

## Effectiveness of distance education on nurses' knowledge about bowel elimination ostomies



*Efetividade da educação à distância no conhecimento de enfermeiros sobre estomias intestinais de eliminação*

*Eficacia de la educación a distancia en el conocimiento de enfermeros sobre ostomías intestinales de eliminación*

Delmo de Carvalho Alencar<sup>a</sup>  
 Elaine Maria Leite Rangel Andrade<sup>a</sup>  
 Soraia Assad Nasbine Rabeh<sup>b</sup>  
 Telma Maria Evangelista de Araújo<sup>a</sup>

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### ABSTRACT

**Objective:** To evaluate the effectiveness of distance education on primary care nurses' knowledge about bowel elimination ostomies.

**Methods:** A quasi-experimental, before-after study conducted with 41 nurses, from June to July 2015, by means of an instrument constructed and validated in Brazil. The Wilcoxon's test was used to compare the correct scores in the pre- and post-test. The results of the tests that presented a less than or equal to 0.05 were considered statistically significant.

**Results:** In the evaluation of nurses' knowledge, five obtained correct answers above 80% in the pre-test. After distance education, the number of nurses that obtained scores greater than 80% increased to 32. There was a statistically significant difference in nurses' knowledge after an educational intervention ( $p=0.000$ ), with a 96.7% overall improvement.

**Conclusions:** Distance education can be an effective strategy for nurses' permanent education.

**Keywords:** Ostomy. Primary health care. Education, distance. Education, continuing. Nursing.

### RESUMO

**Objetivo:** Avaliar a efetividade da educação à distância no conhecimento de enfermeiros da atenção primária sobre estomias intestinais de eliminação.

**Métodos:** Estudo quase-experimental, do tipo antes-depois, realizado com 41 enfermeiros, no período de junho a julho de 2015, por meio de instrumento construído e validado no Brasil. Para comparar os escores de acertos no pré e pós-teste, foi utilizado o Teste de Wilcoxon. Foram considerados estatisticamente significantes os resultados dos testes que apresentaram a menor ou igual a 0,05.

**Resultados:** Na avaliação do conhecimento dos enfermeiros verificou-se que cinco obtiveram acertos superiores a 80% no pré-teste. Após a educação à distância, o número de enfermeiros que obtiveram acertos superiores a 80% aumentou para 32. Houve diferença estatística significativa no conhecimento dos enfermeiros após intervenção educativa ( $p=0,000$ ), com percentual de melhoria de 96,7% no geral.

**Conclusões:** A educação a distância pode ser uma metodologia efetiva para educação permanente de enfermeiros.

**Palavras-chave:** Estomia. Atenção primária à saúde. Educação à distância. Educação continuada. Enfermagem.

### RESUMEN

**Objetivo:** Evaluar el efecto de la educación a distancia en el conocimiento de enfermeros de la atención primaria sobre ostomías intestinales de eliminación.

**Métodos:** Estudio cuasi-experimental, del tipo antes-después, realizado con 41 enfermeros, en el período de junio a julio de 2015, por medio de un instrumento construido y validado en Brasil. Para comparar los puntajes de aciertos en el pre y post-test, se utilizó el Test de Wilcoxon. Se consideraron estadísticamente significantes los resultados de las pruebas que presentaron a menor o igual a 0,05.

**Resultados:** En la evaluación del conocimiento de los enfermeros, se verificó que cinco obtuvieron aciertos superiores al 80% en el pre-test. Después de la educación a distancia, el número de enfermeros que obtuvieron aciertos superiores al 80% aumentó a 32. Hubo diferencia estadística significativa en el conocimiento de los enfermeros luego de la intervención educativa ( $p = 0,000$ ), con porcentual de mejora del 96,7% en general.

**Conclusiones:** La educación a distancia puede ser una estrategia efectiva para la educación permanente de enfermeros.

**Palabras clave:** Ostomía. Atención primaria de salud. Educación a distancia. Educación continua. Enfermería.

<sup>a</sup> Universidade Federal do Piauí (UFPI), Programa de Pós-Graduação em Enfermagem. Teresina, Piauí, Brasil.

<sup>b</sup> Universidade de São Paulo (USP), Escola de Enfermagem de Ribeirão Preto. Ribeirão Preto, São Paulo, Brasil.

## INTRODUCTION

Bowel elimination ostomies result from surgical interventions performed on the large or small intestine, and consist of the exteriorization of an intestinal segment, through the abdominal wall, creating a stoma that allows the exit of feces and flatus<sup>(1-2)</sup>.

