

Assessment, diagnosis and treatment of peristomal skin lesions by remote imaging: An expert validation study

Maria-Elena García-Manzanares^{1,2}   | Margarita Lancharro-Bermúdez³ |
 Blanca Fernandez-Lasquetty-Blanc⁴ | Antonio Hernández-Martínez⁵ |
 Julián Rodríguez-Almagro⁵  | Maria-Rosario Caparros-Sanz³

¹Department of Nursing, Hospital Universitario 12 de Octubre. Instituto de Investigación Sanitaria Hospital 12 de Octubre (imas12), Madrid, Spain

²Faculty of Nursing, University (Complutense of Madrid), Spain

³Department of Nursing, Hospital Clinico San Carlos, Madrid, Spain

⁴Department of Nursing and Nutrition, Faculty of Biomedical and Health Sciences, Universidad Europea de Madrid, Madrid, Spain

⁵Department of Nursing, Physiotherapy, and Occupational Therapy, Ciudad Real Faculty of Nursing, University of Castilla-La Mancha, Ciudad Real, Spain

Correspondence

Maria-Elena García-Manzanares,
 Department of Nursing, Hospital Universitario 12 de Octubre. Instituto de Investigación Sanitaria Hospital 12 de Octubre (imas12), Madrid, Spain.
 Email: mgmanzanares@salud.madrid.org, Phone: 34 649464922, Twitter: @GMalenag14

Abstract

Background: Prevention and treatment of peristomal skin problems should be a priority for nurses caring for ostomates, even when the assessment of lesions must be done remotely.

Objective: To measure the level of agreement on assessment, diagnosis and care indications for peristomal skin lesions using remote imaging among nurses in Spain.

Design: Prospective observational multicentre study to assess the diagnostic validity and inter- and intraobserver agreement between nurses in peristomal skin lesions. Data were collected between March and October 2019.

Settings and Participants: The research sample consisted of a group of 39 nurses with expertise in the care of ostomates.

Methods: A panel of experts established a list of 24 common signs/findings, 15 diagnostic options and 35 treatment approaches for peristomal skin lesions. Three expert stoma therapy nurses compiled the clinical cases, which they described thoroughly and documented with photographs. The 39 participating nurses evaluated the cases in two rounds to measure inter and intraobserver agreement.

Results: A high or very high level of agreement ($\kappa > 0.61$) was observed for the following signs: encrustation, nodules, mucocutaneous separation and varicose veins; for the following diagnoses: mucocutaneous dehiscence, allergic contact dermatitis, encrustation and varicose veins (caput medusae); for the following treatments: recommending a diet rich in vitamin C/blueberries, applying acetic acid dressings, applying cold and topical tacrolimus treatment.

Conclusions: The most easily identifiable lesions were those most prevalent and with visible signs. There was a lower level of agreement in identifying lesions for which photographs required additional information (laboratory data, description of signs and symptoms, type of diet and level of self-care). It is important to train nurses caring for ostomates to correctly describe ostomy-related lesions, which is important for nursing records, continuity of care and telehealth care.

KEYWORDS

continuity of care, digital health, eHealth, nurse education, nursing care, ostomy, peristomal skin, remote consultation, remote diagnostic imaging, selfcare, telehealth

1 | INTRODUCTION

Surgical treatment of some intestinal or urinary tract pathologies may require an ostomy, which is a surgical procedure in which an opening (stoma) is created in the abdominal wall through which a viscera is passed to the outside to expel faeces, urine, or other secretions (Registered Nurses' Association of Ontario, 2019). Depending on the organ exteriorized, the stoma is referred to as a colostomy, ileostomy or urostomy (McGee, 2016).

The estimated incidence in Western countries is 2–4 ostomized patients per 1000 adults, with colostomy being the most frequent surgery (Smeltzer et al., 2016) and colorectal cancer the main cause (Violin et al., 2017).

Ostomy surgery can have a significant impact on quality of life (QoL), as it generates important physiological, emotional, and relational changes in those who undergo it, also requiring the learning of new self-care habits (Díaz et al., 2019; Moya-Muñoz et al., 2019). Furthermore, the creation of a stoma is not a risk-free procedure, and its performance is associated with a high rate of complications including Peristomal Skin Lesions (PSL) (Ruiz-de-la-Hermosa-García-Pardo et al., 2019).

It is essential for ostomy patients to keep the peristomal skin healthy and intact, but despite advances in care, peristomal skin issues remain frequent among patients. The incidence of these issues can be up to 75%, depending on the type of stoma. (Almutairi et al., 2018; Malik et al., 2018). Skin conditions can vary from mild abrasions to serious wounds requiring complex treatment and care (Murken & Bleier, 2019; Steinhagen et al., 2017).

A systematic review of the literature (Szymanski et al., 2010) concluded that impaired integrity of the peristomal skin may be related to chemical damage, mechanical destruction, infectious disease, immunological reactions and disease-related conditions.

Subsequently, the term peristomal moisture-associated skin damage (P-MASD) defined by Colwell et al. (2011) as 'inflammation and erosion of the skin caused by prolonged exposure to various sources of moisture' was incorporated. If the exposure to moisture is due to contact with faeces, the problem is referred to as irritant contact dermatitis (Colwell et al., 2017). Another term currently used to describe peristomal skin lesions is Peristomal medical adhesive-related skin injury (P-MARSI) defined as 'erythema, epidermal stripping or skin tears, erosion, bulla, or vesicle observed after removal of an adhesive ostomy pouching system' (LeBlanc et al., 2019).

Irrespective of the cause, peristomal skin issues have a significant impact on patients' lives and can cause pain, discomfort, self-care difficulties, low mood, reduced social interaction, and increased healthcare costs (Nichols et al., 2018).

