Physical Education, Health and Social Sciences

https://journal-of-social-education.org E-ISSN: 2958-5996

P-ISSN: 2958-5988

Effect of Skill Demonstration On Clean Intermittent Self Catheterization Among Spinal Cord Injury Survivors

Dost Muhammad Khan [1], Dr. Sardar Ali [2], Dr. Shah Hussain [3], Amin Ullah [4], Nargis [5]

[1] Dost Muhammad Khan RNO- RHC Darmai Swat. dostmuhammad15@gmail.com
[2] Dr. Sardar Ali Assistant Professor-Khyber Medical University Peshawar sardar.ins@kmu.edu.pk
[3] Dr. Shah Hussain, Assistant Professor -Zalan College of Nursing Swat. shahpicu@gmail.com
[4] Amin Ullah Medical Entomologist DHO office Peshawar aminullah880@gmail.com
[5] Nargis Head Nurse THQ hospital Kalam swat. nurgism63455@jmail.com
Corresponding Author dostmuhammad15@gmail.com

DOI: https://doi.org/10.63163/jpehss.v3i1.213

Abstract

Background

CISC is a valuable procedure for survivors of Spinal Cord Injury to use in managing urinary incontinence, which can cause complications like reinfection by Urinary Tract Infections and problems with the bladder. Nevertheless, many patients with an SCI are still challenged to master CISC; hence, it is essential to identify adequate training strategies.

Aim

The purpose of this research was to assess the effectiveness of using skill demonstration on the overall effectiveness of CISC in increasing technical proficiency, assertiveness, and self-sufficiency among SCI survivors.

Methods

Quasi-experimental research was used in this study, which was carried out at the Paraplegic Centre Hayatabad Peshawar with a sample of 54 participants selected through a convenient sampling technique. Information was obtained with a translated and cross-culturally adapted 12-item checklist of CISC performance that evaluated the performance before and after an intervention with the teaching of hands-on skills. To compare the pre and post-experimental data, the results of the paired sample t-tests and the Chi-square test were obtained to check the efficacy of the behavioral intervention.

Results

The results showed a positive shift in mean practice scores from pre-intervention (70.25%) to post-intervention (94.52%) in CISC skills, Wilcoxon test $p < 0.0001$. Concerning the intervention proposal, there was a significant improvement in good practice, with the number rising from 18.5% pre-intervention to 74.1% post-intervention. While receptiveness to change was influenced by education level and previous training in CISC, age and marital status did not impact the results.

Conclusion

Implementation of skills has demonstrated a positive impact on improving the CISC among SCI survivors and controlling complications. These results indicate the need to include practical cases in the training methods used to teach SCIs to become more self-sufficient in their everyday lives.

Keywords-Self-Catheterization, Spinal Cord Injury, Skill Demonstration, Self-Management

Introduction

Clean intermittent self-catheterization (CISC) is one of the most frequent techniques for persons with spinal cord injuries (SCI) to treat urinary incontinence. [1] It entails the periodic passing of a catheter in the bladder and subsequently removing the urine into it; this is crucial for managing a condition that might lead to complications such as urinary retention, infections, and others. People with paraplegia, people with quadriplegia, and others experiencing spinal cord injuries are locked in and lose voluntary control over their bladder, whereby CISC is an essential ability to uphold urinary integrity. [2]

This technique has a tremendous impact on enhancing the quality of the lives of these patients by reducing the outcomes of complications arising from the dysfunction of their bladder and enhancing their self-reliance in their day-to-day activities. [3] CISC can be offered as part of a professional curriculum after the patients have been explained about it or as part of a community health education program, and skills must be demonstrated. [4]

In the United States, 40 cases per million will be affected. The SCI cases do not have a registry at the national level in Pakistan. [5] Out of all the post-2005 earthquake victims, 650-750 of them sustained spinal cord injuries. According to the WHO, STIs suggest that UTIs are responsible for 40% of hospital-acquired infections among patients with Spinal Cord Injury and 80% of all infections associated with catheterization. Approximately 50% of SCI patients utilize the CISC method as a primary means of bladder management. [6]

