Comparison of health related quality of life and health related outcomes among male patients with spinal cord injury with indwelling vs intermittent bladder catheterization - A pilot study

Abidfaheem TK¹, Leena KC²
¹Santhi College of Nursing, Calicut, Kerala – 673582, India
²Yenepoya Nursing College, Yenepoya (Deemed to be University), Mangalore, Karnataka, India

ABSTRACT

The majority of people with Spinal Cord Injury (SCI) have abnormalities in bladder function. It is important for an individual with SCI to understand the merits and demerits of different methods of bladder management. The purpose of the study is to compare the health related quality of life (QOL) and health related outcomes among male patients with SCI on indwelling and intermittent bladder catheterisation. A descriptive comparative study was conducted from June to December 2019 among patients with SCI residing in Calicut District, India. Demographic and clinical data were collected using a structured interview schedule. Quality of life was assessed by Qualiveen-30. Urine culture and Numerical pain scale were used to assess Urinary Tract Infection (UTI) and pain, respectively. The mean Qualiveen 30 score was higher among individuals with indwelling catheterisation 2.426 ± 0.52 than in individuals with intermittent catheterisation 1.746 ± 0.39, which is significant (p=0.0001) and patients with intermittent catheterisation showed better QOL. Mean pain after catheterisation was 5.07 ± 1.44 among persons with indwelling catheterisation while 4.70 ± 1.41 in intermittent catheterisation, which is not significant (p=0.13). The people with indwelling catheterisation are 5.5 times likely to develop UTI than people with intermittent catheterisation (OR 5.5, 95% CI 1.15-26.41). The better QOL and less UTI are demonstrated in patients using intermittent catheterisation over indwelling catheterisation. There is no remarkable difference of pain during catheterisation in both groups. Intermittent catheterisation can be preferred over indwelling catheterisation among persons with SCI.

INTRODUCTION

Most of the people with Spinal Cord Injury (SCI), even those with incomplete impairment, have impairment in bladder function which may result in upper and lower urinary tract complications such as hydronephrosis, renal calculi, recurrent urinary tract infections and even renal failure. Therefore, the bladder management program should be aimed at using an appropriate method for urinary bladder emptying, which is compatible with the lifestyle of affected persons. It is important that the individuals with SCI and their family members should be aware of the merits and demerits of each bladder emptying...
ing method. The patient should be educated about the consequences of each method and its effects on their lifestyle, sexuality and health (Consortium for Spinal Cord Medicine, 2006). Many individuals with SCI are using intermittent self-catheterisation (ISC), but it may not be suitable during acute illness stage. In such circumstances, the other alternative bladder emptying methods such as indwelling bladder catheterization may be more suitable. However, prolonged use of indwelling bladder catheters can end up in urethral strictures and recurrent infections.

Quality of life is somewhat a replication of the individual's capability to adjust and cope with the new life situations. Over the last 20 years, the study of quality of life gained a lot of attention in measuring the outcomes of social and medical interventions. Quantifying the quality of life provide individual’s improvement to the interventions and response to treatment beyond the routine morbidity and mortality measurements. One of the major aspects of rehabilitation of an SCI is the management of neurogenic bladder. A study conducted by the Model Spinal Cord Injury Systems of Care revealed that, Among total individuals with SCI, 81% suffered from bladder dysfunction within one year of injury. The impaired bladder functioning can lead to recurrent urinary tract infections which further results in mortality and morbidity (Consortium for Spinal Cord Medicine, 2006). The key elements in the management of neurogenic bladder are to maintain optimum Quality of Life of patient and preserve renal functions by minimizing urological complications. With suitable management of bladder, that enhances social functioning and bladder functioning provides a healthier life to the persons with spinal cord injury.

Impaired bladder emptying is one of the main complications of spinal cord injury. It is present in around 60% of SCI patients (Wyndaele et al., 2010). There are many methods for bladder emptying in SCI. In this study, the researcher interested to compare the health related QOL and health related outcomes among individuals with SCI who were using indwelling and intermittent catheterisation for bladder emptying. If a significant difference is found in any group, such management will help to improve the QOL of persons having impaired bladder emptying. Studies on quality of life of spinal cord injuries report the finding in diverse manner and dissimilarity in the score of quality of life in relation to specific dimensions. There are very few studies attempted to assess the QOL of persons SCI to the Indian cultural context. Present study hopes to contribute to the research knowledge that highlights the QOL of patients with SCI.