In Brazil, the National Guidelines for the Health Care of People with Stomas, within the Unified Health System (SUS - Sistema Único de Saúde), highlight the need to promote the training of professionals on this subject at all levels of health care, and orientation actions for self-care, prevention of complications regarding the stomas and provision of collecting equipment and protection and safety adjuvants<sup>(1)</sup>.

In the postoperative period, the nurse will resume the self-care practices regarding the stoma and its functioning, as well as its use, management and exchange of collecting equipment, use of adjuvants, provision of practical guidelines appropriate to the sanitary and domicile conditions of these people, in addition to adaptation needs in their daily life, as well as the clarification of doubts. Moreover, the nurse conducts a referral to the Stomized People Program (maintained by SUS) closest to the city of residence, as well as presents and directs to other possibilities of services in the Health Care Network, such as the Family Health Strategy (FHS) of their region<sup>(1)</sup>.

Thus, it is imperative that nurses acquire knowledge about the surgical technique and the intestinal anatomy and physiology to identify the specific consequences and modifications suffered by the individual. This will directly influence the teaching of self-care, indication of the type of collecting equipment and adjuvants, considering the type of ostomy, the individual needs and the prevention of complications of the stoma and peristomal skin<sup>(2)</sup>.

Studies on Nursing care for people with bowel elimination ostomies indicate that there are gaps and misconceptions in the process of rehabilitation of the stomized person, which may be caused by the insufficient knowledge of the nurses regarding the theme, insufficient training during graduation or lack of technical and scientific training<sup>(3-6)</sup>.

Permanent Health Education (PHE) emerges as an important instrument that associates reality and scientific evidence in the formation of new knowledge, in which learning and teaching are incorporated into the daily life of organizations and work, relying on meaningful learning and on the possibility of transforming the professional practices, especially in the context of Basic Care.

PHE seeks to build new practices in health and nursing, and Distance Education (DE) represents a relevant tool that

can be used to improve knowledge management, quality of care and customer service satisfaction<sup>(7-8)</sup>.

The DE comes to meet certain needs, such as access to learning and training opportunities, upgrading of skills, reduction of educational resource costs, targeted education campaigns, and emergency training of target groups<sup>(8)</sup>.

Although there are studies on the use of DE for the education of stomized people and Nursing students about stomas<sup>(9)</sup>, few have used DE for permanent education of nurses<sup>(10)</sup>, and none was performed with nurses of basic health care, thus justifying the need for research of this nature.

In view of this, in this study it was decided for the use of DE for the permanent education on bowel elimination ostomies for the permanent education of Family Health Strategy (FHS) nurses, since it is recognized the need for updates and training of health professionals in their daily work, expanding the possibilities of collective educational spaces that favor the exchange of experiences.

To guide the investigation, the following research questions were chosen: What is the profile of the nurses taking part in the study? What is the nurses' knowledge about bowel elimination ostomies before and after DE? Is there a difference in nurses' knowledge on bowel elimination ostomies before and after DE?

In order to do so, this study aimed to verify the effectiveness of distance education in the knowledge of primary care nurses on bowel elimination ostomies.

## METHODS

A quasi-experimental, pre-after study with a single group, carried out in the Family Health Strategy (FHS) of the Norte de Teresina/Piauí Regional Health Center, from June to July 2015.

The population was composed of all the nurses (n=81) from the Regional Health Center/Norte de Teresina. The sample was obtained by convenience and consisted of 41 nurses who met the following inclusion criteria: to have availability to perform activity in Moodle's virtual learning environment (VLE) in extra time to workload, Internet and computer access, and to know how to use them. Nurses who were away on vacation or on a medical leave at the time of data collection were excluded. The 41 nurses completed the pre-test, intervention and post-test, without loss.

For the data collection, sociodemographic characterization and assessment instruments were used to measure nurses' knowledge about bowel elimination ostomies, these were constructed and validated in Brazil<sup>(11)</sup>, in addition, adapted computer and Internet were also used.

The data collection was carried out in four stages. In the first one, the researcher trained eight students of the Nursing Course of a public University of Teresina to assist in the active search of the FHS nurses to tutor the DE. Then, the researcher asked the Nursing Manager of the Teresina Municipal Health Foundation for a list of names of the FHS nurses from the Health Center/North Regional. Having this, the researcher and the students carried out an active search in all the health units of the Regional Health Center/Norte de Teresina to find the possible participants of the research. On this occasion, the objectives of the research were presented and the invitation to participate in the DE was made and, upon acceptance of the nurse, the signing of the Free and Informed Consent Term (FICT), e-mail and telephone were requested. These data were used for registering the nurses in the Moodle VLE, sending login and password access and for the group creation in the *WhatsApp* messaging application to facilitate the communication between researchers, students and nurses during DE.