SCI results in an injury to the nervous system, which, among other effects, impairs sensation and mobility below the site of the damage. [7] This limits mobility and affects other more or less automatic reflexes like the bladder. Because sensation, precisely that of a filled bladder, is typically lost when a person suffers from an SCI, such a survivor cannot urinate consciously, hence the need to learn how to do so safely and efficiently. [8] Clean intermittent self-catheterization is therefore helpful to individuals with SCI in emptying their bladder effectively and, at the same time, reducing the incidence of UTIs and other complications that result from wrong emptying of the bladder. [9]

Utilization of CISC is often viewed as having a cultural barrier, especially whenever SCI survivors introduce it. Knowledge of the technique entails theoretical and practical sessions, which is why skill demonstration is part of the learning process. [10] Those are useful, as demonstrations let people see the process and gain Confidence in the procedure to be done alone. For this reason, the study showed that people given appropriate examples of CISC are more likely to practice it, minimizing the effects of improper catheterization on their general health. [11]

Hence, CIS is one of the most critical skills spinal cord injury survivors need to learn when it comes to bladder care. [12] Assisted skills training blended with continuing education, counseling, and resource availability is vital in helping clients independently practice and execute this technique. [13] Health caregivers should consider both the physical and emotional requirements of SCI survivors when seeking to implement CISC training to have better results. Maintaining the emphasis on commitment to product development, affordability, and comprehensiveness in the practice of self-catheterization is the most significant element in its successful and sustainable practice among SCI survivors all over the globe. [14]

Methodology

A quantitative quasi-experimental study design was employed to fulfill the study objectives, including pre- and post-assessing parameters and associations. The current study was carried out at the Paraplegic Center Hayatabad Peshawar. Data was collected from the paraplegia patients. The study used Convenience Sampling. The sample size for the study was computed using G-Power statistical software, which is widely used for accurate sample size calculations. A sample of 54 participants was used, with an effect size of 0.5 and an alpha error of. 05, and a power of.95 was fixed for this study. A validated (CVI 0.92) and reliable (KR 20- 0.84) questionnaire was used for Data collection.

Data collection process

The Graduate Committee and the Advanced Board of Research Studies were sought and granted permission to conduct the study before data could be collected. Subsequent permission was sought from the Ethical Review Board and the concerned departments for data collection. All participants signed a written informed consent after understanding the study's goal. A validated 12-item checklist was employed to administer data in the pre and post-phases before and after the intervention.

The tool comprises a Demographic Data Questionnaire and an assessment checklist for Clean Intermittent Self-Catheterization (CISC). In addition to demographic information of gathering age, marital status, education level, and employment status of the participants, the demographic questionnaire also includes a section about the cause of injury and training regarding CISC, which the participants attended before. It also looks at the origins of training and the beginning of the initiation procedure. The assessment checklist assesses the specific utilization of CISC techniques. The data were gathered from primary researchers and the institution's professional staff. The data was collected in three waves.

In phase 1 of the study, data were obtained as a baseline measure of the degree of self-catheterization among the participants.

Phase 2, participants' catheterization self-training instruction was done using routine, well-established processes from the literature.

Phase 3, data was obtained again after two weeks to check the level of self-catheterization in the patients and the effectiveness of the demonstration. Every ethical issue was addressed when collecting the data.

Data Analysis Procedure

Data analysis is part and parcel of the research plan. The steps usually taken when engaging in data analysis in research revolve around how the results can be presented most logically. Further, the collected data was processed and analyzed using the Statistical Package for the Social Sciences-SPSS Software, the latest version being 27. The checklist used for data collection consisted of 12 items, and the scoring was categorized as follows: A practice with a score above 80% was classified as Good Practice, while 60-79% was Average Practice, and below 59% was Poor Practice.

The results derived from the analysis process were presented in frequency tables and graphs to ease understanding. For the continuous variable, the variables of means and standard deviations, such as age, were used. For categorical data (gender, level of education, relationship with the patient), percentages and frequency were calculated so as not to complicate the presentation of findings. A pre-test post-test matched pair(t) test was conducted on the results to determine the significance of the effect of skill demonstration on practice levels among spinal cord injury survivors in clean intermittent self-catheterization. Chi-square analysis was applied to assess the importance of practice scores with some demographic variables before the demonstration. Other relevant statistical tests were employed in the study depending on the findings necessary to analyze the data exhaustively.

Ethical Considerations

The ethics approval was sought from ASRB and the Ethical Committee Board of Khyber Medical University, Peshawar. Consent was sought and received from the Director of selected hospitals. The participant provided Information about the Study that was to be conducted, including the benefits, risks, and their right to withdraw from the study. Finally, participants underwent signed consent as indicated by the Consent form presented in this study under Annexure I. The code system averts the participants' identification. Information dissemination on the findings will be made without revealing the identity of the participants.