**MATERIALS AND METHODS**

A descriptive - comparative study was done from June 2019 to December 2019 among patients with Spinal cord injury (SCI) residing in Calicut District, Kerala. Before collecting data written, informed consent was collected from each participant. The structured interview schedule was used to collect demographic data and clinical data. Quality of life was assessed by by Malayalam translated version of Qualiveen-30 questionnaire (Costa et al., 2001; Bonniaud et al., 2004). Urine culture and Numerical pain scale were used to assess Urinary Tract Infection (UTI) and pain, respectively. This study was approved by the MIMS Hospital ethics Committee, Calicut, Kerala state, India.

**Population**

Individuals with spinal cord injury with impaired bladder emptying who were using either indwelling bladder catheterisation or intermittent bladder catheterisation for bladder emptying. Purposeful sampling technique was used.

**Inclusion criteria**

Male Patients above 18 years diagnosed with spinal cord injury having impaired bladder emptying using either intermittent or indwelling bladder catheterisation; Men diagnosed with spinal cord injury for a period above 6 months.

**Exclusion criteria**

Patients with other disorders such as renal and bladder disorders, head injury, stroke and mental disorders. Patients impossible to be interviewed were also excluded. Individuals who had SCI at the cervical level were also excluded from the study.

**Assessment**

Demographic data, clinical proforma and health related QOL were assessed by a structured interview schedule. The health related outcome includes Pain after catheterization and Urinary Tract Infection (UTI). They were assessed by numeric pain scale and by Urine culture, respectively.

- Demographic data.
- Clinical proforma includes items related to SCI: Some clinical data were collected from patient’s medical records.
- Health related QOL assessment.

Health related QOL was assessed by using Qualiveen 30 questionnaire. The tool specifically measures the
QOL of individuals with SCI with disorders of the urinary bladder. This tool has 4 domains. First domain is bother with limitations and it contains 9 items, second domain is the frequency of limitations which contains 8 items, third domain is fears which consist of 8 items and last domain is feelings which consist of 5 items. Thus the tool has a total of 30 items. The score of each domain is calculated as an average of the scores for the items. Individual items were weighted equally. An overall QOL score also can be calculated from the mean of the 4 domains, with lower scores representing better QOL.

The health related outcome included pain after catheterization and Urinary tract infection. Pain after catheterisation was assessed by Numeric pain scale. Patients were asked to express pain after catheterisation on 0-10 numeric pain rating scale which was classified in to score 0- represents No pain, score 1-3 represents mild pain, score 4-6 represents moderate pain and 7-10 represents severe pain. A urine sample was collected from participants and urine culture was done to identify the presence of UTI. The cost of lab testing was borne by the investigator.

Statistical analysis
SPSS 21.0 version was used for data analysis. The analysis was done using descriptive and inferential statistics. The hypotheses were tested at 0.05 level of significance. The significant difference of pain after catheterization was analyzed by using independent sample ‘t’ test. The significant difference in UTI was assessed by Chi-square test.

RESULTS AND DISCUSSION

Demographics
Total of 30 samples was selected for the study. Among them, 16 (53.3 %) were using intermittent catheterization and the remaining 14 (46.7 %) were using indwelling bladder catheterisation for bladder emptying. The mean age of the participants was 35.57 ± 10.02. Among total participants, 22 (73.3 %) were married and 18 (60%) had educational qualification equivalent to high school. In all the participant’s caregivers were family members and of them, 23 (76.7 %) were untrained caregivers.

Clinical variables
In 17 participants, (56.7 %) the cause of injury was fall from height followed by road traffic accident 13 (43.3 %). In 19 (63.3 %) participants, the level of injury was at the lumbar level. In 18(60 %) participants, the mean duration after spinal cord injury was less than 5 years. Other clinical variables are described in Table 1.

Quality of life
The mean Qualiveen 30 score was higher among individuals with indwelling catheterisation 2.426 ± 0.52 than in individuals with intermittent catheterisation 1.746 ± 0.39 which is significant at 0.05 level of significance (p = 0.0001), p < 0.05. Thus the patients with intermittent bladder catheterisation showed better QOL. Each domain of health related QOL (by using Qualiveen 30) was compared among indwelling and intermittent bladder catheterisation. Table 2 shows that there is a significant difference in the mean score of bother with limitation (p = 0.0001), frequency of limitation (p = 0.0001) and feelings (p = 0.021). But there was no significant difference in fear (p = 0.096) among these groups.

Health related outcome
Urinary tract infection
Among persons using indwelling bladder catheterisation, 10(71.4%) had UTI while in persons with intermittent catheterisation, only 5 (31.3%) had UTI and the difference was statistically significant (p=0.03). Thus people with indwelling catheterisation are 5.5 times as likely to develop UTI as people with intermittent catheterisation (OR 5.5, 95% CI 1.15-26.41).

