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# Relationship between pressure ulcer risk based on Norton Scale and on the "Eating/Drinking" need assessment

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## Abstract

**Aim**: To study the relationship between pressure ulcer risk evaluated by the Norton Scale and inadequate fulfilment of Need 2 (*Eating/Drinking*) from the 14-need classification designed by Virginia Henderson.

**Background**: Assessing nutritional status and skin condition to implement preventive measures are important nursing interventions. Our hospital's standard procedure requires recording Norton Scale and Henderson *Eating/Drinking* Assessment results.

**Methods**: This was a descriptive cross-sectional study, analysing case histories of 219 patients in medical/surgical wards for >24 hr with nursing care recorded in the GACELA Care computer application. Patient sociodemographic variables and evaluation concepts from the Norton Scale and *Eating/Drinking* were studied.

**Results**: A statistically significant relationship ($p < 0.05$; 95% CI: 0.61, 2.83) was seen between inadequate *Eating/Drinking* need fulfilment and increased pressure ulcer risk. Pressure ulcer risk was generally low in the sample, with mainly no or minimum risk (77.3%); the oldest age group had the highest risk. Self-care autonomy was the most frequently assessed item in *Eating/Drinking* (42%).

**Conclusions**: A relationship was found between Norton Scale risk results and *Eating/Drinking* need assessment results. The greater the pressure ulcer risk, the more likely was inadequate need satisfaction (poor nutritional status).

**Implications**: To help identify pressure ulcer risk, nurses should assess patients' eating independence. Safeguarding nutritional status and preventing pressure ulcers are nursing skills associated with quality nursing care.

KEYWORDS

electronic health records, nursing care, nursing records, pressure ulcer prevention, scales

## 1 | INTRODUCTION

There is a direct relationship between morbidity, mortality, and patients' nutritional status (Tangvik et al., 2014). In hospitalized patients, malnutrition affects wound healing and the immunological, endocrine, cardiorespiratory, and gastrointestinal systems (Meehan et al., 2016). Nurses are important in patient nutritional assessment because their evaluations and records help identify the risk of malnutrition and decide on plans for loss of appetite, weight loss, and nursing care.

Detecting patients with nutritional risk on admission, before the problem grows, helps adaptation to nutritional needs during hospitalization; it also prevents malnutrition, which hinders patient evolution and prolongs hospital stay (Ballesteros et al., 2016; Citty, Kamel, Garvan, Marlowe, & Westhoff, 2017). The nurse's evaluation should also cover the patient's ability to eat independently and the patient's

  

degree of autonomy Haesler, 2014. Identifying dysphagia and the concomitant difficulty in eating is another strategy for detecting patients at greater risk of malnutrition and dehydration. Swallowing is a complex neuromuscular activity that may sometimes be altered, so such identification also helps prevent further complications that put patient safety at risk (Simons & Hamdy, 2017). Nursing staff, as part of the multidisciplinary health care team, should collaborate in identifying these at-risk patients by performing appropriate evaluation (Nicolo et al., 2014).

Nutritional status is one of the intrinsic factors linked to pressure ulcers (PUs); consequently, the more severe malnutrition is on patient admission, the greater is the risk of developing skin lesions (Neloska et al., 2016). Inadequate nutrition is normally associated with physical weakness, dehydration, oedema, and the loss of fat mass cushioning on bony prominences. Poor nutrition also weakens skin resistance, mobility, and immune defences—all weaknesses that make PUs more likely (Tsaousi, Stavrou, Ioannidis, Salonikidis, & Kotzampassi, 2015). Excess body fat can be another of the PU-related nutritional problems because it produces decreased adipose tissue vascularization and elasticity, making the areas in question vulnerable to pressure (Oliveira, Sabino, Almeido, & Santos, 2015).

As PUs are potentially avoidable in most cases, they are considered adverse events; they are also a measure of health care quality and of patient safety (Torra-Bou et al., 2016). The Fourth National Study on Pressure Ulcer Prevalence in Spain, carried out by the National Study and Advisory Services Group on Pressure Ulcers and Chronic Wounds (GNEAUPP is the Spanish acronym) established that there was a hospital prevalence of 7.87%, with a 95% confidence interval (CI) of 7.31%–8.47% (Pancorbo-Hidalgo, García-Fernández, Torra, Verdú, Soldevilla-Agreda, 2014). A German study found a prevalence of 4.8% in their hospitals (Lechner, Lahmann, Neumann, Blume-Peytavi, & Kottner, 2017), and an Italian study on patients older than 65 years, hospitalized in acute medical units, indicated prevalence of 6.5% (Palese et al., 2017). The Registered Nurses' Association of Ontario (RNAO) guide published the prevalence data that the Canadian Institute for Health Information determined in 2013; prevalence ranged from 0.4% to 14.1%, depending on whether the patient was admitted to an acute ward, admitted to a chronic ward, or was receiving home-care services (Registered Nurses' Association of Ontario, 2016).