Results

Demographic Characteristics of Participants

Most participants were within the age range of 31-40 years. About 60% of the participants are single, suggesting they are relatively young. As for the level of education, slightly more than a quarter (25.9%) have professional education, and only a few (9.3%) are illiterate. Preventable injuries as a group are defined as those that result from road traffic accidents 46.3%, and firearms 18.5%. (Table 1)

Table 1: Demographic Characteristics of Participants

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age	18-30	12	22.2%
	31-40	15	27.8%
	41-50	14	25.9%
	51-55	13	24.1%
Marital Status	Single	10	18.5%
	Married	44	81.5%
Education	Illiterate	5	9.3%
	Primary	8	14.8%
	Secondary	12	22.2%
	Higher School	15	27.8%
	University	14	25.9%
	Others (Diploma)	5	9.3%
Cause of Injury	Road Traffic Accident	25	46.3%
	Fire Arm Injury	10	18.5%
	Fall from Height	8	14.8%
	Coal Mine Incident	5	9.3%
	Bomb Blast	4	7.4%
	Others	2	3.7%
Employment Status	Employed	24	44.4%
	Unemployed	30	55.6%
Previous Training Regarding CISC	Yes	35	64.8%
	No	19	35.2%
Training Received From	Doctor	20	37.0%
	Nursing Staff	15	27.8%
	Technical Staff	10	18.5%
	Others (Workshops)	9	16.7%
Starting Month or Year of the CISC	Less than 1 Month	18	33.3%
	2 Months	12	22.2%
	3 Months	10	18.5%
	More than 3 Months	14	25.9%

