

# Constipation in patients with quadriplegic cerebral palsy: intestinal reeducation using massage and a laxative diet\*

PARALISIA CEREBRAL TETRAPLÉGICA E CONSTIPAÇÃO INTESTINAL: AVALIAÇÃO DA REEDUCAÇÃO INTESTINAL COM USO DE MASSAGENS E DIETA LAXANTE

PARÁLISIS CEREBRAL TETRAPLÉJICA Y ESTREÑIMIENTO: EVALUACIÓN DE LA REEDUCACIÓN INTESTINAL CON USO DE MASAJES Y DIETA LAXANTE.

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## ABSTRACT

Constipation affects 74% of individuals with cerebral palsy. This study aimed to evaluate the results of nursing interventions for treating intestinal constipation associated with cerebral palsy. This quantitative, prospective, comparative study included 50 patients with quadriplegic cerebral palsy and constipation. The main conservative measures included daily consumption of laxative foods and vegetable oils, increase in fluid intake, and daily intestinal massage. Total or partial constipation relief was observed in 90% of the patients, with improvement in quality-of-life aspects such as sleep, appetite, and irritability, and a significant decrease in rectal bleeding, anal fissure, voluntary retention of stools, crying, and pain on defecation. Only 10% of the patients required laxative medications. It is recommended that conservative measures be used for treating cerebral palsy-related constipation and medications be used solely as adjuvants, if needed.

## DESCRIPTORS

Cerebral palsy  
Quadriplegia  
Constipation  
Massage  
Rehabilitation nursing

## RESUMO

A constipação intestinal afeta 74% dos indivíduos com paralisia cerebral. O objetivo deste estudo foi avaliar resultados das intervenções de enfermagem no tratamento da constipação intestinal associada à paralisia cerebral. Trata-se de um estudo quantitativo, prospectivo e comparativo (antes-depois). A amostra foi composta por 50 pacientes com paralisia cerebral tetraplégica e constipação intestinal. As principais orientações conservadoras foram: consumo diário de alimentos laxantes e óleos vegetais, aumento da ingestão hídrica e execução de manobras intestinais diárias. Houve alívio total ou parcial da constipação em 90% dos participantes, com melhora de aspectos da qualidade de vida, como sono, apetite e irritabilidade, além de diminuição significativa de sangramento retal, fissura anal, retenção voluntária de fezes, choro e dor ao evacuar. Apenas 10% necessitaram de medicações laxantes. Recomenda-se que medidas conservadoras sejam preferencialmente utilizadas para o tratamento da constipação intestinal associada à paralisia cerebral e que medicamentos sejam apenas adjuvantes, quando necessário.

## DESCRIPTORIOS

Paralisia cerebral  
Quadriplegia  
Constipação intestinal  
Massagem  
Enfermagem em reabilitação

## RESUMEN

El estreñimiento afecta a un 74% de las personas con parálisis cerebral. El objetivo de este estudio fue evaluar los resultados de las intervenciones de enfermería en el tratamiento del estreñimiento asociado a parálisis cerebral. Se trata de un estudio cuantitativo, prospectivo y comparativo (antes - después). La muestra fue compuesta por 50 pacientes con parálisis cerebral tetraplégica y con estreñimiento. Las principales orientaciones conservadoras fueron: consumo diario de alimentos laxantes y aceites vegetales, aumento de la ingesta de líquidos, y ejecución de maniobras intestinales diarias. Hubo alivio total o parcial del estreñimiento en 90% de los participantes, con mejoría de la calidad de vida en los aspectos del sueño, apetito e irritabilidad, además de la disminución significativa del sangrado rectal, la fisura anal, retención voluntaria de heces, llanto y el dolor al evacuar. Sólo el 10% requirieron medicamentos laxantes. Se recomienda que las medidas conservadoras sean preferentemente utilizadas en el tratamiento del estreñimiento asociado a parálisis cerebral y si es necesario los medicamentos sean sólo coadyuvantes.

