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# Ongoing nursing training influence on the completion of electronic pressure ulcer records

María López [a,d,*], José María Jiménez [b,d,*], Isabel Peña [c], María José Cao [d], María Simarro [e,d], María José Castro [d]

[a] GACELA Care Management Department, Hospital Clínico Universitario de Valladolid, Valladolid, Spain
[b] Hospital Universitario Rio Hortega, Valladolid, Spain
[c] Research of Nursing Care Department, Hospital Clínico Universitario de Valladolid, Valladolid, Spain
[d] Faculty of Nursing, Universidad de Valladolid, Spain
[e] Research Instituto Biología y Genética Molecular IBGM, Universidad de Valladolid, Valladolid, Spain

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ABSTRACT

*Introduction:* Pressure ulcer (PU) care in nursing at the Hospital Clínico Universitario de Valladolid (HCUV) in Spain includes basic care and its registration through the electronic GACELA Care tool. To assess and evaluate the nursing intervention in PU evolution, a training programme was carried out to unify criteria on PU assessment, treatment, evaluation and monitoring.
*Objective:* To assess the influence of training on the completion of PU records in the GACELA Care application, and identify the level of satisfaction of the nurses after its use.
*Materials and Methods:* A quasi-experimental prospective study consisting of a specific training programme assessed pre- and post-training was carried out on the records of PU documentation at the HCUV. The PU records included in the study were collected using the electronic nursing healthcare management computer tool GACELA Care and belonged to patients admitted for >48 h, excluding venous, arterial and stage I PUs. The pre-training sample consisted of 65 records collected between 1 April and 30 June 2014, and there were 57 post-training records, completed from 1 January to 31 March 2015. The training programme consisted of thirty-minute theoretical and practice training sessions. The study variables were ulcer type, location, stage, length and diameter, perilesional skin, cure type, products used and cure frequency, in addition to the number of actions taken in the records in correlation to the days of hospitalisation. To identify the nurses' opinions, a satisfaction survey about the management platform of ongoing Castilla y León training was administered. Results: The variations from the pre- to the post-training PU-sample completion rates were the following: from 23% to 40% for PU diameter, from 11% to 38% for PU length and from 57% to 79% for perilesional skin condition records. There was also a significant increase in the number of form updates after the training activity. The nurses' level of satisfaction with the training activity showed a positive outcome, with an average score of 8.84 over 10.
*Conclusion:* The training activity improved PU record completion significantly and was deemed positive by the nurses, mainly for its applicability in clinical practice.



## 1. Introduction

According to the Nursing Interventions Classification, "a nursing intervention is any treatment based upon clinical judgement and knowledge that a nurse performs to enhance patient/client outcomes" (Bulecheck et al., 2013). Skills, experience and specific knowledge facilitate the implementation of a correct intervention after carrying out patient assessment to achieve the established objectives (Alfaro-Lefevre, 2009).

It is important for all the activities of the care process to be documented, not only to abide by the rules concerning the rights and obligations with regard to clinical information and documentation (Boletín Oficial del Estado, 2002), but for reasons related to care quality, patient safety and development of the scientific profession. The absence of data or the lack of specific information makes it difficult to see the overall picture of health work which has an impact on care quality and safety (Gunningberg et al., 2009). Accrediting institutions such as the Joint Commission on Accreditation of Healthcare Organizations establish that Nursing records must meet basic standards and have to be real, exact, complete, updated and organised to be considered quality records (Joint Commission on Accreditation of Healthcare Organizations (JCAHO), 2009).

The appearance of pressure ulcers (PUs) is common complication in hospitalised patients. This type of lesion is linked to a high rates of morbidity and mortality, infection and economic costs (Vollman, 2010). Nurses play an important role in preventing and handling PUs; their

* Corresponding authors at: Avda Ramón y Cajal, n°7, 47005 Valladolid, Spain.
*E-mail addresses:* maria.lopez.vallecillo@uva.es (M. López), josejimenez@enf.uva.es (J.M. Jiménez).

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interventions, together with records of ulcer evolution, make it possible to carry out strategies that facilitate evidence-based work in nursing healthcare (Tayyib et al., 2016). Implementing ongoing training sessions on classifying, handling and registering pressure ulcers would promote improvement in the quality of nursing healthcare (Bredesen et al., 2016).