Pressure-ulcer-linked economic costs involve longer hospital stays, greater mortality risk, more nursing staff time, and more PU treatment materials (Sullivan & Schoelles, 2013). Demarré, et al., 2015a, 2015b established an average daily cost for PU prevention of €7.88 per hospitalized patient and of between €2.34 and €77.36 for treatment. After their systematic review, they set a variability of from €1.71 to €470.49 per patient and day of admission as the mean cost of PU treatment, while that of prevention was established as between €2.65 and €87.57 (Demarré, et al., 2015a, 2015b).

Early detection of patients at risk of PUs makes corrective and preventive measures possible. Consequently, evaluating patients on admission, independently of the severity of their clinical condition, is advisable. Scales are instruments that help detect patients at risk and promote early implementation of measures to keep PUs from appearing (Oliveira et al., 2015). The GNEAUPP has found a high level of evidence that using validated scales such as the Braden, EMINA, and Norton scales is effective in identifying at-risk patients (Pancorbo, García, Soldevilla, & Blasco, 2009). Having a reliable, valid assessment tool helps evaluate and re-evaluate PU risk (Registered Nurses' Association of Ontario, 2016). The criteria for choosing one type of scale or another should be based on how quickly at-risk patients can be identified objectively, and on how the scale serves to classify them. Using such scales helps to assign preventive resources effectively and efficiently, to determine clinical decisions, and to develop standard procedures (Mallah, Nassar, & Badr, 2015).

### 1.1 | Study background

In the Hospital Clínico Universitario de Valladolid (HCUV) teaching hospital in Valladolid (Spain), the modified Norton Scale (Norton Scale) is administered to all patients admitted, to detect the risk of developing PUs. The Norton Scale is negative in that the lower the score is the greater the risk. It assesses five items (general physical condition, mental status, mobility, activity, and incontinence), with a range of 1 (least favourable) to 4 (most favourable) for each variable. The final result (the sum of the five items assessed) ranges from 5 to 20, from very high risk to minimum risk/no risk, respectively. It is a simple scale that can easily be applied in health care (Šáteková, Žiaková, & Zeleníková, 2015). Some researchers have found a direct relationship between low scores on the Norton Scale and other adverse events besides the risk of developing PUs (González-Expósito, García-Román, Prado-Amores, Pardo-Fernández, & Pariente-Rodrigo, 2015). Other studies show the scale being used predictively in elderly patients to identify other clinical risk factors apart from PUs (Rabinovitz et al., 2016).

In the HCUV, the Norton Scale results are recorded in the GACELA Care version 1.8 computer application as an integral part of the patient's electronic case-history file in the Castilla y León autonomous region (Spain) at the level of nursing records (López et al., 2017). Each patient is assessed on admission using the 14-need classification designed by Virginia Henderson. For this study we focused on Need 2, related to food and nutrition, coded as *Eating/Drinking* in the GACELA Care application. North American Nursing Diagnosis Association (NANDA-I) standardized nursing language was used, with defining characteristics (DCs), characteristics of normality (CNs), and risk factors (RFs) (Herdman and Kamitsuru, 2015; Tseng & Moorhead, 2014).

## 2 | OBJECTIVES

The principal objective was to study the relationship between PU risk based on the Norton Scale and changes in the Henderson *Eating/Drinking* need satisfaction assessment. Secondary objectives were identifying the level of staff compliance with complete recording of Norton Scale results, analysing the general physical condition,

mental status, activity, mobility, and incontinence items evaluated by the Norton Scale, identifying the level of staff compliance with recording the Henderson *Eating/Drinking* need, and analysing the DCs, CNs, and RFs included in this need.

## 3 | MATERIAL AND METHODS

A descriptive cross-sectional study was performed using a sample of 219 patients hospitalized in the HCUV from 1 October to 30 October 2016.

### 3.1 | Inclusion and exclusion criteria

Patients admitted for more than 24 hr in the surgical and medical hospitalization wards for whom the initial patient assessment and the Norton Scale results were entered in the GACELA Care computer application were included.

Paediatrics, maternity, psychiatry, recovery, and intensive care hospitalization wards were excluded as they did not use these records.

### 3.2 | Sample size

Sample size was calculated estimating a prevalence of 80% in record completion, with a 5% accuracy and 95% confidence interval (CI). The patients analysed were determined in a systematic random and anonymous fashion from the patients hospitalized within the study period indicated.

### 3.3 | Variables

- Demographic characteristics: age, sex, admission diagnosis, and medical service.
- Norton Scale (Rabinovitz et al., 2016): total score (5 to 20). Risk level (very high, high, medium, or no/minimum risk). General physical condition (good, fair, poor, or very bad). Mental state (alert, apathetic, confused, or stuporous). Activity (ambulant, walks with help, chair bound, or bedridden). Mobility (full, slightly limited, very limited, or immobile). Incontinence (none, occasional, urinary or bowel, or urinary and bowel).
- Virginia Henderson Need 2 (Eating/Drinking) with all the items contained in it (Herdman and Kamitsuru, 2015): nine CNs, 12 DCs, and three RFs.

