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Efficacy of a Neurogenic Bowel Rehabilitation Program in Improving the Quality of Life in Persons with Spinal Cord Injury

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Abstract
Introduction: *Spinal cord injury (SCI) is defined as damage to the spinal cord that temporarily or permanently causes changes in its function. It causes sudden, often devastating damage to the central nervous system, with potential adverse effects in multiple body systems. A large majority of persons with SCI who have neurogenic bowel problems suffer from constipation and faecal incontinence, often resulting in impaired Quality of Life.*
Aim of the study: *To assess the efficacy of a neurogenic bowel rehabilitation program in reducing bowel dysfunction and improving the quality of life in patients with spinal cord injury.*
Methods: *Patients with SCI having neurological deficit of duration between 3 months to 3 years were included in this study. Initially patients were assessed to find out the severity of neurogenic bowel dysfunction and to assess the quality of life. After the assessment, patient was given standard bowel rehabilitation program. They are then reassessed at 3 months and 6 months.*
Results: *At the end of bowel rehabilitation program, there was considerable improvement in neurogenic bowel dysfunction and the Quality ofLife.*
Conclusion: *The bowel rehabilitation program was very effective in reducing the bowel dysfunction and improving the quality of life in SCI patients.*
Keywords: *Spinal Cord Injury, Neurogenic bowel dysfunction, Quality of Life.*

Introduction

This Spinal cord injury (SCI) is defined as damage to the spinal cord that temporarily or permanently causes changes in its function[1]. SCI is divided into 2 types – traumatic & nontraumatic[2]. Traumatic spinal cord injury (SCI) is an acute, unexpected and dramatic situation, which can alters the course of an individual's life. It causes sudden, often devastating damage to the central nervous system, with potential adverse effects in multiple body systems including musculoskeletal, integumentary, digestive, urinary, cardiovascular, and reproductive system[3].

SCI is the condition that is most frequently associated with neurogenic bowel dysfunction. Furthermore, gastrointestinal involvement is not limited to the colon after SCI; all segments of alimentary tract are affected[4].

Damage to the spinal cord has a profound impact on the function of the large bowel and on the maintenance of faecal continence. Dysfunction of the gastrointestinal system increases care requirements and can be a source of substantial social and psychological stress in patients with SCI[5]. Approximately 39% of patients with SCI report that bowel dysfunction significantly reduces their quality of life (QOL)[6].

After spinal cord injury, the descending input from the brain to the colon and ano-rectum is lost. These changes result in the loss of sensation of the need for defecation, loss of voluntary control of defecation and loss of the brain's influence over reflex activity. The enteric nervous system, which lies within the walls of the colon, remains functionally intact. Therefore peristalsis continues, but without the co-ordination from the brain and spinal cord it is less effective, and colonic transit time increases and this extended time in the colon results in a drier stool and an increased likelihood of constipation.

When spinal shock has resolved, one of the two types of neurogenic bowel may develop. 1. Upper motor neuron bowel (UMN) - lesions above the conus[7]. 2. Lower motor neuron bowel (LMN) - lesions affecting the conus or cauda equina[8]. Bowel rehabilitation program for UMN and LMN dysfunction differs slightly. Those with UMN dysfunction were advised to take stimulant laxative at night. In the morning, patients were advised to make use of gastrocolic reflex by taking a glass of hot drink, followed by rectal stimulant suppository (bisacodyl). Then the patients were advised to perform gentle abdominal massage in clockwise direction from right side to left side of the abdomen, down towards the rectum. This is followed by digital rectal stimulation using gloved lubricated finger for bowel evacuation. If the reflex evacuation is incomplete, digital removal of faeces is then performed. After 10 minutes, digital examination was done to make sure that rectum was empty. In SCI patients with LMN bowel dysfunction, bowel rehabilitation program is similar to the above mentioned UMN bowel program except that the rectal stimulant suppository and digital rectal stimulation was avoided.

The aim of bowel management following SCI is to achieve regular and predictable emptying of the bowel at a socially acceptable time and place, avoiding constipation, unplanned evacuations and autonomic dysreflexia[9]. Almost one third of patients SCI patients report worsening of bowel function after 5 years of injury, 33 % develops megacolon[10]. When restoring normal defecations is not possible, social continence becomes the goal.

Overall bowel management is outlined in the bowel program, which includes the following components: diet, fluid intake, medications, physical activity, and a schedule for bowel care. Bowel care is the procedure for assisted defecation with one or more of the following components: positioning, assistive devices, rectal simulation or trigger for defecation, and assistive manoeuvres like abdominal massage.