## DESCRIPTORIOS

Parálisis cerebral  
Cuadriplejía  
Estreñimiento  
Masaje  
Enfermería en rehabilitación

\* This article is extracted from a Master's thesis entitled "Constipação intestinal em pacientes com paralisia cerebral: avaliação dos resultados das intervenções de enfermagem", presented at the Federal University of Minas Gerais in 2009. <sup>1</sup> PhD in Rehabilitation Science, University of Dortmund, Germany; Professor, Nursing School of Ribeirão Preto, University of São Paulo, Ribeirão Preto (SP), Brazil. fabifaleiros@eerp.usp.br <sup>2</sup> PhD in Nursing; Professor, School of Nursing, Federal University of Minas Gerais, Belo Horizonte (MG), Brazil. elenice\_lima@hotmail.com

## INTRODUCTION

Cerebral palsy (CP) is defined as *a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain*<sup>(1)</sup>. Currently, CP is among the most common neurodevelopmental disorders, causing considerable distress to affected individuals and their families<sup>(2)</sup>. Quadriplegic CP affects all the 4 limbs and is the most severe form of CP. Advancements in science and improvements in the quality of health services have increased survival in children with quadriplegic CP. A new challenge has been put forward to health professionals – to go beyond survival and provide a better quality of life for CP patients<sup>(3-4)</sup>.

Among the major complications associated with CP is constipation, which affects approximately 74% of CP patients<sup>(5-6)</sup>. In patients with quadriplegic CP, the origin of constipation is organic and is secondary to extra-intestinal abnormalities. Dryness of the stools is a result of inadequate water and food intake due to dysphagia, low mobility of the body, and slow peristalsis due to rigid abdominal muscles<sup>(5,7)</sup>.

In striving for excellence in nursing care, rehabilitation nurses serving CP patients should empower caregivers of these patients in order to improve their quality of life. In referral hospitals for rehabilitation, nurses are often presented with problems related to chronic constipation in children with CP. This condition not only is detrimental to the quality of life of patients and their families but also interferes with the care provided by an interdisciplinary team.

To address this problem, a nursing service was established for intestinal reeducation in patients with CP and constipation in the rehabilitation hospital in this study. This service includes a set of actions that aim at achieving a new standard for intestinal function, in order to alleviate constipation and improve the well-being of patients. The conservative interventions used include intestinal massage; abdominal press; increase in water intake; increase in the use of vegetable oils in main meals; increase in the consumption of laxative fruits, leafy vegetables, and high-fiber foods; and decrease in the consumption of constipating foods.

Patients with quadriplegic CP are completely dependent, and therefore, the inclusion of the family of these patients as an integral part of the professional staff is essential in the rehabilitation process. The aim of this approach in the treatment of constipation is not to turn the families into therapists but rather to help them provide care for their children with CP, thus providing a better quality of life for both the children and the families<sup>(8)</sup>.

Few previous studies have examined the efficacy of conservative measures in treating constipation in patients with quadriplegic CP. Therefore, we performed this study to describe and evaluate the effectiveness of nursing interventions for intestinal reeducation in CP patients in a rehabilitation hospital. In addition, we evaluated whether these interventions interfered with the quality of life of children with CP, by assessing quality-of-life domains such as appetite, sleep, and mood. These domains were chosen on the basis of the data obtained from the interviews with the caregivers, which indicated that these domains were significantly impaired when the patients had constipation.

## METHOD

This was a quantitative, prospective, and comparative (before-after design) study with convenience sampling, in which the subjects served as their own control group.

Constipation was defined as the presence of fecalomas or dry or hard stools for the past 30 days, or less than 3 bowel movements per week, except in children not yet weaned. Thus, bowel frequency and consistency of feces were the diagnostic parameters of constipation. The desired result in the treatment of constipation was a bowel frequency of at least 3 stools per week and mushy and/or soft stools<sup>(9)</sup>.

In the available literature, no studies were found to provide parameters for the sample size calculation formula, which were estimated from a random sample of pre-previous treatments performed by the researcher. The sample size was calculated using longitudinal analysis of binary response data. The study sample comprised 50 patients. We excluded those patients who were receiving nutrition via gastrostomy or breastfeeding.