### 3.4 | Statistical Analysis

The data were entered into a Microsoft Office Excel spreadsheet. The variables were refined and then exported to the v20.0 IBM SPSS Statistics software program.

Quantitative variables were expressed as mean ± standard deviation (*SD*), and qualitative variables were expressed using absolute and relative frequencies.

In the comparison of the variables that did not follow a normal distribution, nonparametric statistical methods were used. In the comparative analysis between qualitative variables, the chi-square test was used.

In the comparison between qualitative and quantitative variables, if they followed a normal distribution, Student's *t* test was used for one group, and analysis of variance (ANOVA) for more than two group. If they did not follow a normal distribution, the Mann–Whitney test was used for one group, and the Kruskal–Wallis test for more than one group.

Statistical significance was set at $p < 0.05$.

## 4 | RESULTS

### 4.1 | Sample characteristics

There were 219 Norton Scale and *Eating/Drinking* need assessment records entered, for 124 men (57%) and 95 females (43%). Mean age was 68.43 ± 17.03 years. The records analysed belonged to patients admitted to HCUV hospitalization wards, distributed as follows: 55% medical wards (cardiology, digestive, haematology, internal medicine, pneumology, nephrology, neurology, and oncology) and 45% surgical wards (vascular surgery, general surgery, cardiac surgery, thoracic surgery, neurosurgery, gynaecology, otorhinolaryngology, traumatology, and urology).

The records were separated by patient age into three study groups: ≤ 64 years (73 records), 65–85 years (101), and ≥ 86 years (45).

Ward distribution was homogeneous (medical or surgical) in the ≤64-year and in the 65–85-year groups. In contrast, in the ≥86-year group, general medical patients greatly outnumbered those of the surgical service (78% vs. 22%) ($p < 0.05$).

### 4.2 | Norton Scale

The level of PU risk in the sample studied was principally "no/minimum risk" (163 patients; 77% of the cases), with no statistically significant differences between sex and risk level (the risk was minimum in over 77% of cases). Likewise, no differences were seen based on hospital service: "no/minimum risk" prevailed in more than 74% of cases, both in medical and surgical wards.

There were statistically significant differences by age groups. The greatest risk was found in the most elderly group ($p < 0.05$; 95% CI: 0.28, 3.17) (Figure 1).

In this study the Norton Scale was fully completed in 96% of the cases analysed. The mean for the Norton Scale-based PU risk score was 16.59 ± 3.91 points, with no statistically significant differences by sex (males: 16.52 ± 3.94; females: 16.68 ± 3.89). A higher

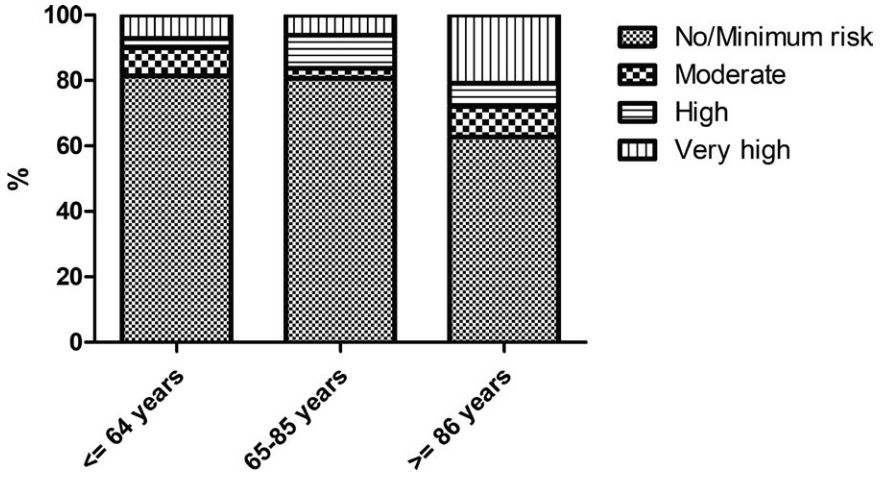


**FIGURE 1** Pressure ulcer risk by age

score was found for surgery wards (medical: 16.20 ± 3.9; surgical: 17.06 ± 3.8) ($p < 0.05$).

The Norton Scale "general physical condition" item was assessed as good (111; 51%), fair (53; 24%), poor (37; 17%), or very bad (10; 5%).

By service (medical or surgical), the only statistically significant differences were seen in "mobility". "Very limited" (57% of the cases) and "slightly limited" (50%) mobility were prevalent in the medical wards ($p < 0.05$).

By age group, the "mental status" and "incontinence" characteristics were the only ones that showed statistically significant differences ($p < 0.05$). The worst results were almost always found in the oldest patient group (Table 1).

### 4.3 | Assessment of the Henderson Need 2 (*Eating/Drinking*)

The Virginia Henderson *Eating/Drinking* need was assessed in all cases. However, 51 records had incomplete DC, CN, and RF options, so the records were fully completed in 77% of the cases. In the *Eating/Drinking* assessment, DCs (51 cases; 30%), CNs (106; 62%), and RFs (11; 6%) were specified; most of these conditions were normal. The CN "autonomy in self-care" item was the most frequently assessed (42% of the cases). This was followed by the DC items that affect swallowing and the inability of the patients to feed themselves, as can be seen in Table 2.

