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REVIEW

Nurse interventions in the rehabilitation of adults with neurogenic bowel after spinal cord injury: Rapid Review

Intervenciones de enfermería en la rehabilitación de adultos con intestino neurógeno tras una lesión medular: Revisión Rápida

Beatriz Novo[1,2], Márcia Ribeiro[1,2], Mariana Bação[1,2], Sandy Severino[2], Isabel Rabiais[2,3], João Tomás [2,4], Geyslane Albuquerque[5], Luís Sousa[2,6]

[1]Unidade Local de Saúde de Lisboa Ocidental, EPE, Hospital de São Francisco Xavier. Lisboa, Portugal.
[2]Escuela Superior de Salud Atlántica, Universidad Atlántica, Departamento de Enfermería. Barcarena, Portugal.
[3]Centro de Investigación Interdisciplinar en Salud, Universidad Católica Portuguesa. Lisboa, Portugal.
[4]Centro de Investigación en Calidad de Vida (CIEQV). Santarém, Portugal.
[5]Universidad de São Paulo, Escuela de Enfermería de Ribeirão Preto, Departamento de Enfermería. São Paulo, Brasil. Brasil.
[6]Centro Integral de Investigación en Salud, Universidad de Évora. Évora, Portugal.

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Corresponding author: Beatriz Novo

ABSTRACT

Introduction: neurogenic bowel is a complex condition that affects adults with spinal cord injury, requiring multiple interventions to optimize bowel function.
Objective: this review aims to identify the main nursing interventions in the rehabilitation of people with spinal cord injury who have neurogenic bowel.
Method: a rapid literature review based on the Cochrane guidelines was carried out by searching databases on the EBSCO Host and PubMed platforms. Articles in English, published between 2018 and 2024, with free access and addressing nursing interventions for the management of neurogenic bowel were included.
Results: narrative synthesis was carried out using thematic analysis to analyze the 7 articles included in the review. The following nursing interventions were found: digital rectal stimulation, abdominal massage, electrical rectal stimulation, diet management, stimulation of the gastro-colic reflex, muscular exercise and follow-up.
Conclusions: digital and electrical rectal stimulation were the most widely used, while dietary strategies proved important, but without standardized guidelines. Innovative technologies have shown promise, but accessibility can be a challenge. In addition, there is a significant gap in the literature on nursing interventions, as well as great heterogeneity in the studies analyzed. The combination of interventions has been shown to be effective in bowel management in adults with neurogenic bowel, post spinal cord injury. However, the lack of solid scientific evidence reinforces the need for more studies to validate the best nursing practices in this area.

Keywords: Neurogenic Bowel; Nursing Care; Rehabilitation; Spinal Cord Injuries.

RESUMEN

Introducción: el intestino neurogénico es una patología compleja que afecta personas adultas con lesión medular y que requiere múltiples intervenciones para optimizar la función intestinal.

Objetivo: esta revisión pretende identificar las principales intervenciones de enfermería en la rehabilitación de personas con lesión medular que presentan intestino neurogénico.
Método: una revisión bibliográfica rápida basada en las guías Cochrane mediante búsqueda en bases de datos en las plataformas EBSCO Host y PubMed. Se incluyeron artículos en inglés, publicados entre 2018 y 2024, con acceso libre y que abordaran intervenciones de enfermería para el manejo del intestino neurógeno.
Resultados: se realizó síntesis narrativa mediante análisis temático para analizar a los 7 artículos incluidos en la revisión. Se encontraron las siguientes intervenciones de enfermería: estimulación rectal digital, masaje abdominal, estimulación rectal eléctrica, manejo de la dieta, estimulación del reflejo gastro-cólico, ejercicio muscular y seguimiento.
Conclusiones: la estimulación rectal digital y eléctrica fueron las más utilizadas, mientras que las estrategias dietéticas demostraron ser importantes, pero sin directrices estandarizadas. Las tecnologías innovadoras han demostrado ser prometedoras, pero la accesibilidad puede ser un reto. Además, existe un vacío importante en la bibliografía sobre intervenciones de enfermería, así como una gran heterogeneidad en los estudios analizados. La combinación de intervenciones ha demostrado ser eficaz en el manejo intestinal en adultos con intestino neurógeno, tras una lesión medular. Sin embargo, la falta de evidencia científica sólida, refuerza la necesidad de más estudios para validar las mejores prácticas de enfermería en esta área.

