J Rehabil Med 2013; 45: 141–144

ORIGINAL REPORT

NEUROGENIC BOWEL MANAGEMENT AFTER SPINAL CORD INJURY: MALAYSIAN EXPERIENCE

Julia Patrick Engkasan, MRehabMed(Mal) and Siti Suhaida Sudin, MD(UKM)

From the Department of Rehabilitation Medicine, University of Malaya, Kuala Lumpur, Malaysia

Objectives: **To describe the bowel programmes utilized by individuals with spinal cord injury; and to determine the association between the outcome of the bowel programmes and various interventions to facilitate defecation.**
Study design: **A cross-sectional study.**
Participants: **Individuals with spinal cord injury who have neurogenic bowel dysfunction.**
Methods: **Face-to-face interviews were conducted using a self-constructed questionnaire that consisted of: (*i*) demographic and clinical characteristics of the participants; (*ii*) interventions to facilitate defecation; (*iii*) bowel care practices; (*iv*) outcome of the bowel programme (incidence of incontinence and duration of the evacuation procedure); and (*v*) participant satisfaction with their bowel programme.**
Results: **The majority (79.2%) of subjects used multiple interventions for bowel care. Duration of the evacuation procedure was more than 60 min in 28.0% of participants. Water intake of more than 2 l/day was associated with longer duration of bowel care. Only 8.0% of participants had at least one episode of incontinence per month. The majority of participants (84.8%) were satisfied with their bowel programme.**
Conclusion: **Patients used multiple interventions to manage their bowels and spent a substantial amount of time performing bowel care. Nevertheless, the incidence of incontinence was low and satisfaction with their bowel programme was high.**

Key words: paraplegia; quadriplegia; laxatives; bowel evacuants; incontinence.

J Rehabil Med 2013; 45: 141–144

Correspondence address: Julia Patrick Engkasan, Rehabilitation Medicine, University of Malaya, 59100 Kuala Lumpur, Malaysia. E-mail: juliape@um.edu.my

Submitted April 2, 2012; accepted August 16, 2012

INTRODUCTION

Neurogenic bowel dysfunction is one of the impairments caused by spinal cord injury (SCI). The consequences of this condition include altered bowel motility, loss of sphincter control, and an inability significantly to increase intra-abdominal pressure (1). Even though bowel dysfunction is less threatening than other organ dysfunction, it is a cause of distress among individuals with SCI (2–4). An effective bowel programme should address issues of faecal incontinence, constipation, functional mobility, effective evacuation and prevention of complications (1, 5, 6). Bowel care can consume considerable amounts of time, leading to an increase in the level of anxiety and depression (7–10).

Spinal cord rehabilitation is a growing specialty in Malaysia, and studies involving areas that are influenced by one's culture, social, sexual and vocational needs are scarce (10–12). Individuals with SCI continue to face a continuum of possible medical complications, and it is pertinent to know how patients fare in the community. Due to the limited resources available to manage this problem, we felt that the choices we give our patients are limited and may not meet their specific requirements based on their abilities, social settings and availability of resources in the community.

The objectives of this study were to describe the bowel programmes utilized by individuals with SCI in the community and to study the association between the outcome of bowel evacuation and interventions used for the bowel programme. The outcomes of the bowel programmes were the incidence of unplanned bowel evacuation (incontinence) in the last 12 weeks, duration of the evacuation procedure and patient satisfaction with their bowel programme. As the majority of our patients have upper motor neurone type neurogenic bowel, this study focused only on this group.

MATERIAL AND METHODS

This cross-sectional study was conducted in the Spinal Rehabilitation Clinic of a tertiary medical centre. All consecutive patients attending this clinic were screened for suitability. We included patients of 18 years old and above with spinal cord injury/lesion of any aetiology of at least 6 months' duration and with upper motor neurone type neurogenic bowel. The neurological level of injury, completeness of injury and presence of upper motor neurogenic bowel (UMNB) were determined according to the American Spinal Cord Injury Association (ASIA) Impairment Scale (AIS) (13). Patients who had full recovery and had a colostomy or cognitive impairments were excluded. The research was approved by the University of Malaya Medical Centre Medical Ethics Committee. Written consent was obtained after informing participants about the purpose of the study, the procedure and the confidentiality of the information given.