Impact Statement

- The assessment of peristomal skin lesions (PSLs) is complex and requires specific expertise and knowledge in the nursing staff caring for ostomates.
- Remote assessment using photographs opens up a new opportunity in the care of PSLs, but requires that the images are accompanied by additional information such as
 - Laboratory data
 - Description of signs and symptoms
 - Type of diet
 - Level of self-care
- The use of standardized tools for peristomal skin assessment would facilitate consensus among professionals and continuity of care, helping to facilitate telehealth and healthcare savings.

1.1 | Background

During the COVID-19 pandemic, many ostomates were unable to receive their usual level of care due to the restructuring of healthcare resources and limited face-to-face visits. This prompted teleconsultations (Pata et al., 2020), a healthcare resource that is increasingly used. Experiences of teleconsultation of ostomy nurses with ostomy patients have been published (Sims & Wilson, 2020; Weinstein et al., 2021) but not of the use of teleconsultation counselling between professionals for the management of ostomy-related problems.

In daily practice, it is common for ostomy nurses to consult each other on complex cases of stoma and peristomal skin complications via emailed images or mobile apps, but is the advice reliable after remote assessment of these lesions?

Therefore, it is important to carry out research to determine the degree of proficiency among nurses in assessing and diagnosing PSL when patients are not physically present using clinical information and images of the lesions exclusively.

This study will help to understand the limitations of remote visits to address gaps and improve outcomes in the care of ostomized patients.

2 | THE STUDY

2.1 | Aim

The aim of the study was to measure the level of agreement in the assessment, diagnosis and care indications for PSL using remote imaging among Spanish nurses with expertise in ostomy care.

2.2 | Design

This is a multicentre prospective observational study assessing diagnostic validity and inter- and intraobserver agreement among nurses about a sample of ostomy patients with PSL.

The study centred around the participation of three stoma therapy nurses with extensive training and experience from two hospitals in Madrid with many PSL cases.

These three nurses recruited cases for the study and collected information on an electronic data collection form (DCF). The first part of the DCF collected socio-demographic data of the ostomized patient, personal history, aspects of the disease necessitating the ostomy, the surgery itself and the stoma. Also included were up to three photographs of each PSL taken by these three nurses with a state-of-the-art mobile phone camera according to a set of pre-identified specifications. Complications were framed with two small rulers to measure the size of the lesion.

The second part of the DCF covered the assessment of the signs observed (24 signs/findings), diagnosis of the lesion or lesions present (15 diagnostic options) and the appropriate treatment prescribed (35 treatment approaches).

All items were compulsory and a list of response items, which had been agreed in advance with a panel of experts, was provided. There was also the option to add an alternative in free text form. The panel of experts was made up of 4 stoma therapy nurses, three colorectal surgeons, two urologists and two dermatologists.

The list of diagnostic options, signs/findings and treatments/care indications described by the group of experts can be viewed in Table 1.

During their first visit to the data collection platform, the nurses filled in a questionnaire about their training and experience in the care of ostomates.

To facilitate consensus on the naming of signs/findings and diagnoses, the participating nurses were provided with a glossary of terms previously developed by the expert group.

To determine the level of agreement, the kappa index (Cohen, 1960) was used, interpreting the results according to the scale proposed by Landis and Koch (1977) in which a value of k equal to or greater than 0.61 indicates a degree of agreement of 'substantial' to 'near perfect'.

2.3 | Sample/participants

The reference population was nurses providing clinical care to ostomates in Spanish hospitals.

Opportunity sampling was performed, including in the study nurses who worked with ostomized patients, with ostomy training at expert or master's level and who agreed to participate in the study on a voluntary basis.

TABLE 1 List of diagnostic options, signs/findings, and treatments and care indications defined by experts

Diagnoses	
Candidiasis	Pseudoverrucous lesion
Atopic dermatitis	Neoplasm
Mechanical dermatitis	Pyoderma gangrenosum
Allergic contact dermatitis	Psoriasis
Contact irritant dermatitis	Bacterial superinfection
Mucocutaneous dehiscence	Friction/pressure ulcer
Granuloma	Varicose veins
Encrustation	
Signs and findings	
Cellulitis	Maceration
Crust	Nodules
Scaling	Erythematous plaques
Blockage	Lichenified plaques
Erythema	Pustules centred on hair follicles
Erosion	Haemorrhage
Purulent exudate	Mucocutaneous separation
Serous exudate	Necrotic tissue
Fistula	Tumour
Hive	Ulcer
Overgranulation	Varicose veins
Calcium encrustations	Vesicles, blisters, bullae
Care and treatment	
Adjusting the diameter of the faceplate	Belt
Diet rich in vitamin C / blueberries	Barrier paste
Antidiarrhoeals	Hydrocolloid paste
Topical antifungals	Convex faceplates
Emollient products	Hydrocolloid powder
Foam dressing	Mouldable resin strips
Extra thin hydrocolloid dressing	Applying cold
Hydrofibre dressing with silver	Topical haemostatic agents
Hydrofibre dressing without silver	Acetic acid dressings
Hydrogel dressing	Reducing soluble fibre intake
Silicone dressing	Reducing insoluble fibre intake
Increasing soluble fibre intake	Skin barrier spray
Increasing insoluble fibre intake	Adhesive remover spray
Increasing water intake	Replacing the device
Topical corticosteroids	Topical tacrolimus
Two-piece device	Negative pressure therapy
Hydrocolloid rings	Oral/topical antibiotic treatment

2.4 | Data collection

The designated hospitals recruited patients when they attended their appointments for PSL. Once they had been informed of the study purpose, agreed voluntarily to participate and signed the informed consent form, the nurses completed the first part of the DCF, took photographs and attached them to the file.

On the second part of the DCF, the nurses marked 'yes', 'no', or 'I don't know' to indicate the presence or absence of each of the 24 possible signs/findings used to assess the lesion, the 15 diagnostic options and the 35 treatment/care indications based on their own judgement.

