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Analyses of pressure ulcer incidence in inpatient setting in a Portuguese hospital

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ABSTRACT

Aim: To gain more insight into the magnitude of the problem of pressure ulcer incidence in general wards of a Portuguese hospital.
Material and methods: Retrospective cohort analysis of electronic health record database from 7132 adult patients admitted to medical and surgical wards of Aveiro Hospital during 2012. The development of (at least) one pressure ulcer during the length of stay was associated with age, gender, type of admission, specialty units, first Braden Scale score, length of stay, patient discharge outcome and ICD-9 diagnosis.
Results: An incidence of 3.4% participants with pressure ulcer category I-IV in inpatient setting during 2012. During the length of stay, 320 new pressure ulcers were developed, most of them category/stage II. The sacrum/coccyx and the trochanters were the most problematic areas.
Conclusions: The major risk factor for the development of a new pressure ulcer during the length of stay was the presence of (at least) one pressure ulcer at the first skin assessment. The length of stay itself, age and lower Braden Scale scores of our participants also played an important role in the odds of developing a pressure ulcer. Infectious diseases, traumatism and fractures and respiratory diseases were the ICD-9 diagnoses with higher frequency of participants that developed (at least) one pressure ulcer during the length of stay. It's important to standardize procedures and documentation in all care settings. The documentation of nursing interventions is vital to evaluate the impact of evidence-based nursing.

1. Introduction

Pressure ulcers continue to be a challenge worldwide [1–5] and represent an indicator of healthcare quality [6–9]. Nowadays there are several studies on pressure ulcer prevalence [10–19] and/or incidence [19–28] developed in different countries and in different care settings, however data about Portuguese reality and/or general wards are still few.

This paper is just one step of a larger project that aims to gain more insight into the magnitude of the problem of pressure ulcer risk, prevalence, incidence and management in Portugal. Our results will be very important epidemiological data that will guide us on the development of a preventive/intervention protocol based on institutional reality and patients' characteristics.

Recent studies in a Portuguese hospital analysed the characteristics of patients classified as "at risk" of developing a pressure ulcer during the length of stay [29] and the characteristics of participants with (at least) one documented pressure ulcer at the first skin assessment [30]. Nevertheless, there is a lack of knowledge about pressure ulcer incidence in Portuguese hospitals and/or general wards, the category/stage and anatomical location of those hospital acquired pressure ulcers, and the characteristics of

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patients who developed pressure ulcers during the length of inpatient stay.

In order to overcome these gaps, and following EPUAP statement [31], the main aim of this study was to gain more insight into the magnitude of the problem of pressure ulcer incidence in general wards of a Portuguese hospital.

Specific objectives were defined as: [1] To calculate the incidence of pressure ulcers in hospitalised adult patients; [2] To identify the category/stage of pressure ulcers developed during the length of inpatient stay; [3] To identify the anatomical location of pressure ulcers developed during the length of inpatient stay. [4] To analyse the demographic and clinical characteristics of hospitalised adult patients who developed pressure ulcers during the length of inpatient stay.

2. Material and methods

2.1. Design

This study was designed as a retrospective cohort analysis of electronic health record database from adult patients admitted to medical and surgical wards of Aveiro Hospital from January 1, 2012 to December 31, 2012.

2.2. Sample/participants

The inclusion criteria were: [1] Patients aged $\geq$ 18 years at the time of admission; [2] Patients admitted and discharged in 2012; [3] Patients admitted through emergency service or with programmed hospital admission. The exclusion criteria were: [1] Patients with less than 24 h' length of inpatient stay; [2] Patients admitted to specialties of Psychiatry, Gynaecology, Obstetrics and Intensive Care; [3] Patients without pressure ulcer risk assessment and/or skin assessment at admission in inpatient setting.

2.3. Ethical issues and approval

The study was performed after Hospital Council Board and Ethics Committee approval. Confidentiality of the participants was maintained and no names or identifying information was recorded.