Data were collected using a self-constructed questionnaire, which was pilot-tested with 12 patients and further refined. The questionnaire collected data on: (*i*) participant demographics (gender and age) and disease characteristics (duration of injury, cause of injury, neurological level and completeness of injury); (*ii*) interventions used to facilitate defecation (techniques of faecal evacuation and supplementary interventions

© 2013 The Authors. doi: 10.2340/16501977-1074

Journal Compilation © 2013 Foundation of Rehabilitation Information. ISSN 1650-1977

to facilitate bowel movements, such as dietary modification and fluid intake); (*iii*) bowel care practices (frequency and timing of care, posture during evacuation and need for assistance); (*iv*) outcome of the bowel programme (incidence of incontinence and duration of the evacuation procedure); and (*v*) participant satisfaction with their bowel programme.

In this study, the bowel programme was defined as an all-inclusive treatment plan aimed at accomplishing faecal continence and efficient colonic evacuation. The duration of the evacuation procedure was defined as the time taken from initiation of the defecation process (i.e. insertion of suppository) to the time the evacuation process was completed. The questionnaire was administered via a face-to-face interview by the same investigator and took approximately 15 min to complete. Data collection took place over 6 months, from June 2010 until November 2010. All 125 SCI patients who fulfilled the inclusion criteria participated in the study, a response rate of 100%.

Statistical analyses were performed using SPSS Version 18. The χ^2 test was used for the differences between participant's characteristics, bowel programme and outcomes. Stepwise logistic regression was used to assess the likelihood of duration taken for each bowel programme, faecal incontinence and participant satisfaction. The outcome of the bowel programme was adjusted for participant characteristics.

RESULTS

All patients ($n = 125$) who met the inclusion criteria during the study period took part in this study. Their mean age was 43 years (age range 19–79 years) and the majority (69%) had had SCI for more than 5 years (mean 10.3 years (standard deviation 9.07), range 6 months–41 years). There were a majority of males (78.4%) and of paraplegics (60.0%), but an approximately equal number of patients with complete (AIS A, 52.8%) and incomplete injuries (AIS B, C and D, 47.2%). The most frequent neurological level of injury was thoracic (45.6%), followed by cervical (37.6%) and lumbosacral (16.8%).

Half of the participants (52%) had been using their current bowel programme for more than 5 years and the majority (79.2%) used 2–4 interventions. The majority of participants (76.0%) received information regarding the bowel programme from health personnel. Some ($n = 16$, 12.8%), however, learned and adapted their programme based on personal experiences through a process of trial and error.

Types of interventions used to facilitate defecation and bowel care practices are shown in Table I. The 3 most common techniques of evacuation were combinations of bisacodyl suppository and digital stimulation, suppositories plus digital stimulation plus manual evacuation and suppositories only. Interestingly, we noted 4 participants used water gushing from a flexible pipe that was inserted into the anal opening, which mimicked the action of retrograde anal irrigation. Many participants (79.2%) used supplementary interventions to facilitate defecation. The use of oral laxatives was not common in this sample ($n = 50$, 40%), with 80% taking oral lactulose. Most (96, 76.8%) of the participants continued with our recommended frequency of evacuation (alternate days and daily evacuation) and evacuated at a consistent time of the day. Tetraplegics were more likely to defecate in a lying position ($p < 0.01$) and needed more assistance compared with paraplegics ($p < 0.01$). There was no significant association between bowel care practices and evacuation techniques with age or duration since injury.

Table I. *Intervention to facilitate defecation and bowel care practices*

Descriptions	*n* (%)
Main techniques for faecal evacuation (single response)	
Suppository only	17 (13.6)
Digital stimulation only	11 (8.8)
Manual evacuation only	9 (7.2)
Suppository and digital stimulation	37 (29.6)
Suppository and manual evacuation	6 (4.8)
Suppository, digital stimulation and manual evacuation	24 (19.2)
Digital stimulation and manual evacuation only	8 (6.4)
Spontaneous	13 (10.4)
Supplementary interventions (multiple responses possible)	
Initiation of gastrocolic reflex	37 (29.6)
Stimulation of skin around the anus	4 (3.2)
Straining or bearing down	36 (28.8)
Massage or rubbing abdomen	32 (25.6)
Oral laxatives	50 (40.0)
Diet modifications	57 (45.6)
Water intake > 2 l/day	55 (44.0)
Water gushing	4 (3.2)
Other interventions	3 (2.4)
Frequency of bowel care	
More than once daily	3 (2.4)
Once daily	32 (2.4)
Every other day	64 (51.2)
At least once a week	26 (20.8)
Timing of bowel care	
Morning	59 (47.2)
Afternoon or evening	36 (28.8)
Night	15 (12.0)
Inconsistent	15 (12.0)
Position during evacuation	
Lying	34 (27.2)
Upright	91 (72.8)
Degree of assistance needed	
No	70 (56.0)
Partial	22 (17.6)
Total	33 (26.4)