Palabras clave: Intestino Neurógeno; Atención de Enfermería; Rehabilitación; Traumatismos de la Médula Espinal.

INTRODUCTION

Spinal Cord Injury (SCI) is a serious health condition that interferes with the regular function of the body, causing a set of limitations that result from alterations in the anatomy and functioning of the spinal cord. These alterations result from contusion, concussion, laceration, hemorrhage, cross-section, edema, the presence of masses and/or vascular compromise. Spinal cord injuries can be classified according to: their etiology, as traumatic or non-traumatic, and their evolution, as temporary or permanent; taking into account the level of functionality, they can be complete or incomplete. Paralysis or paresis of segments of the body or the body as a whole, motor and sensory alterations, as well as sphincter control dysfunction, are considered to be the main manifestations seen in people with SCI.[1,2]

In view of the manifestations described above, our quick review of the literature will focus exclusively on the neurogenic bowel. Given that, frequently in people with SCI, one of the main problems that arises is the loss of self-control of bowel continence, most people try to find strategies in order to readapt.[3] According to Rodriguez et al., neurogenic bowel dysfunction affects approximately 80 % of people with SCI, 47 % of whom report moderate to severe symptoms.[4,5]

Intestinal continence is closely linked to various factors, including stool consistency, colonic transit time, rectal tone, anal sphincter tone and anorectal sensitivity. Neurogenic bowel appears as a lesion in the central nervous system where there is an interruption in the nerve pathways that connect the brain, spinal cord and digestive system.[1] The main symptoms of neurogenic intestinal dysfunction are: constipation, fecal incontinence, abdominal distension/discomfort and hemorrhoids.[5]

According to Rocha and Redol, lesions with maintained sacral reflexes correspond to lesions of the first motor neuron and sensory pathways, and there may be hyperreflexia of the anal and bulbocavernosus reflexes, which leads us to the definition of reflex neurogenic bowel, which is present in spinal cord lesions above the D12-L1 vertebral level. While the absence of sacral reflexes corresponds to lesions of the 2nd motor neuron, where there is an abolition of sensitivity and of the anal and bulbocavernosus reflexes, due to a complete lesion of the reflex arc, present in spinal cord lesions at or below the D12-L1 vertebral level, defining the concept of autonomous neurogenic bowel.[1] Although the two situations mentioned above require different approaches, taking into account the specificities and evolution of each person, most of the actions of bowel training are common and seek to eliminate or minimize involuntary bowel movements, ensuring a periodicity of bowel movements at a specific time/place and avoiding complications.[3]

Considering that neurogenic bowel is a complex condition that affects thousands of people and the consequences of this diagnosis goes beyond physical limitations, having a negative impact on the quality of life of people and their caregivers, the aim of this review is to identify the main nursing interventions in the rehabilitation of people with neurogenic bowel after SCI.

METHOD

Based on the Cochrane recommendations for a rapid literature review, we gathered the latest scientific evidence on the topic under study. This rapid literature review method consists of a synthesis of knowledge,

simplifying the process of preparing a systematic literature review and providing scientific evidence in an efficient manner. This review method includes the following eight stages: defining the research question, describing the eligibility criteria, designing the search strategy, selecting the studies, extracting the respective data, assessing the risk of bias of the different studies, developing a synthesis of the information obtained and other considerations relevant to the study.[6]

In view of the topic under study, this rapid review aims to answer the following research question: "What are the nurse's interventions in the rehabilitation of adults with neurogenic bowel after SCI?". The research question was formulated using the PICO model, based on one of its variants. In this study, the components used for the research question took into account the following acronym: (P) Population, (I) Intervention and (Co) Context.[7] Thus, the components that are closely linked to the question defined above are for the (P)opulation people with neurogenic bowel, for the (I)ntervention we focused on nursing interventions in the rehabilitation of the selected population, on advanced nursing and on bowel training, regarding the (Co)ntext we opted for SCI. As for the inclusion and exclusion criteria, we defined the following (table 1):

Table 1. Inclusion and exclusion criteria

Acronym PICO	Inclusion Criteria	Exclusion Criteria
Population	- People with Neurogenic Bowel. - People aged 19 or over.	- People with other health conditions that affect intestinal function. -People up to and including the age of 18. -People aged 65 or over.
Interventions	- Nursing interventions that focus on functional rehabilitation, preventing complications and promoting quality of life for people with neurogenic bowel. - Advanced nursing and rehabilitation nursing (countries with rehabilitation nurses)[8]	- Other nursing interventions involving people with neurogenic bowel. - Interventions specific to other areas of health.
Context	- Studies featuring people with SCI.	- Studies involving people with other central nervous system disorders.

