article

DOI: 10.21276/ijchmr.2017.3.1.11

Prevalence of UTI in Spinal cord injury: Knowledge and practices towards its prevention

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Abstract

Background: Urinary tract infection (UTI) means growth of microorganism in urinary tract. There is an increased risk of UTI in patients with spinal cord injury (SCI) that accounts an overall incidence nearly 2.5 cases per year in India. The present study was aimed to estimate the prevalence of UTI in patients with SCI and to assess knowledge and practices regarding its prevention among them and their caregivers in a Tertiary care centre.**Materials and Methods:** A descriptive approach was used. Target population was patients with SCI and their caregivers. Sample size was 100. Total enumeration technique was used. Microbiological cultural report and Modified UTI basic data sheet were used for assessing the prevalence of UTI in patients and Interview schedule was used for assessing the knowledge and practices of the patients and their caregiver regarding the prevention of UTI. The study was ethically approved by the Institution Ethics Committee of the hospital.**Result:** The mean age of the patients was 40 ±14.09 (in years) and mean age of caregivers was 36 ±13.55 (in years). Out of the total subjects most of them were married and male. The main cause of injuries was fall. About (10%) of patients had UTI. Subjects had more knowledge about sign and symptoms of UTI. **Conclusion:**Subjects had adequate knowledge about UTI but they need education and training programmes to improve practices to prevent it.

Keywords: Knowledge, Practices, Spinal cord injury (SCI), Urinary tract infection (UTI)

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This article may be cited as: Prevalence of UTI in Spinal cord injury: Knowledge and practices towards its preventionInt J Com Health and Med Res 2017;3(1):46-54

Article Received: 26-01-17 **Accepted On:** 06-02-2017

INTRODUCTION

Spinal cord injury (SCI) is an injury to the spinal cord resulting in a change, either temporary or permanent; in the cord's normal motor, sensory, or autonomic function.[1] Common causes of damage are trauma or disease. The complications of SCI vary from pain to paralysis to incontinence. It is also associated with a risk of developing secondary conditions like Urinary tract Infection (UTI). The overall incidence of UTI in SCI is 2.5 cases per year.[2] Frequently, it occurs as a result of neurogenic bladder and the need for catheterization. Pathogenic factors include bladder overdistention, vesicoureteral reflux, high-pressure voiding, large postvoiding residual volume, stones in the urinary tract and outlet obstruction.[3] Signs and symptoms of a UTI involving lower urinary tract may include dysuria, frequency, urinary incontinence and hematuria. Patients with acute upper urinary tract involvement may present with any of the above signs and symptoms as well as high grade fever, chills, nausea, headache, elevated serum white blood cell count.[4]Diverse studies accepted novel and well-established approaches towards the prevention of UTI in patients with spinal cord injury. Hand hygiene is a simple and

utmost important method to prevent transmission of health care associated infections which makes its implementation fundamental in the care of patients with spinal cord injury.[5] Different strategies for catheter insertion, such as inserting a catheter only when appropriate, early removal of the catheter and use of aseptic techniques are vital in lowering the rates of catheter-related urinary tract infections.[6] When indwelling catheters are used for long-term bladder drainage in patients with spinal cord injury, it is recommended to routinely change the catheters every two to four weeks to reduce the risk of asymptomatic bacteriuria and urinary tract infections. The catheter should also be changed if urinary tract infection is suspected.[7]

The present study aimed to estimate the prevalence of UTI in patients with SCI and to assess knowledge and practices regarding its prevention among them and their caregivers attending Neurosurgery OPD, PGIMER, Chandigarh**.**

MATERIALS AND METHODS

A descriptive quantitative survey was conducted among 50 patients with SCI and their 50 caregivers attending Neurosurgery OPD, PGIMER, Chandigarh. Total enumeration technique was used. Structured interview schedule was used to collect data. It was prepared by extensive review of literature and was validated by experts in nursing and medical field. It comprised of 7 parts:

Part A: Socio demographic data and clinical profile of the patients

It included identification and demographic profile of the patient and contained items such as C.R. no, age, sex, habitat, marital status, education, religion, occupation, type of family, type of injury, level of Injury and duration of injury and current use of antibiotics.

