Rehabilitation and Sports Medicine. 2025; 5:116
doi: 10.56294/ri2025116

CASE REPORT

Caregiver Training in the Management of Neurogenic Bladder in Individuals with Spinal Cord Injury: A Case Report

Capacitación del Cuidador en la Gestión de la Vejiga Neurogénica en Personas con Lesión Medular: Un Informe de Caso

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Cite as: Rodrigues P, Ribeiro M, Sousa L, Severino S. Caregiver Training in the Management of Neurogenic Bladder in Individuals with Spinal Cord Injury. Rehabilitation and Sports Medicine. 2025; 5:116. https://doi.org/10.56294/ri2025116

Submitted: 08-04-2024 **Revised:** 28-09-2024 **Accepted:** 12-03-2025 **Published:** 13-03-2025

Editor: PhD. Nicola Luigi Bragazzi

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ABSTRACT

Introduction: spinal cord injury presents a significant challenge for rehabilitation, with neurogenic bladder being one of its most demanding complications. Proper management is crucial for the quality of life of affected individuals, often requiring caregiver involvement. Rehabilitation Nursing plays a central role in empowering the caregiver, ensuring continuity of care after the hospital period.
Objective: to describe the outcomes of caregiver training in managing neurogenic bladder in individuals with spinal cord injury, conducted by a Rehabilitation Nursing Specialist, focusing on promoting autonomy and empowerment of both the person and their family.
Method: case report based on the CARE guidelines, detailing the intervention of the Rehabilitation Nursing Specialist in training the individual's father. The results were measured using the Barthel Index, the Functional Independence Measure, and knowledge gains.
Results: the active involvement of the caregiver in neurogenic bladder management allowed for continuity of care during the post-hospital period, minimizing risks and promoting a smoother adaptation to the home environment. Caregiver empowerment contributed to reduced institutional dependence and a safer transition to the community setting.
Conclusion: caregiver training proved to be essential for managing neurogenic bladder, facilitating rehabilitation and preserving the autonomy of individuals with spinal cord injury. The intervention by the Rehabilitation Nursing Specialist, grounded in Orem's Self-Care Theory and Meleis' Transition Theory, highlights the need for a holistic and participative approach in rehabilitation.

Keywords: Rehabilitation Nursing; Caregiver Training; Neurogenic Bladder; Spinal Cord Injury; Empowerment.

RESUMEN

Introducción: la lesión medular representa un gran desafío para la rehabilitación, siendo la vejiga neurógena una de las complicaciones más exigentes. Su gestión es esencial para la calidad de vida de las personas, requiriendo frecuentemente la participación de los cuidadores. La Enfermería de Rehabilitación desempeña un papel central en la capacitación del cuidador, garantizando la continuidad de los cuidados tras el período hospitalario.
Objetivo: describir los resultados de la capacitación del cuidador en la gestión de la vejiga neurógena en

personas con lesión medular, realizada por el Enfermero Especialista en Enfermería de Rehabilitación, en términos de promoción de la autonomía y empoderamiento de la persona y su familia.
Método: informe de caso basado en las directrices CARE, que describe la intervención del Enfermero Especialista en Enfermería de Rehabilitación en la capacitación del padre de la persona. Los resultados se midieron mediante el Índice de Barthel, la Medida de Independencia Funcional y las ganancias en conocimiento.
Resultados: la participación activa del cuidador en la gestión de la vejiga neurógena permitió la continuidad de los cuidados durante el período post-hospitalario, minimizando riesgos y promoviendo una mejor adaptación al entorno doméstico. El empoderamiento del cuidador contribuyó a una reducción de la dependencia institucional y a una transición segura al contexto comunitario.
Conclusión: la capacitación del cuidador demostró ser esencial para la gestión de la vejiga neurógena, facilitando la rehabilitación y la preservación de la autonomía de las personas con lesión medular. La intervención del Enfermero Especialista en Enfermería de Rehabilitación, basada en la Teoría del Autocuidado de Orem y la Teoría de las Transiciones de Meleis, refuerza la necesidad de un enfoque holístico y participativo en la rehabilitación.