It should be noted that in addition to these criteria, we took into account studies with publication dates between 2018 and 2024, whose available language is English and which provide free access to their full text.

The search was carried out using available database platforms, excluding gray literature. The respective article search was carried out in November 2024 by three reviewers using the EBSCO Host (Medline, CINAHL and Cochrane Database of Systematic Reviews) and PubMed platforms. The following descriptors/keywords were associated using Boolean operators as a search strategy: ('Neurogenic Bowel') AND (('Advanced Practice Nursing' OR 'Rehabilitation' OR 'Bowel Training' OR 'Bowel Care' OR 'Nursing Interventions' OR 'Nurs*')) AND (('Spinal Cord Injury' OR 'Spinal Cord Dysfunction')).

The articles resulting from both the database search and the article obtained through a manual search were imported into the Rayyan application to remove duplicates and assess their titles and abstracts.[9] The 20 % analysis of the article titles and abstracts was carried out independently by two reviewers and validated by a third reviewer. Conflicts were resolved in a panel discussion made up of the three reviewers. As for reading the full text of the different articles, this was carried out by two reviewers through a pilot exercise using the 12 full-text articles, in order to carry out a critical appraisal and applying the inclusion and exclusion criteria described above. Subsequently, a reviewer analyzed the included full-text articles and a second reviewer analyzed all the excluded full-text articles. When differences were found, they were resolved by a third reviewer. In this way, we drew up a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flowchart which summarizes the article selection process (figure 1).[10]

The data acquired through the research was extracted using an Excel® table, in accordance with the objectives set for this review and the inclusion and exclusion criteria outlined. [11] A reviewer checked the reliability of at least 10 % of the articles included (1 article) to assess the accuracy and consistency of the extracted data. An error of more than 1 % was obtained, so the remaining extracted data was submitted for analysis by a third reviewer, ensuring that the criteria had been correctly applied.

A critical assessment of the quality of the data extracted is an essential step in determining the risk of bias, using validated tools for this purpose. In this review, the Joanna Briggs Institute (JBI) assessment grids were used for each type of study. The risk of bias was checked by two reviewers and then confirmed by a third reviewer. According to Oliveira et al., the JBI guidelines are not watertight, allowing some flexibility in the classification of methodological quality assessment, and the criteria can be adapted as long as they are duly described in the study. [12] In this rapid review, with regard to the JBI evaluation grids, was considered the following score: "Yes"- 1 point; "No"- 0 points; "Obscure"-05, points and "Not applicable"- 0 points, with the

aim of calculating the percentage of quality of the various articles, classifying them as follows: low quality (60 %-69 %), moderate quality (70 %-79 %), high quality (80 %-89 %) and excellent quality (90 % and above).[13,14]