To collect data, we used 2 evaluation forms: one for intake and one for evaluation during subsequent appointments. The forms were previously developed and validated.

After being approved by the ethics committees of the SARAH Hospitals and the Federal University of Minas Gerais – UFMG (Protocol ETIC 421/08), the project was presented to the family caregivers who signed a consent form after expressing a desire to participate in the study.

During the study, the patients received 3–4 nursing visits, which were scheduled at intervals of approximately 30 days. During these visits, fecal disimpaction was performed using a suppository and massage, and the caregivers were trained for intestinal reeducation of the patients. This training program (intestinal reeducation) included orientations, training maneuvers for emptying the bowel (intestinal massage, perianal massage, and abdominal press), and training for evaluating the consistency of the

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stools. In addition, each family was given a manual that explained intestinal reeducation in patients and a table chart for recording the daily frequency of bowel elimination, consistency of stools, need for suppository use, and possible complications in the patients. The families were also handed a cup with a dispenser lid for ease of administration and measurement of liquids.

At the beginning of intestinal reeducation in patients, after fecal disimpaction was performed, the caregivers were instructed to withhold laxative administration. If the patients had no bowel movements for more than 3 days, the caregiver was instructed to apply a suppository and perform the maneuvers for emptying the bowel<sup>(10)</sup>. The suppositories were donated to the patients.

An intestinal massage consists of circular, clockwise movements along the line of the colon by using the hands, permeating the ascending, transverse, and descending colon, for a period of 5–10 minutes, preferably 30 minutes after a meal, when gastrocolic and duodenocolic reflexes cause mass movements in the large intestine. An abdominal press assists in the expulsion of fecal matter, and it should be performed concurrently with an intestinal massage, by pressing the legs flexed on the abdomen. This maneuver is not indicated for patients with hip dislocation, as it may increase their pain.

Consumption of laxative foods (subject to availability, preferences, and family conditions); daily consumption of laxative fruits, vegetables, and leafy vegetables; addition of vegetable oils (olive, soybean, corn, and canola) to the main meals; increase in the intake of fluids; and decrease in the intake of constipating foods (constipating fruits and starchy tubers) were recommended. Because most of the patients presented with dysphagia, they were oriented on a pasty diet that contained solid food that was liquefied. A rigid schedule and amount of food intake was not imposed on the patients because of their individual habits based on the routine care provided to them and the financial conditions of their respective families.

Data were analyzed using binary logistic regression to determine the probability of the outcome and the independent variables influencing the patients. The effect of the interventions on the dependent variables was measured using bilateral McNemar's test (nominal variables) and marginal homogeneity tests (ordinal variables). For the remaining analyses, we used the Student *t*-test, Fisher's exact test, and nonparametric Mann-Whitney-Wilcoxon test.

## RESULTS

The study sample comprised 50 patients (25 female and 25 male patients) aged between 1 year, 7 months and 21 years (average age, 7.6 years; standard deviation, 5.63 years;  $7.6 \pm 5.63$ ). All patients were diagnosed with constipation associated with quadriplegic CP. The majority of the patients (74%) used anticonvulsant medications. Thirteen

patients (26%) used laxative medications, 22 (44%) used suppositories, and 9 (18%) had a history of enemas.

Almost all patients (96%) had a complication related to constipation, such as the presence of hemorrhoids, anal fissure, flatulence, rectal bleeding, crying, and expression of pain on the face, in addition to voluntary retention of stools due to fear of pain or discomfort when defecating.

In addition to the low incidence of patients who consumed laxative foods, almost all patients ( $n=47$ ) had a very limited intake of fluids (water, juice, or tea). Only 3 patients consumed  $\geq 1000$  ml of fluids per day.

The caregivers of the patients were either the mothers alone ( $n=33$ ), the fathers and mothers together ( $n=11$ ), or the grandparents ( $n=6$ ) of the patients. Most of the caregivers had a low educational level. Only 40% of the caregivers had completed high school, 52% had completed only primary education, and 8% were illiterate.