Duration of bowel care was less than 30 minutes in 44.0% of participants, 31–60 min in 28.0%, and more than 60 min in 28.0%. Participants with tetraplegia took a significantly longer time compared with paraplegia ($p < 0.01$). There was no significant association between duration of bowel care and participant age, gender or injury characteristics. Use of bisacodyl suppositories, evacuation frequency less than daily, intake of oral laxatives, and water intake more than 2 litres per day were significantly associated with longer duration of bowel care (Table II). Multiple regression analysis showed that only the amount of water intake per day was significantly associated with the time taken for bowel care ($p = 0.027$, 95 % confidence interval (CI) 1.111–5.495, odds ratio (OR) 2.5).

The majority of participants ($n = 92$, 73.6%) were incontinence-free in the last 3 months prior to the study. For those that had incontinence, $n = 10$ (8.0%) had at least one episode a month, and $n = 23$ (18.4%) had less than one a month. There was no association between incontinence and bowel programme variables. The majority of participants ($n = 106$, 84.8%) were satisfied with their bowel programme. Age, level and complete-

Table II. *Relationship between duration of bowel care and bowel care practices (only significant associations are shown)*

Bowel care practices	Duration of bowel care				*p*-value (95% CI)
	<30 min	31–60 min	>60 min	Total	
Use of bisacodyl suppository					
Yes	24	31	29	84	0.000
No	31	4	6	41	(0.000–0.024)
Use of oral laxatives					
Yes	14	18	18	50	0.024
No	41	17	17	75	(0.000–0.024)
Frequency of bowel care					
Daily	29	3	3	35	0.000
Alternate days	18	22	25	65	(0.000–0.024)
Twice a week	7	9	8	24	
Once a week	1	1	0	2	
Water intake/day					
<2 l	32	24	14	70	0.038
>2 l	23	11	21	55	(0.001–0.063)

CI: confidence interval.

ness of injury, and duration since injury did not significantly influenced satisfaction. Satisfaction was significantly associated with the duration of time spent on bowel care ($p=0.013$, 95% CI 1.316–9.845, OR 4) and the frequency of bowel care ($p=0.019$, 95% CI 1.243–10.916, OR 3.4).

DISCUSSION

This study illustrates the practice and outcomes of bowel care in the community of individuals with SCI that had UMNB bowel in Malaysia. The frequency of bowel care, methods used, timing of bowel care, incontinence rate, use of oral laxatives, and predictors of satisfaction with their bowel programme were comparable to the Western population (3, 14). The striking difference, which is a cause of concern, lies in the duration of bowel care. A third of our patients spent more than 60 min on their bowel care. We also found an unanticipated relationship between the amount of fluid intake and duration of bowel care.

Most studies have shown that individuals with SCI use more than one intervention to facilitate faecal evacuation as well as to stimulate colonic movements (3, 9, 10, 14–16). Since this was a study on UMNB, the combination of bisacodyl suppositories and digital stimulation was expected. Although transanal irrigation in SCI is associated with improved bowel care outcome (16, 17) and is available locally, we have rarely recommended its use in our setting, due to the high cost. As for individuals with SCI elsewhere, most participants used other strategies, such as dietary modification, initiation of gastrocolic reflex, straining, abdominal massage and perianal skin stimulation, to facilitate defecation, despite a lack of evidence for the effectiveness of these interventions (8, 9, 18, 19). The interventions used by patients in this study superseded the options given to them during in-patient rehabilitation. This implies that there is a need for healthcare providers to consider providing information on various other interventions employed by the patients in this study.