Pain during catheterisation
The mean pain score of individuals using indwelling bladder catheterisation was 5.07 ± 1.44 and score of individuals using intermittent catheterisation was 4.70 ± 1.41. The mean pain scores in both groups were compared by independent sample ‘t’ test. It indicated that there is no significant difference in pain during catheterisation among individuals with the indwelling and intermittent bladder catheterisation (p-value = 0.19). Even though the difference was not substantial, the pain was slightly higher among individuals using indwelling bladder catheterisation.
Table 1: Clinical variables.

| S No | Clinical Variables                        | Frequency (f) | Percentage (%) |
|------|------------------------------------------|---------------|----------------|
| 1    | **Bladder emptying methods**             |               |                |
|      | Indwelling Bladder Catheterisation       | 14            | 46.7           |
|      | Intermittent Bladder Catheterisation     | 16            | 53.3           |
| 2    | **Bowel elimination pattern**            |               |                |
|      | Normal                                   | 15            | 50             |
|      | Abnormal                                 | 15            | 50             |
| 3    | **Re admission in the hospital within one year** |         |                |
|      | Yes                                      | 29            | 96.7           |
|      | No                                       | 1             | 3.3            |
| 4    | **Co-morbidities**                       |               |                |
|      | Diabetes Mellitus                        | 05            | 16.7           |
|      | Hypertension                             | 05            | 16.7           |
|      | Respiratory diseases                     | 02            | 6.7            |
|      | Nil                                      | 18            | 60             |
| 5    | **Complications (for last one year)**    |               |                |
|      | Urinary Tract Infection                  | 15            | 50             |
|      | Pain                                     | 09            | 30             |
|      | Respiratory infections                   | 04            | 13.33          |
|      | Nil                                      | 02            | 6.67           |

Table 2: Assessment of QOL by using Qualiveen 30 (n = 30).

| Health related QOL          | Indwelling (n=14) Mean and SD | Intermittent (n=16) Mean and SD | Mean difference | t value | df | p-value  |
|-----------------------------|-------------------------------|---------------------------------|-----------------|---------|----|----------|
| Bother with limitation      | 2.649 ± 0.52                  | 1.589 ± 0.49                    | 0.42            | 0.010   | 29 | 0.0001*  |
| Frequency of limitations    | 2.669 ± 0.52                  | 1.945 ± 0.46                    | 0.23            | 0.088   | 29 | 0.0001*  |
| Fears                       | 2.346 ± 0.51                  | 2.026 ± 0.51                    | 0.33            | 0.303   | 29 | 0.096    |
| Feelings                    | 2.043 ± 0.71                  | 1.497 ± 0.53                    | 0.10            | 1.062   | 29 | 0.021*   |
| Overall QoL                 | 2.426 ± 0.42                  | 1.746 ± 0.39                    | 0.28            | 0.395   | 29 | 0.0001*  |

* Significant at 0.05 level of significance.

with intermittent bladder catheterisation showed better QOL. Second part of the study tried to compare the health related outcome, including pain and UTI among these two groups. The numeric pain scale was used to assess pain after catheterisation. The mean pain after catheterisation was 5.07 ± 1.44 among indwelling catheterisation while it was 4.70 ± 1.41 in an intermittent catheterized group. Even though the difference is not significant, the pain was slightly higher among indwelling catheterized patients. The study also compared UTI in both groups. Among persons using indwelling bladder catheterisation, 10 (71.4%) had UTI while in persons with intermittent catheterisation, only 5 (31.3%) had UTI and the difference was statistically significant (p=0.03). Thus people with indwelling catheterisation are 5.5 times as likely to develop UTI than people with intermittent catheterisation (OR 5.5, 95% CI 1.15-26.41).

Comparison with literature data

Quantifying the QOL provide individual’s improvement to interventions and response to treatment beyond the routine morbidity and mortality measurements. It acts as tool of evaluation of health services. It is found that association between better QOL and good rehabilitation outcomes. Various studies displayed that bladder management method is a key component of health related QOL. A study compared QOL among persons with indwelling and intermittent catheterisation and found patients with
intermittent catheterization had improved QOL compared to individuals using indwelling catheterization (Yasami et al., 2017). Another study revealed that around 50% of study participants reported that intermittent catheterisation improved their QOL. Intermittent catheterisation encourages patients to perform social roles more effectively compared with indwelling or condom catheter. It was also found that reduced UTI enhances QOL of patients performing intermittent catheterisation (Yılmaz et al., 2014).

