

# Infectious risk in ostomy patient: the role of nursing competence

Chiara Foà<sup>1</sup>, Elena Bisi<sup>2</sup>, Alessandra Calcagni<sup>3</sup>, Alexandra Goldoni<sup>4</sup>,  
Maria Paola Moscatelli<sup>5</sup>, Vincenza Pellicani<sup>6</sup>, Stefano Uccelli<sup>1</sup>, Leopoldo Sarli<sup>1</sup>,  
Giovanna Artioli<sup>7</sup>

<sup>1</sup>Department of Medicine and Surgery, University of Parma, Italy; <sup>2</sup>Health Professional Service Management, Local Healthcare Company, Piacenza, Italy; <sup>3</sup>Gastroenterology and Digestive Endoscopy Unit, Castelli Hospital, Local Healthcare Company of Roma 6, Italy; <sup>4</sup>Nursing Clinic of Family Doctors, Meditem Soc. Coop, Carpi, Italy; <sup>5</sup>General Surgery Unit, Frascati Hospital, Local Healthcare Company, Roma 6, Italy; <sup>6</sup>Health Professional Service, Marianna Giannuzzi Hospital, Manduria, Italy; <sup>7</sup>Azienda USL –IRCCS, Reggio Emilia, Italy

**Abstract.** *Background and aim of the work:* The risk of peristomal infections in ostomy patients is well documented in the literature. The nurse and the stoma therapist play a fundamental role in the management and prevention of ostomy-related infections. The present research aims to investigate, across the different phases of the nursing process, the level and characteristics of nursing expertise and highlight their impact on reducing infectious risk in ostomy patients. *Methods:* 40 nurses (31 women; mean age = 47.7; SD= 7.68) working with ostomy patients were interviewed, in three Italian Local Healthcare Company (LHC) of Northern Italy, Central Italy, and Southern Italy. Nurses compiled a semi-structured ad-hoc interview concerning the level of skills, training, and experience with ostomy patients. The declared expertise has been compared to the retrospective archive data related to the peristomal skin infections of the three LHC. *Results:* Several differences have emerged in terms of nurses' expertise and care settings: for instance, ostomy complications in Southern Italy being managed with specific checklists, whereas in the Northern Italy complications being managed by stoma therapists and in Central Italy by hospital ward general nurses. Moreover, the level of professional training was very important for all respondents. The incidence rates of infections after training are lower than a pre-training period. *Conclusions:* The expertise resulting from specific training for nurses and stoma therapists are crucial for the management of the ostomy and the prevention of complications, in particular of infections. If the training reduces the peristomal complications, therefore, it is necessary to provide and preserve nurses' expertise, to guarantee patients an optimal treatment path. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** ostomy, infectious risk, peristomal, complications, competence, nursing, interview

## Introduction

### *The ostomy*

The word "ostomy" (or "stoma") derives from the Greek and means "mouth", and it is done using a surgical procedure that creates an aperture in the abdomen (i.e. the ostomy). This aperture allows the patient to eliminate feces and urine that will be collected in a

special medical device (pouch) as well as to introduce substances for nutritional or therapeutic purposes (1). Because of functional and bodily modifications, patients require healthcare and welfare due to the increased of complications related to ostomy conformation and functionality (2). According to Vyas (3), the two main types of ostomies are: intestinal, such as colostomies (cecostomy, transdostomy, sigmoidostomy, and ascendostomy) and urinary, of which the most

important are nephrostomy, cystostomy, and ureter-cutaneous-ostomy.

### *Ostomy complications*

Complications of the stomal complex (i.e. the ostomy and its surrounding area) may be caused by:

- surgical ostomy outcomes or incorrect techniques (these are the most widespread source of complications and correspond to about 40% of cases);
- ostomy inappropriate managing methods (4);
- individual factors (such as age, skin conditions, excessive increase or decrease in body weight, pre-existing and/or concomitant diseases);
- or abdominal wall alteration of the ostomy site.

That is, it is very important to recognize whatsoever change in the appearance or functionality of the ostomy, as well as the main accompanying symptoms, promptly report them to healthcare professionals and immediately implement possible solutions. Specifically, ostomy complications generally consist of (5) constipation and irregularity of bowel movements and peristomal skin redness and inflammation.

In all cases, it is necessary to eliminate the cause of the problem with specific treatments in order to avoid the rapid evolution of (more or less) extensive skin lesions, such as (6): fungi infections; folliculitis; peristomal hernia; skin plane retraction below the ostomy; stenosis and ostomy prolapse.

### *Prevention of complications*

In order to prevent the above-mentioned ostomy-related complications, patient education and counseling, the management of resources and training are essential activities for an effective prevention plan. The creation of a support network involving public and private structures within a wider research process can also help to adopt a prevention plan on a larger scale.