Figure 1: Cause of Injury

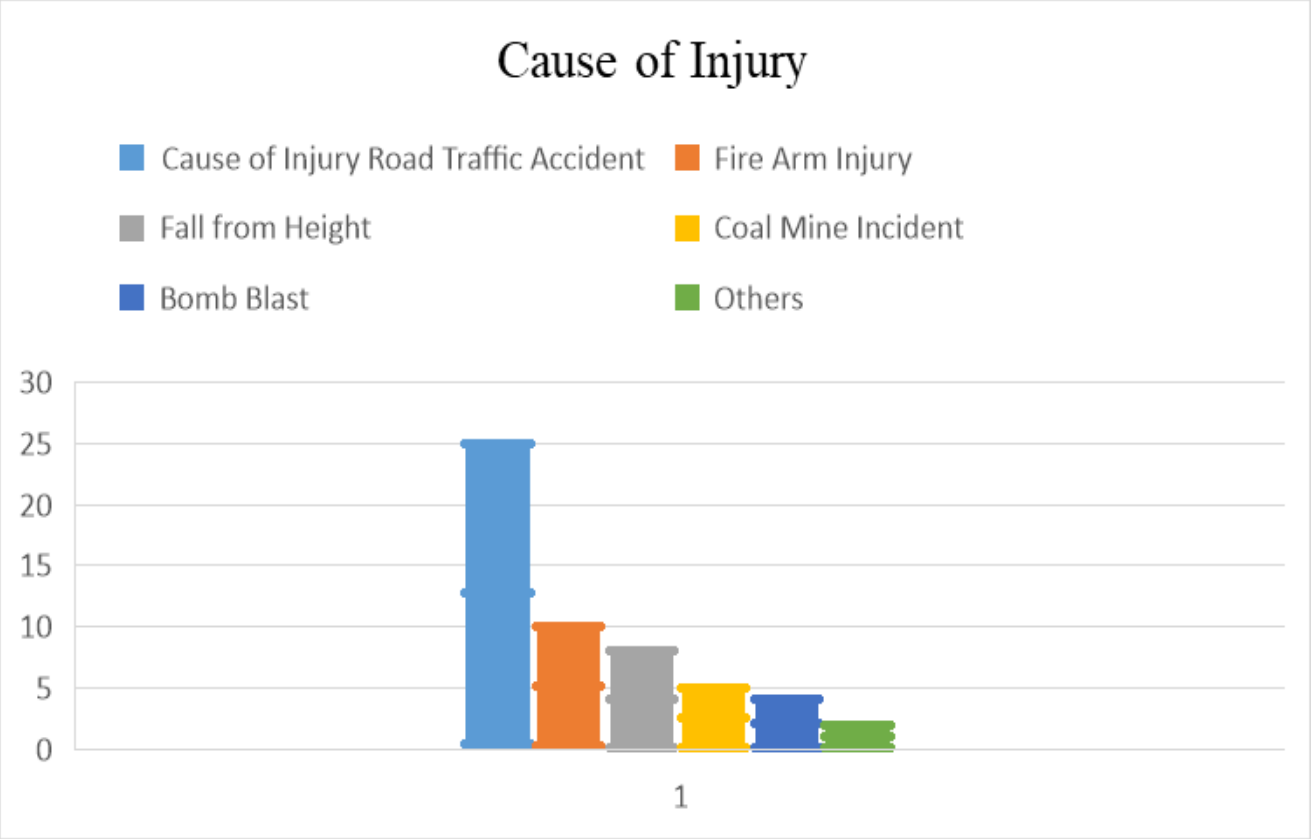


Figure 1 shows that Self-generated road traffic accidents have been identified as the main reason for participants' injuries, according to the diagram below. The Flying figure shows that 46.3% of injured participants incurred mishaps from self-generated road traffic accidents. Firearm injuries come second at 18.5%, while those that arise from falls from heights account for 14.8%. Other causes are relatively rare: coal mine occurrences (9.3%), bombing (7.4%), and other forms of accidents (3.7%).

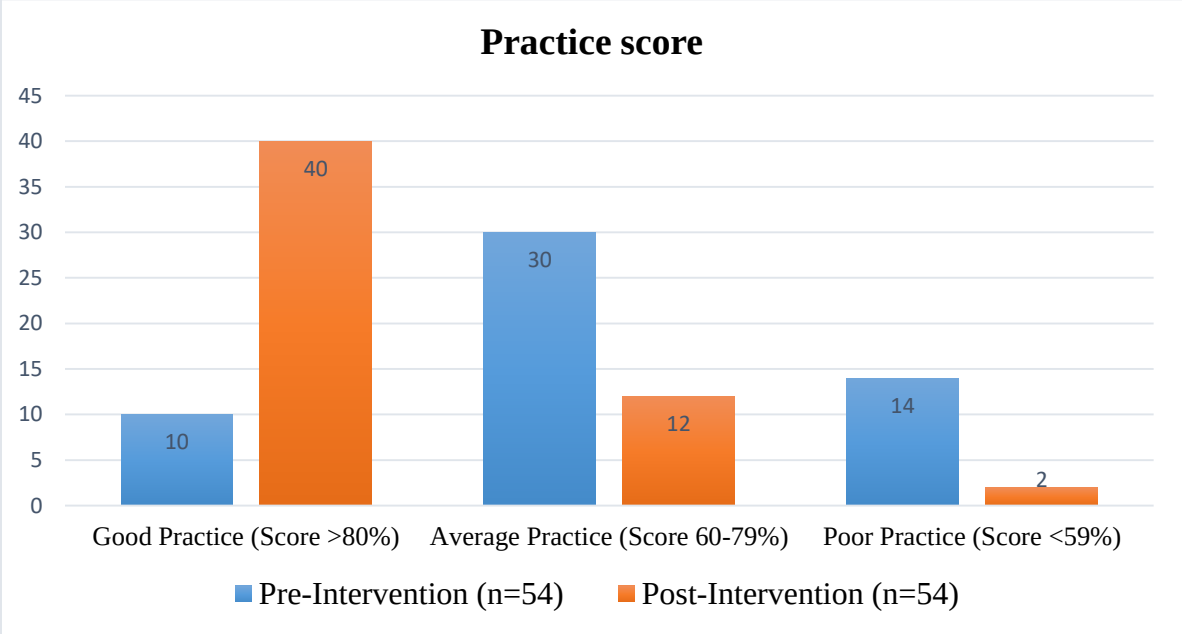
Table 2: Pre- And Post-Intervention Scores

Step	Step Description	Pre-Intervention Score (%)	Post-Intervention Score (%)
1	Washed hands	75%	95%
2	Prepared and set up supplies	80%	100%
3	Confirmed that the location is suitable and private	70%	90%
4	Positioned properly as a spinal cord injury patient	60%	85%
5	Put on gloves	90%	98%
6	Held the catheter about 3 inches from the tip	65%	90%
7	Lubricated the tip of the catheter	80%	95%
8	Cleaned the penis starting from the urethral opening	85%	100%

