Nurse-Led Clean Intermittent Self-Catheterization Training On Confidence And Practical Skills Of Patients With Neurogenic Bladder Dysfunction

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ABSTRACT

Neurogenic bladder dysfunction, which arises from spinal cord injuries or neurological disorders, frequently requires clean intermittent self-catheterization (CISC) for effective bladder management. This research analyzed the effects of nurse-led CISC training on patient confidence and practical skills. A quasi-experimental design employing a single-group pre-post framework was utilized to assess the effectiveness of CISC instruction on 95 patients at Jinnah Hospital in Lahore. Participants were evaluated prior to the intervention, immediately following the intervention, and during a follow-up, utilizing the Clean Intermittent Catheterization Skills Assessment Checklist and the Self-Confidence Scale. The intervention comprised six sessions: three focused on education and three on demonstration, incorporating video-enhanced instruction and practical application. Results demonstrated significant enhancements in self-confidence and practical abilities. The mean self-confidence score increased from 15.73 pre-education to 40.58 at follow-up ($p < 0.001$), and practical skills improved from 5.97 to 14.30 ($p < 0.001$). The follow-up phase indicated that a significant majority of participants (72.6%) reported confidence in their capacity to perform CISC autonomously. Moreover, employment status and educational attainment did not significantly affect outcomes, with illiterates demonstrating the most substantial improvement. This study underscores the significance of nurse-led CISC education in enhancing physical health and self-esteem, highlighting the need for standardized training protocols to improve patient outcomes in neurogenic bladder management.

INTRODUCTION

Individuals with neurogenic bladder dysfunction due to spinal cord injury or neurological disorders require efficient bladder management (1). Dysfunctions often result in urine retention or insufficient bladder emptying, making intermittent self-catheterization (ISC) an essential treatment measure(2). ISC maintains normal bladder capacity and diminishes problems such as bladder distension and infection risks, surpassing long-term indwelling catheterization (3).

Clean Intermittent Self-Catheterization (CISC) enables patients to proficiently regulate bladder function, thereby enhancing body image, self-esteem, and general quality of life(4). The benefits include the elimination of drainage bags, improved physical comfort, and heightened intimacy due to the lack of a urinary catheter (5).

Empowering patients via nurse-led education is essential; nevertheless, the lack of recognized teaching approaches underscores the need for more research in this domain (6). Effective training necessitates evaluating patients' preparedness, using visual aids, and progressively integrating them into the process (7).

The transition from sterile to clean therapies, along with the personalization of strategies for female patients, enhances practical learning and confidence.
The instructional approach starts with nurse-assisted catheterization and advances to patient autonomy via visual and practical teaching (8).This progressive approach enables patients to cultivate skills and autonomy while receiving continuous nursing support (9). ISC education greatly enhances physical health and self-esteem (10). Patients progressing from the first learning phase, when the nurse does catheterization, to complete self-catheterization independence exhibit enhanced confidence and autonomy in managing their urine care (11). Therefore, the aim of the study is to assess the effects of nurse-led clean intermittent self-catheterization training on confidence and practical skills of neurogenic bladder dysfunction patients

METHODOLOGY

A quasi-experimental study with a single-group pre-post design is conducted to assess the impact of nurse-led clean intermittent self-catheterization (CIC) training on practical skills and self-confidence among patients with neurogenic bladder dysfunction. Practical skills are evaluated using the Clean Intermittent Catheterization Skills Assessment Checklist, which includes 16 items scored as "yes" (1 point) or "no" (0 points), with higher scores indicating greater competency. Confidence is assessed using the Self-Confidence Scale, a 16-item, 5-point Likert scale, with higher scores reflecting greater self-confidence. The study is conducted at the urology outpatient clinic of Jinnah Hospital, Lahore, using convenient sampling to recruit 95 participants, including a 10% attrition rate. Female patients aged 16–65 years, newly initiating CIC, and meeting specific inclusion criteria are enrolled, while patients with urinary tract infections, permanent catheterization, or other exclusions are excluded. Data collection occurs in pre-intervention, intervention, post-intervention, and follow-up phases over nine months. The intervention involves six sessions (three educational and three demonstrations), incorporating video-enhanced education, brochures, and hands-on practice. Follow-up assessments evaluate long-term adherence and confidence. Data is analyzed using SPSS Version 25, with descriptive and inferential statistics applied based on data distribution.