The degree of CN completion was greater in the age group ≤64 years (37; 77% of the cases) than in the group aged 65–85 years (52; 65% of the cases) ($p < 0.001$). As for DC completion, the groups with the highest completion level were the 65–85 year group (26; 32% of the cases) and the ≥86 year group (19; 47% cases) ($p < 0.001$). Turning to the RF category, record completion was homogenous in the three age groups assessed. The lowest level of completion was seen in the 65–85 year group (2; 2% of the cases). The DC and RF sections were completed more frequently for patients ≥86 years old (71; 62% cases) ($p < 0.001$). The same two sections were selected more frequently in the medical services than in the surgical wards (45% vs. 16%) ($p < 0.001$). Table 3 presents, by age group and care service, the statistically significant DCs, CNs, and RFs.

Each of the DCs, CNs, and RFs of the Henderson *Eating/Drinking* need was analysed and correlated with the risk of developing PUs based on the Norton Scale results. Patients unable to lift food to their mouths presented high and very high risk of developing PUs, compared to those that were able to do so (10; 59% vs. 25; 13%) ($p < 0.001$). Of the patients unable to manage cutlery, 50% (11) presented a high and very high PU risk in comparison

**TABLE 1** Norton Scale results by age group in terms of "mental status" and "incontinence" items

| Norton Scale characteristics | Age group, n (%) | | | *p* value |
|---|---|---|---|---|
| | ≤64 years | 65–85 years | ≥86 years | |
| Mental status | | | | |
| Stuporous | 0 (0) | 1 (1) | 2 (4.7) | 0.013 |
| Confused | 6 (8.6) | 6 (6.1) | 3 (7) | |
| Apathetic | 3 (4.3) | 6 (6.1) | 9 (20.9) | |
| Alert | 61 (87.1) | 85 (86.7) | 29 (67.4) | |
| Incontinence | | | | |
| Urinary and faecal | 5 (7.1) | 7 (7.1) | 7 (16.3) | 0.024 |
| Urinary or faecal | 2 (2.9) | 10 10.2) | 4 (9.3) | |
| Occasional | 3 (4.3) | 16 (16.3) | 26 (60.5) | |
| None | 60 (85.7) | 65 (66.3) | — | |

**TABLE 2** Defining characteristics, characteristics of normality, and risk factors most frequently selected in the assessment of Virginia Henderson's "*Eating/Drinking*" need

| | Items | Frequency | Percentage |
|---|---|---|---|
| Defining characteristics | Inability to lift food to the mouth | 18 | 8.2 |
| | Inability to handle cutlery | 23 | 10.5 |
| | Information about or observation of dysfunctional patterns | 2 | 0.9 |
| | Body mass index less than 20 | 5 | 2.3 |
| | Body mass index more than 20 | 3 | 1.4 |
| | Weight loss with adequate food provision | 1 | 0.5 |
| | Intake in agreement with recommended amounts | 5 | 2.3 |
| | Aversion to eating | 7 | 3.2 |
| | Weak chewing muscles | 5 | 2.3 |
| | Oral cavity Inflammation | 3 | 1.4 |
| | Oedema | 10 | 4.6 |
| | Thirst | — | — |
| Characteristics of normality | Autonomy in self-care | 92 | 42 |
| | Dental prosthesis in good condition | 39 | 17.8 |
| | Chews without problems | 48 | 21.9 |
| | Swallows without problems | 51 | 23.3 |
| | Adequate fluid supply | 20 | 9.1 |
| | Normally functioning oesophagostomy | — | — |
| | Normally functioning gastrostomy | — | — |
| | Normally functioning duodenostomy | — | — |
| | Normally functioning jejunostomy | — | — |
| Risk factors | Extreme ages | 12 | 5.5 |
| | Situations that affect nutritional intake | 22 | 10 |
| | Excessive excretions through normal routes | — | — |

to the 12% (24) of patients not having this inability ($p < 0.001$). Patients with the RF "extreme ages" chosen in the assessment had a greater risk of developing PUs (5; 42% vs. 30; 15%) ($p < 0.05$). The degree of PU risk was shown to be linked to the type of characteristic chosen in the Virginia Henderson assessment. The DCs were associated with a greater PU risk (16; 32%), with respect to CNs (10; 10%) and RFs (1; 9%) ($p < 0.05$). Likewise, lack of risk or minimum risk of developing PUs was observed to be linked to the CNs (82; 68%).

## 5 | DISCUSSION

Patients in the study sample presented a low risk of developing pressure ulcers. It has been shown that the patients obtaining Norton Scale scores indicating risk of presenting PUs were more likely to have an altered Henderson *Eating/Drinking* need.