The positive effects of fibre and fluid intake on colonic transit time and stool consistency in the non-spinal-cord-injured population have been established (20, 21). However, similar effects have not been consistently produced in people with spinal cord injury (16, 19). The association between increased fluid intake and duration of bowel care could possibly be explained by the following: (*i*) stool consistency is significantly influenced by the amount of water intake, and this can possibly explain the relationship between water intake and duration of bowel care in this study. Softer stool is more difficult to evacuate manually. This also might be the reason why oral laxatives are associated with longer duration of bowel care, and several studies have reported similar findings (3, 8, 14); (*ii*) another possible explanation is we did not specify the type of fluid taken by patients, as types of fluid can either increase or delay stool transit time (6, 22).

Previous studies reported that most individuals with SCI were able to complete their bowel care within 45 min, and thus recommended that those spending more than an hour to be evaluated for bowel dysfunction (5, 8). The numbers of participants that in this group was high compared with other studies (3, 8, 14). One-third spent more than 1 h on bowel care. This is perplexing, as the other aspects of the bowel programme and bowel care in our sample were similar to other studies. This result calls for us to explore further whether patients did, in fact, use the correct techniques to perform the bowel care intervention. It is also imperative for us to review our current practices; the most common methods of educating patients in these techniques are mostly verbal and 1 or 2 live demonstrations on the patients themselves. We do not routinely supplement this with written or visual materials. There is no structured or standardized inpatient education programme for bowel management, and this could lead to variations in the amount and accuracy of information received by patients. Moreover, in the early stages of spinal cord injury, patients and family may have information overload and may need more support to comprehend the nature of SCI and its consequences.

The low incidence of faecal incontinence implies that the bowel programmes practiced by the participants were successful and the rate is comparable to that of developed countries (3, 8, 14). This could be due to the fact that we only studied people with UMNB who generally retain their rectal tone, making the escape of faeces more difficult (1, 23). All our participants returned to home environments that support their new needs and foster adherence to the prescribed bowel programme. This is in contrast to a study in Pakistan, where most patients returned to tent villages without proper toilet facilities and this hindered them from continuing with the prescribed bowel programme. As a result, the majority of subjects experienced regular incontinence (24).

It is worth mentioning that, compared with a study involving the UK SCI population (3), partial and total assistance with bowel management was not associated with poor satisfaction in this study. In our culture, the very personal nature of bowel care calls for partner involvement rather than for it to be done by a stranger (in our experience this person is usually the maid/paid attendant). In another Asian culture, taking care of disabled people is viewed as a respectable task (24). Unfortunately this beneficent act tends to foster patient dependency on others. In our current healthcare system, and in many other developing countries, it is not possible to have this care performed by community healthcare personnel.

This study has several limitations. As a questionnaire-based study, it relied on the respondents' memories of their bowel care. There might be an element of recall bias. However, we believe that it is unlikely to account for any major differences obtained in the data collection, because bowel care is a regular and significant part of the SCI patient's life. As this study was conducted in an urban setting with access to rehabilitation services, our findings do not reflect those who do not have an opportunity to receive rehabilitation services, especially those in rural areas where awareness of available treatment for neurogenic bowel is still lacking. The small sample size in each subgroup might produce uncertainty in the results. In the future, adding a qualitative study design will give us a deeper understanding of the issues surrounding management of neurogenic bowel in this population.

In conclusion, participants in this study used multiple interventions to manage their bowels and spent a substantial amount of time performing bowel care. Nevertheless, the incidence of incontinence was low and participants' satisfaction with their bowel programmes was high.

ACKNOWLEDGEMENTS

This study was funded by University Malaya Postgraduate Fund; P00135/2010B.

The authors declare no conflicts of interest.