Part B: Socio demographic data of the caregiver

It comprised of the identification and demographic profile sheet of the caregiver. It included items such as age, sex, habitat, marital status, education, religion, occupation, relationship with the patient.

Part C: Check list to assess the knowledge about the sign and symptoms of UTI

The main sign and symptoms of UTI listed were, lower abdominal pain, vomiting, nausea, fatigue, cloudy, dark, bloody, smelling urine, discomfort, redness and swelling, loss of appetite, strong persistent urge to urinate and with an option to add other sign and symptom by the study subjects.

Part D: Check list to assess the knowledge about the causes of UTI

The causes of UTI listed were incomplete voiding, poor personal hygiene, excessive use of antibiotics, dehydration, detrusor sphincter, presence of stone, incontinence of urine, prolonged catheterization, delayed empting the urinary bags, retention of urine, bedridden patients, increase intravesical pressure, using public toilet and with an option to add other causes by the study subjects.

Part E: Check list to assess knowledge about risk factors of UTI

It included large post voiding residual, vesicoureteral reflux, decrease functional activities, neurogenic bladder, outlet obstruction, pyelonephritis and with an option to add other risk factors by the study subjects.

Part F: Practices regarding prevention UTI

It included the assessment of practices such as 2-3 litre of water per day, kegal exercise 2-6 times per day, position change every 2-3 hours, insertion of urinary catheters using aseptic technique and sterile equipments, perineal cleaning from front to back after defecation, use of clean and dry urinal/bedpan, change of urinary bag every seven days, catheter care once in a day, catheter change once in 2-4 weeks, voiding at least at an interval of 2-3 hours, maintaining perineal hygiene daily and screening for asymptomatic bacteriuria regularly with an option to add other practices used by the study subject.

Part G: Modified Urinary tract infection basic data sheet

It included date of specimen collection, length of the sign and symptom if present. Urine culture with expression of positive and negative.

Institutional ethics committee approved the study. Permission from Head of the Department, Neurosurgery and a written informed consent were taken from the study subjects (patient and their caregivers) before collecting the data. Subjects were explained about the objectives, duration of involvement and their freedom to deny participation in the study. Anonymity of study subjects and confidentiality of information was

ensured. The pilot study was conducted on 5 subjects to check the feasibility and reliability of the tool. Necessary changes were incorporated in the tool after the consultation with guide and coguide. Sufficient time was given to subjects to respond with adequate privacy to ensure unbiased answers from the study participants during the interview. The data was entered, coded and analyzed by SPSS-16.

RESULTS

Table 1: Socio demographic profile of the study subjects

Variables	Patients (n=50) n (%)	Caregivers (n=50) n (%)
Age (in years)	Mean±SD (years) =40.12±14.09 Range (years) =15-72	Mean±SD(years) =36.96±13.55 Range (years) =15-75
Gender		
Male	39 (78)	28 (56)
Female	11 (22)	22 (44)
Habitat		
Rural	37 (74)	37 (74)
Urban	13 (26)	13 (26)
Marital status		
Married	39 (78)	39 (78)
Unmarried	11 (22)	11 (22)
Education		
Illiterate	08 (16)	04 (08)
Primary	14 (28)	11 (22)
Matric	15 (30)	16 (32)
Senior secondary	05 (10)	06 (12)
Graduation & above	08 (16)	13 (26)
Occupation		
Skilled	08 (16)	03 (06)
Semi-skilled	19 (38)	14 (28)
Unskilled	10 (20)	33 (66)
Unemployed	13 (26)	-
Type of family		
Nuclear	15 (30)	—
Joint	35 (70)	
Per capita income (Rs.)	Mean±SD (Rs.) = 4667.2±3925.13 Range (Rs.) = 500-20000	—
Relationship		
Spouse	—	24 (48)
Parents		08 (16)
Children		10 (20)
Sibling		09 (18)

Table 1 shows the mean age of patient was 40 years and caregiver was 36 years. Majority of the patients (78%) and (56%) caregivers among them were male. Approximately three fourth of the subjects (74%) were rural habitants and (78%) of the subjects were married. Out of the total subjects (30%) of patients and (32%) of their caregivers had education up to matric. Less than 40% of patients

were involved in semiskilled occupation and 66% of their caregivers were involved in unskilled occupation. About two third of subjects had joint family. Nearly 50% of caregivers were the spouse of the patients.