The importance of preventing ostomy infections is highlighted in the literature and pinpoints several key-points (7, 8): the implementation of practices to delimit the ostomy site and reduce complications; the importance of expert ostomy therapists possessing skills in pre-operative care, infections and improving

the patients' quality of life); the patient involvement, as a part of a working approach centered on the patient and the caregiver and the ability to use and understand tools and techniques used in ostomy management.

### *Role of the nurse in the prevention of peristomal infections*

The nurse (more or less specialized) plays a fundamental role in the correct planning of health care management in ostomy patients, in the pre- and post-operative care, in the hospital ward, in the clinic, or at home. Patients must be properly informed and supported in the entire treatment period between diagnosis and intervention, in order to ensure the patient feels ready for the surgery. Similarly, it is crucial for patients to understand the psychological and emotional implications of consequent the operation, to manage their stress and reduce the sense of anxiety. Moreover, the caregiver's involvement is fundamental for the patient's ability to self-regulate anxiety. That is, patients must be supervised during the whole care until up the healing (or, at least, the self-management of their disease) and the achievement of the maximum possible degree of autonomy. Several studies have shown how a global approach to the patient can be decisive for treatment progress, duration of the hospital stay, and quality of life (9; 10). In particular, the education of patients and caregivers (as supported by the appropriate tools) is strongly incisive on obtained benefits and the prevention of complications (i.e. infections) (11; 12). Furthermore, this can increase self-esteem, self-care and compliance in assisted persons (13).

The nurse who manages the duration of the rehabilitative and educational process of the ostomy patient (both in pre- and post-stages) is the stoma-therapist. A stoma-therapist is a professional figure in possession of the technical and behavioral skills that enable him or her to provide advanced assistance and rehabilitation services to the ostomy patient (14). In different health care settings, however, the hospital ward nurses are the ones who generally assist ostomy patients. They are not always adequately trained, understandably, and may not have the relevant skills to adequately respond to the patient's questions or choose the appropriate instructive pathway for the patient in discharge. Consequently, this may lead to a greater incidence of

stoma-related complications, due in part to incorrect nursing practices or, ultimately, to the incorrect care management at home. The competence and training level of nurses, therefore, seems to be decisive for an optimal healing outcome in patients, and the reduction of ostomy complications including the infectious ones.

## Methods

### *Aim*

Given the evidence reported in the literature, the aim of the present study consists of improving the nurses' training of respect to specific phases of the nursing (i.e., the assessment, assistance, education, and follow-up phases), with a special emphasis on how these skills reduce the risk of infection in ostomy patients.

### *Design*

The research consists of a qualitative study focusing on a comparison of self-reported skills among nurses with retrospective archive-data on the peristomal skin infections (i.e. abscess and cellulitis, but not fistula and dermatitis) of ostomy patients.

### *Setting*

The study began on October 2018 and concluded on February 2019. Three Local Healthcare Company (LHC) were involved: the LHC of Piacenza, the LHC of Rome, and the LHC of Manduria (Taranto) (Northern, Central, and Southern Italy, respectively).

### *Instruments*

Two instruments were used:

1. An ad-hoc semi-structured interview lasting c.a. 60 minutes, aimed at evaluating nursing skills exhibited during patients' health care. Four main areas were investigated: personal details, professional data, acquired training and applied nursing skills.

The interview guide is reported in Table 1.

2. The retrospective archive-data regarding peristomal skin infections found in assisted ostomy pa-

tients in the involved Complex Operating Units (COU) and surgery units of the three LHC.

The collected data concerned the number of infections found in the last 6 months of 2017 year (July 1st – December 31st) and the antecedent 7 months before performing interviews (May 1st 2018 – November 30th, 2018).

### *Data analysis*

Prior to participant consent, each interview was recorded, transcribed word by word by the research team, and then analyzed with respect to thematic content. Qualitative data was codified by three independent raters to compute the inter-rater accordance (Cohen's Kappa Coefficient = .092).

Acquired skills reported by interviewed persons were compared with the retrospective archive-data regarding peristomal skin infections collected in the three LHC. An inter-structural comparison was made to verify the setting uniformity.

### *Participants*

Through convenience sampling, a total of 55 nursing professionals operating in the three different companies were recruited (15 from the stoma therapy center and the general vascular senile surgery unit COU of Piacenza; 25 from the surgery unit COU and stoma therapy of Rome LHC; 15 from the stoma therapy of Manduria LHC). 15 professionals that did not work with stoma patients or did not give their consent were excluded from the study, yielding a final sample of 40 nurses.