The responses of the stoma therapy nurse from the recruiting hospitals represented the gold standard. The nurses received support from the group of experts where necessary.

The images and the first part of the DCF were blinded and sent to the assessing nurses online. The complete cases were sent to the research team in the same manner.

To measure interobserver agreement between the assessing nurses, they were asked to complete the second part of the DCF based on their own judgement, in the same manner, marking 'yes', 'no', or 'I don't know' to indicate the presence or absence of each of the signs, diagnoses, and care indications after viewing the images and reading the patients' clinical characteristics.

The assessing nurses carried out their assessments individually without help from other experts in a maximum of 15 days.

To measure intraobserver agreement, another round of assessments was conducted in the same way after 30 days. On this occasion, the cases were presented in a different order than in Round 1 to reduce recall bias as much as possible.

Once all the information had been collected on the DCF, the assessing hospitals sent it to the research team for analysis.

2.5 | Ethical and legal considerations

This observational study using anonymous data adhered to the ethical principles established by the World Medical Association's Helsinki Declaration and was approved by the Clinical Research Ethics Committee at the recruitment hospitals (San Carlos Clinical University Hospital (18/503-E) and 12 de Octubre University Hospital (18/479), in Madrid) in December 2018.

Patients were invited to participate in the study on a voluntary basis, were given oral and written information and signed an informed consent form guaranteeing the anonymity and confidentiality of their data.

In legal terms, Spanish Organic Law 5/2018 on Personal Data Protection guaranteed the anonymity of the participants (patients and nurses) and the database, with no personal data that can be used to identify them.

2.6 | Data analysis

The variables were described using absolute and relative frequencies. The level of agreement (the proportion of agreement observed) between the responses given by the assessing nurses and the recruiting nurses, as well as between the assessing nurses' first and second assessments, was calculated for the various diagnoses, signs, and care indications. To test for agreement, McNemar's test and Bowker's symmetry test were performed to check the equality of classification measurements and Cohen's κ coefficient and the 95% confidence intervals were calculated.

All analyses were performed using SAS statistical software (Copyright © 2002–2012 by SAS Institute Inc., Cary, NC, USA). The statistical significance threshold for all analyses was set at 5%.

2.7 | Validity and reliability/rigour

We adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines in reporting this study (Vandenbroucke et al., 2014).

3 | RESULTS

From March to October 2019, 32 patients were recruited. Their mean age was 69.2 years old (± 15.09). 53.1% (17) were men, 71.9% (23) were able to care for their ostomy themselves and only 5 patients took no medication. The diagnosis leading to the stoma surgery was oncological in 56.3% (18) of the cases, the main surgical procedure was sigmoidectomy, with 25.2% (8) of cases, and the most common type of stoma was end colostomy, with 62.5% (20) of cases.

Thirty-nine nurses participated in the validation and agreement study based on their availability and consent to participate. About the profile of the participating nurses, 59% (23) had specific training in stoma therapy at the expert level and 41% (16) at the master's degree level. A total of 56.4% (22) had been working as stoma therapy nurses for more than 5 years and 89.7% (35) had participated in a refresher course on stoma therapy in the last year (Table 2).

3.1 | Level of agreement

About signs/findings, from the list of 24 signs/findings initially established by the expert panel, a high or very high level of agreement (κ -value >0.61) was obtained for four signs, which were encrustation, nodules, mucocutaneous separation and varicose veins. The level of agreement was low (κ -value <0.61) for the identification of signs such as obstruction, purulent exudate, maceration and blisters.

About diagnosis, of the 15 diagnostic options initially established by the expert panel, a high or very high level of agreement (κ -value

TABLE 2 Experience and training among nurses

Characteristics of the sample	N = 39
Professional experience as a nurse, n (%)	
<5 years	1 (2.6)
6–10 years	2 (5.1)
11–20 years	7 (17.8)
>21 years	29 (74.4)
Professional experience as a stoma therapy nurse, n (%)	
<5 years	17 (43.6)
6–10 years	9 (23.1)
11–20 years	11 (28.2)
>21 years	2 (5.1)
Level of training in stoma therapy, n (%)	
Postgraduate diploma in stoma therapy	23 (59)
Master's degree in stoma therapy	16 (41)
When was the last time you participated in a refresher course on stoma therapy? n (%)	
<1 year ago	35 (89.7)
1–2 years ago	4 (10.3)

>0.61) was obtained for four of them, namely mucocutaneous dehiscence, allergic contact dermatitis, encrustation and varicose veins (caput medusae). The lowest level of agreement (κ -value <0.61) was observed for the diagnoses of candidiasis, psoriasis, bacterial superinfection and friction/pressure ulcer.

With reference to the treatment, of the 35 options initially established by the expert panel, a high or very high level of agreement (κ -value >0.61) was obtained for the four following indications for care: recommendation of a diet rich in vitamin C/ blueberries, application of acetic acid dressings, application of cold, topical treatment with tacrolimus. The lowest level of agreement (κ -value <0.61) was obtained for the application of a foam dressing, application of a silicone dressing, recommendation to increase water intake and recommendation to reduce soluble fibre intake.

About the intraobserver agreement, all the values for the signs, diagnoses and care indications were significant and the κ -value was 1 (perfect agreement).

All results with a non-zero κ -value in McNemar's test or Bowker's symmetry test are shown in Tables 3 (signs/findings), 4 (diagnoses) and 5 (indications for care).