At the first interview, 84% of the caregivers reported that they performed some form of abdominal massage on the patient. However, on evaluation, it was observed that none of the caregivers performed the massage using the correct technique or in a systematic manner (regularly). The abdominal press was performed in 35 patients.

### Changes in intestinal functions and demographic variables

Younger patients showed a better result with respect to intestinal reeducation than did the older patients. The average age of those patients who remained constipated at the end of the intestinal reeducation was 10.3 years, whereas the average age of those patients who reported relief from constipation was 6.2 years. The demographic variables *patient sex* and *educational level of the caregivers* did not correlate with relief from constipation ( $p=0.543$ ).

After intestinal reeducation, changes in stool consistency were observed in all patients, except for 5 patients (Table 1). Most of the patients (90%) showed some improvement in stool consistency during intestinal reeducation, and among these, almost all patients (86%) showed optimal results, without further presenting with fecalomas or hard or dry stools.

**Table 1** – Distribution of patients according to the consistency of the stools before and after intestinal reeducation

Consistency of the stools	Before	After
Mushy	0%	22%*
Soft	0%	64%*
Dry	32%	6%*
Hard	40%	6%*
Fecaloma (fecal impaction)	28%	2%*
<b>Total</b>	<b>100%</b>	<b>100%</b>

\* $p < 0.001$ ; Note:  $n=50$

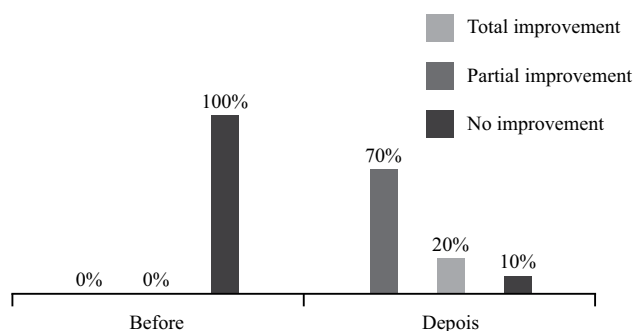
Almost all the patients (96%) showed a significant change in the frequency of bowel function ( $p < 0.001$ ). Only 2 patients (4%) retained the same bowel habits. Daily bowel movement or bowel movement every 2 days, which was not observed in any of the patients at the beginning of training, characterized the bowel habits of 38 patients (76%) at the end of the training (Table 2).

**Table 2** – Distribution of patients according to the frequency of bowel function before and after intestinal reeducation

Frequency of bowel function	Before	After
Daily	0%	28%*
2/2 days	0%	48%*
3/3 days	26%	18%*
4/4 days	22%	0%*
5/6 days	16%	6%*
7/8 days	20%	0%*
10/10 days	6%	0%*
15/15 days	10%	0%*
<b>Total</b>	<b>100%</b>	<b>100%</b>

\* $p < 0.001$ ; Note:  $n = 50$

The ideal result in the treatment of constipation was a bowel frequency of at least 3 bowel movements per week and a good consistency of the stools (pasty or mushy). Thus, a change in the consistency and/or frequency of the stools was considered as a factor for improvement of constipation. As shown in Figure 1, the results of intestinal reeducation were divided as follows: total improvement (no constipation, ideal bowel frequency, and optimal stool consistency); partial improvement (only one of the variables, i.e., either the consistency or the frequency of the stools, showed ideal changes); and no improvement (presence of constipation).