Table 2: Clinical profile of the patients **N=50**

Variables	n (%)
Cause of injury	
Fall	25 (50)
Road side accident	10 (20)
Disease condition (Potts supine,Tumor,Meningomyelocele)	10 (20)
Sports Injuries	03 (06)
Assault	01 (02)
Level of injury as per record	
C1C6	08 (16)
T1T6	06 (12)
T7T12	05 (10)
L1L3	15 (30)
BelowL3	15 (30)
Duration of injury (in months)	
< 6	01 (02)
06-12	21 (42)
12-24	22 (44)
>24	07 (14)
Current use of antibiotics	09 (18)

Mean± SD (months) =13.98±12.07
Range (months) = 2-46

Table 2 depicts the clinical profile of the patients. Primary cause of spinal cord injuries was falls that accounted for half of the total subjects (50%).The number of the patients injured at the Level of L1L3 and below L3 were 30%.The proportion of patients who had injury 12-24 months back was 44% and less than 20% of subjects were using antibiotics for controlling the UTI.

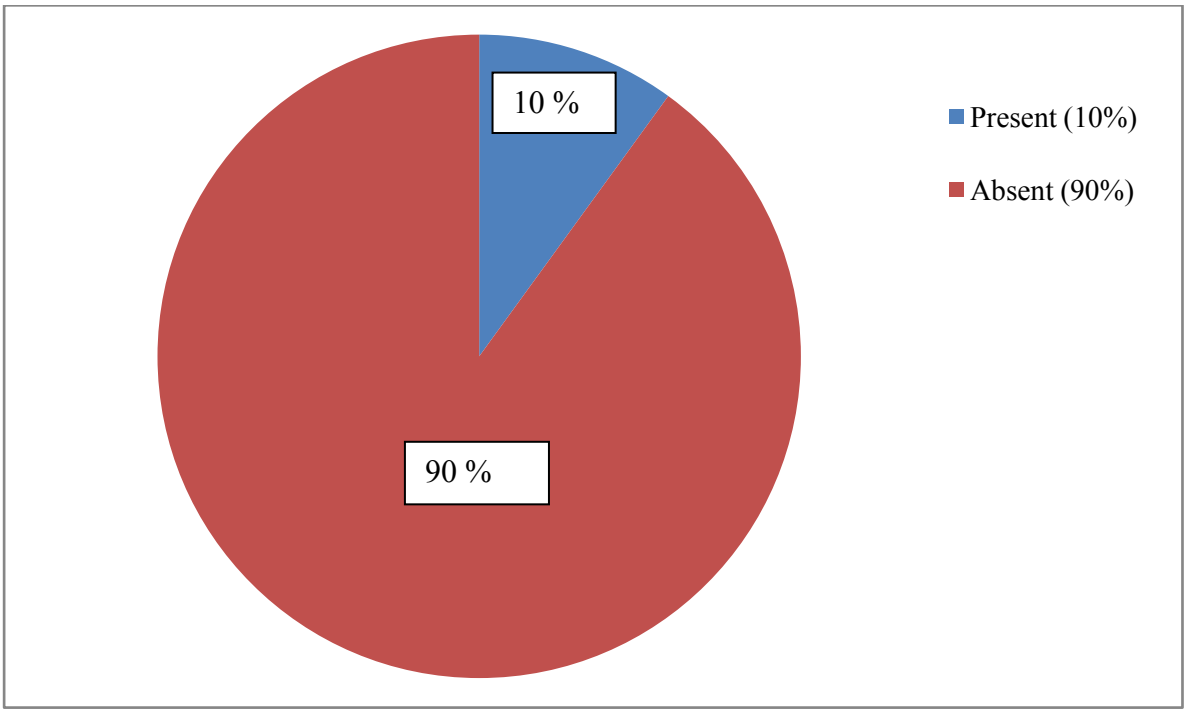

Fig.1: Prevalence of UTI among SCI Patients **N=50**

Table 3: Knowledge about the sign and symptoms of UTI among the study subjects

Sr.No	Sign & Symptoms	Correct Response n (%)	
		Patients n=50	**Caregiver n=50**
1.	Cloudy, dark, bloody, or strange-smelling urine	42 (84)	41 (82)
2.	Itching and burning sensations	40 (80)	41 (82)
3.	Lower abdominal pain	37 (74)	34 (68)
4.	Urinary Incontinence	35 (70)	29 (58)
5.	Strong persistent urge to urinate	33 (66)	35 (70)
6.	Discomfort	28 (56)	30 (60)
7.	Nausea and Vomiting	25 (50)	23 (46)
8.	Fever and chills	24 (48)	34 (68)
9.	Fatigue and tiredness	21 (42)	23 (46)
10.	Redness and swelling in perianal area	18 (36)	23 (46)