TABLE 3 Interobserver agreement on signs. Significant κ -values. Rounds 1 and 2

Result	Round 1		Round 2	
	n	Cohen's κ (95% CI)	n	Cohen's κ (95% CI)
1. Cellulitis	9	0.43 (0.38 to 0.48)	9	0.43 (0.38 to 0.48)
2. Scaling	15	0.41 (0.34 to 0.49)	15	0.416 (0.34 to 0.49)
3. Blockage	2	0.37 (−0.77 to 1.52)	2	0.37 (−0.77 to 1.52)
4. Erythema	14	0.42 (0.37 to 0.47)	14	0.42 (0.37 to 0.47)
5. Erosion	17	0.42 (0.38 to 0.46)	17	0.42 (0.38 to 0.46)
6. Purulent exudate	9	0.36 (0.22 to 0.50)	9	0.36 (0.22 to 0.50)
7. Serous exudate	14	0.41 (0.37 to 0.44)	14	0.41 (0.37 to 0.45)
8. Fistula	7	0.42 (0.13 to 0.70)	7	0.42 (0.13 to 0.70)
9. Overgranulation	34	0.49 (0.45 to 0.53)	34	0.49 (0.45 to 0.53)
10. Encrustation	28	0.71 (0.63 to 0.79)	28	0.71 (0.63 to 0.79)
11. Maceration	5	0.38 (0.20 to 0.56)	5	0.38 (0.20 to 0.56)
12. Nodules	29	0.61 (0.51 to 0.72)	29	0.61 (0.51 to 0.72)
13. Erythematous plaques	17	0.41 (0.31 to 0.51)	17	0.41 (0.31 to 0.51)
14. Haemorrhage	5	0.36 (0.23 to 0.49)	5	0.36 (0.24 to 0.49)
15. Mucocutaneous separation	38	0.63 (0.58 to 0.68)	38	0.63 (0.58 to 0.68)
16. Necrotic tissue	24	0.51 (0.40 to 0.63)	24	0.51 (0.40 to 0.62)
17. Tumour	10	0.41 (0.17 to 0.65)	10	0.41 (0.17 to 0.65)
18. Varicose veins	18	0.80 (0.69 to 0.91)	18	0.80 (0.69 to 0.91)
19. Blister	7	0.32 (0.02 to 0.62)	7	0.32 (0.02 to 0.62)
20. Ulcer	35	0.55 (0.50 to 0.60)	35	0.55 (0.50 to 0.60)

Result	Round 1		Round 2	
	n	Cohen's κ (95% CI)	n	Cohen's κ (95% CI)
1. Candidiasis	12	0.33 (0.10 to 0.55)	12	0.33 (0.10 to 0.55)
2. Mucocutaneous dehiscence	39	0.64 (0.59 to 0.69)	39	0.64 (0.59 to 0.69)
3. Mechanical dermatitis	13	0.55 (0.45 to 0.65)	13	0.55 (0.45 to 0.65)
4. Allergic contact dermatitis	37	0.72 (0.64 to 0.81)	37	0.72 (0.64 to 0.81)
5. Contact irritant dermatitis	21	0.46 (0.41 to 0.51)	21	0.46 (0.41 to 0.51)
6. Granuloma (overgranulation)	30	0.48 (0.42 to 0.53)	30	0.48 (0.42 to 0.53)
7. Encrustation	26	0.61 (0.53 to 0.68)	26	0.61 (0.53 to 0.68)
8. Pseudoverrucous lesion	17	0.46 (0.30 to 0.61)	17	0.46 (0.31 to 0.61)
9. Neoplasm	8	0.42 (0.25 to 0.59)	8	0.42 (0.25 to 0.59)
10. Pyoderma gangrenosum	24	0.57 (0.45 to 0.69)	24	0.57 (0.45 to 0.69)
11. Psoriasis	2	0.32 (−3.81 to 4.47)	2	0.32 (−3.81 to 4.47)
12. Bacterial superinfection	2	0.33 (−0.08 to 0.73)	2	0.33 (−0.08 to 0.73)
13. Varicose veins (caput medusae)	18	0.79 (0.70 to 0.88)	18	0.79 (0.70 to 0.88)
14. Friction/pressure ulcer	16	0.33 (0.23 to 0.44)	16	0.34 (0.23 to 0.44)

TABLE 4 Interobserver agreement on diagnoses. Significant κ values. Rounds 1 and 2

When relating the degree of agreement and the degree of uncertainty ('do not know' response) with the professional and educational factors, no statistically significant differences were found between the variables, neither with parametric nor with non-parametric tests (Table 6).

4 | DISCUSSION

Best practice guidelines recommend ongoing research into peristomal skin care and the prevention, detection and treatment of lesions that may appear in this area. (Association of Stoma Care Nurses UK, 2016; Registered Nurses' Association of Ontario (RNAO), 2009). This recommendation, together with the pandemic situation experienced by COVID-19 in which many ostomized patients had to be attended by teleconsultation, are the reasons that motivated this research.

In this study, a high level of agreement was found in the identification through images of lesions such as nodules, calcium encrustations and varicose veins, which are unmistakable lesions with striking colours and characteristics. The same may be said for mucocutaneous separation, a frequent and recognizable complication for expert nurses and allergic contact dermatitis, which takes the form of distinctive lesions covering the entire area beneath the device with erythema and, on some occasions, blisters.

Lesions that need to be palpated, such as blockage or maceration, or which cannot be assessed from an image, such as exudate, obtained a lower level of agreement among the nurses participating in the study, as did candidiasis and bacterial superinfection. The images of these lesions must be supplemented with the results of diagnostic tests and descriptions of the patient's signs and symptoms. These complications are relatively rare, making them harder to diagnose for nurses with more limited experience or who work

in hospitals with fewer cases (Nieves et al., 2017). However, pyoderma gangrenosum, a lesion with an estimated prevalence of 1% (Afifi et al., 2018) showed an adequate level of agreement. This may be due to the experience and up-to-date training of the participating nurses as several articles have recently been published that elaborate on the aetiopathogenesis and treatment of this lesion (Afifi et al., 2018; Cerdán-Santacruz et al., 2020; George et al., 2019; Le et al., 2019).