## 2. Background

Within the patient's safety, strategy indicators of the Spanish National Health System are those that identify the risk of PU appearance and its prevalence (Sociedad española de calidad asistencial, 2012). In Spain, the prevalence of hospital PUs in 2013 was 7%–8%, with 65% of these injuries being nosocomial (Pancorbo-Hidalgo et al., 2014). The Nosocomial Infections Prevalence Study in Spain (EPINE) identified the prevalence as 6% in 2014 at the Hospital Clínico Univeristario de Valladolid (HCUV) (Sociedad Española de Medicina Preventiva, Salud Pública e Higiene y ECDC, 2014). Although PUs were not historically considered an important problem in Spanish Public Health, in economic terms, hospital PU treatment represents a total annual cost of 461 million euros, out of which 15% is spent on bandages and related supplies, 19% on nursing time and 45% on hospital stay (Soldevilla-Agreda et al., 2007).

The healing process of the PU is long and complex (Soldevilla-Agreda and Torra-Bou, 2004) and healing speed is the main indicator of treatment effectiveness. It is necessary to use a monitoring device that helps observe ulcer evolution, assesses the effectiveness of the established medical care and enables its continuity. In an attempt to unify the minimum set of data that a PU report should contain, the National Group for the Study and Advice of Pressure Ulcers has published a position paper thereon, which specifies the items that must be included for their assessment, such as injury size and depth, wound edge characteristics, the wound bed of the injury, exudation and signs of infection (Ibars-Moncasi et al., 2012). Another way of monitoring ulcer changes is the PUSH (Pressure Ulcer Scale for Healing) scale validated by the National Pressure Ulcer Advisory Panel; it includes parameters such as injury size (length and width), amount of exudation and injury wound bed tissue type to evaluate healing status (National Pressure Ulcer Advisory Panel, 2015). The purpose of its design was to analyse the results of the treatment applied in tackling the ulcer and its reassessment (Restrepo-Medrano and Verdú, 2011). This monitoring enables effective communication among the nurses in charge of the care, helping them to choose the most adequate care intervention objectively (Li and Korniewicz, 2013).

In the HCUV, individual PU records have been maintained using the online nursing care management computer programme GACELA Care (GACELA being the acronym for the programme title in Spanish), Version 1.8-09, since 2009. This application, whose acronym stems from the Spanish for encompasses ulcer assessment, treatment and monitoring and is a part of the electronic patient history in the Castilla y León region health system. GACELA Care makes it possible to work on nursing methods, given that it integrates the various phases of the nursing process. Using a virtual map in which the patients admitted in each hospital unit are presented, specific icons allow access to nursing care evolution, clinical variables, patient registers, evaluation based on Virginia Henderson's 14 basic needs and healthcare plans. Computerising the nursing work records promotes standardisation and obtaining complete documents. The GACELA Care nursing registers make nurses' work and, in turn, the nursing profession, visible (Rubio Sevilla, 2014).

Scanning clinical histories through GACELA Care facilitates systematisation and organisation in data collection, as well as promoting interprofessional communication, decision making and application of evidence-based nursing (Li and Korniewicz, 2013). Electronic records are consequently an important part of improving the nursing process to achieve greater record use (Pokorski et al., 2009).

## 3. Literature

There are several studies analysing Nursing documentation of PUs in hospitals that lead to the conclusion that such documentation is of low quality and that PU records will have to be completed correctly to be able to make good use of the patient's electronic records in the future (Alexander, 2015; Gunningberg and Ehrenberg, 2004). It is important to highlight that incomplete documentation is of no use in assessing care quality (Thoroddsen et al., 2013) and the records cannot be used as a form ulcer notification (Sebastián-Viana et al., 2016). Detecting documents with these deficiencies has led to the emergence of research areas focusing on evaluating existing standardised records and implementing improvements (Törnvall et al., 2009).

Identifying the level of PU application form completion in the HCUV was carried out in May 2014 through the EPINE research. This study detected 43 PU records, in which only 7 included ulcer size, information essential to assess ulcer status and progress objectively. Several studies such as that carried out by Li and Korniewicz (2013) associate the lack of records -both in digital and paper format- concerning ulcer size with the lack of specific knowledge in the area. However, for O'Brien and Cowman (2011), time constraints and limited nursing staff are boundaries that hinder the development of a good document.