**Figure 1** – Intestinal reeducation: Results related to constipation

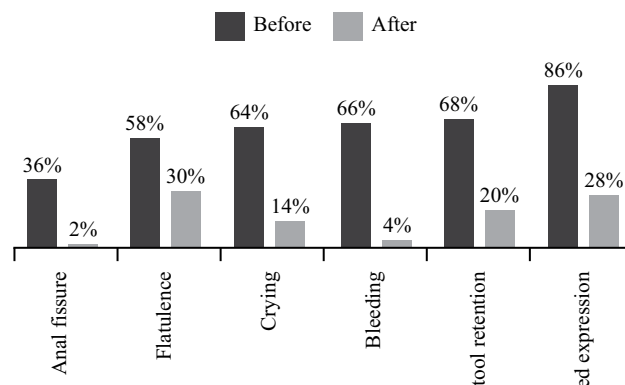
Most patients ( $n = 45$ , 90%) showed statistically significant improvement ( $p < 0.001$ ) in constipation, i.e., total ( $n = 35$ , 70%) or partial ( $n = 10$ , 20%) improvement. However, even patients who exhibited no improvement showed decreased severity of constipation.

During intestinal reeducation, 24 patients required the use of suppositories; however, only 10 patients used more than 3 suppositories a month. Use of suppositories for  $\geq 3$  months was expected to reduce the prevalence of constipation in the patients. However, analysis with Fisher's exact test showed that there was no significant association between the use of suppositories for  $\geq 3$  months and the prevalence of constipation in patients, because the use of suppositories for  $\geq 3$  months in patients who showed no improvement (12%) was not significantly lower ( $p = 0.087$ ) than that in patients who obtained relief from constipation (18%). Therefore, the use of suppositories was not a confounding factor in the relationship between constipation and independent variables.

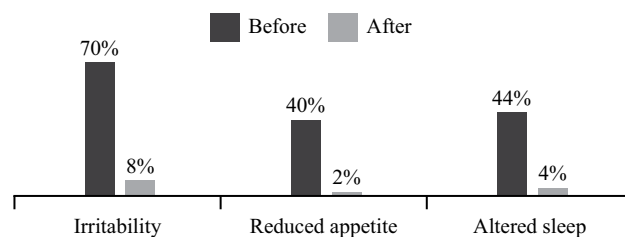
At the beginning of intestinal reeducation, fecal disimpaction was performed in 40 patients, i.e., 80% of the study sample. At the end of the intestinal reeducation, fecal disimpaction was required in only 1 patient.

**Effects of nursing interventions on complications of constipation**

As shown in Figure 2, after the nursing interventions (intestinal reeducation), statistically significant improvements were observed in all of the evaluated complications. Besides these complications, some symptoms related to the quality of life of patients were also evaluated (Figure 3).



**Figure 2** – Complications reported by caregivers before and after intestinal reeducation



**Figure 3** – Changes in the quality of life associated with constipation before and after intestinal reeducation



The results showed a significant decrease ( $p \leq 0.001$ ) in irritability, reduced appetite, and altered sleep patterns in the patients (Figure 3).

The recommended conservative measures were employed by more than 75% of the patients. Most of the patients made changes in their eating habits, by increasing their water intake (78%), regularly consuming laxative fruits (80%), consuming leafy vegetables (76%), and increasing the use of vegetable oils (84%) in their main meals, in addition to performing maneuvers in a systematic manner for emptying the bowel (64%).

Approximately half of the caregivers ( $n=27$ , 54%) reported difficulties in performing the intestinal reeducation. Of these caregivers, 48% cited difficulties related to food (changes in the eating habits, lack of appetite, and dysphagia). Financial difficulties were cited by 5 caregivers, followed by family problems, lack of acceptance of the bowel massage by the patients, and lack of time.

#### **Analysis of the changes in the response variable (constipation)**

We estimated the effect of each independent variable on the results by using logistic regression analysis. By calculating the odds ratios, we found that patients who increased their daily intake of fruits were 3.2 times more likely to have reduced constipation than did the others. The chances of reducing constipation also increased with the increase in fluid intake (2.9 times), daily consumption of leafy vegetables (2.7 times), systematic massage of the bowel (2.2 times), and addition of vegetable oils to the main meals (1.8 times). All these changes acted as *protective factors* against constipation ( $p < 0.05$ ).