Nurses had a mean age of 47.7 (SD = 7.68) with an average service length of 12.38 years (SD = 10.2). Data on the three LHC populations were comparable: mean age = 12 (SD = 11.76) at the Manduria center; mean age = 13.75 (SD = 9.19) at the Piacenza center; mean age = 11.06 (SD = 10.11) at the Rome center. Most nurses (67.5%) had a regional qualification as a professional nurse; 22.5% had a bachelor's degree and 10% had a master's degree. Ten participants (25%) had a post-graduate training and four of them had a Stoma-care and incontinence" post-graduate training. More than half of nurses (60%) attended a refresher

**Table 1.** The interview guide

Thematic area	Questions
Personal data area	Age
	Sex
	Geographical area of belonging
Professional area	In which hospital ward do you work?
	Since when?
	How many years have you worked as a nurse?
Training area	Professional title (regional qualification as a professional nurse; bachelor's degree; master's degree)
	Advanced qualification (post-graduate training -Ph.D.)
	Have you ever attended a "Stoma-care and incontinence" post-graduate training? If so, in which year?
	Have you ever attended a "Stoma-care and incontinence" refresher course ? If so, in which year?
	Did you attend a "Stoma-care and incontinence" refresher course during the last six months?
Stoma-care nursing skills area	How do you prevent infections in ostomate patients?
	What are the interventions you apply to prevent infections of peristomal skin?
	How do you plan nursing care in the ostomy patient?
	How do you check the goals you've set yourself?
	How do you manage ostomy-related complications?
	How do you deal with patient and/or caregiver about the education on the management of ostomy?
	What are the other professionals you interact with to reach the care goals?

course in stoma therapy over the past six months. No participants had a Ph.D. title.

### Ethical considerations

This study has been approved by the Ethics Committee of Area Vasta Emilia Nord (Italy) (n° 0088206/2018) and has been conducted in agreement with the Helsinki declaration. Informed consent was obtained before the nursing professionals' participation in the study. All eligible participants were informed of

the purpose and characteristics of the study and received a clear and informative document, explaining the design, aims, and procedure of the study. The investigator presented the study to the nursing professionals and answered any questions before asking for informed consent. The nurses who signed the consent have been informed that participation in the study was voluntary and that they could withdraw their consent to participate at any time. The data collected has been reserved and used in compliance with the current legislation on the protection of sensitive data and privacy

regulations. The Investigator was the data processor, according to EU Regulation 2016/679. The Investigator guaranteed, at every stage of the study, monitoring, verification, review by the Ethics Committee and regulatory authorities, providing direct access to both the data and the original documents.

## Results

### 1. Qualitative analysis of interviews

The results relative to the thematic contents of the 40 interviews are reported below.

#### *Infectious risk*

As addressed earlier, nurses (especially those that undergone specialization) may have a large impact on the reduction of ostomy complications, especially, infections. Regarding infectious risks, it is fundamental nurses check the ostomy appears in the days following the surgery and implement relevant precautionary procedures to prevent infections. The educational aspect is crucial as this allows recognizing signs and symptoms.

Thirty-three participants (82.5%) highlighted the role of hands' hygiene with respect to peristomal skin infections.

*"The hands' hygiene is highly important before and after the contact with the patient, but as well as when manipulating biological materials"* (interview n. 33).

Thirty participants (75%) attributed great importance to using gloves and individual medical protection devices.

*"Well, in general, first of all, a nurse must keep in mind what kind of patient he or she is dealing with. It is obvious to proceed with as much care as possible, for instance using single-use materials (gowns, gloves, etc.) and distinguishing clean and dirty areas as well as taking in account the presence of other patients in the same room. Therefore, each time you undertake whatever health care procedure to a first-time patient, it is necessary to replace all single-use materials before moving on to the next one"* (interview n. 38).

Twenty-seven participants (67.7%) highlighted the necessity of a correct peristomal skin hygienic treatment.

*"Specific attention goes to accurately cleanse the skin with water and soap. It is clear that, in the presence of little wounds, each of them must be specifically treated"* (interview n. 11).

Sixteen participants (25%) reported the importance of using appropriate disinfectants.

*"So, peristomal skin hygiene is very important and suitable non-alcoholic disinfectants are necessary; the area of interest must be always dry and, if necessary, it is suggestable to use sprays and powders to avoid complications from peristomal skin"* (interview n. 34).

Three nurses (7.5%) considered it indispensable to mark the pre-operation site the ostomy in order to avoid infection. Only two participants (5%) considered it a necessity to possess adequate skills in order to carry out advanced treatments.

#### *Health care planning*

Nurses (with or without specialization) play a fundamental role in effective health care management and planning for stoma patients both during pre- and post-operation, in the hospital wards, and at home.