About care indications, indications related to urostomies were easily identifiable (recommending a diet rich in vitamin C/blueberries or applying acetic acid dressings), as were applying cold and topical tacrolimus. The use of foam or silicone dressings obtained a low level of agreement and so did nutritional recommendations. About the latter, it is important to remember that recommendations to address complications should not only focus on product application and/or device change but should also include indications related to self-care and diet/hydration, as recommended by Ratliff et al. (2021) in their consensus document. Accompanying images of a PSL with a description of the suitability of self-care routines would help increase the level of agreement in the identification of lesions such as mechanical dermatitis, which is related to sudden movements while handling the device, and lesions such as friction/pressure ulcers. Similarly, we believe that adding information about nutritional and intestinal habits (frequency, quantity and consistency/appearance) at the onset of the complication would help ensure that more holistic measures are recommended.

Research has shown that the care of ostomy patients by stoma therapy nurses is cost-effective and significantly reduces the occurrence and time required to cure PSL (Coca et al., 2015). Stoma therapy nurses are better equipped to manage skin complications caused by ostomy and to manage the devices used (Wound, Ostomy, and Continence Nursing: Scope and Standards of WOC Practice, 2nd Edition: An Executive Summary, 2018). Peristomal skin assessment is

TABLE 5 Interobserver agreement on care indications. Significant κ -values. Rounds 1 and 2

Result	Round 1		Round 2	
	<i>n</i>	Cohen's κ (95% CI)	<i>n</i>	Cohen's κ (95% CI)
1. Adjusting the opening diameter of the faceplate	3	0.32 (−0.50 to 1.13)	3	0.32 (−0.50 to 1.13)
2. Diet rich in vitamin C / blueberries	36	0.75 (0.70 to 0.81)	36	0.75 (0.70 to 0.81)
3. Antidiarrhoeals	23	0.56 (0.50 to 0.63)	23	0.56 (0.50 to 0.63)
4. Topical antifungals	12	0.30 (0.07 to 0.51)	12	0.30 (0.07 to 0.51)
5. Foam dressing	2	0.12 (−1.43 to 1.68)	2	0.12 (−1.43 to 1.68)
6. Extra thin hydrocolloid dressing	13	0.41 (0.33 to 0.48)	13	0.41 (0.33 to 0.48)
7. Hydrofibre dressing with silver	4	0.37 (0.27 to 0.48)	4	0.37 (0.27 to 0.48)
8. Silicone dressing	1	0	1	0
9. Increasing soluble fibre intake	2	0.29 (−0.55 to 1.13)	2	0.29 (−0.55 to 1.13)
10. Increasing water intake	1	−0.31	1	−0.31
11. Topical corticosteroids	2	0.46 (0.44 to 0.47)	2	0.46 (0.44 to 0.47)
12. Two-piece device	5	0.45 (0.32 to 0.59)	5	0.45 (0.32 to 0.59)
13. Using hydrocolloid rings	8	0.38 (0.33 to 0.43)	8	0.38 (0.33 to 0.43)
14. Using belts	21	0.43 (0.38 to 0.48)	21	0.43 (0.38 to 0.48)
15. Use of stoma paste to level skin	8	0.43 (0.34 to 0.52)	8	0.43 (0.34 to 0.52)
16. Use of convex faceplates	30	0.56 (0.51 to 0.61)	30	0.56 (0.51 to 0.61)
17. Use of hydrocolloid powder	16	0.39 (0.36 to 0.43)	16	0.39 (0.36 to 0.43)
18. Acetic acid dressings	24	0.61 (0.52 to 0.69)	24	0.61 (0.52 to 0.69)
19. Applying cold	9	0.67 (0.51 to 0.84)	9	0.67 (0.51 to 0.84)
20. Topical haemostatic agents	8	0.49 (0.30 to 0.68)	8	0.49 (0.30 to 0.68)
21. Silver nitrate	20	0.45 (0.41 to 0.49)	20	0.45 (0.41 to 0.49)
22. Reducing insoluble fibre intake	2	0.20 (−2.29 to 2.69)	2	0.20 (−2.29 to 2.69)
23. Skin barrier spray	1	0.33	1	0.33
24. Adhesive remover spray	1	0.49	1	0.49
25. Topical tacrolimus	15	0.61 (0.43 to 0.78)	15	0.61 (0.43 to 0.78)
26. Oral antibiotic treatment	11	0.51 (0.35 to 0.69)	11	0.51 (0.35 to 0.69)

complex and requires specific expertise and knowledge, even more so if this assessment is performed remotely. Recommendations for a nurse to perform telehealth include an expert level of knowledge and demonstrated experience in the application of evidence-based care (Cloyd & Thompson, 2020). In this study, the participating nurses had a high level of knowledge of ostomy care and kept their knowledge up to date by taking additional training courses. However, the level of agreement was not very high, perhaps due to the complexity of the remote assessment of stoma and peristomal skin lesions. Along the same lines show the results of their study by Colwell et al. (2017) describing the practices of North American ostomy nurses in relation to PSL. They did not find complete concordance in any of the practices, although they did observe general trends in the management of complications. The study concluded that further research was needed to define the epidemiology, type and severity of PSL, as well as to establish their management, care and treatment.

Remote imaging of stoma or peristomal skin lesions is a resource that allows stoma care nurses to act as consultants to other professionals or the patients themselves. But this resource requires that the images are of good quality, indicate the position in which they

are taken, are accompanied by information on lesion measurements using standardized tools (Shiraishi et al., 2020) and complementary information such as self-care habits, type and consistency of effluent, nutritional status, laboratory results (cultures, biopsies, etc.) and dressing or ostomy materials used (Beitz & Colwell, 2016). Other data, such as social support, physical activity level and emotional state, can also be useful in assessing the person and their injury in a holistic manner, allowing for an appropriate and individualized care plan to be developed.