Our study is based on nursing records and on the level of correct record completion. Records were completed more frequently for the Norton Scale than for the *Eating/Drinking* need (there are records in which DCs, CNs, and RFs were not selected). *Eating/Drinking* need assessment may be deficient because evaluating this need is more complex than entering Norton Scale factors.

It is clear that our patients ≥86 years old are at the greatest risk of PUs and of having their *Eating/Drinking* need met poorly. Other studies indicate that the patient characteristic of being over 80 years old is related to the development of PUs (Alhaug, Gay, Henriksen, & Lerdal, ; Chiari et al., 2017). This might be due not only to the fact that biological, physiological, and social functions are diminished but also to the development of chronic illnesses that lengthen hospitalization and rehabilitation periods. As a person ages, the skin becomes drier, vascularization decreases, and muscles atrophy, which makes the bony structures more prominent. When these factors are linked to other risk factors (changes in mobility and nutrition, as well as urinary and bowel incontinence), PUs are more likely to develop (Dos Santos, Almeida, & Lucena, 2016). Age alone is not always a risk factor for malnutrition; it has to be accompanied by a gradual deterioration in health and body functioning caused by aging. A review by Fávaro-Moreira et al. (2016) identified malnutrition risk factors to be age, frailty in institutionalized individuals, excessive polypharmacy, overall

**TABLE 3** Defining characteristics (DCs), characteristics of normality (CNs), and risk factors (RFs) by age group and care service

| | Age group, *n* (%) | | | | Care service, n (%) | | |
|---|---|---|---|---|---|---|---|
| Items | ≤64 years | 65–85 years | ≥86 years | *p* value | Medical | Surgical | *p* value |
| DC_Inability to lift food to the mouth | 1 (5.6) | 7 (38.9) | 10 (55.6) | <0.001 | 17 (94.4) | 1 (5.6) | <0.001 |
| DC_Inability to manage cutlery | 4 (17.4) | 7 (30.4) | 12 (52.2) | <0.001 | 17 (73.9) | 6 (26.1) | 0.05 |
| DC_Oedema | 0 | 6 (60) | 4 (40) | 0.05 | 9 (90) | 1 (10) | 0.02 |
| CN_Dental prosthesis in good condition | 4 (10.3) | 25 (64.1) | 10 (25.6) | 0.03 | — | — | — |
| CN_Chews without problems | 18 (37.5) | 26 (54.2) | 4 (8.3) | 0.05 | — | — | — |
| CN_Swallows without problems | 16 (31.4) | 30 (58.8) | 5 (9.8) | 0.04 | — | — | — |
| RF_ Extreme ages | 0 | 3 (25) | 9 (75) | <0.001 | 12 (100) | 0 | <0.001 |
| RF_Situations affecting nutritional intake | — | — | — | — | 17 (77.3) | 5 (22.7) | 0.02 |

decline in health (including physical functioning and cognition), loss of interest in life, baseline oral dysphagia, signs of deterioration in swallowing efficacy, and institutionalization (Fávaro-Moreira et al., 2016). The risk of malnutrition or undernutrition is highly prevalent in the elderly, so these conditions should be evaluated early in order to avoid the development of comorbidities linked to poor nutritional status (Iuliano, Poon, Wang, Bui, & Seeman, 2017).

Our patients ≥86 years old are those most admitted to non-surgical medical wards. In turn, these services are linked to more frequent recording of *Eating/Drinking* alterations and to the risk of PUs. These elderly patients present a greater degree of incontinence, incapacity, and diminished mobility compared with ambulant patients admitted to surgical wards. The Norton Scale is consistent with the recommendations of Good Clinical Practice guidelines for PU prevention, which endorse assessing patient activity/mobility levels (Haesler, 2014). The review by Coleman et al. (2013) indicates that there is no single factor accounting for the risk of developing PUs, and that it is more a matter of a complex interaction of factors that increase the likelihood of PUs. Among the most common risk factors are mobility/activity levels and perfusion status. Other factors such as skin moisture, age, blood measurements, nutrition, and general health status are also important. That is why it is essential to study the intrinsic factors associated with the patient's medical, psychosocial, and physical condition. This evaluation must cover nutritional assessment (malnutrition and dehydration), immobility or limited mobility, incontinence, and old age (Registered Nurses' Association of Ontario, 2016).

The degree of patient autonomy in eating was assessed in the study sample. It was found that the older the patient was, the less able was the patient to lift food to the mouth and handle cutlery. This is in agreement with the fact that nutritional imbalance occurs more frequently in the elderly (Krzyminska-Siemaszko et al., 2016). The abilities to chew and swallow were also assessed in relation to swallowing condition. Some studies link increases in the prevalence of swallowing problems to malnutrition, which contributes to muscle weakness and a loss of functional capacity; in turn, these factors promote dysphagia (Fávaro-Moreira et al., 2016). Altered mental state as a risk factor for PU development might be related to the DCs involved in self-care autonomy, swallowing problems, and the ability to feed oneself. When need-fulfillment was considered to be normal using the Henderson scheme, the nurses indicated whether the patients used a dental prosthesis, if they chewed and swallowed without problems, and if there was an adequate fluid supply. Nurses are clearly aware of the importance of clinical records about patient ability/inability to eat as part of nutritional follow-up and nursing care treatment (Halvorsen, Eide, Sortland, & Almendingen, 2016). Good clinical practice guidelines recommend assessing the individual's ability to eat independently and, in the case of an adult, assessing cognitive status as well (Haesler, 2014).