RESULTS

4.1 Demographic Characteristics of Participants

Table 4.1: Demographic Characteristics of Children

Demographic characteristics	Frequency (%)
Age	
16-30 Year	66(69.5%)
31-40 Year	21(22.1%)
41-45 year	8(8.4%)
Marital Status	78(82.1%)
Male	17(17.9%)
Female	
Education Level	
Illiterate	38(40.0%)
Primary School Level	39(41.1%)
High School Level	18(18.9%)
Residence	49(51.6%)
Rural Areas	46(48.4%)
Urban Areas	
Profession	
Housewives	88(92.6%)
Private Servant	4(4.2%)

Government Servant	3(3.2%)

The demographic characteristics of the participants reveal that the majority (69.5%) were aged 16-30 years, followed by 22.1% aged 31-40 years, and 8.4% aged 41-45 years. The sample predominantly consisted of males (82.1%), with females making up 17.9%. In terms of education, 40.0% were illiterate, 41.1% had a primary school education, and 18.9% had completed high school. A slightly higher proportion of participants (51.6%) resided in rural areas compared to 48.4% from urban areas. Regarding profession, the vast majority were housewives (92.6%), with 4.2% working as private servants and 3.2% as government servants.

4.2 Confidence of Patient Regarding Clean Intermittent Self Catheterization

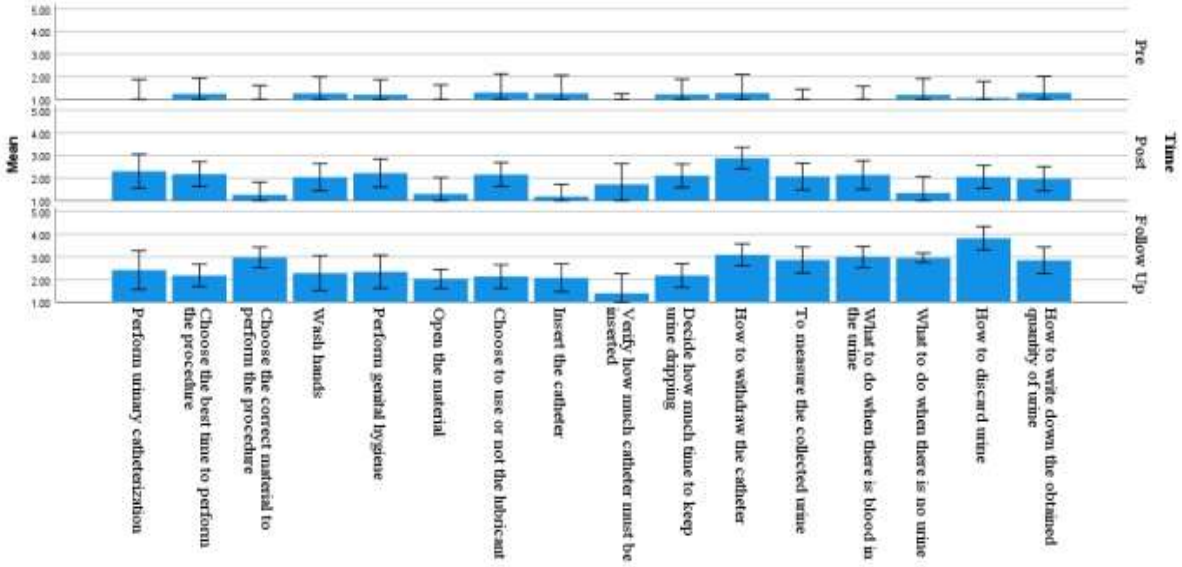

Figure 1: Comparison of mean ± SD responses at to Self-Confidence Scale at different time