In the second stage, the nurses were released from a work shift, by the Teresina Municipal Health Foundation, to participate in a six-hour face-to-face meeting at the Informatics Laboratory of the Postgraduate Course in Nursing at a Public University of Teresina, for setting in the Moodle VLE (Week 0). For this meeting, the nurses were subdivided into five groups and each had the opportunity to access the Moodle VLE, edit their profile, watch videos, download and save files, respond to the presentation forum, "Hot Potatoes" crossword exercise and respond to the pre-test. In addition, at the end of the meeting, each participant received a tutorial with instructions on how to access and participate in the DE, also available as a link within the Moodle VLE.

In the third stage (weeks 1 to 5), the nurses accessed the Moodle VLE independently at the desired time and space to complete the corresponding units. These were released weekly and remained open until the end of the DE, providing the opportunity for the participant to complete all the activities by the end of the DE. During this period, each group of five or six participants was tutored by a student collaborator, avoiding that they did not carry out the activities of the DE and that there was loss of participants.

In the fourth stage (week 7), the participants were released from a work shift to attend a two-hour face-to-face meeting in order to respond to a post-test at the end of the DE.

The DE was offered through a Virtual Learning Object (VLO) built, validated and hosted in the Moodle VLE <http://ead.uninovafapi.edu.br><sup>(11)</sup>. The content was organized into seven units, of which two were introductory (to familiarize the learners with the virtual learning object and present the following to the target audience: tutors, objectives,

content, activities schedule and interactive tools). The other five included the following contents: anatomy and physiology of the digestive system, conceptual aspects of the elimination ostomy, nursing care in the perioperative period of intestinal stomas, early and late complications, the rights of stomized people, and procedure to change the ostomy collection equipment of bowel elimination. All the units had the same structure: content, goals, videos, teaching materials, discussion forums and "Hot Potatoes" crossword exercises. The total hours of DE was 48 hours, distributed into seven weeks, in the months of June and July 2015. Week 0 (08 to 06/12/2015), six hours, for setting in the Moodle VLE and answering the pre-test, weeks 1 to 5 (06/15 to 07/03/2015), 40 hours to study the educational material on bowel elimination ostomies, watch videos, respond to discussion forums and "Hot Potatoes" crossword puzzles, and week 7 (07/27 to 07/31/2015), two hours to answer to the post-test.

The data collected were coded for the elaboration of a data dictionary. They were then transcribed through the double typing process into Microsoft Excel application sheets, and the errors corrected to be exported to the Statistical Package for Social Science Version 18.0 program (SPSS Version 18.0). The data were processed in order to make the analyzes possible. The variables Gender, Marital Status, Training (Graduation, Specialization and Master's Degree), Computer and Internet Use (Possession, Frequency and Where Used) were dichotomized. Descriptive statistics (mean, standard deviation, frequency and percentage) were used for an exploratory analysis of the socio-demographic variables, training, computer and Internet use, and nurses' knowledge about bowel elimination ostomies before and after the DE. The Wilcoxon's test was used to compare the correct scores in the pre and post-test, and the significance level adopted was  $\alpha=0.05$ . The results of the tests that presented a less than or equal to 0.05 were considered statistically significant.

All the participants signed the FICT after knowing the purpose of the study according to the guidelines and norms for research involving human beings, established in the Resolution No. 466/12 of the National Health Council. The research was approved by the Ethics Committee of the Universidade Federal do Piauí, under the Opinion No. 886,182/2014.

## ■ RESULTS

Of the 41 nurses, the majority were female 39 (95.1%) and the mean age was 40.0 (SD=10.3) years old. Thirty-one (75.6%) graduated from public institutions, almost all

of them had a specialization 37 (92.5%) and five (12.2%), a master's degree. The mean training time was 14.6 (SD=9.5) years. Thirty-nine nurses (95.1%) had computers and all (100.0%) had access to the Internet. The majority 30 (73.2%) used the computer daily and, at home 30 (75%). Thirty-five (85.4%) used the Internet daily and, at home, 37 (90.2%).