The above study results are supporting the current study finding, which showed Qualiveen 30 score was higher among individuals with indwelling catheterisation 2.43 ± 0.52 than in individuals with intermittent catheterisation 1.75 ± 0.39. The patients with intermittent bladder catheterisation showed better QOL. A study on compliance with clean intermittent catheterisation among individuals with SCI revealed the highest UTIs were reported in patients using indwelling catheterisation compared to intermittent catheterisation and also found many patients reverting to intermittent catheterisation due to recurrent UTIs (Afsar et al., 2013).

Another study conducted on Bladder management methods and urological complications in patients with SCI revealed the incidence of UTI per 100 person was 2.68 for indwelling catheterisation and 0.34 for clean intermittent catheterisation (Singh et al., 2011). The present study showed that among individuals with indwelling catheterisation, 10 (71.4%) had UTI while in intermittent catheterized individuals only 5 (31.3%) had UTI and found UTI is less among intermittent bladder catheterized patients than in indwelling bladder catheterized patients which is supportive to previous studies. Researcher hardly found articles compared pain after catheterisation among intermittent and indwelling catheterisation in Spinal cord injury. The current study revealed that even though the difference in pain is not significant among the two groups. Pain was slightly higher among persons with indwelling catheterisation (5.07 ± 1.44) than persons with intermittent catheterisation (4.70 ± 1.41).

Clean intermittent catheterisation is considered as the safest method of bladder emptying over other methods in preventing urinary complications among SCI patients. It was also found to be the best method for assisted bladder voiding method in SCI. It is very important to note that support and education are prime in the initial stages of voiding with CIC. Patients having sufficient hand functioning can empty the bladder regularly, which helps in reducing UTI and offers good continence (Weld and Dmochowski, 2000).

In the initial stage of SCI, indwelling bladder catheterization is used. But as a long term measures, it is not recommended over other bladder emptying methods due to high risk for urinary complications. It was reported that an indwelling catheter as the most predominant risk indicator of UTI in SCI patients. The risk of urinary tract infection increases with the increasing duration of catheterisation (Fonte, 2008).

**Limitations of the study**

1. Small sample size in both groups
2. Only male patients were included.
3. Compared only 2 methods of bladder emptying
4. The Individual having SCI at the cervical level were excluded.

**CONCLUSIONS**

Bladder dysfunctions are one of the most common complications in SCI and pose a significant threat to the well-being of patients. Bladder management methods have much considerable impacts on QOL and other complications. The better QOL was demonstrated in patients using intermittent catheterization over indwelling catheterisation. There was a substantial reduction in UTI among intermittent catheterized patients than indwelling catheterized patients. There was no remarkable difference in pain during catheterisation in both groups. Clean intermittent catheterisation can be preferred over indwelling catheterisation who needs long term bladder management.

**Funding Support**

The authors declare that they have no funding support for this study.

**Conflict of Interest**

The authors declare that they have no conflict of interest for this study.

**REFERENCES**

Afsar, S. I., et al. 2013. Compliance with clean intermittent catheterization in spinal cord injury patients: a long-term follow-up study. *Spinal Cord*, 51(8):645–649.

Bonniaud, V., et al. 2004. Measuring quality of life in multiple sclerosis patients with urinary disorders using the Qualiveen questionnaire. *Archives of Physical Medicine and Rehabilitation*, 85(8):1317–1323.
Consortium for Spinal Cord Medicine 2006. Bladder management for adults with spinal cord injury: a clinical practice guideline for health-care providers. *Journal of Spinal Cord Medicine, 29*(5):527–573.

Costa, P., *et al.* 2001. Quality of life in spinal cord injury patients with urinary difficulties. *European Urology, 39*(1):107–113.

Fonte, N. 2008. Urological care of the spinal cord injured patient. *Journal of Wound, Ostomy and Continence Nursing, 35*(3):323–331.

Singh, R., *et al.* 2011. Bladder management methods and urological complications in spinal cord injury patients. *Indian Journal of Orthopaedics, 45*(2):141–147.

Weld, K. J., Dmochowski, R. R. 2000. Effect of bladder management on urological complications in spinal cord injured patients. *Journal of Urology, 163*(3):768–772.

Wyndaele, J. J., *et al.* 2010. Neurologic urinary incontinence. *Neurourology and Urodynamics, 29*(1):159–164.

Yasami, S., *et al.* 2017. The association between bladder-emptying methods and health-related quality of life among Iranian individuals with spinal cord injury. *Journal of Spinal Cord Medicine, 40*(5):530–537.

Yılmaz, B., *et al.* 2014. Intermittent catheterization in patients with traumatic spinal cord injury: obstacles, worries, level of satisfaction. *Spinal Cord, 52*(11):826–830.