Figure 1 compares mean ± SD responses on the Self-Confidence Scale at three time points: pre-education, post-education, and follow-up. The mean score was low at pre-education (15.73 ± 8.13), reflecting low confidence. After the intervention, the score significantly increased to 30.87 ± 2.99, indicating a positive immediate effect. At follow-up, the score further increased to 40.58 ± 2.68. The differences at each phase were statistically significant ($p < 0.001$), highlighting the sustained impact of the intervention on self-confidence.

Table 2: Comparison of self-confidence regarding education level

Self Confidence score	Response	Education Level			Total	p-value
		Illiterate	Primary school	High school		
Before Education	Not Sure	22(57.9%)	28(71.8%)	13(72.2%)	63(66.3%)	0.635
	Less Confident	13(34.2%)	9(23.1%)	3(16.7%)	25(26.3%)	
	Confident	3(7.9%)	2(5.1%)	2(11.1%)	7(7.4%)	
Post Education	Not Sure		1(2.6%)		1(1.1%)	0.424
	Less Confident	25(65.8%)	25(64.1%)	15(83.3%)	65(68.4%)	
	Confident	13(34.2%)	13(33.3%)	3(16.7%)	29(30.5%)	
Follow-up	Not Sure		1(2.6%)		1(1.1%)	0.007
	Less Confident	3(7.9%)	13(33.3%)	6(33.3%)	22(23.2%)	

Confident	34(89.5%)	25(64.1%)	10(55.6%)	69(72.6%)
Very Confident	1(2.6%)		2(11.1%)	3(3.2%)

Table 2 compares self-confidence scores across education levels (illiterate, primary, and high school) at three stages: pre-education, post-education, and follow-up. Before the intervention, most participants were "Not Sure," with no significant difference (p = 0.635). Post-intervention, confidence improved across all groups, though differences remained insignificant (p = 0.424). At follow-up, significant improvement was observed (p = 0.007), with 89.5% of illiterate, 64.1% of primary, and 55.6% of high school participants reporting "Confidence." The intervention effectively enhanced self-confidence, particularly at follow-up.

Table 3: Comparison of self-confidence regarding profession

Self Confidence	Response	Profession			Total	p-value
		Private	Government	Housewife		
before-Education	Not Sure	2(50.00%)	1(33.30%)	60(68.20%)	63(66.30%)	0.632
	Less Confident	1(25.00%)	2(66.70%)	22(25.00%)	25(26.30%)	
	Confident	1(25.00%)	-	6(6.80%)	7(7.40%)	
After Education	Not Sure	1(25.00%)	-	-	1(1.10%)	0.064
	Less Confident	2(50.00%)	3(100.00%)	60(68.20%)	65(68.40%)	
	Confident	1(25.00%)	-	28(31.80%)	29(30.50%)	
Follow-up	Not Sure	1(25.00%)	-	-	1(1.10%)	0.095
	Less Confident	-	1(33.30%)	21(23.90%)	22(23.20%)	
	Confident	3(75.00%)	2(66.70%)	64(72.70%)	69(72.60%)	
	Very Confident	-	-	3(3.40%)	3(3.20%)	

Table 3 compares self-confidence scores by profession (private, government, and housewife) at three stages: pre-education, post-education, and follow-up. Before the intervention, most housewives (68.2%) were "Not Sure," while private (50%) and government employees (33.3%) showed slightly higher confidence (p = 0.632). Post-education, confidence improved, with 25% of private employees and 31.8% of housewives becoming "Confident" (p = 0.064). At follow-up, most participants across professions were "Confident," though differences remained statistically insignificant (p = 0.095).