Investigating nutritional status is essential to ensure evidence-based nursing care and establish treatment plans. If nutritional information is inadequately documented, severe health-related complications, longer hospital stays, reduced quality of life, and higher medical care costs are more likely to occur (Halvorsen et al., 2016). The relationship between nutritional status and PU prevalence means that standard procedures that identify at-risk patients early must be established (Neloska et al., 2016). Using PU risk assessment scales will help determine which patients are at greater risk and, in turn, favour PU prevention (Matozinhos, Velasquez-Melendez, Tiensoli, Moreira, & Gomes, 2017). Risk assessment tools such as the Norton Scale are useful in structuring PU risk evaluations and in planning nursing care (Registered Nurses' Association of Ontario, 2016).

As nursing care administrators involved in this care area, nurses have to strengthen their evidence-based and nursing-method-based skills in nutritional treatment in the various life-cycle stages (Tseng & Moorhead, 2014). If the patient is elderly, the nursing staff have an important role in detecting and assessing geriatric syndromes to provide individualized, quality, nursing care. Working with the Virginia

Henderson model and the Norton lets nurses use a shared language, a standardized terminology that facilitates communication, health care continuity, and evidence-based practice (Tseng & Moorhead, 2014). If this is focused on the area of nutrition, the nurses need information that makes it possible for them to take action both to prevent poor nutritional status and to aid patient recovery. That is why the quality of nursing records must be evaluated, and why research in this is essential for the profession (Braga Azambuja, Beghetto, de Assis, & de Melho, 2015; Saranto et al., 2014).

## 6 | LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

One limitation of this study is that anthropometric variables such as weight, height, and body mass index were not analysed. Likewise, a more accurate nutritional scale to identify patient nutritional risk was unavailable; only the *Eating/Drinking* need assessment could be used. There are also the limitations inherent in retrospective studies whose results are based on the records made by various nurses. Assessment recording might vary and it is impossible to check the relationship between the records and the actual condition of the patients and their later progress.

For future research, the results from risk assessment might be compared with the number of patients that develop PUs during their hospital stay. Comparing the degree of risk prediction provided by the Norton Scale in the HCUV against other scales such as the Bradem Scale could also be of interest, as could the development of a more complete nutritional evaluation that would facilitate early detection of patients at risk of malnutrition.

## 7 | CONCLUSIONS

Watching over nutritional status and preventing PUs are nursing skills that help to ensure quality nursing care. Nurses' records are important because they aid continuity of care and help detect changes in patient needs quickly. There is a direct link between the fulfilment of Henderson's Need 2 (*Eating/Drinking*) and Norton Scale PU-risk results. Patients with an altered Need 2 show greater risk of developing PUs. Likewise, whether or not the needs in *Eating/Drinking* are adequately fulfilled is related to general nutritional status (number of meals and fluid intake). When physical condition is considered good or fair using the Norton Scale assessment, the nursing staff log more CN (normality) items.

## 8 | IMPLICATIONS FOR NURSING MANAGEMENT

Assessing how independently patients feed themselves should be a priority for nursing staff because the results help to identify patient risk of PUs. Safeguarding patient nutritional status and preventing PUs are nursing skills that help ensure quality nursing care.

## ETHICAL APPROVAL

The Ethics Committee of the Universidad de Valladolid (Valladolid, Spain) approved this study (in-house code CINV 16–135).

## REFERENCES

Alhaug, J., Gay, C. L., Henriksen, C., & Lerdal, A. (2017). Pressure ulcer is associated with malnutrition as assessed by Nutritional Risk Screening (NRS 2002) in a mixed hospital population. *Food & Nutrition Research*, *12*, *61(1)*, 1324230. https://doi.org/10.1080/16546628.2017.1324230

Ballesteros, M. D., Suárez, A., Calleja, A., Pintor, B., Urioste, A., Vidal, A., & Villar, R. (2016). Influence of an appropriate coding of disease-related malnutrition in clinical indexes. *Nutrición Hospitalaria*, *33*(1), 86–90.

Braga Azambuja, F., Beghetto, M. G., de Assis, M. C., & de Mello, E. D. (2015). Food intake reported versus nursing records: Is there agreement in surgical patients? *Nutrición Hospitalaria*, *31*(6), 2735–2739.