Nineteen participants (47.5%) declared that their main goal was the reduction of ostomy-related complications, among which the incidence of infections is. To do this, thirteen nurses made direct observations on ostomies and six nurses apply advanced treatments.

*"By inspecting the ostomy skin and its surrounding, or an eventual irritation and how it appears, or how the ostomy forms in a convex manner... Then, I report to the surgeon"* (interview n. 30).

Fifteen participants (37.5%) declared that their main goal was the evaluation of patients' achievement of autonomy during their ostomy management. Twelve participants (30%) underlined the importance of patients' education for independence adequate health care.

*"Help patients to understand how the bag works, how to replace it if patients can to do it, otherwise instruct their caregivers [...] and patients education, which is the most important thing, right? Then, see how the patient reacts"* (interview n. 40).

Twelve participants (30%) cited hygiene, in addition to the decision where to apply the correct ostomy protection. Five participants specified hygiene and

cleaning only, two the protection site, and five indicated both aspects for a correct health care planning.

*“Let’s say that it should be cleaned daily with appropriated detergents”* (interview n. 25).

Nine participants (22.5%) referred to using checklists for the evaluation of health care goals.

Eight nurses (20%) referred to respect the health care plan, procedures, and guidelines adopted in the hospital ward.

Nine nurses (22.5%) emphasized the importance of offering adequate psychological support to patients.

Seven participants (17.5) gave importance to listening to the patient and communicate with him.

Six participants (15%) also included dietary aspects in health care planning for effective ostomy management and the prevention of complications.

#### *The management of ostomy complications*

Interviewed participants managed ostomy complications subdividing them into early or late, and severe or not severe complications. Based on this classification, participants usually made health care-related decisions as to whether to involve other professional figures. Participants referred to the following complications: lacerations, pus collection, surgical staples separation, irritation, infections, dermatitis, dehiscence, inflammations, fistulas, prolapse, reddening, edema, bleeding, necrosis, infiltration, and stoma retraction.

After an initial evaluation, twenty-two participants (55%) applied the health care plan in autonomy. In case of complications, participants reported the following tools: use of a bacteriological buffer, skin hydration, irrigation, dietary control, use of adequate plaques, advanced medications, skin cleansing, and use of antiseptic disinfectant or antibiotic ointments.

Consultation with is considered fundamental for 52.5% of participants; for 35% of participants, in particular, the crucial evaluation should be conducted by stoma therapists, if possible.

*“It depends on the type of complication: for instance, if there is bleeding, I must immediately handle it. But it depends also from the site: if it is in the peristomal area, I call the stoma therapist because he or she is the relevant professional”* (interview n. 20).

60% of nurses referred to skin hygiene in general

terms, while two of them specified skin-cleansing as an important factor in managing peristomal skin complications.

*“Peristomal skin is fundamental; it is the most important part of the ostomy itself. It has to be always well cleaned and intact”* (interview n. 34).

According to 5 nurses (12.5%) ostomy complications should be managed through planning and execution of standard procedures and guidelines.

#### *Patient and caregiver education*

Patients must undergo surgical interventions that lead to changes in bodily-shape. This implies that not only patients have to face ostomy-related problems, but also body changes to their body that may carry psychological implications. In this context, the role of the nurse consists of accompanying the patient along a journey consisting of different stages. This starts with the complete support of the patient, moving on to the establishment of active support and, finally, to the achievement of a state of self-care including encouragement activities. All interviewed participants deemed the education of patient and caregiver as a fundamental element of the health care service. Through counseling activities, indeed, the goal is to inform the patient in care about possible complications.

Thirteen participants (32.5%) have spoken about structured training.

*“We train the patient directly from his or her bed during the first period but, when possible, from the fifth day we call patients to the doctor ward, which is more suitable as there is more privacy, and all the necessary products”* (interview n. 11).

In most cases, the training starts once the surgical intervention is completed: three participants indicated the pre-operation phase as the start of educational training, while eight participants reported facing the argument during the patrol between beds. Only one interviewed mentioned the use of a mirror as an educational tool, to help patients recognize their modified body image.

#### *Training needs*

To ensure the safety of the patient, a structured diagnostic, therapeutic, and care program is necessary.

To achieve this goal, nurses must master advanced nursing techniques through specialistic training and professional courses. However not all the participants reported the importance of training as a need. The training needs are usually quantified based on the professional skills required from a specific patient or a health service context.

From the interview analysis four training areas emerged:

1- Knowledge of new safety measures (nineteen participants, 47.5%).

*“Sure, attendance of an updated professional course is fundamental, mostly given the existence of a helpful novel techniques and awareness of frequently renewed products”* (interview n. 37).

2- Recognition of ostomy complications (ten participants, 25%).