Ongoing training allows health organisations to maintain their professionals' ability to adapt to changes (Pineda Herrero, 2007), as well as to improve their competence in knowledge, skills and attitudes and foster adequate professional criteria (Beamud Lagos et al., 2004). Bearing this in mind, a face-to-face training activity was designed in contrast to the e-learning methodology because, as Beeckman points out, it has been proven equally effective in the case of professionals (Beeckman et al., 2008). The purpose of this training programme was to unify assessment, treatment, evaluation and monitoring criteria to improve the quality PU application form completion. In addition, as specified in the Registered Nurses' Association of Ontario guidelines on "Assessment and Management of Stage I through IV Pressure Ulcers," it was designed to raise awareness of the "need for precise, coherent and uniform assessment, description and documentation of the degree of tissue deterioration" (RNAO, 2007).

The purpose of this study was to assess the influence of training on how to complete electronic PU records in the GACELA Care programme. The study was specifically designed to analyse variations in data completion of ulcer characteristics and treatment, to determine the development of the level of PU monitoring and, finally, to identify the nurses' level of satisfaction with the training programme.

This article provides information on electronic PU records and how training improves their completion, adapted to Good Clinical Practice Guidelines recommendations. Most PU studies focus on ulcer care and not on the area of data registers, whose correct completion makes it possible to reflect the nursing process and measure the impact of planned nursing care.

## 4. Methods

### 4.1. Study Design

This was a quasi-experimental prospective study consisting of a specific training programme, assessed with a pre- and post-training analysis of the records of PU documentation of the GACELA Care computer programme at the HCUV.

The PU record consists of four main areas: record data (nurse's name and data entry date), severity data or ulcer characteristics, monitoring data and ulcer remission. The records mainly collect information on the date and place of PU appearance, PU type, location, stage, diameter and length, perilesional skin, edges, discharge, infection symptoms, type of cure, supplies, frequency. They also make it possible to perform all necessary proceedings to monitor the ulcer. It is mandatory to indicate the place of PU emergence, PU type and PU stage. The length and

diameter are open fields on the form where measurements can be noted in centimetres, while the other fields offer drop-down menus with default options to facilitate standardising the information.

### 4.2. Participants

Electronic PU records gathered through the GACELA Care platform, of patients with PUs admitted to one of the three HCUV Internal Medicine units, with a total of 94 beds. The PU registers from these hospital units were selected for this study because they handle a type of patients who are at greater risk of developing PUs associated with their clinical process.

Venous and arterial ulcer records were excluded because the training programme was not aimed at their assessment and registration, differentiating them from those of vascular origin. Stage I PUs were also excluded, given that they constitute precursor skin ulcer lesions and that documenting their data is not obligatory at the HCUV.

All the records of patients admitted for >48 h, with stage II through IV PUs, including those of hospital or domestic origin, and in any anatomical site were included in the PU sample with the GACELA platform.

### 4.3. Data Collection

The PU record data collection was carried out sequentially in two periods: before providing the training activity, from 1 April to 30 June 2014 (pre-training), and after training, from 1 January to 30 March 2015 (post-training).

The pre-training group consisted 914 admitted patients, on whom 108 PU registers were obtained. Of these, 65 records fulfilled the inclusion criteria. The post-training group consisted of 776 admitted patients, with 86 PU registers being found. Of these, 57 fulfilled the inclusion criteria.

### 4.4. Study Protocol

The training programme carried out consisted of a theoretical and practical training session aimed at the 197 nurses working in the HCUV hospital units, given by two nurses experts in and responsible for the GACELA Care programme. Held in a classroom equipped with 15 computers, the session lasted from thirty to forty minutes, and was repeated from 15 September to 10 October 2014. It was offered from Monday through Friday, at three different times (12:00, 13:00 and 14:00), within the working day and in small groups of no more than six people; 142 nurses attended a session voluntarily. The training session was designed to promote healthcare continuity in handling PUs through their registers in the GACELA Care application. Specific focuses were unifying PU register criteria, assessing nursing interventions, and acquiring skills in managing the computer tool itself.

The theoretical segment of the training session included a brief introduction of the reasons for it, plus a reminder that there was teaching material available on demand through the hospital intranet related to preventing, treating and registering PUs. The content of the PU record itself was analysed by projecting to dynamically set minimum data completion: ulcer type, location, stadium, length and diameter, perilesional skin, type of cure, products used and cure frequency. According to the PU care protocol, included in the HCUV Nursing Procedures Manual, weekly form update was set to monitor ulcer evolution and evaluate any change in handling this ulcer (Hospital Clínico Universitario de Valladolid, 2009). The practical component consisted of carrying out a simulation of PU data registry in the virtual training environment of the computer application. To do so, a computer was available for each participant to allow the nurses to individually apply the content from the theoretical component.