It is important to eat a balanced diet which is rich in fruit, vegetables, bread and cereals and adequate fibres. Fibre holds water and adds bulk to the stool, which aids the movement of the stool through the bowel. A fluid intake of at least 2 litres daily is recommended made up mostly of water. Eating and drinking initiates peristalsis throughout the digestive system thus moving stool through the colon towards the rectum. This is called the gastro-colic reflex. This is to be done 20 to 40 minutes after a meal or at least a hot drink.

Massage is thought to mechanically push stool through the colon and to stimulate the colon to push stool towards the rectum. The massage starts from the right hand side of the abdomen, moves across the abdomen at around the umbilical level and down the left hand side of the abdomen[11].

Many individuals with spinal cord injury also require rectal medication although the use of suppositories and enemas is not an essential part of bowel management for all spinal cord injured people. The most commonly used is bisacodyl suppository, which stimulates peristalsis and the onset of action is usually within 30 – 60 minutes.

Quality of Life is defined as individual's perception of their own position in life in the context of the

culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns[12].

The impact of problems with bowel evacuation on quality of life is formidable. In patients with difficult bowel evacuation, bowel care routinely occupies a significant part of the day and it also causes reduction in food intake. Changes in bowel function adds to more morbidity than loss of ambulation in patients with SCI. Managing these changes, has implications for independence and autonomy, community reintegration and long term health for the injured person, and is therefore an important area of care and rehabilitation. High quality researches and experience in SCI rehabilitation also supports systematic evidence to support bowel management after SCI should be individualized so that patient can avoid incontinence that may lead to improvement in Quality of Life. Problems related to the control of defecate on are a source of physical, psychological and social distress to people with spinal cord injuries.

Hence, this study has been embarked on in order to assess the role of bowel rehabilitation programme in quality of life in persons with spinal cord injury.

Aim of Study

To assess the efficacy of a neurogenic bowel rehabilitation programme in improving the neurogenic bowel dysfunction and quality of life in persons with spinal cord injury.

Materials and Methods

Study Design: Prospective Cohort Study

Study Setting: Tertiary hospital Kozhikode, Kerala.

Study Period: One year

Study Population: 30 spinal cord injured patients who were admitted as inpatients.

Inclusion Criteria

- All spinal cord injured patients (both tetraplegics and paraplegics) with neurological deficit of duration 3 months to 3 years following injury
- Those patients who give valid consent to be included in this study.

Exclusion Criteria

- SCI patients with past history of major gastrointestinal diseases like malignancies, cirrhosis, portal hypertension, chronic hepatitis, inflammatory bowel diseases etc.
- SCI patients in spinal shock
- SCI patients with age below 18 years and above60 years
- Patients having cognitive dysfunction
- Patients with past history of longstanding diabetes mellitus

Method of Study

Patients with spinal cord injury having neurological deficit of duration between 3 months to 3 years were included in this study after fulfilling the inclusion and exclusion criteria. Detailed history and clinical examination was taken with special attention to the nature of bowel dysfunction. At the start of this study, patients were assessed to find out the severity of neurogenic bowel dysfunction and s the quality of life[1].

The patients were divided in to two groups. 1st group includes patients with UMN bowel dysfunction and 2nd group with LMN bowel dysfunction. Bowel rehabilitation program for UMN and LMN dysfunction differs slightly. Those with UMN dysfunction were advised to take stimulant laxative at night. In the morning, patients were advised to make use of gastrocolic reflex by taking a glass of hot drink, followed by rectal stimulant suppository (bisacodyl). Then the patients were advised to perform gentle abdominal massage in clockwise direction from right side to left side of the abdomen, down towards the rectum. This is followed by digital rectal stimulation using gloved lubricated finger for bowel evacuation.

If the reflex evacuation is incomplete, digital removal of faeces is then performed. After 10 minutes, digital examination was done to ensure that rectum was empty.

In SCI patients with LMN bowel dysfunction, bowel rehabilitation program is similar to the above mentioned UMN bowel program except that the

rectal stimulant suppository and digital rectal stimulation was avoided.

