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Studying the Effects of Clean Intermittent Self-Catheterization on the Quality of Life and Anxiety of Patients

Doreen McClurg[1,2*], Kerry Walker[1,2], Rob Pickard[3], Paul Hilton[3], Holly Ainsworth[3], Kelly Leonard[4], Sheeba Suresh[5], Annette Nilsson[6], Nicola Gillespie[2]

[1]*Nursing, Midwifery and Allied Health Professions, Research Unit, United Kingdom.*
[2]*Room A603 Govan Mbeki Building, Glasgow Caledonian University, Glasgow, G4 0BA, United Kingdom.*
[3]*The Medical School, Newcastle University, Newcastle upon Tyne, NE2 4HH, United Kingdom.*
[4]*Urology Research Nurse, Addenbrooke's Hospital, Cambridge, United Kingdom.*
[5]*Ipswich Hospital NHS Trust, Ipswich, Suffolk, United Kingdom.*
[6]*Research & Development, University Hospitals Birmingham NHS Foundation Trust, United Kingdom.*

Abstract

Urinary incontinence is one of the complications of spinal cord injury that affects different aspects of a person's life and has many negative consequences. This study investigated the effect of clean intermittent self-catheterization on the anxiety and quality of life of patients. This research was a semi-experimental before-after study with a control group and 80 spinal cord injury patients were studied. The samples were selected as available and were assigned to two intervention groups and a control group using a regular method. Beck's anxiety questionnaire and 23-question quality of life questionnaire of spinal cord injury patients were used to collect data. Data were analyzed using SPSS version 23 and Medcalc version 8. The findings showed that before the intervention, the two groups were homogeneous in terms of quality of life and anxiety and the research intervention (clean intermittent survey) led to a significant increase in quality of life (P = 0.0001) and a significant decrease in anxiety (P = 0.0001). According to the results obtained from the present study, clean intermittent self-catheterization by the patient can be used as a method to increase the quality of life of patients and reduce their anxiety.

Keywords: Self-Catheterization, Patients, Quality of life, Anxiety

Introduction

Injuries to the spinal cord are one of the most dangerous physical injuries that can cause disturbances in various body systems and even threaten a person's life [1, 2]. According to the World Health Organization, the prevalence of spinal cord injury in the world is reported to be 15-40 million people, and 12-40 million people in the world suffer from spinal cord injuries every year [3, 4]. The incidence of spinal cord injuries in the United States is about 30 to 40 cases per million people per year, of which about half are injured due to motor vehicle accidents, and about a quarter of these injuries result in total paralysis. Spinal cord injuries mainly occur at young ages, so about 53% of spinal cord injuries are observed in the age group between 16 and 30 years. Spinal cord injuries are more common among young and active men, as their number is 4 to 1 in men compared to women [5-7].

One of the most common side effects for people who suffer from spinal cord injury (SCI) is bladder dysfunction. Following a spinal cord injury, the bladder will not function as before due to spinal cord injury, and the extent of

Corresponding author: Doreen McClurg
Address: Nursing, Midwifery and Allied Health Professions, Research Unit, United Kingdom.
E-mail: ✉ Doreen.mcclurg@gcal.ac.uk
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the injury will determine how the bladder functions [8]. Urinary incontinence can affect various aspects of life for people with spinal cord injuries, including social, psychological, family, occupational, physical, and sexual aspects. On the other hand, it can cause problems such as soiling of clothes, unpleasant odor, skin sensitivity, urinary tract infection, disruption of sleep patterns, isolation, anxiety, and depression, all of which can greatly affect the quality of life [9].

Although with the disappearance of the initial shock, the normal rhythm of the bladder (the involuntary ability of the bladder to release urine) gradually returns, the voluntary control of the complete emptying of urine is usually disturbed [8]. One of the most common complications of spinal cord injury in the field of urinary system problems is urinary infection, which causes them to be hospitalized repeatedly. This complication in the form of symptomatic urinary infections causes pain in these patients, makes it more difficult for them to tolerate disability, affects their health in the long term, and increases their dependence and anxiety [9, 10].

Few studies have investigated the prevalence of anxiety after SCI; the prevalence of anxiety in these people is reported to be 20-25% [11]. On the other hand, post-traumatic stress disorder occurs more in these people than in people without physical complications [12]. This issue affects the quality of life of spinal cord injury patients [9, 10]. In this way, another component that can be changed in spinal cord injury patients is the quality of life and the psychological factors related to it [13, 14]. Researchers have found that quality of life can be one of the most important outcomes in evaluating people's health [15]. Trying to return these people to a relatively active life faster and preventing physical and mental complications caused by spinal cord injuries plays a very important role in their lives. Many studies have been conducted on the quality of life of people with spinal cord injuries. In their study, Silver *et al*. [16] have reported a decrease in the quality of life of people with spinal cord injuries in the areas of returning to work or school, adapting to new roles in society, and gaining individual independence [16]. Development of optimal adaptation skills leads to life satisfaction and better mood in spinal cord injury patients. People who can adapt themselves to the new situation have less dependent behavior and better quality of life [17, 18].