The study variables were ulcer type, location, stadium, length and diameter, perilesional skin, type of cure, products used and cure frequency, as well as the number of record updates depending on the number of days of hospital admission. The demographic variables included data such as patient sex, patient age, exitus and days of hospital admission.

The participants each attended a single training session voluntarily within the workday schedule. To recruit the nurses, information about the training programme was sent via e-mail to the nursing supervisors of each HCUV hospitalisation unit to facilitate the nurses' attendance to the training sessions. Posters about the training were also placed in common staff areas throughout the hospital to encourage staff attendance.

To identify the nurses' opinions, a satisfaction survey from the management platform of ongoing training in Castilla y Leon (FOSA version 3.0.0) was used. The survey questioned the student on aspects related to the suitability of the activity used in the programme, organisational aspects, level of overall satisfaction and evaluation of the trainers using a Likert scale from 1 to 10, where 1 is dissatisfied and 10 fully satisfied. The survey also included an open observation field divided into two sections: strengths and weaknesses of the programme. This form was voluntarily completed by 134 nurses immediately after the training session they attended.

### 4.5. Statistical Analysis

SPSS statistical programme v.15.0 (SPSS Inc. from 1989 to 2006) was used in the analysis of the variables. The statistical significance level was considered to be $p < 0.05$. The quantitative variables were described as mean ± standard deviation (SD), while the qualitative variables were described with absolute and relative frequencies (percentages). Changes in clinical variables were compared before and after performing the educational intervention, using Student's *t*-test for continuous variables and the Chi-square test for qualitative variables.

## 5. Results

In relation to demographic variables analysed, 47.7% of PU records were conducted in women and 52.3% in men in the pre-training group, and 63.2% were women and 36.8% were men in the post-training one. The average age of patients with an ulcer record was 81.3 ± 9.6 years prior to the intervention and 86.1 ± 3.1 years afterward. The average hospital stay, understood as being admitted to the hospital, was 23.7 ± 26.8 days in the patient records previous to the training in contrast to 17.6 ± 13.2 days after the training. Regarding exitus or deaths, the percentage was 40% in the pre-training and 24.6% in the post-training. The two groups were homogeneous regarding gender ($p = 0.08$), days of hospital stay ($p = 0.85$) and number of exitus ($p = 0.06$), while they were heterogeneous in relation to age ($p = 0.001$).

The assessment of ulcer type, stage and location was 100% before and after the training activity. In the pre-intervention study sample, 46.15% of the PU records were on stage II ulcers, 27.69% were stage III and 26.15%, stage IV. In the post-intervention sample, 54.39% were stage II, 35.09% stage III and 10.53%, stage IV. As for PU location, the highest percentage prior the intervention was 46.15% in the sacrum and 20% in the heels; in the post-intervention group, 63.16% were in the sacrum and 17.64% in the heels. Other sites such as the malleolus, trochanter, buttock, leg, toe or other had lower percentages (Fig. 1). These variables did not show statistical significance.

The data completion of PU length, understood as the measure coinciding with the longitudinal or vertical axis of the body, increased from 10.81% to 38.6% ($p = 0.001$). Documentation of PU diameter, registered as the perpendicular measurement to the length, rose from 23.1% to 40.4% ($p = 0.04$) and the perilesional skin status records went from 56.9% to 78.9% ($p = 0.001$). There was also variation in the number of updates to the form, with an average of 1.08 ± 0.32 updates before the training activity and 1.74 ± 0.95 after it ($p < 0.001$). In all cases, the differences were statistically significant. Other items analysed varied pre- and post-training; examples are type of cure, which rose from