9	Gently inserted the catheter 6-8 inches and allowed urine to drain	70%	95%
10	Pinched the catheter while withdrawing it	50%	85%
11	Assessed urine output	80%	95%
12	Removed gloves and washed hands	90%	100%

Table 2 highlights improved scores of catheterization skills post-intervention, showing a considerable enhancement in all the procedural steps among the participants. Lower scores obtained before the intervention (50%—90%) indicate the presence of variation in baseline skills that require differentiation in training. After the interventional phase, significant improvements were recorded, especially in inappropriate positioning (60% to 85%) and catheter handling (50% to 85%).

Figure 2: Pre- and Post-Intervention Scores for Self-Catheterization Practice



The above figure shows an increase in the self-catheterization practice scores after intervention. As a result of the assessment conducted before the intervention, the overall level of skills for a significant portion of students was average: 55.6% of the learners performed as such, while 18.5% demonstrated a good level of practice, and 25.9% were poor. In post-intervention, overall good practice increased significantly, and the test result also improved to 74.1% of the total, indicating improvement in the degree of skillfulness.

Table 3: Paired Sample t-Test Results for Pre- and Post-Intervention Scores

Variable	Mean (Pre)	Mean (Post)	t-value	p-value
CISC Practice Score	70.25	94.52	15.32	0.000

Table 3 shows the findings of the paired sample t-test on assessing CISC practice with clients pre-and post-intervention. The mean percentage before intervention was 70.25 %, while that after the intervention was 94.52 %, significantly improving. The t-test calculated 15:32 and the p-test 0:000 discredit the null hypothesis and affirm that there is a statistically significant difference in practice scores. These facts confirm the high efficacy of the offered intervention at improving participants' skills for self-catheterization and ensuring necessary levels of skill improvement and adherence to standards.

Table 4: Demographics and Pre-Intervention Practice Score

Demographic Variable	Category	Chi-Square Value (χ^2)	P-Value	Association with Pre-Intervention CISC Score
Age	18-30	2.45	0.30	Not Significant
	31-40			
	41-50			
	51-55			
Marital Status	Single	4.12	0.04	Not Significant
	Married			
Education	Illiterate	8.50	0.03	Significant
	Primary			
	Secondary			
	Higher School			
	University			
Cause of Injury	RTA	6.21	0.01	Not Significant
	Firearm Injury			
	Fall from Height			
	Coal Mine Incident			
	Bomb Blast			
	Others			
Employment Status	Employed	0.98	0.77	Not Significant
	Unemployed			
Previous Training-CISC	Yes	12.34	0.0001	Significant
	No			
Training Received From	Doctor	3.45	0.18	Not Significant
	Nursing Staff			
	Technical Staff			
	Others (Workshops)			
Starting Month/Year	Less than 1 Month	1.27	0.73	Not Significant
	2 Months			
	3 Months			
	More than 3-Months			

Interpretation

The findings show that there are significant variables that the independent variables – pre-intervention CISC practice scores – are correlated to. Pre-intervention scores have a weak positive correlation with educational level, with a probability value 0.03. This implies that acquired education might influence the ability of the participants to master the CISC practice. Prior experience in CISC also came out as an influential variable in forecasting practice performance in the first phase, with a high probability value suggesting that learners who have taken indicative preparation perform well in practice tests. The lack of training is a particular concern highlighted by this study because it underlines a primary method of managing fundamental FCM skills for self-catheterization.

Discussion

The study demonstrated significant improvements in participants' ability to perform Clean Intermittent Self-Catheterization (CISC) following the intervention, with the most notable advancements in patient positioning and catheter insertion. This improvement highlights the effectiveness of targeted educational programs in addressing specific skill gaps. The statistically significant change in practice scores, from 70.25% pre-intervention to 94.52% post-intervention, reflects the importance of structured and interactive learning approaches in enhancing procedural competencies. These findings align with similar research emphasizing the critical role of skill demonstrations and hands-on practice in improving healthcare practices.[15]