5 | LIMITATIONS

The κ -value, used to determine the level of agreement in this study, is an indicator of strong agreement, but it depends on the complexity of the issue studied and the assessment of peristomal skin is certainly complex. The κ -value is affected by the prevalence of the aspect in question, so it is a useful statistic for description but not for making inferences. The study included several less prevalent lesions, which were difficult for nurses at hospitals with limited numbers of cases to assess.

TABLE 6 Relationship between occupational and educational factors and the degree of agreement and uncertainty

Variable	n (%)	Mean kappa values (DE)	p value*	p value**	Mean percentage uncertainty values (DE)	p value*	p value**
Professional experience as a nurse			.240	.245		.139	.125
<5 years	1 (2.6)	0.39 (NC)			35.9 (NC)		
Between 5 and 10 years	2 (5.1)	0.21 (0.11)			5.5 (7.73)		
Between 11 and 20 years	7 (17.8)	0.30 (0.14)			36.8 (13.6)		
>1 20 years	29 (74.4)	0.34(0.08)			26.5 (17.8)		
Professional experience as a stomatherapy nurse			.674	.591		.312	.258
<5 years	17 (43.6)	0.31 (0.11)			24.1 (17.7)		
Between 5 and 10 years	9 (23.1)	0.37 (0.09)			25.2 (17.0)		
Between 11 and 20 years	11 (28.2)	0.31 (0.10)			31.2 (17.9)		
>20 years	2 (5.1)	0.32 (0.03)			46.6 (9.9)		
Level of training in stomatherapy			.110	.061		.272	.247
Stomatherapy expert level (29–30 credits ECTS = 725–750 h theory/practice)	23 (59.0)	0.31 (0.10)			24.9 (18.4)		
Stomatherapy masters degree (60 credits ECTS = 1500 h theory/practice)	16 (41.0)	0.36 (0.09)			31.3 (16.2)		
Have you received any training during the last 5 years in Evidence-Based Clinical Practice (EBP)?			.509	.676		.776	.872
No	10 (25.6)	0.35 (0.08)			26.0 (11.4)		
Yes	29 (74.4)	0.32 (0.11)			28.0 (19.4)		
How long ago have you participated in a refresh course in stomatherapy?			.105	.105		.647	.563
<1 year	35 (89.7)	0.32 (0.10)			27.1 (18.1)		
Between 1 and 2 years	4 (10.3)	0.41 (0.08)			31.4 (13.7)		

*t de Student-Fisher/Anova.; **U de Mann Whitney/Kruskall Wallis.

The κ -value also depends on the number of categories. The more categories there are, the more difficult it is to correctly classify the subjects and very low κ -values are usually obtained. In this study, a total of 72 categories encompassing signs, diagnoses, and care indications were measured.

When the variables are classified, the κ value depends to a large extent on the definition assigned to each category. Although participants were provided with a glossary produced by the experts containing perfectly detailed definitions of each category, there is a degree of subjectivity involved in assessing skin lesions that would be controlled if validated tools for assessing peristomal skin such as care algorithms were used.

Limitations of the study include the small number of participants, which makes it difficult to detect statistical differences and generalize results.

Another limitation is the possible recall bias among the participating nurses that could account for the high level of intra-observer agreement obtained.

Despite having taken all the photographs in the case with the same type of mobile phone and having established guidelines for taking the photographs, it is possible that the lighting and focus used when taking the photographs may have influenced the results.

6 | CONCLUSIONS

There is significant variability among nurses in Spain when it comes to the level of agreement on assessments, diagnoses and care indications in PSL using digital images.

The most easily identifiable lesions were the most prevalent and those accompanied by visible signs. There was a lower level of agreement in identifying lesions for which photographs required additional information (laboratory data, description of signs and symptoms, type of diet and level of self-care).

It is important to train nurses caring for ostomates to correctly describe ostomy-related lesions, which is important for nursing

records, continuity of care and the remote care or telehealth that is so widely used today.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*):

1. Substantial contributions to conception and design, acquisition of data or analysis and interpretation of data.
2. Drafting the article or revising it critically for important intellectual content.

* <http://www.icmje.org/recommendations/>

ACKNOWLEDGEMENTS

Our thanks to all patients whose lesions were photographed for the study as well as to the nurses who participated in the study.

FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/jan.15497>.

DATA AVAILABILITY STATEMENT

Data available on request from the authors. The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Maria-Elena García-Manzanares  <https://orcid.org/0000-0003-2940-0895>