Figure 1 shows results of microbiology examination for UTI. Only (10%) of patients had UTI.Table 3 depicts knowledge of the subjects regarding the sign & symptoms of urinary tract infection. Out of the total number of subjects, the patients and their caregivers who identified cloudy, dark, bloody, or strange-smelling urine were 84% and 82% followed by itching and burning sensations as 80% and 82% respectively. Table 4 depicts the knowledge of subjects regarding the causes of UTI. Out of the total number of subjects, the patients and caregivers reported poor personal hygiene (98% & 94%) and dehydration (84% & 80%) respectively as primary causes.Figure 2 depicts the knowledge of subjects regarding the risk factors of the UTI. Out of the total number of subjects, the patients and caregivers who identified pyelonephritis were 74% & 80%, vesicoureteral reflux were 70% & 72% and outlet obstruction were 68% & 64% respectively.

Table 4: Knowledge about the causes of UTI among the study subjects

Sr.No	Cause	Correct Response n (%)	
		Patients n=50	**Caregiver n=50**
1.	Poor personal hygiene	49 (98)	47 (94)
2.	Dehydration	42 (84)	40 (80)
3.	Using public toilet	41 (82)	31 (62)
4.	Prolonged catheterization	40 (80)	36 (72)
5.	Incomplete voiding	39 (78)	44 (88)
6.	Delay in empting the urinary bags	38 (76)	39 (78)
7.	Bedridden condition	33 (66)	33 (66)
8.	Urinary Retention	25 (50)	29 (58)
9.	Excessive use of antibiotic	20 (40)	24 (48)
10.	Urinary incontinence	20 (40)	30 (60)