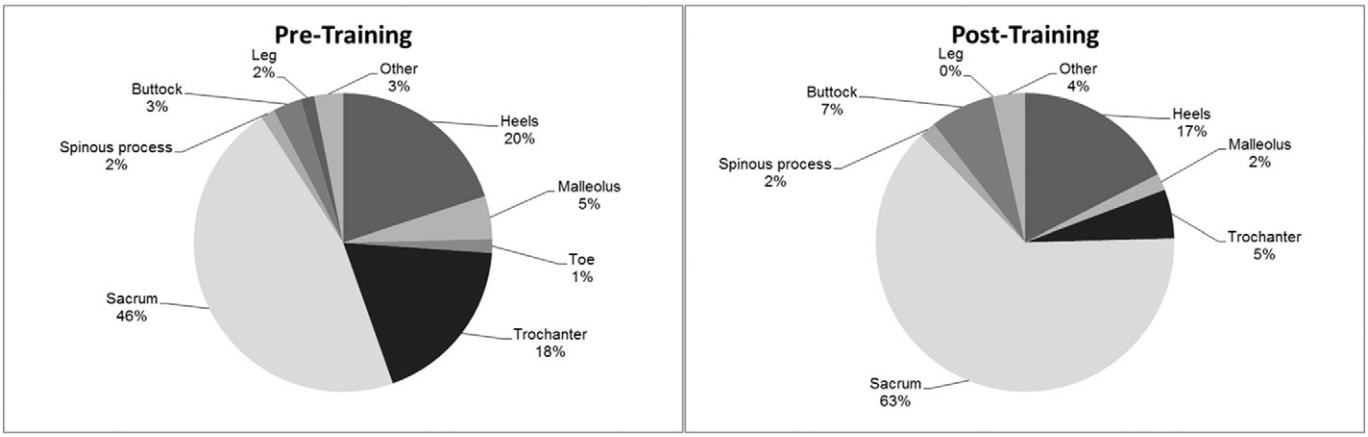


**Fig. 1.** Pressure ulcer locations before and after the training activity.

93.8% to 94.7%; product use, which dropped from 90.8% to 89.5%; and frequency of the cures, which fell from 89.29% to 87.7%. None of these changes were statistically significant, as shown in Table 1.

Turning to the nurses' opinions, of the 197 nurses working in the HCUV hospital units, 142 (72%) participated in the training programme; of these, 134 (94%) completed the satisfaction survey. The suitability of the activity and the programme obtained an average score of 8.55 out of 10. The following aspects were assessed: programme development of objectives set, training programme content, greater knowledge of the training content, improvement and/or updating of professional competence, and increase in working performance knowledge and/or skills. Programme content and increased professional competence were the most highly regarded aspects (8.84 and 8.75, respectively). The lowest score was received by the item for increased work performance (8.44). More detailed information, is shown in Fig. 2.

The organisational aspects evaluated, which obtained an average of 8.72, included activity scheduling, duration of sessions, the place where the training sessions were held and the resources used. The level of satisfaction was 8.84 and the evaluation of the GACELA-expert nurses who taught the activity was 9.25 in the sections of contents presented and level of communication.

In the section for attendee observations, there 25 comments included in the strengths of the activity. These were grouped into the following main concepts: 7 highlighted the practical part; 7, the clarity of the explanation; and 11, the efficiency of the training related to content and the time spent in explaining and answering questions. Only two comments were made in the weaknesses paragraph, reflecting that the training time had been limited.

## 6. Discussion

Hospital PU registration form completion has been improved after carrying out the training programme, with there being a direct connection between the training programme and the upgraded completion of the variables analysed. This coincides with other studies relying on an educational intervention to achieve an improvement in performing the registrations (Gunningberg et al., 2009; Törnvall et al., 2009; Fossum et al., 2013).

Ulcer type and stage were registered in 100% of cases, both before and after the training because it was compulsory to do so. It is worth stressing that 100% completion was also maintained for PU location, despite such registration being optional. It is a significant fact that coincides with the results of other studies that also show that the most annotated feature was ulcer location (Li and Korniewicz, 2013; Sánchez et al., 2004; O'Brien and Cowman, 2011).

There has been a significant increase in completing the information related to PU size after the implementation of the training activity, with results similar to those obtained by Gunningberg (Gunningberg et al., 2009).

Before the implementation of the training programme, there was a contrast between completing the variables related to PU characteristics. Diameter, length and perilesional skin started from a low rate of completion, whereas the items related to nursing intervention and monitoring (such as type of cure, product used and its frequency) showed high initial completion rates that remained around 90% after the training. It is important to point out that none of the variables were of mandatory completion. Therefore, it can be concluded that nurses had integrated well the importance of registering variables connected with healthcare interventions, but not those related to ulcer assessment that allowed measuring the impact of nursing activity. It has been demonstrated that training has been most effective when nurses initially had low levels of record completion (Dunbar, 2004).