Julián Rodríguez-Almagro  <https://orcid.org/0000-0002-6239-2842>

TWITTER

Maria-Elena García-Manzanares  @GMalenag14

REFERENCES

- Afifi, L., Sanchez, I. M., Wallace, M. M., Braswell, S. F., Ortega-Loayza, A. G., & Shinkai, K. (2018). Diagnosis and management of peristomal pyoderma gangrenosum: A systematic review. *Journal of the American Academy of Dermatology*, 78(6), 1195–1204.e1. <https://doi.org/10.1016/j.jaad.2017.12.049>
- Almutairi, D., LeBlanc, K., & Alavi, A. (2018). Peristomal skin complications: What dermatologists need to know. *International Journal of Dermatology*, 57(3), 257–264. <https://doi.org/10.1111/IJD.13710>
- Association of Stoma Care Nurses UK. (2016). ASCN stoma care national clinical guidelines. https://ascnuk.com/_userfiles/pages/files/national_guidelines.pdf
- Beitz, J. M., & Colwell, J. C. (2016). Management approaches to stomal and peristomal complications: A narrative descriptive study. *Journal of Wound, Ostomy, and Continence Nursing: official publication of The Wound, Ostomy and Continence Nurses Society*, 43(3), 263–268. <https://doi.org/10.1097/WON.0000000000000215>
- Cerdán-Santacruz, C., Lancharro-Bermúdez, M., Caparrós-Sanz, M. R., & Cerdán-Miguel, J. (2020). Peristomal pyoderma Gangrenosum in a rectal cancer patient with an ileostomy: A case study. *Journal of Wound, Ostomy, and Continence Nursing: Official Publication of The Wound, Ostomy and Continence Nurses Society*, 47(4), 403–406. <https://doi.org/10.1097/WON.0000000000000657>
- Cloyd, B., & Thompson, J. (2020). Virtual care nursing: The wave of the future. *Nurse Leader*, 18(2), 147–150. <https://doi.org/10.1016/j.mnl.2019.12.006>
- Coca, C., De Larrinoa, I. F., Serrano, R., & García-Llana, H. (2015). The impact of specialty practice nursing care on health-related quality of life in persons with ostomies. *Journal of Wound, Ostomy and Continence Nursing*, 42(3), 257–263. <https://doi.org/10.1097/WON.0000000000000126>
- Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20(1), 37–46. <https://doi.org/10.1177/001316446002000104>
- Colwell, J. C., McNichol, L., & Boarini, J. (2017). North America Wound, ostomy, and continence and Enterostomal therapy nurses current ostomy care practice related to Peristomal skin issues. *Journal of Wound, Ostomy, and Continence Nursing: Official Publication of the Wound, Ostomy and Continence Nurses Society*, 44(3), 257–261. <https://doi.org/10.1097/WON.0000000000000324>
- Colwell, J. C., Ratliff, C. R., Goldberg, M., Baharestani, M. M., Bliss, D. Z., Gray, M., Kennedy-Evans, K. L., Logan, S., & Black, J. M. (2011). MASD part 3: Peristomal moisture-associated dermatitis and periwound moisture-associated dermatitis: A consensus. *Journal of Wound, Ostomy, and Continence Nursing: Official Publication of The Wound, Ostomy and Continence Nurses Society*, 38(5), 541–555. <https://doi.org/10.1097/WON.0b013e31822acd95>
- Díaz, D. F., Carrasco, V. I. C., Barbero, F. L., Carrión, P. B., & Atalaya, J. C. V. M. (2019). ¿Cómo es la experiencia de vivir con una ostomía? Una aproximación fenomenológica. *Enfermería Comunitaria*, 15, e11994. <https://ciberindex.com/p/ec/e11994>
- George, C., Deroide, F., & Rustin, M. (2019). Pyoderma gangrenosum—A guide to diagnosis and management. *Clinical Medicine (London, England)*, 19(3), 224–228. <https://doi.org/10.7861/clinmedicine.19-3-224>
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159–174.
- Le, S. T., Wang, J. Z., Alexanian, C., Ellis, S., Martinez-Alvarado, Y. C., Johng, S., Sood, A., & Maverakis, E. (2019). Peristomal pyoderma gangrenosum: An exceedingly rare and overdiagnosed entity? *Journal of the American Academy of Dermatology*, 81(1), e15. <https://doi.org/10.1016/j.jaad.2019.02.026>
- LeBlanc, K., Whiteley, I., McNichol, L., Salvadalena, G., & Gray, M. (2019). Peristomal medical adhesive-related skin injury: Results of an international consensus meeting. *Journal of Wound, Ostomy, and Continence Nursing: Official Publication of The Wound, Ostomy and Continence Nurses Society*, 46(2), 125–136. <https://doi.org/10.1097/WON.0000000000000513>
- Malik, T., Lee, M. J., & Harikrishnan, A. B. (2018). The incidence of stoma related morbidity—A systematic review of randomised controlled trials. *Annals of the Royal College of Surgeons of England*, 100(7), 501–508. <https://doi.org/10.1308/RCSANN.2018.0126>
- McGee, M. F. (2016). Stomas. *JAMA*, 315(18), 2032. <https://doi.org/10.1001/jama.2016.0202>