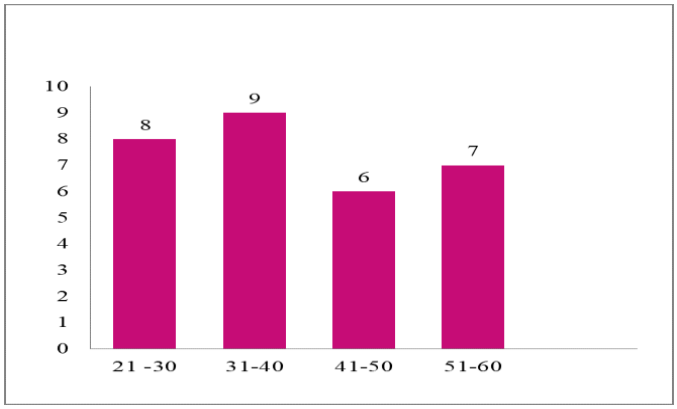
After the initial assessment, patients were rehabilitated with standard bowel program. Each patient was then reassessed subsequently at 3 months and 6 months to find out the change in bowel dysfunction and quality of life. The results were statistically analysed.

Statistical Analysis

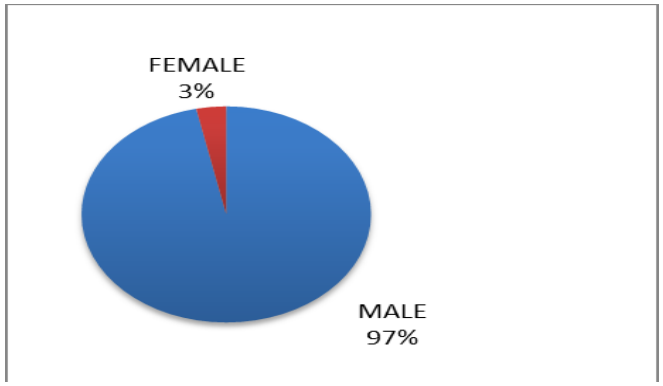
All the data was coded and entered in Microsoft excel sheet, rechecked and analysed using statistical package for social sciences (SPSS18.0) software.

Results

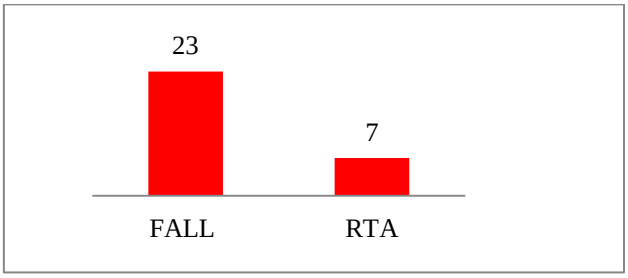
1. Age Distribution



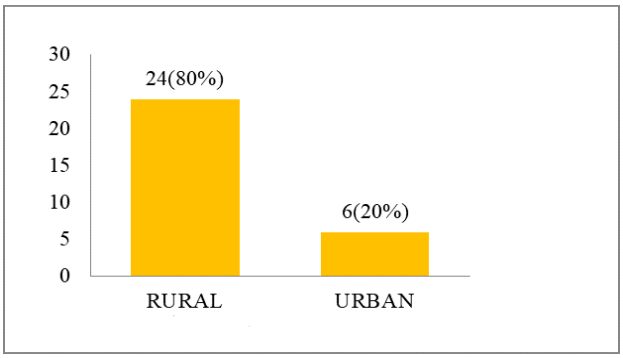
2. Gender of Study Population



3. Etiology of Spinal Cord Injury



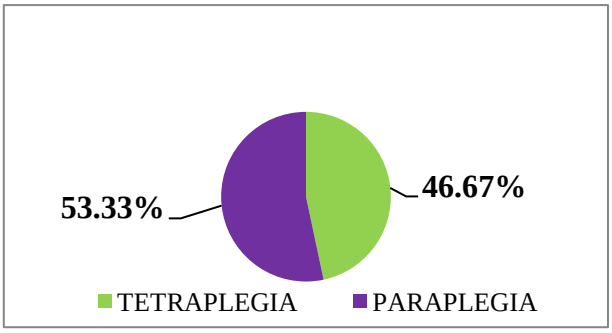
4. Geographic distribution



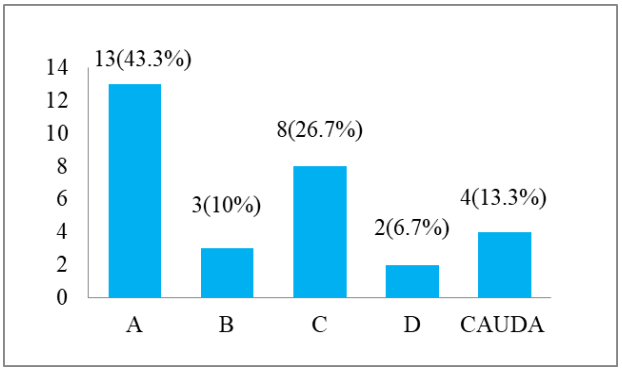
5. Socioeconomic status

Socio economic status	Number of patients	%
Lower class	11	36.7%
Upper lower class	13	43.3%
Lower middle class	5	16.7%
Upper middle class	1	3.3%