4.3 Clean Intermittent Catheterization Skill of Patient

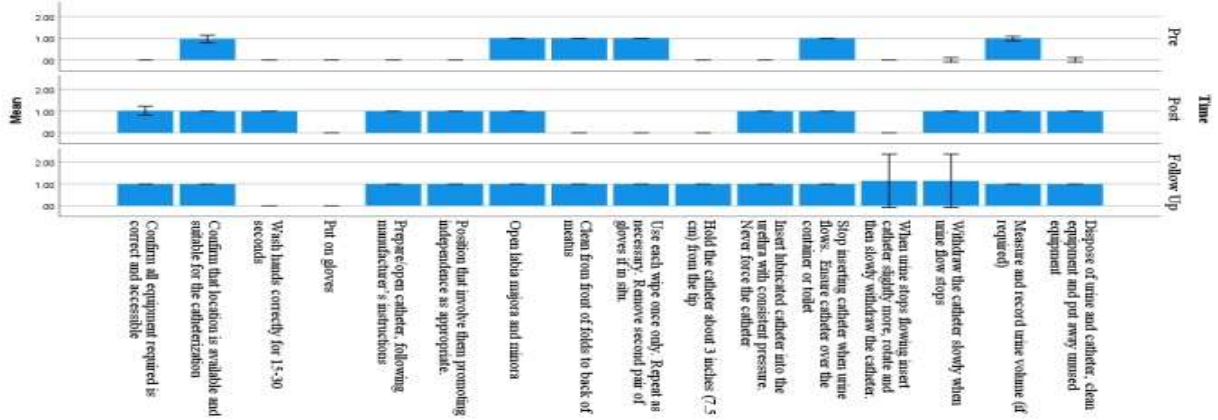

Figure 2: Comparison of mean ± SD clean intermittent catheterization skills assessment checklist responses at to different time

The mean Clean Intermittent Catheterization Skills Assessment Checklist scores were 5.97±0.24 (95% CI: 5.91–6.03) pre-education, 11.00±0.00 (95% CI: 11.00–11.00) post-education, and 14.30±1.71 (95% CI: 13.88–14.72) at follow-up. The mean differences between adjacent phases were statistically significant ($p < 0.001$).

Table 4: Comparison of practical skills regarding education level

Skill	Practices	Education Level			Total	p-value
		Illiterate	Primary school	High school		
Before Education	Incompetent	38(100.0%)	39(100.0%)	18(100.0%)	95(100%)	N/A
Post Education	Competent		1(2.6%)		1(1.1%)	1
	Incompetent	38(100.0%)	38(97.4%)	18(100.0%)	94(98.9%)	
Follow Up	Competent	33(86.8%)	24(61.5%)	11(61.1%)	68(71.6%)	0.025
	Incompetent	5(13.2%)	15(38.5%)	7(38.9%)	27(28.4%)	

Table 4 compares practical skills by education level across study phases. Pre-education, all participants were incompetent. Post-education, only one participant became competent across all education levels. At follow-up, competency improved significantly, with 86.8% of illiterate, 61.5% of primary school, and 61.1% of high school participants demonstrating competence. Despite this, 28.4% remained incompetent overall. The difference in skills at follow-up was statistically significant ($p = 0.025$), emphasizing the role of education in enhancing competency.

Table 5: Comparison of practical skills regarding profession

		Profession			Total	p-value
Skill		Private	Government	Housewife		
Before Education	Incompetent practices	4(100.00%)	3(100.00%)	88(100.00%)	95(100.00%)	N/A
After Education	Competent practices	1(25.00%)	0(0%)	0(0%)	1(1.10%)	N/A
	Incompetent practices	3(75.00%)	3(100.00%)	88(100.00%)	94(98.90%)	
Follow Up	Competent practices	4(100.00%)	2(66.70%)	62(70.50%)	68(71.60%)	0.473
	Incompetent practices	0(0%)	1(33.30%)	26(29.50%)	27(28.40%)	

Table 5 shows practical skills by profession across study phases. Pre-education, all participants were incompetent. Post-education, one private-sector participant became competent, while others remained incompetent. At follow-up, competency improved to 100% for private-sector participants, 66.7% for government professionals, and 70.5% for housewives. However, 28.4% remained incompetent overall, with no significant differences between professions ($p = 0.473$).