In addition, spinal cord injury brings many costs to the patient and the health system. Patients who use an indwelling catheter have a urinary tract infection with a colony of more than 105 bacteria per milliliter. Patients who use a temporary catheter for 2-3 days get an infection in 10-20% of cases. The most common bacteria that cause urinary tract infections are Gram-negative bacteria, which is responsible for causing infection in 90% of cases. These infections include about 40% of hospital infections. Therefore, it is very important to perform urinary catheterization under sterile conditions [9, 10].

Nowadays, to improve the quality of life of spinal cord injury patients, training in the field of intermittent self-probing is given frequently [19, 20]. Clean Intermittent Self-Catheterization (CISC) has been receiving attention since the 20th century. Today, this method is very effective for the care of patients with nervous system disorders who have problems in the urinary system [21]. Today, self-cavitation is the gold standard for people who cannot empty their bladder naturally due to bladder outlet obstruction or lack of bladder control. This technique is significantly effective in the treatment of neurogenic bladders, as it determines whether this retention is caused by a neurological process or not [22, 23]. To do this, patients insert a thin catheter, usually with a diameter of 4.5 mm, through the urethra in clean (non-sterile) conditions, empty it, and then remove the catheter. This work is repeated at specific time intervals based on a specific pattern [24], in this field, studies have been conducted that have shown that urinary tract infections are one of the dangers that always threaten spinal cord injury patients [25] and patients who have They use intermittent self-cavitation and are always prone to urinary tract infections [26].

However, clean intermittent self-probing is an effective solution to increase the quality of life of these patients [22], which requires careful training and follow-up of the patient due to the sensitivity of its performance. Intermittent clean self-cavitation is the gold standard for managing chronic urinary retention, helping to improve patient's quality of life and reduce complications such as upper urinary tract infections. Education to these patients should be accompanied by the promotion of understanding, acceptance, and correct performance of CISC [19]. Therefore, the present study was conducted to investigate the effect of clean intermittent self-probing on the anxiety and quality of life of spinal cord injury patients. In this regard, the assumption of the research was that clean intermittent self-probing leads to a decrease in anxiety and an increase in the quality of life of spinal cord injury patients.

Materials and Methods

The current research was semi-experimental and applied research, during which the effect of clean intermittent self-probing on the anxiety and quality of life of spinal cord injury patients was investigated. In this research, data

was collected in two stages before and after the intervention. The research population in this study included 80 spinal cord injury patients aged 16 to 60 who met the criteria for entering the study. The criteria for entering the research include the age range of 16 to 60 years, spinal cord injury from the C7 vertebrae down due to trauma, having a spinal cord injury within the last year, not having pressure ulcers, reading and writing literacy, having sufficient insight, and The ability to cooperate in the study was necessary. The criteria for withdrawing from the research included unwillingness to continue participating in the research, quadriplegic patients, relapse of the disease, and severity of disability from moderate disability to severe disability according to the doctor's opinion.

The sample size for each of the intervention and control groups was equal to 39. To prevent the samples from falling, one person was added to the sample size of both groups and finally, by random allocation in each of the groups, there were 40 people in each group. Therefore, out of 80 spinal cord injury patients, 40 were in the intervention group and 40 were in the control group. To assign the samples to the groups, a simple and accessible random assignment method was used for the intervention and control groups.

The research tools included three demographic questionnaires, Beck's anxiety questionnaire, and the quality of life questionnaire for spinal cord injury patients (SCIQL-23), which were distributed in printed versions and face-to-face among people. The method of conducting the research was as follows: the researcher went to the hospital and the consent of the officials of the research site was obtained. Written consent was obtained from the eligible samples after explaining the objectives of the study, the importance, and the process of conducting the study. Then the patients were selected by the available sampling method and random allocation was used in the phase of allocating the samples to the intervention and control groups. The information related to the individual characteristics of the patients was also recorded in the questionnaire through face-to-face interviews, and the sample members answered then the anxiety and quality of life questionnaires in two stages before and after the intervention. The content of the intervention sessions was also described in **Table 1**.

Table 1. Content of intervention sessions.