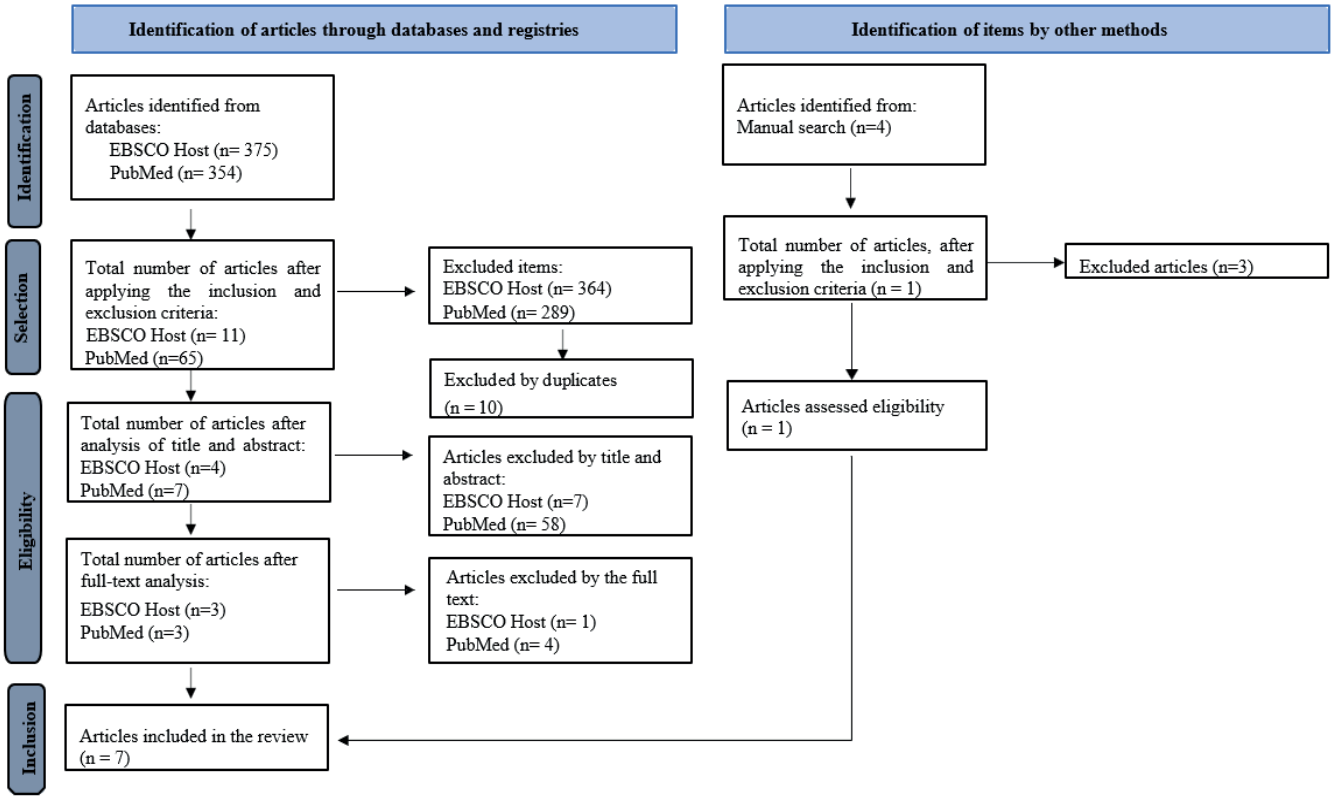

Figure 1. PRISMA 2020 Flow Diagram.
Source: Adapted from Page M, et al.[10]

For the categorization of the extracted data, was draw up a data extraction table for the studies included in the rapid review, which was used as a guide to carry out the thematic analysis of the results obtained, which will be presented below. The articles were summarized using a table and in narrative form, and were distributed equally among the three reviewers, after which a panel discussion was held to validate the judgments made by each of the reviewers. According to the results obtained and the heterogeneity presented by the studies, they will be grouped according to the types of nursing interventions described that focus on the rehabilitation of people with neurogenic bowel after SCI. Thematic analysis was therefore used as a method of synthesizing the data.

Thematic analysis, according to Braun and Clarke, is a method that identifies, analyzes and reports patterns (themes) through the data provided. The main objective of thematic analysis is to analyze a set of empirical data, extracted from series of texts, in order to identify patterns of meaning.[15,16]

Through the coding process, the themes defined are closely linked to the data itself, making it an inductive thematic analysis.[16] It is widely used, but there is no consensus on its definition and application.[15] However, in the field of nursing, it has been widely used by researchers in the context of qualitative analysis, as it provides a form of systematization, taking into account the subjectivity inherent in the concepts explored and the theme defined, as well as allowing them to be discussed in depth.[17] Thematic analysis is a flexible process and it is important that it is clear and well-defined, so it must take into account the criteria of credibility, reliability, transferability, verifiability and trustworthiness.[18]

The analysis of the reliability of the evidence was first carried out by one of the reviewers and validated by the other reviewers. This was done using the Grading of Recommendations Assessment, Development and Evaluation- Confidence in Evidence from Reviews of Qualitative research (GRADE -CERQual), and its evaluation is shown in table 2.[19]

This rapid literature review complied with the Cochrane guidelines and was registered on the Open Science Framework (OSF) platform under the number OSF.IO/b5y4q.[6] At the same time, the work was carried out in accordance with ethical and legal considerations, guaranteeing that all the information contained therein is of our own authorship and that all citations throughout the text have been duly referenced in accordance with the aforementioned referencing standards. As this was a rapid literature review, based exclusively on articles

published and available in the scientific literature, without involving participants at any stage, it was not necessary to submit the study for consideration by an Ethics and Research Committee.