The study results underscore the impact of prior knowledge on initial performance. Participants with previous exposure to CISC concepts performed significantly better in pre-intervention assessments, confirming that baseline knowledge is a strong predictor of competency. However, the training was particularly beneficial for individuals with limited prior knowledge, as they demonstrated the most significant relative improvement.[16] This suggests that while prior exposure enhances readiness, well-designed interventions can successfully bridge knowledge and skill gaps for all participants. These findings are consistent with studies that advocate prioritizing individuals with minimal baseline knowledge in training programs, ensuring equitable outcomes across diverse learner groups.[17]

The interactive, hands-on approach employed in the intervention proved to be a crucial factor in its success. Participants actively engaged in demonstrations and received personalized feedback during practice sessions, which enhanced their technical skills and increased their Confidence in performing the procedure independently. [18] This combination of theoretical knowledge and practical application aligns with adult learning principles, which emphasize the importance of experiential learning in achieving long-lasting educational outcomes. [28] Participants' improved self-assurance post-intervention further reinforces that interactive methods are more effective than passive instructional techniques.[19]

One of the study's key findings was the absence of significant associations between demographic variables, such as age, marital status, employment status, and post-intervention performance. This contrasts with some literature suggesting that factors like age or social support might influence self-care practices. [Twenty] older adults are often reported to face challenges in self-catheterization due to reduced dexterity or cognitive decline. [21] However, the results of this study suggest that with appropriate training, demographic factors may exert less influence than previously thought. [30] These findings highlight the universal applicability of structured training programs, which can benefit individuals across a wide range of demographic characteristics.[22]

The study also identified limitations that warrant further investigation. The relatively small sample size and confinement to a single hospital limit the generalizability of the findings.[29] Expanding the research to include multiple centers and more prominent, diverse populations would provide a broader understanding of the intervention's effectiveness across different contexts. [23] Additionally, the lack of long-term follow-up means whether the skills acquired during the intervention are sustained over time remains uncertain. [24] Future studies should incorporate extended follow-up periods to evaluate the durability of these outcomes and explore strategies for maintaining long-term competency, such as periodic refresher training.[25]

Another important consideration is the role of systemic and contextual factors in shaping participants' ability to adopt and sustain CISC practices. Limited access to resources, such as educational materials and supervision, can act as barriers to effective self-care. [26] Addressing these challenges requires a comprehensive approach that includes developing accessible training tools, such as instructional videos and mobile applications, which participants can use for continued learning and reference. [27] Such resources could also extend the reach of training programs to underserved or remote areas, ensuring broader accessibility and equity.[31]

Conclusion

The findings of this study revealed that skill demonstration on Clean Intermittent self-catheterization (CISC) enhanced the technique and practice among spinal cord injury survivors. Participants displayed improved self-catheterization ability, which is essential if the patients are to be effectively managed in the case of neurogenic bladders. The positive effects state that practical training should enhance patient competencies regarding handling diverse and intricate healthcare tasks, preferably independently. This work proves that the demonstration similarly has a crucial place in promoting patient control and self-care procedures since health personnel provide explicit examples that foster Confidence and reduce errors.

Limitations

The study had several limitations, which should be considered when reflecting on the findings. First, the sample size was relatively small, comprising 54 individuals, to investigate possible findings within larger or differently marginated spinal cord injury survivors. Hence, data were collected from several centers with a higher number of subjects to ascertain whether skill demonstration had an impact on CISC.

Second, the study data was collected only at a single institution, which may have influential biases or a limited number of patients. These findings may not be transferable to other settings using patients of different characteristics, different health care systems, or different resources. When the study was conducted, the researchers only assigned patients from one specific hospital or rehabilitation center. In order to overcome this limitation, we expanded the study to several hospitals or rehabilitation centers.

Lastly, the last follow-up was only two weeks after the intervention implementation, despite the ultimate aim of practice change being sustainable. A more extended follow-up period would have been more desirable in determining if the training in self-catheterization was sustained over time and whether it meant a lower incidence of complications or an improved perceived quality of life in that sample.