Table 6: Comparison of median (IQR) score at different time of study

	Pre	**Post**	**Follow-up**	**p-value**

Self-Confidence Scale	13(19-10)	30(32-29)	39(41-39)	<0.001*
Clean Intermittent Catheterization Skills Assessment Checklist	6(6-6)	11(11-11)	14(14-14)	<0.001*

Friedman Education

Table 6 shows significant improvements ($p < 0.001$) in Self-Confidence Scale and Skills Checklist scores across phases. Median confidence scores rose from 13 to 30 post-intervention and 39 at follow-up, while skills scores increased from 6 to 11 and 14, respectively.

DISCUSSION

The discussion chapter critically interprets the findings of this study in the context of existing literature, highlighting the implications and significance of the results. This study demonstrates a significant improvement in self-confidence following an educational intervention, aligning with previous research. Previous researches similarly found that targeted education enhances self-confidence, especially in chronic condition management (12), (13).

Notably, illiterate participants showed the greatest improvement, consistent with a study, while those with higher education experienced less pronounced changes (14). These results underscore the need for tailored interventions, particularly for lower-educated groups (15).

The study also highlights a shift from uncertainty to confidence, particularly at follow-up, aligning with a previous study (16).While no immediate differences were observed by education level post-intervention, significant improvements were evident at follow-up ($p = 0.007$), supporting the necessity of long-term reinforcement. The findings also suggest that group-based interventions, as supported by a research study (17), effectively foster confidence.

Regarding self-confidence in various professional backgrounds, this study confirms that educational interventions benefit diverse groups, including private employees, government employees, and housewives. The follow-up phase showed the most significant improvements, as seen in Stewart & Hogan-Tricks (18).However, discrepancies between studies highlight the impact of professional context on intervention effectiveness (19).

Comparisons with recent research on Clean Intermittent Catheterization (CIC) skills underscore the long-lasting benefits of educational interventions. Studies by Wang et al. and Lima et al. (11), (10),(20). showed significant post-intervention improvements, similar to this study's results, which demonstrated enhanced CIC skills at follow-up. The findings suggest that long-term reinforcement is crucial for skill retention and highlight the importance of continued practice and support.

Overall, this study supports the growing body of literature indicating the effectiveness of structured, sustained educational interventions in improving self-confidence and practical skills, particularly when reinforced over time.

CONCLUSION

The study found significant improvements in participants' self-confidence and practical skills after the educational intervention. Initially, participants had low self-confidence and lacked practical skills. However, post-intervention, 72.6% were confident and 71.6% demonstrated competence. Significant gains were observed in both self-confidence ($p < 0.001$) and practical skills ($p = 0.025$) at follow-up. Median scores for the Self-Confidence Scale and Clean Intermittent Catheterization Skills Assessment Checklist showed marked improvements ($p < 0.001$), highlighting the intervention's effectiveness over time.

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Conflict of Interest

Authors have no conflict of interest.