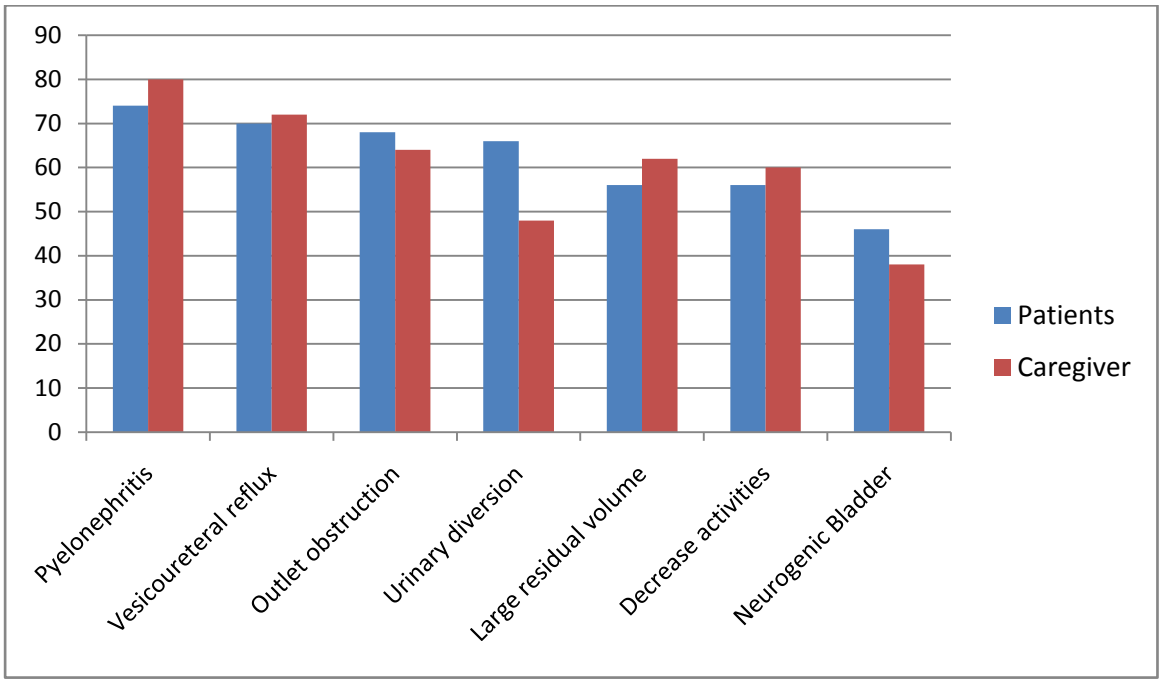

Fig. 2: Knowledge about the risk factors of UTI among the study subjects

(N=100)

Table 5: Practices of study subjects regarding prevention of UTI

Sr.No	Preventive measures	Patients (n=50) n(%)	Caregiver (n=50) n(%)
1.	Perineal cleaning	42 (84)	38 (76)
2.	Personal hygiene	39 (78)	41 (82)
3.	2-3 ltr of water/day	36 (72)	32 (64)
4.	Catheter care/day	20 (40)	17 (34)
5.	Hand hygiene	20 (40)	21 (42)
6.	Regular voiding at intervals	20 (40)	18 (36)
7.	Aseptic techniques	14 (28)	07 (14)
8.	Avoid bladder irritating fluid intake (coffee, alcohol)	10 (20)	16 (32)
9.	Regular screening	06 (12)	03 (6)
10.	Change urinary bag/7 days	06 (12)	03 (6)
11.	Kegel exercise 2- 6 times/day	05 (10)	09 (18)
12.	Catheter change/2-4 weeks	04 (8)	07 (14)

Table 6 depicts the practices of the study subjects regarding prevention of UTI. Out of the total subjects, patients and caregiver who practiced perineal cleaning were 84% & 76%, maintenance of personal hygiene were 78% & 82% and were aware of daily intake of 2-3 litres of fluids were 72% & 64% respectively.

DISCUSSION

Spinal Cord Injury (SCI) is usually associated with wide range of short and long term complications. These may include autonomic dysreflexia, neurogenic pain, spasms, respiratory problems, low blood pressure, thrombosis and urinary and bowel