Session number	The content of the session	Teaching method
1	Introducing the researcher and providing information related to the anatomy of the spine, its functions, and functional status	Theoretical and practical
2	Providing information related to spinal cord lesions and the resulting complications and discussing with patients	Theoretical and practical
3	Providing information related to spinal cord lesions caused by spinal cord injury (vertebra C7 below) and its complications (lack of urinary control, increased risk of infection, bedsores, and mental and psychological disorders) and discussions related to How to perform intermittent self-probing and urine control	Theoretical and practical
4	Education related to the anatomy of the genital area and urinary tracts by using videos, teaching aids, and mollag, and then discussing with patients	Theoretical and practical
5	A review of the training of the previous sessions and summarization of practical training materials with all patients while preserving their privacy and face-to-face and in compliance with health protocols, evaluating their skill level, and delivering theoretical and practical training booklets to all patients	Theoretical and practical

SPSS version 23 statistical software was used to analyze the data. Descriptive statistical methods such as frequency distribution tables and graphs and inferential statistical analytical methods such as student t-test, analysis of covariance, Chi-Square independence test, and Fisher Exact Test were used to check the objectives.

Results and Discussion

Table 2 shows the demographic characteristics of the sample members.

Table 2. Demographic characteristics of the sample members.

Variable		N	%
Gender	Female	25	31.3
	Male	55	68.8

Marital status	Single	45	56.3
	Married	35	43.8
Education level	Under diploma	30	37.5
	Diploma	30	37.5
	University	20	25
Income	Low	22	27.5
	Average	25	31.3
	No income	33	41.3
Job	Employee	6	7.5
	Freelance	25	31.3
	Unemployed	24	30
	Housekeeper	10	12.5
	Retired	4	5
	Other	11	13.8
Cause of spinal cord injury	Car	42	52.5
	Motorcycle	5	6.3
	Fall	28	35
	Other	5	6.3
History of illness	Blood pressure	9	11.3
	Diabetes	2	2.5
	Heart disease	3	3.8
	Respiratory disease	7	8.8
	Other	59	73.8
Movement problem	No problem	1	1.3
	There is a problem	79	98.8
Excretion problem	No problem	0	0
	There is a problem	80	100
Urinary problem	No problem	30	37.5
	There is a problem	50	62.5
Other complications	No problem	49	61.3
	There is a problem	31	38.7

Table 3 shows the results of the homogeneity of the participants in the control and intervention groups.

Table 3. Homogeneity status of participants in two control and intervention groups.

Variable	Intervention		Control		P-value
	Mean	SD	Mean	SD	
Age	33.5	12.54	31.10	10.44	0.402
Weight	69.9	13.8	67.87	12.98	0.501
Number of children	0.97	1.29	0.52	1.01	0.055
Duration of spinal cord injury	7.48	3.85	8.30	2.98	0.418
Hospitalization frequency	2.05	0.81	2.17	0.74	0.287

According to the Mann-Whitney test results in **Table 3**, the participants of both groups were homogeneous in terms of age, weight, number of children, duration of spinal cord injury, and hospitalization frequency. According to the results of the chi-square test, the participants in the two groups in terms of gender (P = 0.999), education (P

= 0.380), marital status (P = 0.176), employment (P = 0.318), income (P = 0.082), disease history (P = 0.0200), cause of spinal cord injury (P = 0.142), movement problem (P = 0.999), excretion problem (P = 0.999), and urinary problem (P = 0.065) were not significantly different.

In **Table 4**, the mean and standard deviation of the problem score related to spinal cord injury of the participants before and after the intervention in two groups are compared.

Table 4. Comparing the mean and standard deviation of the problem related to spinal cord injury before and after the intervention in two groups.

	Group	Before		After		P-value
		Mean	SD	Mean	SD	
The problem of spinal cord injury	Intervention	15.22	2.21	12.62	2.97	0.0001
	Control	13.8	2.40	14.05	2.52	0.064
	P-value	0.005		0.035		-

The results of the Mann-Whitney test in **Table 4** show that the mean score of the problem related to spinal cord injury in the two groups has a statistically significant difference (P = 0.005). After the intervention, the mean score of the spinal cord injury problem in the two groups had a statistically significant difference (P = 0.035). Also, we used the Wilcoxon test to check the changes in the spinal cord lesion problem score, which showed that the mean spinal cord lesion problem score in the intervention group had a significant decrease of 2.6 ± 2.28 (P = 0.0001), but in the control group, it had increased by 0.25 ± 0.83, which is not significant change (P = 0.064).

To further investigate and control the confounding effect of the problem score related to the spinal cord injury before the intervention (baseline), after checking the assumptions of the analysis of covariance (ANCOVA) test, the adjusted mean in the control group was 14.715 ± 0.279 and in the intervention group was 11,960 ± 0.279, which showed that there is a statistically significant difference between the adjusted average of the spinal cord injury score of the two intervention and control groups (F = 40.455, P = 0.0001, Eta^2 = 0.344). According to the eta squared coefficient, the difference between the two groups due to the intervention is 34.4%.