REFERENCES

1. ERMEÇ B, ÇULHA MG. Evaluation of the Quality of Life of Patients Who Use Intermittant Self-Catheterization by Themselves and by Their Caregivers. The New Journal of Urology. 2023;18(3):196-201.
2. Barken KB, Vaabengaard R. A scoping review on the impact of hydrophilic versus non-hydrophilic intermittent catheters on UTI, QoL, satisfaction, preference, and other outcomes in neurogenic and non-neurogenic patients suffering from urinary retention. BMC urology. 2022;22(1):153.
3. Purves JT, Konstantinidis C, Lloyd JC. Intermittent catheterization (IC). Handbook of Neurourology: Theory and Practice: Springer; 2023. p. 1-9.
4. Mitchell BG, Prael G, Curryer C, Russo PL, Fasugba O, Lowthian J, et al. The frequency of urinary tract infections and the value of antiseptics in community-dwelling people who undertake intermittent urinary catheterization: A systematic review. American Journal of Infection Control. 2021;49(8):1058-65.
5. Sinha S, De Wachter S, Welk B, Sakakibara R, Vrijens DM, Konstantinidis C, et al. Lower urinary tract dysfunction in uncommon neurological diseases, Part II: A report of the Neuro-urology Promotion Committee of the International Continence Society. Continence. 2023;7:101043.
6. Herbert AS, Welk B, Elliott CS. Internal and External Barriers to Bladder Management in Persons with Neurologic Disease Performing Intermittent Catheterization. International Journal of Environmental Research and Public Health. 2023;20(12):6079.
7. Ko H-Y. Managing Neurogenic Lower Urinary Tract Dysfunction in Spinal Cord Injuries. A Practical Guide to Care of Spinal Cord Injuries: Clinical Questions and Answers: Springer; 2023. p. 519-58.
8. Macaraeg AM. A Qualitative Study to Understand the Experiences and Barriers of Home Bladder Manometry for Pediatric Neurogenic Bladder Patients from the Parent, Provider, and Nursing Staff Perspectives: University of California, Irvine; 2022.
9. Culha Y, Acaroglu R. The Effect of Video-Assisted Clean Intermittent Catheterization Training on Patients' Practical Skills and Self-Confidence. International Neurourology Journal. 2022;26(4):331.
10. Lima MBd, Caldini LN, Ramos Junior A, Torquato RC, Pinto TR, Rebouças CBdA. Educational material on intermittent urethral catheterization in children: a scoping review. Texto & Contexto-Enfermagem. 2022;31.
11. Wang R, Zhou C, Wu Y, Sun M, Yang L, Ye X, et al. Patient empowerment and self-management behaviour of chronic disease patients: A moderated mediation model of self-efficacy and health locus of control. Journal of Advanced Nursing. 2022;78(4):1055-65.
12. Price D, McKeon L. Outcomes of a nurse-led difficult urinary catheter team in an academic medical center. Journal of nursing care quality. 2020;35(4):309-16.
13. Churchill K. The management of recurrent urinary tract infections within a nurse-led urology team. British Journal of Nursing. 2023;32(9):S6-S12.
14. Bapir R, Bhatti KH, Eliwa A, García-Perdomo HA, Gherabi N, Hennessey D, et al. Efficacy of overactive neurogenic bladder treatment: A systematic review of randomized controlled trials. Archivio Italiano di Urologia e Andrologia. 2022;94(4):492-506.
15. Tractenberg RE, Groah SL, Frost JK, Yumoto F, Rounds AK, Ljungberg IH. Urinary symptoms among people with neurogenic lower urinary tract dysfunction (NLUTD) vary by bladder management. Topics in Spinal Cord Injury Rehabilitation. 2023;29(3):31-43.
16. Perez NE, Godbole NP, Amin K, Syan R, Gater DR. Neurogenic bladder physiology, pathogenesis, and management after spinal cord injury. Journal of personalized medicine. 2022;12(6):968.
17. Musco S, Rantell A, Linsenmeyer T, Eelen16 P, Wakefield U. Insights From an Expert Roundtable Discussion: Navigating Intermittent Catheterisation-Associated Complications. EMJ. 2023;8(3):38-48.
18. Stewart T, Hogan-Tricks M. A nurse led cauda equina service: a quality improvement project. British Journal of Neuroscience Nursing. 2023;19(3):84-9.
19. Alex J, Ferguson C, Ramjan LM, Montayre J, Lombardo L, Salamonson Y. Bundle-of-care interventions to improve self-management of patients with urinary catheters: Study protocol. Collegian. 2022;29(3):405-13.
20. Redboy S. Educational Material for Nurses in Managing Patients with Neurogenic Bladder: Walden University; 2023.