problems. The latter, often occur when the nerves controlling these functions are damaged. The brain and body can no longer coordinate and the bladder and bowel may eliminate uncontrollably.[8] This results in bladder or bowel dysfunction that is termed as "neurogenic bladder" or "neurogenic bowel.[9]" Due to bladder dysfunction, there is an increased risk of retention or incontinence of urine which may lead to Urinary Tract Infection (UTI). UTI constitutes an additional health burden for patients with SCI. For most, the problem simply amounts to recurrent bouts of symptoms while for others infection is associated with life-threatening sepsis or renal deterioration. Management strategies are based on the elimination of predisposing factors, general preventive measures and the appropriate use of antibiotics.[10] Therefore, a descriptive study was conducted with an objective to assess the prevalence of UTI in SCI patients and to assess the knowledge and practices among them and their caregivers attending Neurosurgery OPD, PGIMER, ChandīgarhA prospective observational study conducted to determine Indian scenario of spinal cord injury retrieved male to female ratio of 4.2:1 and 71% in the age group of 20-49 years. Around 79% patients were from rural background. About 23.3% were farmers while 22.9% were laborers. Among the causes of injury, 53% patients had a fall from height and 28% suffered from road traffic accidents.[11] Interestingly, the present study concluded male to female ratio of 3.5:1 with a mean age 40.12±14.09 years and range between 15 -72 years. Around 75% study subjects were rural habitants and were married. Less than 40% were engaged in semi skilled activities and 28% were unemployed. Among the causes of injury, 50% had fall from height and 20% had road side accident.UTIs are important causes of morbidity and mortality in patients with SCI. It had been reported that 22% of patients with acute SCI developed UTI during the first 50 days with an annual UTI incidence in patients with chronic SCI nearly 20%.[12] This study however, obtained only 10% patients who had UTI.UTI is characterized by the new onset of sign(s)/symptom(s) accompanied by laboratory findings (bacteriuria, leukocyturia and positive urine culture).[13] The individual would be expected to have an onset of symptoms within 2 weeks. Massa et al.[14] found that cloudy urine had the highest accuracy (83.1%) and leukocytes in the urine had the highest sensitivity (82.8%) for the presence of UTI. Fever had very high specificity (99%) but very low sensitivity (6.9%). Autonomic dysreflexia data had low numbers and should be interpreted with caution. Kidney/bladder discomfort, increased spasticity, feeling sick, sense of unease, increased need to perform catheterization, feeling tired, incontinence and foul smelling urine all had high sensitivity (77–95%) but very low specificity (<50%). Acquaintance about these signs and symptoms could help the patients and their caregiver to identify UTI at an early state and manage sufficiently. The present study was able to find out knowledge about these signs and symptoms among the study subjects. Primarily, cloudy, dark, bloody or strange-smelling urine (84%, 82%), itching and burning sensations (80%, 82%), lower abdominal pain (74%, 68%), urinary incontinence (70%, 58%), strong persistent urge to urinate (66%, 70%), discomfort (56%, 60%), nausea and vomiting (50%, 46%), fever and chills (48%, 68%), fatigue and tiredness (42%, 46%) were identified by the patients and caregiver respectively.Esclarín documented the risk factors associated with UTI namely invasive procedures without antibiotic prophylaxis, cervical injury and chronic catheterization (odds ratio 2.62, 3 and 4 respectively). Risk factors associated with repeat infection were a functional independence measure score of less than 74 and vesicoureteral reflux (odds ratio 10 and 23, respectively).[15] Certain structural and physiological factors such as bladder over-distention, vesicoureteral reflux, high-pressure voiding, large post-void residuals, stones in the urinary tract and outlet obstruction increased the risk of infection. The method of bladder drainage also influenced the risk of UTI and most persons with SCI on indwelling or intermittent catheterization developed urinary tract infection.[16]The present study observed a wide range of causes and risk factors of UTI that were pinpointed by the study subjects. Enlisting the most familiar causes were poor personal hygiene (98%, 94%), dehydration (84%, 80%), use of public toilet (82%, 62%), prolonged catheterization (80%, 72%), incomplete voiding (78%, 88%), delay in empting the urinary bags (76%, 78%), bedridden condition (66%, 66%), urinary retention (50%, 58%), excessive use of antibiotic (40%, 48%) by the patients and caregiver respectively. With respect to risk factors associated with UTI that were identified were Pyelonephritis (74%, 80%), vesicoureteral reflux (70%, 72%), outlet obstruction (68%, 64%), urinary diversion (66%, 48%), large residual volume (56%, 62%), decreased activities (56%, 60%), neurogenic bladder (46%, 38%) by the patient and caregiver respectively. For the prevention of UTI, general cleanliness and local hygiene emphasized.[17]

Unfortunately, it could be noted that the infection is still prevalent that could be bracketed together with poor techniques including inadequately cleansing catheters, inadequate perineal hygiene or hand washing, excessively long or too short intervals between catheterization or the inability to insert the catheter without contaminating it in the process.[18] Therefore, it becomes extremely important that patient and caregiver follow practices that could play a vital role in the prevention of UTI.

Considering the same, the present study compiled the knowledge about the practices to prevent UTI among the study subjects. The practice of perineal cleaning (84%, 76%), maintenance of personal hygiene (78%, 82%), drinking 2-3 ltr of water/day (72%, 64%), catheter care/day (40%, 34%) were popular among patients and caregiver respectively. However, excessively significant practices such as maintaining hand hygiene, regular voiding at intervals, use of aseptic techniques, regular screening for bacteriuria, change of urinary bag every 7 days and catheter change every 2-4 weeks were not given due weightage by the study subjects.

CONCLUSION

UTI constitutes an additional health burden for patients with SCI. Emphasis should be given on preventive measures such as maintaining hand hygiene, regular screening, intermittent catheterization and use of aseptic techniques while catheter care not only in health care setting but also in home care setting. Further, it could be recommended that health care providers at all levels should vigorously involve patients and caregivers in effective hand hygiene practices, minimizing duration of catheter use, bladder management programmes, education and training required for the prevention of urinary tract infection.

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Source of support: Nil
Conflict of interest: None declared