## **DISCUSSION**

The results showed that significant improvement of constipation was observed in 90% of the patients, i.e., 70% experienced complete relief from constipation and 20% experienced partial improvement. Only 10% of the patients remained constipated, although they showed some improvement. These results confirm the results of previous studies that suggest that conservative interventions can be used to improve constipation in patients, functional constipation independent association with CP, indicating that good results can be achieved in up to 70% of the cases<sup>(11)</sup>.

There was no difference in the results between the male and female patients. However, young age proved to be a factor in the improvement of constipation. The average age of patients who remained constipated at the end of intestinal reeducation was 10.3 years, whereas the average age of those patients who experienced relief from constipation was 6.2 years. The same results were reported by a previous study, in 2008, on the increased intake of fiber by 422 Asian children with constipation, in which the variable age influenced the response, with significantly better and

faster results observed among the younger participants than among the older participants<sup>(12)</sup>. Thus, the results suggest that the sooner constipation is treated, the higher the chances of success.

The educational level of the caregivers had no influence on the results. The orientations and training provided for intestinal reeducation were not complex and could be performed by individuals with low education.

Prior to the study, all caregivers ( $n=42$ ) performed some type of intestinal massage to relieve constipation, but it was incorrectly performed. After training, they began to perform the massage properly, thus demonstrating the need for the nurse to provide guidance and training to the patient's caregiver.

Approximately one quarter of the participants made use of laxative medications, suppositories, and/or enemas. Although laxatives are used for relief from constipation, prolonged use can lead to dependence, damage the intestinal muscles, and expand the financial costs of treatment<sup>(11)</sup>. Laxatives should not be dominantly used in the treatment of constipation, but their use should be restricted to cases in which they are really needed. The results showed that most of the patients with CP and constipation can be treated with conservative interventions, and these findings correlate with those of other studies on patients with constipation associated with other diseases<sup>(5,11,13)</sup>.

In this study, only 3 patients had an acceptable fluid intake. These patients often have dysphagia, which makes the supply of liquid and results in insufficient water intake. They also identified a diet low in laxative food. In a study on constipation in 152 patients with CP, 83% of the patients had inadequate fluid intake, 53% had a low intake of fiber, and 55% used laxative medications<sup>(14)</sup>.

In the present study, at the beginning of intestinal reeducation, 13 patients (26%) used laxative medications regularly. After intestinal reeducation, only 5 patients required laxatives and only 1 patient needed fecal disimpaction. When used to treat constipation, laxatives should be used only as a temporary aid, and laxative therapy should be combined with conservative interventions and should be gradually tapered<sup>(15-16)</sup>.

In the present study, most patients showed changes in their eating habits and received intestinal massage performed in a systematic manner. We observed good adherence to the proposed treatment, probably because of the simple and practical way of training and the instructions provided in addition to the positive results observed by the relatives of the patients during treatment. The reduction and/or replacement of constipating foods in the diet of the patients may also have contributed to the success of intestinal reeducation. As recommended, vegetable oils were frequently added to the main meals of the patients by the caretakers, since this approach is practical, low cost,

and easy to follow and provides significant benefits in the treatment.

Although the monthly costs of the recommended diet and the monthly incomes of the patients' families were not ascertained, none of the families reported financial difficulties once low-cost diet options were presented to them, such as the use of soybean oil, seasonal fruits, and home-grown leafy vegetables (e.g., kale, *Pereskia aculeata*, and herbs).

After the treatment of constipation, there was a decrease in complications such as anal fissure, rectal bleeding, voluntary stool retention, pained facial expressions, and crying while defecating. In a study of 62 children with constipation, 60% of the patients experienced pain while defecating, 42% experienced rectal bleeding, and 17% experienced hemorrhoids and anal fissure. Of these 62 children, 60% had a deficient intake of fiber, which indicates the influence of dietary conservative interventions on the complications of constipation<sup>(16)</sup>.

In this study, after conservative treatment was implemented, the patients showed significant improvements in the assessed domains of quality of life. It is known that the quality of life of children with CP decreases with an increase in the severity of the disease<sup>(17-18)</sup>. Thus, among the patients with quadriplegic CP, those with the most severe CP had the lowest levels of quality of life. As reported by the caregivers, improvement in the quality-of-life domains such as appetite, sleep, and irritability, which are affected by constipation, contributed to the welfare of the patients, although these domains were not evaluated using a broad protocol.