- Moya-Muñoz, N., Capilla-Díaz, C., Labella-Rodríguez, M., Gálvez-Cano, J., Sánchez-Crisol, I., & Hueso-Montoro, C. (2019). Nursing diagnoses in people with digestive stoma and their association with sociodemographic and clinical factors. *International Journal of Nursing Knowledge*, 30(4), 203–210. <https://doi.org/10.1111/2047-3095.12230>
- Murken, D. R., & Bleier, J. (2019). Ostomy-related complications. *Clinics in Colon and Rectal Surgery*, 32(3), 176–182. <https://doi.org/10.1055/S-0038-1676995>
- Nichols, T. R., & Inglese, G. W. (2018). The burden of peristomal skin complications on an ostomy population as assessed by health utility and the physical component summary of the SF-36v2®. *Value in Health*, 21(1), 89–94. <https://doi.org/10.1016/j.jval.2017.07.004>
- Nieves, C. B. I., Díaz, C. C., Celdrán-Mañas, M., Morales-Asencio, J. M., Hernández-Zambrano, S. M., Hueso-Montoro, C., las Nieves, C. B., Díaz, C. C., Celdrán-Mañas, M., Morales-Asencio, J. M., Hernández-Zambrano, S. M., & Hueso-Montoro, C. (2017). Ostomy patients' perception of the health care received. *Revista Latino-Americana de Enfermagem*, 25, e2961. <https://doi.org/10.1590/1518-8345.2059.2961>
- Pata, F., Bondurri, A., Ferrara, F., Parini, D., Rizzo, G., & Multidisciplinary Italian Study group for STomas (MISSTO). (2020). Enteral stoma care during the COVID-19 pandemic: Practical advice. *Colorectal Disease: The Official Journal of the Association of Coloproctology of Great Britain and Ireland*, 22(9), 985–992. <https://doi.org/10.1111/codi.15279>
- Ratliff, C. R., Goldberg, M., Jaszarowski, K., McNichol, L., Pittman, J., & Gray, M. (2021). Peristomal skin health: A WOCN society consensus conference. *Journal of Wound, Ostomy, and Continence Nursing: Official Publication of The Wound, Ostomy and Continence Nurses Society*, 48(3), 219–231. <https://doi.org/10.1097/WON.0000000000000758>
- Registered Nurses' Association of Ontario (2009). *Ostomy care and management*. Registered Nurses' Association of Ontario. https://www.nswoc.ca/_files/ugd/9d080f_da1e728cf5f24891b5d34491bf73428d.pdf?index=true
- Registered Nurses' Association of Ontario (Ed.2). (2019). *Supporting adults who anticipate or live with an ostomy* (2nd ed.). Registered Nurses' Association of Ontario. <https://rnao.ca/bpg/language/apoyo-adultos-que-esperan-o-viven-con-una-ostom%C3%ADa>
- Ruiz-de-la-Hermosa-García-Pardo, A., Rodríguez-Maldonado, Y., Martínez-Savoini, E., Gómez-de-Antonio, R., Allo-Miguel, G., García-Alonso, F. J., & Seoane-González, J. B. (2019). Estudio prospectivo sobre las complicaciones de los estomas digestivos. *Revista de Gastroenterología del Perú*, 39(3), 215–221. http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1022-51292019000300003&lng=es&tlng=es
- Shiraishi, T., Nishizawa, Y., Nakajima, M., Kado, R., Ikeda, K., Tsukada, Y., Sasaki, T., & Ito, M. (2020). Risk factors for the incidence and severity of peristomal skin disorders defined using two scoring systems. *Surgery Today*, 50(3), 284–291. <https://doi.org/10.1007/S00595-019-01876-9>
- Sims, T. W., & Wilson, K. (2020). Telehealth management of urostomy postoperative complications: A case study. *Journal of Wound, Ostomy, and Continence Nursing: Official Publication of The Wound, Ostomy and Continence Nurses Society*, 47(5), 456–457. <https://doi.org/10.1097/WON.0000000000000698>
- Smeltzer, S., Bare, B., & Hinkle, J. (2016). *Enfermería Medico quirúrgica* (12.a ed.). Lippincott Williams & Wilkins.
- Steinhagen, E., Colwell, J., & Cannon, L. M. (2017). Intestinal stomas-postoperative stoma care and Peristomal skin complications. *Clinics in Colon and Rectal Surgery*, 30(3), 184–192. <https://doi.org/10.1055/S-0037-1598159>
- Szymanski, K. M., St-Cyr, D., Alam, T., & Kassouf, W. (2010). External stoma and peristomal complications following radical cystectomy and ileal conduit diversion: A systematic review. *Ostomy/Wound Management*, 56(1), 28–35 PMID: 20093715.
- Vandenbroucke, J. P., von Elm, E., Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., Egger, M., & STROBE Initiative. (2014). Strengthening the reporting of observational studies in epidemiology (STROBE): Explanation and elaboration. *International journal of surgery (London, England)*, 12(12), 1500–1524. <https://doi.org/10.1016/j.ijsu.2014.07.014>
- Violin, M. R., Mathias, T. A. d. F., & Uchimura, T. T. (2017). Perfil de clientes colostomizados inscritos em programa de atenção aos estomizados. *Revista Eletrônica De Enfermagem*, 10(4), 924–932. <https://doi.org/10.5216/ree.v10.46740>
- Weinstein, R. S., Holcomb, M. J., Mo, J., Yonsetto, P., Bojorquez, O., Grant, M., Wendel, C. S., Tallman, N. J., Ercolano, E., Cidav, Z., Hornbrook, M. C., Sun, V., McCorkle, R., & Krouse, R. S. (2021). An ostomy self-management telehealth intervention for cancer survivors: Technology-related findings from a randomized controlled trial. *Journal of Medical Internet Research*, 23(9), e26545. <https://doi.org/10.2196/26545>
- Wound, Ostomy and Continence Nurses Society Task Force. (2018). Wound, ostomy, and continence nursing: Scope and standards of WOC practice, 2nd Edition: An executive summary. *Journal of Wound Ostomy, and Continence Nursing: Official Publication of The Wound, Ostomy and Continence Nurses Society*, 45(4), 369–387. <https://doi.org/10.1097/WON.0000000000000438>

How to cite this article: García-Manzanares, M.-E., Lancharro-Bermúdez, M., Fernandez-Lasquetty-Blanc, B., Hernández-Martínez, A., Rodríguez-Almagro, J., & Caparros-Sanz, M.-R. (2022). Assessment, diagnosis and treatment of peristomal skin lesions by remote imaging: An expert validation study. *Journal of Advanced Nursing*, 00, 1–11. <https://doi.org/10.1111/jan.15497>

The *Journal of Advanced Nursing (JAN)* is an international, peer-reviewed, scientific journal. *JAN* contributes to the advancement of evidence-based nursing, midwifery and health care by disseminating high quality research and scholarship of contemporary relevance and with potential to advance knowledge for practice, education, management or policy. *JAN* publishes research reviews, original research reports and methodological and theoretical papers.

For further information, please visit *JAN* on the Wiley Online Library website: www.wileyonlinelibrary.com/journal/jan

Reasons to publish your work in *JAN*:

- High-impact forum: the world's most cited nursing journal, with an Impact Factor of 2.561 – ranked 6/123 in the 2019 ISI Journal Citation Reports © (Nursing; Social Science).
- Most read nursing journal in the world: over 3 million articles downloaded online per year and accessible in over 10,000 libraries worldwide (including over 6,000 in developing countries with free or low cost access).
- Fast and easy online submission: online submission at <http://mc.manuscriptcentral.com/jan>.
- Positive publishing experience: rapid double-blind peer review with constructive feedback.
- Rapid online publication in five weeks: average time from final manuscript arriving in production to online publication.
- Online Open: the option to pay to make your article freely and openly accessible to non-subscribers upon publication on Wiley Online Library, as well as the option to deposit the article in your own or your funding agency's preferred archive (e.g. PubMed).