An increase in the frequency of record updating has been seen, which was understood as ulcer evolution monitoring. One might consider whether such improvement, together with the level of data completion on length, diameter and perilesional skin, is enough to consider it a reliable source in ulcer evaluation and continuity of its care. However, this type of information has clinical, administrative and educational importance, making it possible to compare and relate nursing interventions with ulcer evolution, thus facilitating decision-making, medical judgements, ongoing care and the exchange of information between professionals (Chamanga and Ward, 2015).

The implications for clinical practice constitute a constant challenge in achieving active participation of hospital staff in PU care and handling, favouring interaction with the patients (Kitson et al., 2014).

Training at the HCUV normally focuses on improving PU knowledge, approach and treatment, but not explicitly on registering PU data. That is why we approached PU record completion in this study, as a quality

**Table 1**
Assessment of the level of record completion of nursing before and after the training intervention.

| Items | Pre-test | | Post-test | | *p* value |
|---|---|---|---|---|---|
| | n | % | n | % | |
| Diameter | 15 | 23.1 | 50 | 76.9 | 0.04 |
| Length | 7 | 10.8 | 22 | 38.6 | 0.001 |
| Perilesional skin | 37 | 56.9 | 45 | 78.9 | 0.01 |
| Type of cure | 61 | 93.8 | 54 | 94.7 | 0.83 |
| Use of products | 59 | 90.8 | 51 | 89.5 | 0.81 |

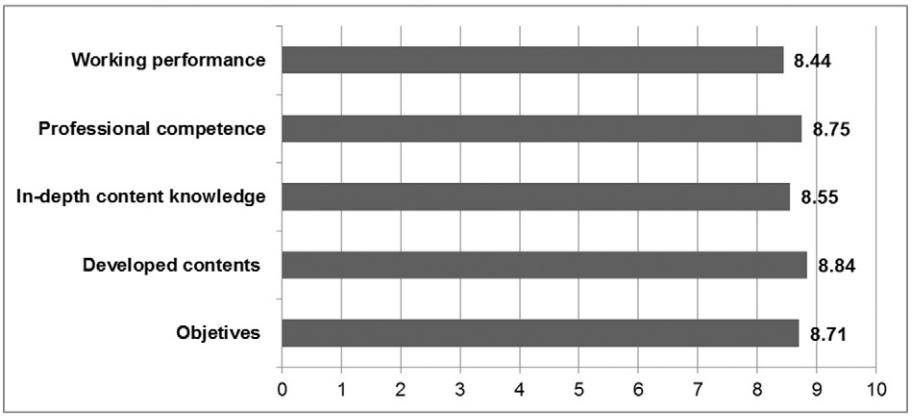


**Fig. 2.** Nurses' level of satisfaction with training and programme suitability.

marker, fulfilling legal-ethical requirements, and promoting safety and autonomy for the patient receiving nursing interventions during the clinical process (Ramos et al., 2011).

Implementing our study training programme in hospitals where PU register completion might not be consolidated would be recommendable. This would help to unify PU approach and evolution assessment criteria.

In the case of the study conducted in the HCUV, the nurses were already acquainted with computer records, including that of PUs, so they opted for training sessions to further improve record completion. In the literature, we found other interventions that had positive results, such as regular evaluation of record content (Törnvall et al., 2009), implementation of standardised guidelines (Gunningberg et al., 2009; Li and Korniewicz, 2013), ongoing training-based staff stimulation during a period of up to three months, and even complementation of training with computerised decision-making support systems (Fossum et al., 2013).

The nurses assessed this training programme positively, mainly because it was clear and concise. The fact that it was accompanied by performing a practical case of registration in the training environment contributed to setting the information and answering questions. However, the high level of satisfaction does not seem to match the degree of improvement in completing the PU registration since, according to some studies, there are other factors not related to the lack of knowledge. In one of the training programmes, through focus groups, nurses attributed the lack of care records to the lack of personnel; they also recommended making PU registration mandatory, but pointed out that this could only be successfully implemented with the cooperation all the staff (O'Brien and Cowman, 2011). Another study indicates that the time that it takes to complete the assessment of ulcer status and progress is a barrier to successful PU record completion (Gunningberg et al., 2009).

Our study has a number of limitations. It should first be noted that completion rate of the registration was assessed only once, two months after the training programme. Secondly, Internal Medicine units at one hospital were included. It would be advisable to extend the study to other units and centres to assess the external validity of ongoing training through a theoretical and a practical workshop.

Finally, attending the training activity was voluntary. Consequently, not all nurses who completed registrations participated in the training programme, even though it had been scheduled during working hours to prevent them from having to work overtime and from seeing the training programme as an overload.