In the evaluation of nurses' knowledge, it was verified that five (14.3%) obtained scores higher than 80.0% in the pre-test. After the DE, the number of nurses who obtained

scores higher than 80.0% increased to 32 (94.1%). Regarding the domains, almost all had an increase in the number of correct answers above 80.0% in the post-test, except for the "Late postoperative period" with 23 (56.1%) correct answers (Table 1).

In the evaluation of general knowledge, the average accuracy in the pre-test 26.5 (SD=4.9) was lower than in the post-test 35.7 (SD=1.8) and this difference was statistically significant (p=0.000), with improvement percentage of 96.7% (Table 2).

**Table 1** – Distribution of lower and higher correct scores to 80% in the pre-test and post-test. Teresina, Piauí, Brazil, 2015. (n=41)

| General and Domains     | Pre-test                   |                             | Post-test                  |                             |
|-------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|
|                         | <80% correct answers n (%) | >=80% correct answers n (%) | <80% correct answers n (%) | >=80% correct answers n (%) |
| General                 | 30 (85.7)                  | 5 (14.3)                    | 2 (5.9)                    | 32 (94.1)                   |
| Concept                 | 20 (50.0)                  | 20 (50.0)                   | 5 (12.2)                   | 36 (87.8)                   |
| Indication              | 2 (4.9)                    | 39 (95.1)                   | 1 (2.4)                    | 40 (97.6)                   |
| Classification          | 9 (22.0)                   | 32 (78.0)                   | 0 (0.0)                    | 41 (100.0)                  |
| Preoperative            | 21 (55.3)                  | 17 (44.7)                   | 0 (0.0)                    | 37 (100.0)                  |
| Immediate postoperative | 34 (87.2)                  | 5 (12.8)                    | 6 (16.2)                   | 31 (83.8)                   |
| Immediate postoperative | 20 (48.8)                  | 21 (51.2)                   | 3 (7.3)                    | 38 (92.7)                   |
| Late postoperative      | 30 (73.2)                  | 11 (26.8)                   | 18 (43.9)                  | 23 (56.1)                   |

Source: Research data, 2015.

**Table 2** – Descriptive statistics and comparison test between correct scores in the pre and post-test. Teresina, Piauí, Brazil, 2015. (n=41)

| General and Domains     |      | n  | Mean (SD)  | MIN  | MAX  | % of Improvement <sup>1</sup> | p <sup>2</sup> |
|-------------------------|------|----|------------|------|------|-------------------------------|----------------|
| General                 | PRE  | 35 | 26.5 (4.9) | 16.0 | 37.0 | 96.7                          | 0.000          |
|                         | POST | 34 | 35.7 (1.8) | 31.0 | 39.0 |                               |                |
| Concept                 | PRE  | 40 | 2.2 (0.9)  | 1.0  | 3.0  | 47.5                          | 0.002          |
|                         | POST | 41 | 2.8 (0.6)  | 1.0  | 3.0  |                               |                |
| Indication              | PRE  | 41 | 0.9 (0.2)  | 0.0  | 1.0  | 4.9                           | 1.000          |
|                         | POST | 41 | 1.0 (0.16) | 0.0  | 1.0  |                               |                |
| Classification          | PRE  | 41 | 0.8 (0.4)  | 0.0  | 1.0  | 21.9                          | 0.004          |
|                         | POST | 41 | 1.0 (0.0)  | 1.0  | 1.0  |                               |                |
| Preoperative            | PRE  | 38 | 8.1 (1.7)  | 4.0  | 11.0 | 88.2                          | 0.000          |
|                         | POST | 37 | 10.7 (0.5) | 9.0  | 11.0 |                               |                |
| Immediate postoperative | PRE  | 39 | 9.0 (2.5)  | 4.0  | 14.0 | 94.6                          | 0.000          |
|                         | POST | 37 | 13.8 (1.2) | 11.0 | 16.0 |                               |                |
| Immediate postoperative | PRE  | 41 | 2.4 (0.7)  | 1.0  | 3.0  | 48.8                          | 0.000          |
|                         | POST | 41 | 2.9 (0.3)  | 2.0  | 3.0  |                               |                |
| Late postoperative      | PRE  | 41 | 3.1 (0.7)  | 2.0  | 4.0  | 46.3                          | 0.000          |
|                         | POST | 41 | 3.6 (0.5)  | 3.0  | 4.0  |                               |                |

Source: Research data, 2015.

<sup>1</sup>Percentage of participants who improved their performance after training. There may have been much null difference, that is, the nurses continued to score the same question after training. <sup>2</sup>Wilcoxon's test.