Table 2. Evaluation of Confidence in Evidence (GRADE-CERQual)

Included studies	GRADE-CERQual	GRADE-CERQual descriptive evaluation
S1[20]	Moderate Confidence	Adequacy of data: Moderate Coherence: High Relevance: High Methodological reliability: Modera
S2[21]	Moderate Confidence	Adequacy of data: Moderate Coherence: Moderate Relevance: High Methodological reliability: Low
S3 [22]	Low confidence	Adequacy of data: Moderate Coherence: Low Relevance: High Methodological reliability: Low
S4 [23]	Low confidence	Adequacy of data: Moderate Coherence: Low Relevance: High Methodological reliability: Low
S5 [24]	Very low confidence	Adequacy of data: Low Coherence: Not applicable Relevance: Moderate Methodological reliability: Very low
S6 [25]	Moderate Confidence	Adequacy of data: Moderate Coherence: High Relevance: High Methodological reliability: Low
S7 [26]	High confidence	Data adequacy: High Consistency: High Relevance: High Methodological reliability: Moderate

RESULTS

This review found three articles in the excellent quality category, three articles in the moderate quality category and one article in the low quality category. This critical appraisal was carried out through the scores obtained when filling in the JBI evaluation grids and the consequent analysis of their quality.[13,14]

The main nursing interventions defined as the main themes for the rehabilitation of adults with neurogenic bowel after SCI are: Digital rectal stimulation, abdominal massage, electrical rectal stimulation, diet management, stimulation of the gastrocolic reflex, muscle exercise and follow-up.

Digital rectal stimulation

Digital rectal stimulation consists of a technique centered on circular movements using a lubricated glove, keeping the finger in contact with the rectal wall, which should be performed at the three, six, nine and twelve o'clock positions. According to Ramos et al.[20], it should last between fifteen and twenty seconds, but no longer than sixty seconds. Zhang et al.[26] and Nelson and Orr[23] state that the technique is carried out using the same method, but with regard to its duration, the latter states that it should be carried out for sixty seconds, promoting rectal contraction in a short period of time. Nelson and Orr[23] also state that the contractions continue for three to five minutes after the end of stimulation, allowing for continuous peristaltic contraction. Stimulation can be carried out every five to ten minutes, if necessary, until the bowel movement is complete and full. Peristalsis can be promoted through this intervention, and digital stimulation has been shown to produce a faster response than chemical stimulation. Pharmacological methods are generally preferred to "manual" methods, such as digital stimulation. According to Pires et al., the percentage of people choosing digital stimulation as a regular method was 0 % in their population, and as a non-regular method it was 1,6 %, and this increase occurred after hospital discharge.[21] Given the low cost/efficiency ratio of digital rectal stimulation, it should be a frequent method in the routines of people with neurogenic bowel, but the authors conclude that there is not enough evidence about this intervention.[20,23,26]

Abdominal massage

Research suggests that massage can be used as a complementary method to stimulating the gastrocolic

reflex, its main purpose being to stimulate peristalsis and the movement of fecal matter, speeding up the evacuation process. The massage technique should be performed from right to left (clockwise), using emollients to minimize friction on the skin. During the massage, the ideal position is supine, with the umbilicus used as a reference, making circular movements, from right to left, along the location of the colon for ten to fifteen minutes. Recommendations regarding the duration of the technique vary between authors, with Ramos et al. stating that it should ideally last between five and twenty minutes, and that it should be done once or twice a day. It should be noted that a small percentage of people with neurogenic bowel after SCI reported using abdominal massage on discharge from hospital, and that this percentage fell from 9,4 % to 4,7 % at home.[20,21,26]