Palabras clave: Enfermería de Rehabilitación; Capacitación; Vejiga Neurógena; Lesión Medular; Empoderamiento.

INTRODUCTION

Spinal cord injury (SCI) is one of the most challenging clinical conditions in terms of rehabilitation and functional reintegration. Among its main complications, neurogenic bladder stands out as a factor with a significant impact on quality of life, requiring a structured approach to managing urinary continence and preventing complications such as recurrent urinary infections and autonomic dysreflexia.[1]

Neurogenic bladder is a dysfunction of the lower urinary tract resulting from neurological alterations that compromise the coordination between the contraction of the detrusor muscle and the functioning of the urethral sphincter. Depending on the level and extent of the lesion, it can vary in its manifestations and symptoms.[1,2] In the context of SCI, the interruption of nerve pathways can result in bladder emptying dysfunction, increasing the risk of urinary infections, vesico-ureteral reflux and autonomic dysreflexia.[3]

Rehabilitation Nursing (RN) promotes health gains by preventing disability and enhancing the person's autonomy.[4] In this context, the transition to the home requires the training of caregivers to ensure continuity of care, which is essential for rehabilitation. This case report illustrates how the preparation of the person's father was decisive for his success, based on Orem's Self-Care Theory [5] and Meleis' Theory of Transitions.[6]

This study is a case report, written in adherence to the CARE guidelines to ensure accurate, transparent, and structured reporting of clinical cases. The aim is to describe a specific caregiver training intervention—not with the intent of generalizability, but to illustrate an exemplar of clinical practice in Rehabilitation Nursing. The CARE guidelines were applied during the reporting phase, not during the design or implementation of the intervention.

METHOD

This study, developed according to the CARE guidelines, is a case report that describes the intervention of the Rehabilitation Nurse Specialist in training the main caregiver of a 39-year-old male victim of a traumatic accident that resulted in a comminuted C5 fracture and subsequent tetraplegia. The development of a reflex neurogenic bladder led to the need for intermittent catheterization (IC) to ensure urinary elimination and prevent complications. On admission to hospital, he had total dependence for activities of daily living (Modified Barthel Index (MIB) = 0; Functional Independence Measure (FIM) = 48). The person's father, identified as the main caregiver, showed interest and motivation to actively participate in the rehabilitation process, becoming a key element in the continuity of care.

The FIM and the MBI were selected for their validity and sensitivity in SCI populations. Smith et al. highlighted that lower FIM scores correlate with higher need for caregiving hours, which supports its use as a proxy for autonomy and care dependency, including for bladder management.[7]

Additionally, Roth et al. demonstrated high correlation between FIM and MBI scores across multiple time points in SCI patients, validating both tools for functional assessment in this population. They noted that both scales effectively reflect burden of care, particularly in self-care and mobility domains, which are directly relevant to the assessment of caregiver training outcomes.[8]

The intervention focused on training the caregiver, ensuring continuity of care after the hospital stay,

promoting the acquisition of skills in managing urinary elimination, intermittent catheterization technique and identifying warning signs of complications. The results were evaluated using an instrument based on the Nursing Outcomes Classification (NOC), allowing for a descriptive analysis of the gains in knowledge and autonomy of the caregiver.

The training was delivered over six individualized sessions, conducted three times a week during the hospitalization period, each lasting approximately 60 to 90 minutes. The structure of each session included theoretical explanation, visual demonstration by the rehabilitation nurse, supervised practice by the caregiver, and correction of technique in real time. Educational tools included illustrated procedural guides, created based on the procedure guide from the Portuguese Order of Nurses.[9]

Competency assessment was performed using direct observation and a performance checklist, requiring the caregiver to correctly execute all steps of intermittent catheterization on two separate occasions without prompting. Proficiency was further reinforced through simulation of complication scenarios and verbal feedback from the caregiver regarding risks, side effects, and warning signs.