## ■ DISCUSSION

Gaps in the knowledge of nurses, related to nursing care in the perioperative period of bowel elimination ostomies are reported in the national and international literature. Despite the sensitivity of the nurses to the theme, the Nursing care provided diverges from recommendations based on scientific evidence, with the adoption of empirical practices, corroborating the results of this study and pointing out the need to update the nurses on bowel elimination ostomies by through permanent education<sup>(3-6)</sup>.

Historically, the training process in the area of health and related have been linked to specific activities, specific to a thematic and strictly formal to the development of the training, and it is sometimes operationalized sporadically and separated from the reality of professionals, as well as their needs. When problematizing the PHE as an organizational strategy, it is necessary to refute the training models generally restricted to formal courses and linked to a specific professional or position, but to seek strategies that collaborate both with what health organizations expect from professionals, regarding the competencies, as well as assist the professionals in the practice of Nursing care<sup>(12)</sup>.

Nurses will be able to view the PHE as a strategy possibility for the development of skills that go beyond the traditional model of educational logic, aimed at a vertical training, which corresponds to specific health practices emergencies, without dealing with the diversity of professionals and articulating with the professional needs and objectives of the institutions<sup>(13)</sup>. With an understanding of breadth, encompassing issues regarding context and acting in a participatory manner, one can gain the knowledge needed for conscious decision-making.

Before the DE on bowel elimination ostomies, the nurses' knowledge was considered inadequate. The expected performance of the participants was 80.0% or higher in the knowledge assessment instrument. In the pre-test, five (14.3%) nurses obtained scores higher than 80.0%, while in the post-test this number increased to 32 (94.1%). Thus, the present study confirms the importance of continuing education that uses DE to acquire new knowledge and skills.

The results obtained in this research corroborate other studies that used DE for the permanent education of nurses. A quasi-experimental study, before and after, performed in an intensive care unit of a University Hospital of Fortaleza on the topic of Pressure Ulcer (PU), showed that the mean post-test scores after the DE increased to 73.0%<sup>(14)</sup>. There was also a greater number of correct answers, 88.3%, after a distance and face-to-face course on the UPP theme with nurses from a large hospital in the state of Piauí<sup>(15)</sup>. In a study

with nurses from Dutch general hospitals to improve the quality of care to elderly patients on delirium, a significant positive effect was obtained in the post-test mean score<sup>(16)</sup>.

Research on the effect of the application of the use of distance educational technologies on nurses' knowledge in the area of ostomies is still incipient. However, from the studies that were performed with this objective, it was possible to observe satisfactory results<sup>(9-10,17)</sup>.

The nurse needs to appropriate this knowledge to work with the stomized people and, thus, to enable the implementation of public health policies that ensure their rights, which, although there is much on paper, they still resent the forgetfulness, the legal non-compliance and social and individual disrespect.

It is important to mention that recommendations to increase nurses' knowledge about bowel elimination ostomies should be applied from graduation and should remain, through lifelong education, during their professional life, which will enable qualified and optimized Nursing care to those with bowel elimination ostomies.

Thus, it is observed that pre and post-operative Nursing interventions significantly influence the social reintegration and quality of life of the stomized person. Regarding the domain "Nursing Care in the Preoperative Period", it was observed that in question 11, although the knowledge improved after the DE, the nurses' performance was less than 80.0% in the evaluation instrument. This result confirmed limitations in the nurses' knowledge regarding the demarcation of the stoma related to the preoperative period (item 11). Confirming these results, the researchers found that none of the people studied had a stoma demarcated, showing gaps and deficits in the knowledge of nurses who perpetuate it in their professional lives<sup>(3)</sup>.

Another study carried out with 270 stomized patients operated in several services showed that 46.0% of them had the site demarcated and that there was a significant difference between the groups ( $p > 0.001$ ) regarding the presence of complications in the stoma, which shows the importance of this procedure in the preoperative period and of the nurses' performance<sup>(18)</sup>.

The preoperative stoma demarcation favors the self-care in the exchange of the collection bag, hygiene of the stoma and of the peristomy skin, which contributes to the prevention of early and late complications, being considered a right of the patient who is a candidate for an ostomy<sup>(5,18-19)</sup>.

Thus, the results of the aforementioned studies demonstrate the need to reinforce the nurses' knowledge about the ostomy demarcation through the widest possible variety of educational strategies to improve the level of understanding of the subject, since gaps are highli-

ghted during the Nursing course, as well as lack of training in this area.