Rectal electrical stimulation

In the study by Colasante et al., digital rectal stimulation was replaced by electrical rectal stimulation, and this was the first time this device was used on people with SCI. It was found that in sixteen of the seventeen stimulation sessions carried out, evacuation was successful immediately after the first cycle was administered. In thirteen sessions, two cycles were administered and in four sessions, three cycles were used, and only in one session were there no gains (evacuation). Effective bowel emptying was found, and for the study participant this method is the equivalent of digital rectal stimulation, however, it was defined by the authors as being potentially more effective compared to digital stimulation. In the study by Emmanuel et al., the aim was to identify the efficacy and safety of an electronic system (Navina Smart) in people with neurogenic bowel, and it was concluded that there was a significant reduction in the symptoms mentioned by the participants, even though they had severe symptoms. [25] Navina Smart is suitable for all individuals with SCI, including those with limited manual dexterity or impaired coordination. This system significantly reduced the time spent on daily bowel management, but some side effects were observed, including one serious case (autonomic dysreflexia). There were flaws with the device throughout the treatment, which were resolved in later phases. According to Nelson and Orr, magnetic electrical stimulation has been identified as an adjunct therapy to digital rectal stimulation.[23,24]

Dietary management

The first measure is the consumption of fiber and although there is no consensus in the studies analyzed, it has been described by the authors that the consumption of fifteen grams/day of fiber translated into benefits in the management of the neurogenic bowel. The second measure is fluid intake, where it was not possible to identify a significant association between intake and improvement in intestinal complications, so it was assumed that fluids serve as an aid combined with other strategies (e.g. fiber intake). In the study by Zhang et al., the water intake implemented in the observation group was at least two liters.[26] As an alternative intervention, Yeung et al. mentioned the use of nutritional supplementation with some positive response, but more research is needed to validate its effectiveness. Finally, the dietary protocol includes measures such as eating behaviors and the use of a personalized diet plan, which can be beneficial, but the studies did not identify common variables and it was not possible to interpret these results. Nevertheless, dietary management is a common strategy in the conservative approach to people with neurogenic bowel.[22]

Stimulation of the gastrocolic reflex

The gastrocolic reflex is triggered by eating and is characterized by a peristalsis of the bowel that promotes the movement of stool. Stimulation of the gastrocolic reflex should be carried out daily or at alternate intervals, based on a pattern, and should be carried out twenty to thirty minutes after meals. As far as positioning is concerned, the person should be in a sitting position on the toilet thirty to forty minutes after the meal, but for people with impaired balance there is the alternative of positioning in the left lateral decubitus position.[20]

Exercising the muscles

As a way of promoting bowel peristalsis, according to Zhang et al.[26], we can resort to muscle exercise by stimulating the muscles involved in the evacuation process (exercising the abdominal muscles as well as anal contraction), for example, we can use deep breathing and abdominal breathing. People should adopt a sitting position on the toilet or a prone position on the bed. With regard to anal contraction, people should remain in a supine position, and during anal contraction, the perianal and thigh muscles should be contracted for five seconds and then relaxed for three seconds.[26]

Follow-up

In this context, the study by Emmanuel et al. addresses the issue that adherence to instituted therapy is achieved through telephone calls by nurses.[25] This also highlights the importance of including caregivers in the process of managing people with neurogenic bowel, in order to improve adherence to treatment at home. Also noteworthy is the reference to the perception of quality of life explained in the study by Pires et al., which

considers that neurogenic bowel dysfunction represents a greater burden in terms of the sequelae of SCI, when compared to immobility. Thus, when assessing quality of life in the domains of the International Classification of Functioning, the most affected were personal factors (loss of privacy) and environmental factors (need for assistance with bowel management). According to Ramos et al., the use of each of these interventions, or a combination of them, improves bowel movements in people with neurogenic bowel disease. There is therefore great importance in implementing a bowel management program and individualized planning to improve bowel function. This study also describes the importance of nurses acquiring knowledge on this subject in order to guarantee quality care, promoting dignity and consequent quality of life.[20,21,26]

DISCUSSION

With regard to the similarities in the evidence obtained from the studies, all the studies state that neurogenic bowel is a condition that affects the quality of life of people with SCI, and that it is a complex problem that requires personalized interventions that cut across the different areas of healthcare. The following have been identified as the main interventions for managing neurogenic bowel: digital rectal stimulation and electrical rectal stimulation, although they are different interventions, their common goal is effective bowel evacuation. However, rectal electrical stimulation has been shown to be an efficient alternative for reducing bowel movement time when compared to rectal digital stimulation.[24] Dietary management could be an asset in the sense that it is a non-invasive, conservative, low-cost strategy that can be easily adapted to each person's routine. The importance of proper dietary management was found to be similar in the study population, but there was no consensus on specific strategies, with the exception of fiber intake and water intake.[22,26] Given the subjectivity and complexity inherent in the management of the neurogenic bowel in people with SCI, there is a need for continuous and close monitoring of people and caregivers, in order to promote continuous monitoring of their health situation, as well as empowering them in this management.