Table 5 compares the mean and standard deviation of the anxiety scores before and after the intervention in the two groups.

Table 5. Comparison of anxiety averages in two intervention and control groups.

Variable	Group	Before		After		P-value
		Mean	SD	Mean	SD	
Anxiety score	Intervention	17.45	12.03	10.6	5.38	0.0001
	Control	19.25	17.72	17.7	14.93	0.809
	P-value	0.515		0.016		-
Performance	Intervention	20.55	4.88	17.15	4.42	0.0001
	Control	20.12	4.35	20.17	4.08	0.762
	P-value	0.602		0.005		-
State of mind	Intervention	8.87	3.37	7.62	3.23	0.0001
	Control	10.9	2.68	11.2	2.73	0.051
	P-value	0.015		0.0001		-

To further investigate and control the confounding effect of the mental state score before the intervention (baseline), after checking the assumptions of the covariance analysis (ANCOVA) test, the adjusted mean in the intervention group was 8.483 ± 0.249 and in the control group was 10.342 ± 0.249, which showed that there is a statistically significant difference between the adjusted average of the mental state score in the intervention and control groups after the intervention (F = 22.147, P = 0.0001, Eta^2 = 0.223). According to the eta square coefficient, the difference between the two groups due to the intervention is 22.3%.

In **Table 6**, the mean and standard deviation of the total quality of life score before and after the intervention in the two groups are compared.

Table 6. Comparison of the mean and standard deviation of the total quality of life score before and after the intervention in two groups.

	Group	Before		After		P-value
		Mean	SD	Mean	SD	
Total quality of life score	Intervention	44.65	8.18	37.4	7.77	0.0001
	Control	44.82	7.08	45.42	7.19	0.085
	P-value	0.919		0.0001		-

The results of the independent t-test in **Table 6** show that the average total score in the two groups does not have a statistically significant difference (P = 0.919). However, after the intervention, the average total score in the two groups has a statistically significant difference (P = 0.0001). We also used the Wilcoxon test to examine the changes in the total score, which showed that the average total score in the intervention group had a significant increase of 7.25 ± 5.24 (P = 0.0001), but in the control group, it had decreased by 1.94 ± 0.6, which is not a significant change (P = 0.085).

This study showed that clean intermittent probing increases the quality of life of spinal cord injury patients. The results of the present study showed that according to the increase in the self-reported quality of life score in the intervention group compared to the control group, and in the intervention group, out of 21 patients who were at a very dissatisfied level of quality of life, all of them changed to an unsatisfied state. 14 people changed their status from dissatisfied to satisfied, which shows the effect of intermittent self-probing on improving the quality of life of spinal cord injury patients.

Studies related to the effect of clean intermittent self-probing in the lives of spinal cord injury patients that have been done before are in some of the same findings as the current research. In this regard, a study has stated that the quality of life of patients who perform self-sonography improves under the influence of factors such as improving urinary status, promoting independence, and increasing self-confidence and social relationships [27].

The results indicate that the level of anxiety in spinal cord injury patients after an accident is higher than in other health groups, and training these patients can help reduce their anxiety [28]. Nursing interventions are effective in reducing the anxiety of spinal cord injury patients. The use of therapeutic and educational approaches for clean intermittent self-probing in patients with extensive disabilities can lead to the promotion of adaptation, increase of sexual ability, and ultimately reduce their anxiety [29].

Learning to clean intermittent self-cavitation can increase independence and reduce the risk of urinary tract infection and stone formation [30]. Learning intermittent self-probing by disabled patients greatly increases their level of satisfaction, understanding, and self-confidence, and the continuation of this process leads to an increase in the satisfaction of these patients and a decrease in their anxiety [31].

Education plays an important role in promoting patients' compliance with intermittent self-probing [32], however, in addition to the educational program, emotional and psychological support and regular follow-up are necessary to improve the performance of self-probing in the long term [31]. Doctors, nurses, and family members should pay more attention to the symptoms and psychological states of their patients to reduce the incidence of anxiety and depression in these patients [8]. The promotion of evidence-based support policies and continuous training in the clean intermittent catheterization method can greatly help in reducing patients' anxiety [33]. Therefore, teaching clean intermittent self-probing to spinal cord injury patients can help reduce anxiety and increase the quality of life of these patients.

Conclusion

This study investigated the effect of clean intermittent self-catheterization on the anxiety and quality of life of patients. The findings showed that before the intervention, the two groups were homogeneous in terms of quality of life and anxiety and the research intervention (clean intermittent survey) led to a significant increase in quality of life and a significant decrease in anxiety. According to the results obtained from the present study, clean

intermittent self-catheterization by the patient can be used as a method to increase the quality of life of patients and reduce their anxiety.

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