REFERENCES

1. Lynch A, Antony A, Dobbs B, Frizelle F. Bowel dysfunction following spinal cord injury. Spinal Cord 2001; 39: 193–203.
2. Pardee C, Bricker D, Rundquist J, MacRae C, Tebben C. Characteristics of neurogenic bowel in spinal cord injury and perceived quality of life. Rehabil Nurs 2012; 37: 28–135.
3. Coggrave M, Norton C, Wilson-Barnett J. Management of neurogenic bowel dysfunction in the community after spinal cord injury: a postal survey in the United Kingdom. Spinal Cord 2009; 47: 323–330.
4. Liu CW, Huang CC, ChenCH, Yang YH, Chen TW, Huang MH. Prediction of severe neurogenic bowel dysfunction in persons with spinal cord injury. Spinal Cord 2010; 48: 554–559.
5. Harari D, Sarkarati M, Gurwitz J, McGlinchey-Berroth G, Minaker K. Constipation-related symptoms and bowel program concerning individuals with spinal cord injury. Spinal Cord 1997; 35: 394–401.
6. Steins SA, Bergman SB, Goetz LL. Neurogenic bowel dysfunction after spinal cord injury: clinical evaluation and rehabilitative management. Arch Phys Med Rehabil 1997; 78: s86–s102.
7. Glickman S, Kamm M. Bowel dysfunction in spinal cord injury patients. Lancet 1996; 347: 1651–1653.
8. Kirshblum SC, Gulati M, O'Connor KC, Voorman SJ. Bowel care practices in chronic spinal cord injury patients Arch Phys Med Rehabil 1998; 79: 20–23.
9. Lynch A, Wong C, Anthony A, Dobbs B, Frizelle F. Bowel dusfunction following spinal cord injury: a description of bowel function in a spinal cord-injured population and comparison with age and gender matched controls. Spinal Cord 2000; 38: 717–723.
10. Naicker A, Roohi S, Naicker M, Zaleha O. Bowel dysfunction in spinal cord injury. Med J Malaysia 2008; 63: 104–108.
11. Ramakrishnan K, Mazlan M, Julia PE, Abdul Latif L. Return to work after spinal cord injury: factors related to time to first job. Spinal Cord 2011; 49: 924–927.
12. Julia PE, Othman AS. Barriers to sexual activity: counselling spinal cord injured women in Malaysia. Spinal Cord 2011; 49: 791–794.
13. Maynard FM, Bracken Mb, Creasey G, Ditunno JF, Jr WHD, Ducker TB, et al. International standards for neurological and functional classification of spinal cord injury. Spinal Cord 1997; 35: 266–274.
14. Haas U, Geng V, Evers GC, Knecht H. Bowel management in patients with spinal cord injury – a multicentre study of the German speaking society of paraplegia (DMGP). Spinal Cord 2005; 43: 724–730.
15. Kim JY, Koh ES, Leigh J, Shin H-I. Management of bowel dysfunction in the community after spinal cord injury: a postal survey in the Republic of Korea. Spinal Cord 2012; 50: 303–308.
16. Krassioukov A, Eng JJ, Claxton C, Sakakibara BM, Shum S, the SCIRE Research Team. Neurogenic bowel management after spinal cord injury: a systematic review of the evidence. Spinal Cord 2012; 48: 718–733.
17. Christensen P, Bazzocchi G, Coggrave M, Abel R, Hulting C, Krogh K, et al. Outcome of transanal irrigation for bowel dysfunction in patients with spinal cord injury. J Spinal Cord Med 2008; 31: 560–567.
18. Ayas S, Leblebici B, Sozay S, Bayramoglu M, Niron EA. The effect of abdominal massage on bowel function in patients with spinal cord injury. Am J Phys Med Rehabil 2006; 85: 951–955.
19. Cameron KJ, Nyulasi IB, Collier GR, Brown DJ. Assessment of the effect of increased dietary fibre intake on bowel function in patients with spinal cord injury. Spinal Cord 1996; 34: 277–283.
20. Spiller RC. Pharmacology of dietary fibre. Pharmacol Treatment 1994; 62: 407–427.
21. Wrenn K. Fecal Impaction. New Engl J Med 1989; 321: 658–662.
22. Banwell JG, Creasey GH, Aggarwal AM, Mortimer JJ. Management of the nerugenic bowel in patients with spinal cord injury Urol Clin North Am 1993; 20: 517–526.
23. Yim SY, Joon SH, Lee IY, Rah EW, Moon HW. A comparison of bowel care patterns in patients with spinal cord injury: upper motor neuron bowel vs lower motor neuron bowel. Spinal Cord 2001; 39: 204–207.
24. Yasmeen R, Rathore FA, Ashraf K, Butt AW. How do patients with chronic spinal injury manage their bowels? A cross-sectional survey of 50 patients. Spinal Cord 2010; 48: 872–875.