Recommendations

- **Enhancing Educational Programs:** Include Clean Intermittent Self-Catheterization (CISC) as part of a nursing, medical, and allied health learning curriculum to achieve early familiarization with practice.
- **Use of Simulation-Based Learning:** Use simulation exercises in order to give students actual practical training on CISC while developing their skills.
- **Periodic Refresher Courses:** Establish repeated educational recurrent continuing education programs and seminars to maintain competency levels and conformance to the new changes to clinical practice.
- **Standardized Training Protocols:** Strengthen and apply practice protocols for the CISC roles within a range of healthcare practices, achieving Staff Training & Development and Staff Training across numerous healthcare services.
- **Competency Assessments:** Promoting and implementing ways of assessing and certifying that practicing healthcare staff is able to meet the set level of CISC consistently.
- **Accessibility of Resources:** Ensure that, for instance, patients and caregivers are offered informational messages in the form of pictures, handouts, and relevant Information Technology videos to enrich the understanding acquired in the clinical setting through Refresher sessions.
- **Incorporating Technology:** Develop openness, convenience and flexibility of training programs using learning technologies such as digital and mobile platforms for continuous training of healthcare workers and patients.

Implication of the Study

This study focuses on the best practices that help enhance the implementation of Clean Intermittent Self-Catheterization (CISC) among spinal cord injury survivors, which includes the demonstration of the right skills. It emphasized the need for skillfully supervised and structured education programs in health fields assisting patients in self-bladder management most securely and efficiently; consequently, there would be fewer complications regarding health. The authors also recommend more work to establish the durability of the aforementioned interventions and other effective approaches toward the improvement of patient self-management and rehabilitation.

References

Joshi AD, Shukla A, Chawathe V, Gaur AK. Clean intermittent catheterization in long-term management of neurogenic bladder in spinal cord injury: patient perspective and experiences. International Journal of Urology. 2022 Apr;29(4):317-23.

Chapple C, Abrams P, Lam T, Mangera A, Belal M, Curtis C, Emkes J, Hillery S, Irwin K, Logan K, Weston P. A consensus statement on when to start clean intermittent self-catheterization: An untapped resource. Neurourology and Urodynamics. 2024 Feb; 43(2):459-63.

Ilyas S, Tariq I, Anwar K, Arshad H, Butt M. Effects of upper limb ergometer on pulmonary functions among spinal cord injury patients. Physiotherapy Quarterly. 2023 Oct 1; 31(4).

Poublon CG, Scholten EW, Wyndaele MI, Post MW, Stolwijk-Swüste JM. Changes in bladder emptying during inpatient rehabilitation after spinal cord injury and predicting factors: data from the Dutch Spinal Cord Injury Database. Spinal Cord. 2023 Nov; 61(11):624-31.

Gomez-del Rio T, Rodríguez J. Design and assessment of a project-based learning in a laboratory for integrating knowledge and improving engineering design skills. Education for Chemical Engineers. 2022 Jul 1; 40:17-28.

Moreno-Guerrero AJ, Rodríguez-Jiménez C, Gómez-García G, Ramos Navas-Parejo M. Educational innovation in higher education: Use of role playing and educational video in future teachers' training. Sustainability. 2020 Mar 24;12(6):2558.

Younes SN. Anticancer Activity of Guggulsterone in Human Leukemic Cells (Master's thesis).

Brewer-García L. Beyond Babel: Translations of Blackness in Colonial Peru and New Granada. Cambridge University Press; 2020 Aug 6.

Zavala C, Waters L, Arslan G, Simpson A, del Prado PN, Gargurevich R, Zavala C, Waters L, Arslan G, Simpson A, Nuñez del Prado P. Psychological Trauma: Theory, Research, Practice, and Policy.

Ingle T, Allen E, Salt M, DelSignore LA. Update in Pediatric Critical Care. InUpdate in Pediatrics 2024 Feb 6 (pp. 149-179). Cham: Springer International Publishing.

Wen JG. The Popularization of Clean Intermittent Catheterization Is a Historical Trend. InProgress in Clean Intermittent Catheterization 2024 Sep 29 (pp. 1-5). Singapore: Springer Nature Singapore.

Robinson C, Ecclestone H, Hamid R. Spinal Cord Injury. In Handbook of Neurourology: Theory and Practice 2023 Oct 26 (pp. 789-800). Singapore: Springer Nature Singapore.

Lam TB, Mangera A, Abrams P, Belal M, Curtis C, Emkes J, Goddard JC, Hillery S, Irwin K, Logan K, Thiruchelvam N. A Narrative Review of Micro-hole Zone Technology: An innovation in clean intermittent self-catheterization. Continence. 2024 Sep 1; 11:101332.

Wen JG. Choosing the Right Catheter and Related Consumables Is a Condition for Successful CIC. InProgress in Clean Intermittent Catheterization 2024 Sep 29 (pp. 21-30). Singapore: Springer Nature Singapore.