In the domain of "Nursing Care in the Immediate Postoperative Period", the lowest percentages obtained, 17 (42.5%) and 24 (58.5%) corresponded to the items related to the color of the stoma and protrusion of the colostomy, respectively.

Although the guidelines recommend that nurses assess the stoma and the peristomy skin in the immediate postoperative period, the present study showed a lack of knowledge of nurses regarding such guidelines<sup>(19)</sup>.

A similar result to what has been found in this study regarding nurses' knowledge about the consistency of feces eliminated by colostomy and ileostomy, demonstrated that nurses, in general, understood that the effluent eliminated in the ileostomy is of liquid consistency and in great quantity, unlike the colostomy, which has different consistency and characteristics.<sup>(3)</sup> The practices experienced in the labor favor and improve the anatomic-physiological understanding of the digestive system.

Regarding the nursing care in the late postoperative period, it was observed that nurses scored less than 80.0% in item 38 of the post-test, related to the colostomy irrigation 25 (61.0%). The best result was related to the public policy information for the stomized person, with 41 (100.0%) correct answers after the DE.

The postoperative care guidelines for the bowel elimination ostomy in the postoperative period published in 2009 by RNAO include irrigation of the descending and sigmoid colostomy as a safe and effective method.

Currently, the method has become more prominent in response to the quantitative and qualitative training of specialist nurses and with adequate training to carry out the procedure and the approval of the National Policy for Care of Stomized People, which includes, stimulates and favors the further dissemination of this procedure as an effective and safe method for clients with stomas in the descending and sigmoid colon<sup>(1)</sup>.

Due to the low performance of the participants in the item related to Nursing Care in the Late Postoperative Period, so intrinsic to the performance recommended to the nurse in Primary Care to the care of stomas, the unit should provide a more detailed material as a mandatory reading on the method of irrigation of the definitive colostomy to support the knowledge on this type of care.

There was a statistically significant difference in the knowledge of the FHS nurses from the Center Regional/Norte de Teresina before and after the DE ( $p=0.000$ ), with a 96.7% overall improvement. In all the domains there was improvement in the percentage of correct answers when

comparing the scores of the post-test in relation to the pre-test. The domain "Nursing Care in the Late Postoperative Period" did not obtain a percentage of correct answers above 80.0% after the DE. Similar results were achieved in distance intervention for the permanent education of nurses<sup>(20)</sup>.

It is believed that Internet-based DE can collaborate with lifelong education, since in a country with large educational gaps; the easy access to Information and Communication Technologies (ICTs) can remove the geographical barriers and gradually promote quality education. Future studies aim to emphasize the stoma demarcation and terminal colostomy irrigation in the descending or sigmoid colon, items of the knowledge assessment instrument on bowel elimination ostomies that remained with a percentage of success less than 80.0% after the DE. For this, Moodle VLE synchronous (chat) and asynchronous interaction tools (forums) will be used for the discussion of clinical cases with nurses involving both the stoma demarcation and terminal colostomy irrigation and other aspects that may emerge.

## CONCLUSIONS

It was possible to verify that, after the DE on bowel elimination ostomies, there was a significant improvement in the general knowledge of the nurses in each domain tested, except in the "Late Postoperative". It confirms that their participation in the DE was effective regarding the knowledge of Primary Care nurses about the subject matter.

The nurses' knowledge deficit regarding the care of stomized people observed before the DE may be related to gaps in the nurses' training. It should be considered that, coupled with this, the nurse professional also did not receive updates on the subject during the professional activity, directly interfering in the quality of the care provided to this clientele, who do not have their rights assured and that resent the forgetfulness.

The results also allow us to infer that the DE can be an effective teaching modality for the permanent education of nurses, since it stimulates the construction of knowledge, fosters student's autonomy in the search and deepening of content, develops skills, improves the argumentative capacity and the cooperative work. Thus, the DE is not intended to replace the traditional teaching, but to consolidate itself as a complementary methodology in the teaching-learning process of nurses.

There were limitations to the accomplishment of this study: the size of the sample, which prevented the generalization of the results; the impossibility of gathering all the nurses in a single time and place to perform the pre and post-test, which may have influenced the kno-

wledge result; and failure to monitor the adjustment needs of the permanent education program or new DE related stages.

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### ■ Corresponding author:

Delmo de Carvalho Alencar  
E-mail: delmo-carvalho@hotmail.com

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