## 7. Conclusions

Implementing continued training programmes on nursing documentation in computer application makes it possible to improve nursing care evidence. Correctly filling out PU records promotes care continuity because it allows identification of treatment type for and evolution of ulcers, with the consequent capability of measuring the impact of nursing interventions.

The implementation of this training activity achieved greater record completion of PU length and diameter and of perilesional skin status, as well as an increase in the prevalence of ulcer status assessment. The checklist variable "PU location" was completed in both pre- and post-training groups in 100% of the cases, even though its registration was optional.

Nurses had integrated well the importance of recording variables involving interventions, but not those regarding assessment. Better results were obtained after the training programme in those items that initially had a low level of completion.

The nurses assessed the training programme positively, mainly for being practical, clear and applicable in clinical practice.

## References

Alexander, G., 2015. Nurse assistant communication strategies about pressure ulcers in nursing homes. West. J. Nurs. Res. 37 (7), 984–1004.
Alfaro-Lefevre, R., 2009. Pensamiento crítico y juicio clínico en enfermería. 4ª ed. Elsevier Masson, Barcelona.
Beamud Lagos, M., Martín Fernández, J., Pérez Rivas, J., Muñoz Delgado, F., 2004. Mejora de la calidad del proceso asistencial mediante una actividad de formación continuada: a propósito de la espirometría. Enfermería Clínica 14 (5), 269–274.
Beeckman, D., Schoonhoven, L., Boucqué, H., Van Maele, G., Defloor, T., 2008. Pressure ulcers: e-learning to improve classification by nurses and nursing students. J. Clin. Nurs. 17 (13), 1697–1707.
Boletín Oficial del Estado, 2002. Ley 41/2002, de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica. (Retrieved 2 December 2015, from). https://www.boe.es/diario_boe/txt.php?id=BOE-A-2002-22188.
Bredesen, I.M., Bjøro, K., Gunningberg, L., Hofoss, D., 2016. Effect of e-learning program on risk assessment and pressure ulcer classification - a randomized study. Nurse Educ. Today 40, 191–197.
Bulecheck, G.M., Butcher, H.K., Dochterman, J.M., 2013. Clasificación de intervenciones de enfermería (NIC). 6ª ed. Elsevier Mosby, Madrid, p. XXIII.
Chamanga, E., Ward, R., 2015. Documentation and record-keeping in pressure ulcer management. Nurs. Stand. 29 (36), 56–63.
Dunbar, A., 2004. An innovative teaching strategy for pressure ulcer documentation: the case for computer-based learning. Ostomy Wound Manag. 50 (11), 28–29.
Fossum, M., Ehnfors, M., Svensson, E., Hansen, L.M., Ehrenberg, A., 2013. Effects of a computerized decision support system on care planning for pressure ulcers and malnutrition in nursing home: an intervention study. Int. J. Med. Inform. 82 (10), 911–921.
Gunningberg, L., Ehrenberg, A., 2004. Accuracy and quality in the nursing documentation of pressure ulcers: a comparison of record content and patient examination. J. Wound Ostomy Continence Nurs. 31 (6), 328–335.
Gunningberg, L., Fogelberg-Dahm, M., Ehrenberg, A., 2009. Improved quality and comprehensiveness in nursing documentation of pressure ulcers after implementing an electronic health record in hospital care. J. Clin. Nurs. 18 (11), 1557–1564.
Hospital Clínico Universitario de Valladolid, 2009. Manual de Procedimientos de Enfermería 2009/2010. (Retrieved 10 December 2015, from). http://bazar.fundacionsigno.com/documentos/proceso-asistencial-del-paciente/manual-de-procedimientos-de-enfermeria/view.
Ibars-Moncasi, P., San Sebastián-Dominguez, J.A., Soldevilla-Agreda, J.J., Conjunto Mínimo Básico de Datos en registros de Ulceras por Presión (CMBD_UPP), 2012. Serie