*“It definitely depends on the type of complication. I may request a preventive evaluation of complications or maybe a careful opinion of colleagues who work with ostomies: that is would be useful”* (interview n. 17).

3- Provide psychological support (seven participants, 17.5%).

*“I believe that the psychological aspect underlies many factors; nurses try, or at least I do, to keep under control the patient psychological asset”* (interview n. 31).

4- Adopt an educational-relational approach (five participants, 12.5%)

*“Once the patient has understood, let’s say, has accepted the situation, it will be easier to educate him or her”* (interview n. 31).

## 2. The relationship between the skills of professionals and peristomal skin infections

Skills and competencies declared by professionals during the period of interest have been correlated with the retrospective archive data relative to peristomal skin infections (abscess, fistula, dermatitis, and cellulitis). From the analysis of the retrospective archive data related peristomal skin infections, some differences have emerged between the number of infections found in the last six months of the year 2017 (July 1<sup>st</sup>–December 31<sup>th</sup>, see Table 2) and the number of infections of the six months antecedent the interviews period (May 1<sup>st</sup> – November 30<sup>th</sup>, 2018, see Table 3).

**Tables 2.** Rate of infections in the three Local Healthcare Company (July 1<sup>st</sup> – December 31<sup>st</sup>, 2017)

	Number of surgeries/ostomy	Number of infections	% of infections
Manduria	14	1	7
Piacenza	61	4	6,5
Roma	30	3	10

**Tables 3.** Rate of infections in the three Local Healthcare Company (May 1<sup>st</sup> – November 30<sup>th</sup>, 2018)

	Number of surgeries/ostomy	Number of infections	% of infections
Manduria	38	0	0
Piacenza	97	1	1,03
Roma	22	1	4,54

From the data collected in the period between July 1<sup>st</sup> 2017 and July 30<sup>th</sup> 2017, it has emerged that the rate of infectious cases was higher in Rome (10%), followed by Manduria (7%), and finally Piacenza (6.5%). Comparing the rate of infection with the interviewee profiles it has emerged that 20% of participants at Manduria had a post-graduate specialization in stoma therapy and incontinence, which is a title qualifying specific competencies and skills in this topic, while the participants of Rome and Piacenza did not have a similar specialization title.

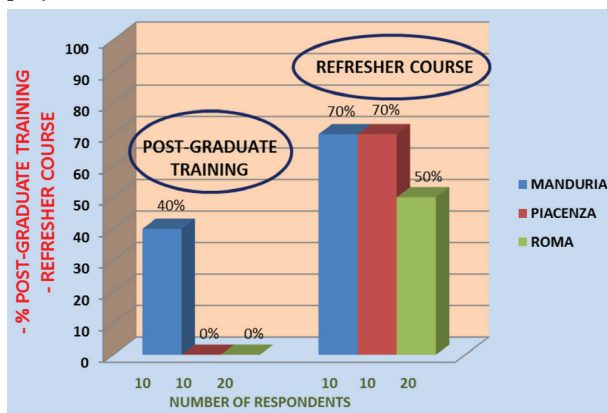
The participation at professional courses before the period of interest (i.e. July 1<sup>st</sup>–July 31<sup>st</sup>, 2017) was: 20% at Manduria, 40% at Piacenza and 30% in Rome. During the data collection (May 1<sup>st</sup> – November 30<sup>th</sup>, 2018) it has become apparent that the infection rate at the Manduria center was equal to 0%, at the Piacenza center was 1.03%, and at the Roma center was 4.54%. There have been substantial differences between training activities have undergone during the period between the previous data collection and this last, with an infection rate reduction equal to 0% at Manduria, 6% at Piacenza, and 5% at Rome. Considering the last

six months, interviewees have reported attendance of refresher courses with the following percentages: 50% at Manduria, 20% at Piacenza, and 5% at Rome. Between the first collection in 2017 and the second one in 2018 it can be claimed that professional training played a key factor in the reduction of the infection risk. Moreover, specializing as a stoma therapist of some interviewees added an adjunct value of continuous professional development.

In particular, great importance is attached to the pre-operative phase, which most impacts the quality of life of individuals subjected to an ostomy operation. Later on, if correctly executed, this also contributes to reducing the risk of complications such as peristomal infections. In all three LHS, professionals attributed strong importance to the correct use of hand hygiene as a personal protection device. This procedure is indeed the most effective, simple and cheap in preventing healthcare-related infections.

Comparing these data with personal competencies (Table 4), we can speculate that for the Manduria case there is a higher number of professionals possessing a post-graduate training, in Piacenza there is a high rate of professionals having attended refresher courses, while in Rome the percentage is 50%. This could justify, at least in part, the low number of infections detected in the first two LHS. This could mean that recent acquired competencies and skills learned during training may determine this outcome, although further studies would be needed to verify this result.