Amin FM, Sundari H. EFL students' preferences on digital platforms during emergency remote teaching: Video Conference, LMS, or Messenger Application? Studies in English Language and Education. 2020 Sep 3; 7(2):362-78.

Bozkurt A, Jung I, Xiao J, Vladimirschi V, Schuwer R, Egorov G, Lambert S, Al-Freih M, Pete J, Olcott Jr D, Rodes V. A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. Asian Journal of Distance Education. 2020 Jun 6; 15(1):1-26.

Yamaki C, Takayama T, Hayakawa M, Wakao F. Users' evaluation of Japan's cancer information services: process, outcomes, satisfaction and independence. BMJ Open Quality. 2021 Dec 1; 10(4):e001635.

Parisi MC. Whole Child Education and Integrated Support Systems. BU Pub. Int. LJ. 2024; 33:69.

Jensen BT, Lauridsen SV, Jensen JB. Optimal delivery of follow-up care after radical cystectomy for bladder cancer. Research and Reports in Urology. 2020 Oct 14:471-86.

Lam TB, Mangera A, Abrams P, Belal M, Curtis C, Emkes J, Goddard JC, Hillery S, Irwin K, Logan K, Thiruchelvam N. A Narrative Review of Micro-hole Zone Technology: An innovation in clean intermittent self-catheterisation. Continence. 2024 Sep 1; 11:101332.

Tayan O, Hassan A, Khankan K, Askool S. Considerations for adapting higher education technology courses for AI large language models: A critical review of the impact of ChatGPT. Machine Learning with Applications. 2023 Nov 25:100513.

Wu SY, Jhang JF, Liu HH, Chen JT, Li JR, Chiu B, Chen SL, Kuo HC. Long-term surveillance and management of urological complications in chronic spinal cord-injured patients. Journal of Clinical Medicine. 2022 Dec 9;11(24):7307.

Manaila AI, Roman NA, Baseanu IC, Minzatanu D, Tuchel VI, Basalic EB, Miclaus RS. The Efficiency of Rehabilitation Therapy in Patients Diagnosed with Neurogenic Bladder: A Systematic Review. Medicina. 2024 Jul 17; 60(7):1152.

Sahu R, Sahu B, Rawal RK. Neurologic Urology Disorders: Evidence-Based Clinical Symptoms and Therapeutic Approaches. InEvidence-Based Neurological Disorders 2024 (pp. 311-355). Jenny Stanford Publishing.

Bach MH, Beck Hansen N, Ahrens C, Nielsen CR, Walshe C, Hansen M. Underserved survivors of sexual assault: A systematic scoping review. European Journal of Psych traumatology. 2021 Jan 1;12(1):1895516.

Vera San Juan N, Shah P, Schlief M, Appleton R, Nyikavaranda P, Birken M, Foye U, Lloyd-Evans B, Morant N, Needle JJ, Simpson A. Service user experiences and views regarding telemental health during the COVID-19 pandemic: A co-produced framework analysis. PloS one. 2021 Sep 16; 16(9):e0257270.

Zahoor Z, Papadopoulos A, Nowrouzi-Kia B, Ibrahim P, Tadrous M, Gohar B. Behind the counter: Exploring pharmacists' stressors and lessons learned during the pandemic in Ontario, Canada. Health Services Insights. 2023 May; 16:11786329231169937.

Christensen LF, Wilson R, Hansen JP, Nielsen CT, Gildberg FA. A qualitative study of patients' and providers' experiences with the use of videoconferences by older adults with depression. International Journal of Mental Health Nursing. 2021 Apr; 30(2):427-39.

Gonzalez JD, Martin L, Osmundsen B, Garg B, Gregory WT, Cichowski S. Understanding the Pursuit of Third-Line Therapies for Overactive Bladder: A Mixed Methods Study. Urogynecology. 2024 Mar 1; 30(3):188-96.

MARTÍ VG. Efficacy of augmented reality versus conventional physical therapy for the improvement of balance, gait, upper-limb and dual task in people with multiple sclerosis (Doctoral dissertation, Universitat de València).

Hussain S, Ali S, Muhammad D, Khan EH, Anwar M. Effect of Demonstration Regarding Percutaneous Endoscopic Gastrostomy Tube Feeding among Caregivers of Patients Diagnosed with Esophageal Carcinoma. medtigo Journal. 2024 Dec 23;2(4).