2.4. Data collection

The data were extracted from electronic health record database with the collaboration of Hospital Informatics and Systems Analysis Service and included the following variables: first pressure ulcer risk assessment (first Braden Scale score), skin assessment records (all Skin Assessment Tool records during the length of inpatient stay), age, gender, type of admission (emergency service or programmed), specialty unit (medical or surgical), length of inpatient stay, patient discharge outcome (discharge, decease or transference to other hospital/health institution) and diagnosis.

Following national [32] and international [1] guidelines the pressure ulcer risk assessment (using the Portuguese version of Braden Scale) and the skin integrity assessment (using the skin assessment tool proposed by the national guideline) were performed by a registered nurse and/or a clinical nurse specialist at admission in inpatient setting and were documented in the patient electronic health record. The risk and skin assessment are updated every 48 h since the admission in inpatient setting until the patient discharge.

The Braden Scale scores (ranging from 6 to 23) were dichotomized according to national guideline [32] in participants "at risk" of developing pressure ulcers (Braden Scale score $\leq$ 16) and participants classified as "not at risk" of developing pressure ulcers (Braden Scale score > 16).

The skin assessment records included the category/stage and the anatomical location of the pressure ulcer. The category/stage was based on the pressure ulcer staging system of the National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP), which includes: Category/Stage I: Non-blanchable erythema; Category/Stage II: Partial thickness; Category/Stage III: Full thickness skin loss; Category/Stage IV: Full thickness tissue loss. The anatomical location was recorded according to national guidelines [32], which identify 29 areas of developing pressure ulcers, and were converted to the regions recommended by EPUAP and NPUAP, prior to the data analysis. Thus, the final location was organized into the following anatomical regions: Occiput; Ear; Scapula; Spinous Process; Shoulder; Elbow; Iliac Crest; Sacrum/Coccyx; Ischial Tuberosity; Trochanter; Knee; Malleolus; Heel; Toe. The anatomical regions registered in Skin Assessment Tool but not part of the recommended EPUAP and NPUAP regions were included in the category "Others".

The variable age was divided in seven groups, namely 18–29, 30–39, 40–49, 50–59, 60–69, 70–79 and $\geq$ 80 years old. The variable length of stay was arbitrarily dichotomized according to a cut-off of 20 days of hospitalization. The diagnoses were grouped according to the International Classification of Diseases Version 9 (ICD-9).

2.5. Data analysis

Data were analysed using the Statistical Package for the Social Sciences software, version 21.0: IBM Corp; New York, USA. Descriptive statistics were calculated for the demographic and clinical variables and sample characterization. Following EPUAP statement [31] pressure ulcer point prevalence was calculated as: [(number of participants with a pressure ulcer/number of participants in a population at a particular point of time) x 100]. Pressure ulcer period prevalence was calculated as: [(number of participants with a pressure ulcer/number of participants in a population during a particular period of time) x 100]. Pressure ulcer cumulative incidence was calculated as: [(number of participants developing new pressure ulcers/number of participants (with or without pressure ulcers) in the population during the data collection period) x 100].

Odds ratio (OR) were calculated by univariate logistic regression.

3. Results

3.1. Sample characterization

This study included 7132 participants, 52.1% were male and 47.9% were female, with the mean age of 65.8 $\pm$ 18.1 years (mean $\pm$ SD). The majority of participants were admitted from emergency service (71.5%) to surgical (61.1%) or medical (38.9%) units. According to the first pressure ulcer risk assessment in inpatient setting, 32.7% were classified as "at risk" of developing a pressure ulcer (Braden Scale score $\leq$ 16). The median length of inpatient stay was 6 days (Q25 = 3 days and Q75 = 10 days), being the maximum 134 days. Considering the patient discharge outcome, 74.5% of the participants were discharged, 20.2% were transferred to another hospital/health institution and 5.3% died during the length of stay (Table 1).

The participants were grouped according to the ICD-9 as the following diseases: Digestive (20%); Respiratory (13%); Musculoskeletal (10%), Genitourinary (9%), Cardiac (9%), Vascular (9%), Traumatisms/Fractures (8%), Neoplasms (7%), Infectious (3%), Endocrine/Metabolic (2%), Central Nervous (2%), Skin (2%), Haematologic (1%) and Others (5%).

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