**Table 4.** Training course in the three Local Healthcare Company



## Discussion

Through the employment of a semi-structured interview, the present research aimed to bring out differences between the nurses' awareness of ostomy complications and the archive data on the detection of infection cases. The main results were grouped into the following three areas: the management and prevention of ostomy complications, health care planning, and professionals' skills and training.

### *The management and prevention of ostomy complications*

The analysis of the forty interviews conducted in the three LHS revealed similitudes in the management of prevention systems of the risk of infection in peristomal skin. Indeed, almost all participants, identified hand hygiene as the "primus inter pares" method for correct infection control and are perceived as necessary to ensure health care safety. The percentage of meticulous peristomal skin hygiene is, in contrast, halved for all three LHS. With regards to interventions aimed at preventing infectious risks, the following heterogeneous strategies have been recorded: professionals with advanced skills in applying scientific evidence to treatment, and professionals that ground their work on the daily practice. These differing strategies most likely affected by the level of post-graduate training. The nurses in Manduria recognized also their fundamental role within the pre-operative period, such as the site marking on which the ostomy will be made, as well as to ensure an appropriate counseling service.

Piacenza and Rome participants (40% and 60%, respectively) paid more attention to practical aspects such as patient observation, hygiene, approach to stoma protection, but they also indicated as fundamental the training (40% and 35%) and the relationship (30% for both centers) to ensure an adequate health care service. On the other hand, at the Manduria center the 70% of nurses follow the health care guidelines very closely using standard procedures, which help to increase variability in daily practices. The employment of patient-personalized health care plans, however, has not been mentioned. Regarding the stoma protection, 20% of participants in Manduria, 50% of Piacenza, and 45% of Rome mentioned the importance of choosing



the appropriate device for that patient, underlying the role of clinical knowledge in stoma therapies.

For the management of more complex issues, just over half of the interviewed required the consultation of a doctor. Indeed, the consultation of a stoma therapist should be evaluated if this professional figure is employed in the structure. Some interviewees work in stoma therapy wards and they consequently must consult the doctor regarding several factors, as compared to colleagues who work in surgical wards. The participants of Manduria usually require the consultation of a doctor or stoma therapist, whereas those of Piacenza and Rome work with more autonomy. The degree of this autonomy is evident from the fact that 75% of nurses in Rome plan and immediately implement treatments aimed at the management of complications, compared to the nurses in Piacenza (40%) and in Manduria (30%) and

The realization of a plan for modification of habits in patients is cited by 50% of participants in Piacenza, 45% in Rome, and 20% in Manduria. Not so many participants of the three LHS attributed importance to preparing patients in dealing with changes in body image (40% at Piacenza, 20% at Manduria, and 5% at Rome). Only 5% of interviewee carried out an investigation of the patients' relatives. Only 7.5% mentioned to a pre-operative education, whereas the 92.5% mentioned to post-operative education. At last only 10% mentioned peristomal skin self-monitoring.

### *Health care planning*

Health care planning revealed some differences in how each single professional works. Several domains have been specified and the health care was categorized into the following categories: observation, education, relationship, and ostomy management. Most participants described ordinary daily activities while others referred to follow mutual instruments in the hospital ward such as guidelines, protocols, and standard procedures. Analysis of responses regarding the evaluation of health care goals indicated a homogeneous population. From the Piacenza and the Rome interviews (30% and 80%, respectively) data mostly referred to ostomy complications control or the patients' achievement of autonomy (60% and 45%), whereas at the Manduria

center the 90% of nurses reported the use of standard procedures and instruments (e.g. checklist), though participants did not mention the items of them. The daily observation of the surgical wounds is useful for professionals to keep under control the situation, as well as the correct hygiene and the correct choice of the stoma protection increase the positive course of the ostomy. Forty-five percent of all participants plan the health care service in autonomy after an initial evaluation, in which the direct ostomy observation represents a part of the successive planning.

It has been underlined that a typical health care plan helps professionals to orient their activities to homogenize attitudes and approaches and reduce errors when dealing with patients. Nonetheless, this standard approach should always be associated with practices that put the single patient needs at the center of the plan, with the aim of making nursing into an ensemble of personalized activities. Moreover, organizational aspects of the working context also affect professionals' management of ostomy complications. Some nurses recur to checklists and standard procedures; others directly manage complications as a stoma therapist, while others request specific consultation of other professionals. Lastly, although an appropriate technical vocabulary is indispensable to document their work to others, the language used by participants results heterogeneous. At the same time, the heterogeneous source of medical approaches across the LHS highlights the indispensable role of the stoma therapist in orienting the appropriate purchase of supplies (also in accord with Health Technology Assessment Standards).