Chiari, P., Forni, C., Guberti, M., Gazineo, D., Ronzoni, S., & D'Alessandro, F. (2017). Predictive factors for pressure ulcers in an older adult population hospitalized for hip fractures: A prognostic cohort study. *PLoS ONE*, *12*(1): e0169909. https://doi.org/10.1371/journal.pone.0169909

Citty, S. W., Kamel, A., Garvan, C., Marlowe, L., & Westhoff, L. (2017). Optimizing the electronic health record to standardize administration and documentation of nutritional supplements. *BMJ Quality Improvement Programme*, *6*(1), https://doi.org/10.1136/bmjquality.u212176.w4867

Coleman, S., Gorecki, C., Nelson, E. A., Closs, S. J., Defloor, T., Halfens, R., & Farrin, A. (2013). Patient risk factors for pressure ulcer development: Systematic review. *International Journal of Nursing Studies*, *50*(7), 974–1003. https://doi.org/10.1016/j.ijnurstu.2012.11.019

Declercq, A., & Duyck, J. (2016). Risk factors for malnutrition in older adults: A systematic review of the literature based on longitudinal data. *Advances in Nutrition*, *7*(3), 507–522. https://doi.org/10.3945/an.115.011254

Demarré, L., Van Lancker, A., Van Hecke, A., Verhaeghe, S., Grypdonck, M., Lemey, J., Annemans, L., Beeckman, D. (2015a). The cost of prevention and treatment of pressure ulcers: A systematic review. *International Journal of Nursing Studies*, *52*(11), 1754–1774.

Demarré, L., Verhaeghe, S., Annemans, L., Van Hecke, A., Grypdonck, M., & Beeckman, D. (2015b). The cost of pressure ulcer prevention and treatment in hospitals and nursing homes in Flanders: A cost-of-illness study. *International Journal of Nursing Studies*, *52*(7), 1166–1179.

Dos Santos, C. T., Almeida, M. A., & Lucena, A. F. (2016). The nursing diagnosis of risk for pressure ulcer: Content validation. *Revista Latino-Americana De Enfermagem*, *24*, e2693. https://doi.org/10.1590/1518-8345.0782.2693

Fávaro-Moreira, N. C., Krausch-Hofmann, S., Matthys, C., Vereecken, C., Vanhauwaert, E., Declercq, A., & Duyck, J. (2016). Risk Factors for Malnutrition in Older Adults: A Systematic Review of the Literature Based on Longitudinal Data. *Advances in Nutrition*, *7*(3), 507–522. https://doi.org/10.3945/an.115.011254.

González-Expósito, J., García-Román, J. C., Prado-Amores, M., Pardo-Fernández, L., & Pariente-Rodrigo, E. (2015). The Norton Scale as

predictor of health-related quality of life in institutionalized elderly. *Enfermeria Clinica*, *25*(6), 312–318.

Haesler, E. (Ed.) (2014). *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide*. Perth: Cambridge Media.

Halvorsen, K., Eide, H. K., Sortland, K., & Almendingen, K. (2016). Documentation and communication of nutritional care for elderly hospitalized patients: perspectives of nurses and undergraduate nurses in hospitals and nursing homes. *BMC Nursing*, *15*, 70. https://doi.org/10.1186/s12912-016-0193-z

Herdman, T. H., & Kamitsuru, S. (2015). *Nursing Diagnosis. Definitions and Classication*. Barcelona: Elsevier.

Iuliano, S., Poon, S., Wang, X., Bui, M., & Seeman, E. (2017). Dairy food supplementation may reduce malnutrition risk in institutionalised elderly. *British Journal of Nutrition*, *117*(1), 142–147. https://doi.org/10.1017/S000711451600461X

Krzyminska-Siemaszko, R., Chudek, J., Suwalska, A., Lewandowicz, M., Mossakowska, M., Kroll-Balcerzak, R., … Wieczorowska-Tobis, K. (2016). Health status correlates of malnutrition in the polish elderly population—results of the Polsenior Study. *European Review for Medical and Pharmacological Sciences*, *20*(21), 4565–4573.

Lechner, A., Lahmann, N., Neumann, K., Blume-Peytavi, U., & Kottner, J. (2017). Dry skin and pressure ulcer risk: A multi-center cross-sectional prevalence study in German hospitals and nursing homes. *International Journal of Nursing Studies*, *18*(73), 63–69. https://doi.org/10.1016/j.ijnurstu.2017.05.011

López, M., Jiménez, J. M., Peña, I., Cao, M. J., Simarro, M., & Castro, M. J. (2017). Ongoing nursing training influence on the completion of electronic pressure ulcer records. *Nurse Education Today*, *52*, 22–27. https://doi.org/10.1016/j.nedt.2017.02.006

Mallah, Z., Nassar, N., & Badr, L. (2015). The effectiveness of a pressure ulcer intervention program on the prevalence of hospital acquired pressure ulcers: Controlled before and after study. *Applied Nursing Research*, *28*(2), 106–113. https://doi.org/10.1016/j.apnr.2014.07.001

Matozinhos, F., Velasquez-Melendez, G., Tiensoli, S., Moreira, A., & Gomes, F. (2017). Factors associated with the incidence of pressure ulcer during hospital stay. *Revista Da Escola De Enfermagem Da USP*, *51*, e03223. https://doi.org/10.1590/s1980-220x2016015803223