The NOC-based instrument used to assess caregiver knowledge was developed using indicators from the NOC. Although this tool has not undergone full psychometric validation in this specific domain, there is growing evidence supporting the reliability and validity of NOC-based outcome measures. For instance, Sampaio et al. conducted a rigorous psychometric evaluation of two Portuguese versions of the NOC outcomes, demonstrating high internal consistency (Cronbach's α = 0,90), strong interrater reliability (ICC = 0,997), and a robust factorial structure.[10] These findings support the potential of NOC outcome indicators as reliable and valid tools for clinical and research use in the Portuguese context. The validation of NOC outcomes appears particularly relevant not only due to the scarcity of studies in this area, but also because of the limited research available on the methodologies for their validation.

RESULTS

The intervention was structured around empowering the father, ensuring that he acquired the necessary skills for bladder management and promoting maximum autonomy for the person. The diagnoses, objectives and RN interventions are presented in table format.

Table 1. RN diagnoses, objectives and interventions in caregiver training

RN Diagnosis	Objectives	RN interventions	Frequency & Duration	Competency Evaluation
Potential to improve caregiver knowledge of self-control: urinary continence	Promote urinary elimination Prevent infection	- Teaching about urinary elimination planning; - Planning urinary elimination - Teaching urinary catheter insertion - Teaching the technique of stimulating the trigger zones for urination - Teaching how to change a urinary device	6 sessions, 60-90 min each, 3 times a week	- Direct observation with checklist; - Error-free demonstration in the last 2 sessions.
Potential to improve the caregiver's ability to perform the bladder catheterization technique	Promoting self-control: Family member's urinary incontinence	- Assess progress in ability to perform bladder catheterization - Instruction in the technique of stimulating micturition trigger zones - Train in the technique of stimulating micturition trigger zones - Instruct technique for performing bladder catheterization - Train technique to perform bladder catheterization	6 sessions, 60-90 min each, 3 times a week	- Direct observation with NOC - based checklist; -Error-free demonstration in the last 2 sessions.

Next, an evaluation tool was applied in graph format, presented in the Nursing Outcomes Classification,[11] in order to guarantee and measure the success of the planning mentioned in the previous table. The following graph illustrates the two evaluation moments throughout the intervention period, allowing an analysis of the gains achieved between the beginning and the end of the intervention. On the vertical axis of the graph are the knowledge indicators, while the horizontal axis represents the assessment given, where 1 corresponds to "no knowledge" and 5 indicates "extensive knowledge".