In this study, it was observed that during the course of intestinal reeducation, the distress reported by the caregivers at the start of the study turned into satisfaction after observing improvements in the health of their respective family members, i.e., after watching the patients sleep better, have a preserved appetite, and not show irritability. We believe that this improvement in the quality of life of the patients may also have favored good adherence to the conservative treatment (>75%) by encouraging the caregiver to continue the maintenance therapy of intestinal reeducation.

Massage therapy was used for treating constipation in patients with neurological deficits by 2 researchers<sup>(19-20)</sup>. Besides being a more pleasurable and less invasive treatment than other types of treatments, massage therapy led to an improvement in both constipation and its complications in the patients, resulting in a decrease in the use of laxative medications<sup>(19-20)</sup>. Intestinal reeducation thus decreases the expenses for laxative medications and reduces the time spent on consultations with specialists and in hospitals for fecal disimpaction.

All independent variables (consumption of leafy vegetables and laxative fruits, addition of vegetable oils to meals, increase in the fluid intake, and systematic implementation of massages) led to significant changes in the response

variable (constipation), and these changes acted as protective factors against constipation. Among the interventions, consumption of laxative fruits had the greatest impact on the improvement of constipation, followed by increase in the fluid intake and consumption of leafy vegetables. The results showed that in addition to the independent effects of each variable, a synergistic effect was obtained by considering the effects of the variables together. If applied together, the interventions could produce results that are far more satisfactory.

## CONCLUSIONS

This study demonstrated that nursing interventions using non-pharmacological conservative therapy for the treatment of constipation in patients with quadriplegic CP are effective in most cases, by improving the quality of life of patients, reducing expenses for laxative medications, and reducing the time spent on hospital visits for fecal disimpaction. Complete or partial improvement of constipation was observed in 90% of the total patients in this study. This study also showed that young age is a factor associated with the improvement of constipation, indicating that the sooner the patients are treated, the greater the success in treating constipation.

There were significant improvements in all complications related to constipation, and consequently, in the quality of life of the patients, with significant improvements in sleep patterns, appetite, and mood. Furthermore, because bowel function improved in the patients, the use of laxative medications was reduced. Such drugs should only be used as auxiliaries in the treatment of constipation, if necessary. Overuse of laxative drugs in the long term is not effective and is not recommended, especially for children.

The findings of this study demonstrate the importance of combining conservative interventions to achieve better results. The measurements did not have the same effect independently as they did when they were combined. Therefore, caregivers should be aware that success of the therapy depends on the level of adherence to the set of measures.

It should be noted that, continuous improvement of intestinal behavior requires maintenance therapy, which was administered for all the participants in this study regardless of whether they displayed any improvement after intestinal reeducation. Treatment adherence and support from family members during therapy are essential. With this objective, it is important that along with the therapeutic guidelines provided, nurses should provide information regarding the pathophysiology of constipation to the families of the patients, not just at the beginning of training but several times during it.

This study provided important information on the treatment of constipation in patients with CP. This study, however, has a few limitations, which should be addressed

in future studies. The main limitation was that the volume of food ingested by the patients was not measured, because only water intake was measured. Future research evaluating the qualification and quantification of the volume of foods and fluids for treating constipation is recommended, as well as planning an individualized and balanced diet. Further studies should also test these conservative interventions in patients with other disabling neurological diseases and should involve home visits for closely monitoring and motivating the patients.

The use of these nursing interventions to promote constipation relief proved to be viable, and it deserves further consideration because these interventions address the needs of a population severely affected by other complications associated with CP. Furthermore, this study reinforces the importance of nursing professionals in the direct care of patients. Rehabilitation nurses should strengthen the therapeutic plan and educate, train, and help the families of the patients in planning and modifying activities to continue the treatment program in a home environment.

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