### *Professional skills and training*

Patients' and caregivers' education consent to giving them instruments to prevent whatever complications and promote autonomy, as well as the dialogue, the active listening, and the psychological support consent to accompanying patients in their healing path. The education of patients and caregivers was considered very important by all participants, even if only a few of them have spoken of clear (and poorly coherent with educational approaches) objectives. Only 10% of the Manduria nurses and 15% of the Rome nurses referred to therapeutic education for patients.

The interviews revealed that professionals possess an average knowledge regarding infectious risk complications, related guidelines, health care insured techniques, and recent innovative resources for the treatment of this pathology. This is demonstrated by the fact that the totality of participants exposed the necessity of specific training in this the previous mentioned topics, which among them the most important is the technical assistance related to novel devices (95% at Rome, 50% at Manduria, and 20% at Piacenza), followed by psychological and relational-educational aspects management (25% at Rome, 30% at Manduria, and 50% at Piacenza), and by the complications recognition including infections (15% at Rome, 30% at Manduria and at Piacenza).

Moreover, participants are aware of what is advisable to have to improve their competencies or to acquire new ones. According to some participants, the need for training must follow a cyclic and constant course characterizing improvements, which evolve in parallel with changes in the context. This means to be able to indicate what is missing for developing the professionalism, as well as possessing self-assessment skills acquired during activities, and reflecting on health care outcomes. Recognize the importance of developing effective competencies during the activities is perceived as fundamental from professionals and this is enhanced during educational training. These competencies do not entail mere information of ostomy patients, but also an education aimed to make them fully aware of the new condition, to encourage them in recovery of autonomy, as well as to help them to early recognize potential complications including infection.

## Conclusions

A nurse carrying out his or her activities within a protocol of the stoma therapy is an expert professional that who makes use of his health-care and rehabilitative assistance sustained by values and scientific knowledge. A nurse is, in fact, a proactive member of the scientific community to which he or she belongs. A nurse's activity evolves and takes shape within a specialist service, as well as organizational, educational, and research domains. Indeed, a nurse's expertise af-

fects the patients' health and subsequent clinical course, including long-term welfare until up the achievement of complete self-care (9-10) and self-management of the ostomy (14). The interview and interpersonal relationship with the patient are also very important (13-16) to ensure that patients felt listened, accepted and encouraged (17). That is, a nurse's expertise can ensure an optimal health-care course within a broader scheme of continual improvement. Regards the prevention of ostomy infections, the literature demonstrates that the stoma therapist (who possesses specific experience and competence) plays a key-role to collect adequate pre-operative patient information, to make the peristomal design in order to prevent complications including the infective ones (8) and in order to use advanced medications (4, 14).

Regarding the prevention of ostomy infection, the literature indicates that professional training and involvement within a patient/caregiver-centered approach are key, as well as familiarity with the experience and expectations of the families of patients (17). Related to this, all participants the education of considered fundamental the patients and caregivers in recognizing the signs and symptoms of ostomy complications (5, 7) but only a few participants have spoken about their therapeutic education of patients. If the prevention and management of complications are the responsibility of the stoma therapist (when available), in every day health care service these activities inevitably fall on general nurses who, during the interviews, expressed difficulties in managing ostomy protections with a correct methodology (4). Sometimes, therefore, nurses are frequently inadequately trained and competent in responding to patients' needs and putting into action a suitable educational plan of patients on discharge. This presumably raises the incidence of bad practices-related complications and not adequate ostomy protections. Therefore, the nurses' practice level is deemed determining to the correct patient management, as well as the insurgence of complications (11, 12, 15). The interviewed participants reported facing complications based on the acquired experience during the specific ostomy therapy training. That is, the possession or not of advanced competencies in the stoma therapy field makes participants act with different methods when dealing with complications. Who

attended specific training demonstrate the tendency to ask consultation of the stoma therapist or immediately evaluate complications to elaborate a plan; conversely, who not attended specific training recently focus their attention on the type of medication to execute, without pondering specific complications details.

The need for better professional training was mentioned by all participants, though they also reported that training should consist of cyclic courses enabling a long-term improvement of the professional training of nurses, as well as the need for patients' assess to specific interventions for the early detection of infection. Training is viewed as a part of the wider learning process that brings a transformation, leading professionals to be more aware of their resources, capabilities, and on what and how to improve these skills to ensure patients a better health care service (7). Regarding post-graduate training, the analysis revealed that not the totality of participants had a "know-how" derived from the training course within the interested area. Moreover, participants indicated a lack of constant training, which lead to a deprecation of the acquired skills in light of continual advancements in scientific research. Lastly, the retrospective data associated with acquired specific expertise through professional training confirmed a peristomal skin infectious risk reduction. It is possible to hypothesize that higher acquired professional levels correspond to the significant infection rate reduction, although further research is needed. In accord to this, therefore, specific and continuous training is necessary to increasingly enrich the nursing profession which is characterized by patients' needs.