Meehan, A., Loose, C., Bell, J., Partridge, J., Nelson, J., & Goates, S. (2016). Health system quality improvement: Impact of prompt nutrition care on patient outcomes and health care costs. *Journal of Nursing Care Quality*, *31*(3), 217–223. https://doi.org/10.1097/NCQ.0000000000000177

Neloska, L., Damevska, K., Nikolchev, A., Pavleska, L., Petreska-Zovic, B., & Kostov, M. (2016). The association between malnutrition and pressure ulcers in elderly in long-term care facility. *Open Access Macedonian Journal of Medical Sciences*, *4*(3), 423–427. https://doi.org/10.3889/oamjms.2016.094

Nicolo, M., Compher, C. W., Still, C., Huseini, M., Dayton, S., & Jensen, G. L. (2014). Feasibility of accessing data in hospitalized patients to support diagnosis of malnutrition by the Academy-ASPEN malnutrition consensus recommended clinical characteristics. *Journal of Parenteral and Enteral Nutrition*, *38*(8), 954–959. https://doi.org/10.1177/0148607113514613

Oliveira, A. C., Sabino, C. P., Almeida, A. D., & Santos, A. C. (2015). Pressure ulcer: Incidence and demographic, clinical and nutrition factors associated in intensive care unit patients. *Nutricion Hospitalaria*, *32*(5), 2242–2252.

Palese, A., Trevisani, B., Guarnier, A., Barelli, P., Zambiasi, P., Allegrini, E., … Ambrosi, E. (2017). Prevalence and incidence density of unavoidable pressure ulcers in elderly patients admitted to medical units. *Journal of Tissue Viability*, *26*(2), 85–88. https://doi.org/10.1016/j.jtv.2017.03.003

Pancorbo, P. L., García, F. P., Soldevilla, J. J., & Blasco, C. (2009). *Scales and tools to assess the risk of developing pressure ulcers*. Logroño: Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas.

Pancorbo-Hidalgo, P. L., García-Fernández, F. P., Torra, J. E., Verdú, J., & Soldevilla-Agreda, J. J. (2014). Pressure ulcer epidemiology in Spain in 2013: Results from the Fourth National Prevalence Survey. *Gerokomos*, *25*(4), 162–170.

Rabinovitz, E., Finkelstein, A., Ben, E., Steinvil, A., Konigstein, M., Shacham, Y., Justo, D. (2016). Norton scale for predicting prognosis in elderly patients undergoing trans-catheter aortic valve implantation : A historical prospective study. *Journal of Cardiology*, *67*(6), 519–525. https://doi.org/10.1016/j.jjcc.2016.01.017

Registered Nurses' Association of Ontario (2016). *Assessment and Management of Pressure Injuries for the Interprofessional Team*, Third Edition. Toronto, ON: Registered Nurses' Association of Ontario.

Saranto, K., Kinnunen, U. M., Kivekäs, E., Lappalainen, A. M., Liljamo, P., Rajalahti, E., & Hyppönen, H. (2014). Impacts of structuring nursing records: A systematic review. *Scandinavian Journal of Caring Sciences*, *28*(4), 629–647. https://doi.org/10.1111/scs.12094

Šáteková, L., Žiaková, K., & Zeleníková, R. (2015). Predictive validity of the Braden Scale, Norton Scale and Waterlow Scale in Slovak Republic. *Central European Journal of Nursing and Midwifery*, *6*(3), 283–290. https://doi.org/10.15452/CEJNM.2015.06.0017

Simons, A., & Hamdy, S. (2017). The use of brain stimulation in dysphagia management. *Dysphagia*, *32*(2), 209–215. https://doi.org/10.1007/s00455-017-9789-z

Sullivan, N., & Schoelles, K. M. (2013). Preventing in-facility pressure ulcers as a patient safety strategy: A systematic review. *Annals of Internal Medicine*, *158*, 410–416.

Tangvik, R. J., Tell, G. S., Eisman, J. A., Guttormsen, A. B., Henriksen, A., Nilsen, R. M., … Ranhoff, A. H. (2014). The nutritional strategy: Four questions predict morbidity, mortality and health care costs. *Clin Nutr*, *33*(4), 634–641. https://doi.org/10.1016/j.clnu.2013.09.008

Torra-Bou, J. E., Verdú-Soriano, J., Sarabia-Lavin, R., Paras-Bravo, P., Soldevilla-Ágreda, J. J., & García-Fernández, F. P. (2016). Pressure ulcers as a safety patient problem. *Gerokomos*, *27*(4), 161–167.

Tsaousi, G., Stavrou, G., Ioannidis, A., Salonikidis, S., & Kotzampassi, K. (2015). Pressure ulcers and malnutrition: Results from a snapshot sampling in a university hospital. *Medical Principles and Practice*, *24*, 11–16. https://doi.org/10.1159/000368360

Tseng, H., & Moorhead, S. (2014). The use of standardized terminology to represent nursing knowledge: Nursing interventions relevant to safety for patients with cancer. *Studies in Health Technology and Informatics*, *201*, 298–303.

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