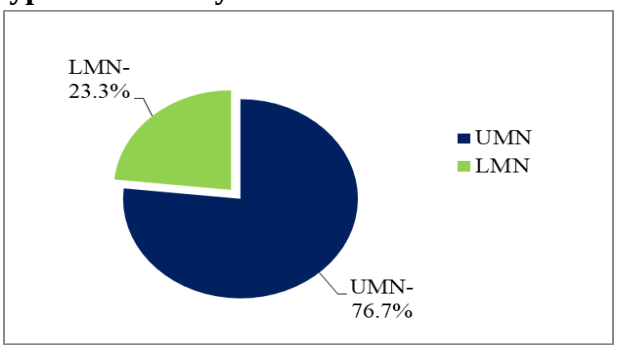
6. Type of spinal cord injury



7.ASIA Impairment Scale



8. Type of Bowel Dysfunction



Discussion

Neurogenic bowel dysfunction is one among the secondary complications of spinal cord injury patients, which has negative effects on the Quality of Life. Thorough evaluation and rehabilitation of bowel dysfunction accordingly has significant effect on Quality of Life in improving the general condition of patients with SCI. The objective of this study was to find out efficacy of bowel rehabilitation program in improving the quality of life among spinal cord injured patients who were getting rehabilitation from tertiary hospital, Kozhikode during the study period.

In this study, 30 spinal cord injured patients were included after fulfilling both the inclusion and exclusion criteria.

Neurogenic Bowel Dysfunction was then assessed based on clinical examination and level of injury. These patients were rehabilitated with standard individualized bowel program and followed at 3 months and 6 months from the start of the rehabilitation program.

In this study, 29 (97%) patients were males and 1(3%) patient was female. Mean age of study population was 39.30yrs (11.10) with maximum number of patients in the age group between 21 to 40yrs of age (56.66%). In a study conducted by Wilson et al in 2014 among spinal cord injury patients, the mean age was 43.2 (±16.9) which is comparable with our study32[13]. 80% of patient's belonged to rural population with most of them were in lower socioeconomic class (36.7%) and upper strata of lower class (43.3%).

In our study, the most common cause for spinal cord injury was found to be, due to falls. 76.7% of patients had history of fall while remaining 23.3% was due to road traffic accidents (RTA). A study conducted by Mathur et al showed falls are the most common cause for spinal cord injury. In the same study RTA was seen in 26.9% of patients of spinal cord injury which is similar to our study results[14].

Out of 30 patients, 53.3% had paraplegia while 46.7% had teteraplegia. In the study conducted by Young et al cervical injuries are the most common type of injuries seen among SCI patients[15].

In our study, out of 30 patients, 23 SCI patients (76.7%) were having UMN bowel dysfunction and 7(23.3%) patients were having LMN bowel dysfunction.

After 6 months of bowel rehabilitation program there is significant decrease in bowel incontinence, poorly localised abdominal pain, prolonged defecation, bloating, abdominal distention, use of laxatives, digital stimulation in UMN bowel, digital evacuation in LMN types. The number of bowel passages per week also gets increased.

There was increase in the amount of food intake, improved personal relations with family & friends and the sexual relations with partner also gets better. This indicates that, well organized bowel rehabilitation program among spinal cord injured patients will improve their satisfaction in bowel management and prevents complications.

Conclusion

The bowel rehabilitation program is very effective in reducing the bowel dysfunction and improving the Quality of Life in Spinal Cord Injury patients. Proper evaluation and intervention to improve the gastrointestinal function, is very essential in each and every patient.

Implications

In patients with spinal cord injury, bowel rehabilitation should be started in the early phase and should be continued lifelong for the reducing the bowel dysfunction and improving the quality of life.

Limitations of study

The group of patients included in this study is small. The study is conducted only in the tertiary hospital.

Budget: No funding was received from any agency for this study.

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