Last, the interviewed participants make educational interventions at different times of the health care service but only a few of them make a family investigation of the patient, if not a minority during the pre-operative phase. As emerged from interviews, the types of professional training modalities varied in the different geographic areas: Manduria's nurses use a relational approach, Piacenza's nurses use a structural approach and, for last, Rome's nurses use an informative approach.

Since nowadays the fight against hospital infections is among the most difficult (in terms of nursing-sensitive outcomes), it is important that this challenge being lived by nurses as a deontological and ethic val-

ue. This also means that every LHS should promote a systematic understanding of the needs perceived by patients, in order to ensure proper training interventions to improve the quality of health care service.

**Conflict of interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

## References

1. Adloft M, Ollier JCL. *Les stomies digestives de l'adulte*. Paris: Springer-Verlag; 1993.
2. Chiara K, Fent Y, et al. *La colostomia. Una guida della lega contro il cancro per malati e familiari. Lega contro il cancro [Colostomy. A guide of the cancer league for patients and family members. Cancer League]*. Switzerland: 2003.
3. Vyas P, Crispin PL. Metabolic bone disease following urinary diversion in adults. *Curr Opin Urol* 2014; 24(6):614-618.
4. Abita M, Canese G, Conti E. et al. I principi del processo di realizzazione chirurgica delle enterotomie: stoma siting e tecniche di confezionamento [The principles of the surgical implementation process of enterotomies: stoma siting and packaging techniques]. *AIOSS* 2013; 1-59.
5. Robertson I, Leung E, Hughes D, Spiers M, Donnelly L, et al. Prospective analysis of stoma-related complications. *Colorectal Dis* 2005; 7(3):279-285.
6. Douri T, Shawaf AZ. Letter: Pseudoverrucous papules and nodules: a case report. *Dermatol Online J* 2012; 18(4):14.
7. Bachelet V. The training of stomatherapy nurses. *Rev Infirm* 2012; (181):29.
8. Baykara ZG, Demir SG, Karadag A. et al. A multicenter, retrospective study to evaluate the effect of preoperative stoma site marking on stomal and peristomal complications. *Ostomy Wound Manage* 2014; 60(5):16-26.
9. Márquez-Serrano M, González-Juárez X, Castillo-Castillo L, González-González L, Idrovo AJ. Social network analysis to evaluate nursing interventions to improve self-care. *Public Health Nurs* 2012; 29(4):361-369.
10. Larson EL, Ferng YH, McLoughlin JW, Wang S, Morse SS. Effect of intensive education on knowledge, attitudes, and practices regarding upper respiratory infections among urban Latinos. *Nurs Res* 2009; 58(3):150-157.
11. Foertsch LY, Hoffmann RL, Ren D, Stolar J, Tuite PK. Evaluation of a Surgical Site Discharge Teaching Tool Using Pictures and a Mirror. *Clin Nurse Spec* 2016; 30(2):101-105.
12. Wilde MH, Brasch J. A pilot study of self-monitoring urine flow in people with long-term urinary catheters. *Res Nurs Health* 2008; 31(5):490-500.
13. Katrancha ED. Clean intermittent catheterization in the school setting. *J Sch Nurs* 2008; 24(4): 197-204

14. Colaiocco E, Durizzotto V, Fazzari N et al. L'infermiere esperto in stomaterapia, coloproctologia e riabilitazione delle disfunzioni del pavimento pelvico: storia, formazione e job description. Associazione Italiana Operatori Sanitari di Stomaterapia [The nurse experienced in stomatherapy, coloproctology and rehabilitation of pelvic floor dysfunctions: history, training and job description. Italian Association of Stomatherapy Health Care Operators]. Bellante (TE): 2011.
15. Mangnall J. Managing and teaching intermittent catheterisation. *Br J Community Nurs* 2015; 20(2):82, 84, 86, passim.
16. Comb J. Role of the stoma care nurse: patients with cancer and colostomy. *Br J Nurs* 2003; 12(14):852-856.
17. Ferreira-Umpiérrez A., Fort-Fort Z. Experiences of family members of patients with colostomies and expectations about professional intervention. *Rev Lat Am Enfermagem* 2014; 22(2): 241.

Received: 3 September 2019

Accepted: 4 October 2019

Correspondence:

Chiara Foà

Department of Medicine and Surgery,

University of Parma, Italy

Via Gramsci, 14, 43126 Parma

E-mail: chiara.foa@unipr.it