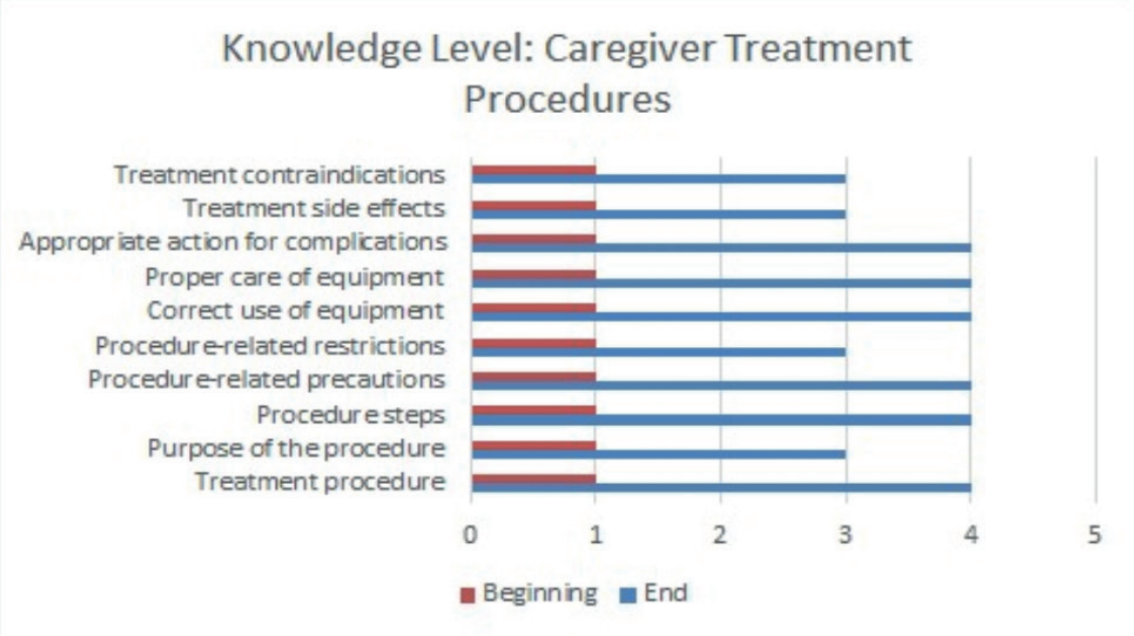

Figure 1. Level of Knowledge: Treatment Procedures by the Caregiver

DISCUSSION

The training of the main caregiver is an essential element in the rehabilitation of the person with SCI, as it directly influences the safety of the transition to the home. Studies show that "the training process is not limited to the person as a unique individual, but also their context, such as family, work and social environment, because knowledge and learning are not limited to people with disabilities" (p.67).[12]

The caregiver training implemented in this intervention is theoretically supported by both Orem's Self-Care Theory and Meleis' Transitions Theory. According to Orem, nursing care becomes necessary when an individual experiences a self-care deficit. In such situations, training a caregiver can serve as a compensatory strategy, enabling them to act as an "extension" of the person, thereby addressing limitations, reducing institutional dependency, and preserving personal autonomy. From this perspective, the caregiver temporarily substitutes the individual's self-care capacity, effectively supporting the restoration or maintenance of health.

Meleis' Transitions Theory further reinforces the value of structured interventions during critical life transitions—such as the shift from hospital to home care. The training provided to the caregiver ensured a safe and person-centred transition, respecting the individual's and the caregiver's/father's shared goal of returning home. This approach aligns with the theoretical emphasis on mitigating vulnerability during transitions through anticipatory guidance and support.

Teaching the caregiver provided significant gains in the acquisition of knowledge, with a rating of "substantial knowledge" in most parameters, and in the ability to manage self-control of elimination. The caregiver acquired practical skills in the intermittent catheterization technique (procedure, precautions, restrictions, side effects and contraindications), urinary elimination planning, as well as early identification of signs of complications, such as autonomic dysreflexia or urinary tract infections.

Our findings align with existing literature regarding the importance of caregiver education in SCI contexts. LaVela et al. highlight the physical burden experienced by caregivers of individuals with SCI, particularly the prevalence of insufficient sleep, coronary heart disease, and obesity. These findings underscore the necessity for structured training interventions, such as the one presented in this case report, to reduce caregiver burden and enhance well-being.[13]

Similarly, Smith et al., in a systematic review, identified that caregiver training programs in SCI populations demonstrated improvements in caregiver knowledge and perceived quality of care. These findings reinforce the relevance of our approach, which enabled caregiver engagement and skill acquisition through structured, individualized education.[7]

CONCLUSION

The training of the caregiver proved to be crucial to the success of the rehabilitation and the preservation of the autonomy of the person with neurogenic bladder. The RN intervention, based on validated scales and theoretical models, enabled not only the acquisition of technical skills, but also the strengthening of the caregiver's role as an active agent in the rehabilitation process.

This case reinforces the need to include the family as a fundamental pillar in the rehabilitation of the person

with SCI, ensuring that the transition to home is made safely. Further research into caregiver training applied to the practice of RN is suggested.

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FINANCING

The authors did not receive financing for the development of this research.

INSTITUTIONAL REVIEW BOARD STATEMENT

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Escola Superior de Saúde Atlântica n. 40 ESSATLA 2024 (approved on December 17, 2024) for studies involving humans.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

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https://doi.org/10.56294/ri2025116