On the other hand, with regard to the differences found, we can see that the use of rectal electrical stimulation shows promising results in isolated cases. However, innovative technological systems, such as the Navina Smart device, have been shown to be effective, even in situations of severe symptoms, in reducing the effects of neurogenic bowel in people with SCI, while also reducing the time spent on the daily management of this condition.[25] As the cost/benefit ratio of electrical interventions is higher than manual interventions, this could be a limiting factor in terms of the population's adherence, despite their demonstrated effectiveness. It is therefore essential to value the financial aspects of this issue, with a view to promoting comprehensive and inclusive health policies that improve the quality of life of the population under study. As far as non-invasive interventions are concerned, it is important to highlight the three manual approaches explained in the studies analyzed, namely abdominal massage, stimulation of the gastrocolic reflex and muscle exercise, because they are easily applied, have low economic costs and are non-invasive, thus helping to ensure people's privacy and dignity in the management of the neurogenic bowel after SCI.[21]

This review analyzes multiple approaches, from advanced technologies to manual interventions, through person-centered studies, reinforcing the importance of individualized care. It includes studies with methodological diversity that broadens the understanding of the topic, however the heterogeneity present reduces the reliability of the data, making the analysis more challenging. The main limitation of the review is the scarcity of robust scientific evidence that directly explores nurse intervention in the rehabilitation of people with neurogenic bowel after SCI. Despite this limitation, the review recognizes its weaknesses, one of its strengths being the clear identification of existing gaps. Although it presents challenges, the review contributes to knowledge on the subject, highlighting the need for specific studies related to it, promoting evidence-based practice.

CONCLUSIONS

The management of neurogenic bowel in people with SCI represents a significant challenge that requires an integrated and personalized approach. In this review, we were able to achieve the objectives we had initially set ourselves, as it allowed us to identify the main nursing interventions in the rehabilitation of people with neurogenic bowel after SCI, as well as to understand their impact on improving the quality of life of this population.

It is important to note that although the implementation of technological innovations is limited by the barriers imposed by the underlying economic costs and manual and conservative interventions are still considered important pillars due to their adaptability and low cost, both require investment in research for the publication of studies, in order to produce scientific evidence that promotes knowledge on this subject. Following on from this, more robust and targeted research will help to respond to the limitations identified, promoting grounded nursing interventions centered on people with neurogenic bowel after SCI. Rehabilitation nurse specialists have a responsibility to be facilitators for the implementation of differentiated interventions that meet the special needs of people with neurogenic bowel after SCI. In this way, quality of life can be enhanced through the

intervention of the rehabilitation nurse specialist in improving symptom management, functional readaptation and the promotion of autonomy and dignity. It should be noted that they have specific skills and competencies in the field of health education, empowering and adapting people and their caregivers.

In short, none of the interventions implemented in isolation is effective in managing neurogenic bowel in people with SCI. It was concluded that there is a need for complementarity between them, as well as an adaptation of a management plan taking into account the individual needs of each person.

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CONFLICT OF INTEREST

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AUTHORSHIP CONTRIBUTION

Conceptualization: Beatriz Novo, Márcia Ribeiro, Mariana Bação e Luís Sousa.
Research: Beatriz Novo, Márcia Ribeiro e Mariana Bação.
Methodology: Beatriz Novo, Márcia Ribeiro, Mariana Bação e Luís Sousa.
Supervision: Luís Sousa, Sandy Severino, Isabel Rabiais, João Tomás e Geyslane Albuquerque.
Validation: Luís Sousa, Sandy Severino, Isabel Rabiais, João Tomás e Geyslane Albuquerque.
Drafting - original draft: Beatriz Novo, Márcia Ribeiro, Mariana Bação e Luís Sousa.
Writing - proofreading and editing: Beatriz Novo, Márcia Ribeiro, Mariana Bação, Sandy Severino, Isabel Rabiais, João Tomás e Geyslane Albuquerque, Luís Sousa.

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