documentos de Posicionamiento GNEAUPP no. 11. Grupo Nacional para el estudio y asesoramiento en úlceras por presión y heridas crónicas. Logroño.
Joint Commission on Accreditation of Healthcare Organizations (JCAHO), 2009o. Revised Chapter Record of Care, Treatment, and Services Long Term Care Accreditation Program.
Kitson, A.L., Muntlin Athlin, A., Conroy, T., 2014. Anything but basic: nursing's challenge in meeting patients' fundamental care needs. J. Nurs. Scholarsh. 46 (5), 331–339.
Li, D., Korniewicz, D.M., 2013. Determination of the effectiveness of electronic health records to document pressure ulcers. Med.-Surg. Nurses 22 (1), 17–25.
National Pressure Ulcer Advisory Panel, 2015. Washington PUSH Tool. http://www.npuap.org/resources/educational-and-clinical-resources/push-tool/push-tool/ (Retrieved 7 January 2016).
O'Brien, J.A., Cowman, S., 2011. An exploration of nursing documentation of pressure ulcer care in an acute setting in Ireland. J. Wound Care 20 (5), 197–203.
Pancorbo-Hidalgo, P.L., García-Fernández, F.P., Torra-Bou, J.E., Verdú-Soriano, J., Soldevilla-Agreda, J.J., 2014. Epidemiología de las úlceras por presión en España en 2013: 4° Estudio Nacional de Prevalencia. Gerokomos 25 (4), 162–170.
Pineda Herrero, P., 2007. La formación continuada en España: balance y retos de futuro. Relieve 13 (1), 43–65.
Pokorski, S., Moraes, M.A., Chiarelli, R., Costanzi, A.P., Rabelo, E.R., 2009. Proceso de enfermería: de la literatura a la práctica. ¿Qué estamos haciendo, de hecho? Rev. Latino-Am Enfermagem 17 (3), 302–307.
Ramos, E., Nava, M.G., San Juan, D., 2011. Conocimiento y percepciones de la adecuada cumplimentación de los registros de enfermería en un centro de tercer nivel. Enferm Clin 21 (3), 151–158.
Registered Nurses' Association of Ontario (RNAO), 2007. Assessment and Management of Stage I to IV Pressure Ulcers. Registered Nurses' Association of Ontario, Toronto.
Restrepo-Medrano, J., Verdú, J., 2011. Medida de la cicatrización en úlceras por presión: ¿Con qué contamos? Gerokomos 22 (1), 35–42 (Retrieved 1 December 2015, from:).
Rubio Sevilla, J.C., 2014. La enfermería en el juicio clínico: la valoración y el diagnóstico. Enferm Cardiol Año XXI 61, 25–31.
Sánchez, M.D., García-Velasco, S., Díaz, F., Torres, R., 2004. Evaluación de la cumplimentación del registro de seguimiento de úlceras por presión. Enfermería Científica 264-265, 23–25.
Sebastián-Viana, T., Losa-Iglesias, M., González-Ruiz, J.M., Lema-Lorenzo, I., Núñez-Crespo, F.J., Salvadores Fuentes, P., ARCE team, 2016. Reduction in the incidence of pressure ulcers upon implementation of a reminder system for health-care providers. Appl. Nurs. Res. 29, 107–112.
Sociedad española de calidad asistencial, 2012. Indicadores de calidad para hospitales del Sistema Nacional de Salud (Retrieved 4 December 2015, from).
Sociedad Española de Medicina Preventiva, Salud Pública e Higiene y ECDC. Estudio EPINE-EPPS, 2014H. Informe Global de España 1. (Retrieved 10 December 2015, from). http://hws.vhebron.net/epine/.
Soldevilla-Agreda, J.J., Torra-Bou, J.E., 2004. Atención integral de las heridas crónicas. 1ª ed. SPA, Madrid.
Soldevilla-Agreda, J.J., Torra-Bou, J.E., Posnett, J., Verdú-Soriano, J., San Miguel, L., Mayan-Santos, J.M., 2007. Una aproximación al impacto del coste económico del tratamiento de las úlceras por presión en España. Gerokomos 18 (4), 43–52.
Tayyib, N., Coyer, F., Lewis, P.A., 2016. Implementing a pressure ulcer prevention bundle in an adult intensive care. Intensive Crit. Care Nurs. 37, 27–36.
Thoroddsen, A., Sigurjónsdóttir, G., Ehnfors, M., Ehrenberg, A., 2013. Accuracy, completeness and comprehensiveness of information on pressure ulcers recorded in the patient record. Scand. J. Caring Sci. 27 (1), 84–91.
Törnvall, E., Wahren, L.K., Wilhelmsson, S., 2009. Advancing nursing documentation—an intervention study using patients with leg ulcers as an example. Int. J. Med. Inform. 78 (9), 605–617.
Vollman, K.M., 2010. Introduction to progressive mobility. Crit. Care Nurse 30 (2), S3–S5.