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PREDICTIVE INDICATORS OF PRESSURE INJURIES IN HOSPITALIZED ADULTS AND ELDERLY PEOPLE: INTEGRATIVE REVIEW

INDICADORES PREDICTIVOS DE LESIONES POR PRESIÓN EN ADULTOS Y ANCIANOS HOSPITALIZADOS: REVISIÓN INTEGRATIVA

INDICADORES PREDITIVOS DA LESÃO POR PRESSÃO EM ADULTOS E IDOSOS HOSPITALIZADOS: REVISÃO INTEGRATIVA

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ABSTRACT
Objective: To present the knowledge produced about the predictive indicators of pressure injuries in hospitalized adults and elderly people. Method: Integrative review of the literature, carried out based on PRISMA recommendations, with the guiding question: "What knowledge is produced about the predictive indicators of pressure injuries in hospitalized adults and elderly people?". The searches were carried out in Latin American and Caribbean Literature in Health Sciences, CAPES Journal Portal and National Library of Medicine. Results: 43 studies comprised this review. In 42, the use of a single evaluation method was observed, with a predominance of evaluation instruments: Braden Scale (n = 37, 86%); followed by the Waterlow Scale (n = 7, 16.2%); and, Norton Scale (n = 6, 13.9%). Only a single study (2.3%) used combined assessment methods: different instruments and presence of comorbidities. In two studies, the assessment took place through the analysis of a specific clinical aspect (nutritional status). Conclusions: The main predictive indicators for assessing the risk of pressure injuries in hospitalized adults and elderly people come from assessment instruments. However, it is suggested that research be developed aimed at analyzing the reliability and validation of such instruments in specific populations.
Keywords: Pressure Injury; Elderly Health; Adult Health; Hospitalization.

RESUMEN
Objetivo: Presentar el conocimiento producido sobre los indicadores predictivos de lesiones por presión en adultos y ancianos hospitalizados. Método: Revisión integradora de la literatura, realizada con base en las recomendaciones PRISMA, con la pregunta orientadora: "¿Qué conocimiento se produce sobre los indicadores predictivos de lesiones por presión en adultos y ancianos hospitalizados?". Las búsquedas se realizaron en Literatura Latinoamericana y del Caribe en Ciencias de la Salud, Portal de Revistas CAPES y Biblioteca Nacional de Medicina. Resultados: 43 estudios comprendieron esta revisión. En 42 se observó el uso de un único método de evaluación, con predominio de los instrumentos de evaluación: Escala de Braden (n = 37, 86%); seguida de la Escala de Waterlow (n = 7, 16,2%); y Escala de Norton (n = 6, 13,9%). Sólo un estudio (2,3%) utilizó métodos de evaluación combinados: diferentes instrumentos y presencia de comorbilidades. En dos estudios, la evaluación se realizó mediante el análisis de un aspecto clínico específico (estado nutricional). Conclusións: Los principales indicadores predictivos para evaluar el riesgo de lesiones por presión en adultos y ancianos hospitalizados provienen de instrumentos de evaluación. Sin embargo, se sugiere desarrollar investigaciones dirigidas a analizar la confiabilidad y validación de dichos instrumentos en poblaciones específicas.
Palabras-clave: Lesión por presión; Salud de las personas mayores; Salud del Adulto; Hospitalización.

RESUMO
Objetivo: Apresentar o conhecimento produzido sobre os indicadores preditivos da lesão por pressão em adultos e idosos hospitalizados. Método: Revisão integrativa da literatura, realizada a partir das recomendações PRISMA, tendo como questão norteadora: "Qual o conhecimento produzido sobre os indicadores preditivos da lesão por pressão em adultos e idosos hospitalizados?". As buscas foram realizadas na Literatura Latino-Americana e do Caribe em Ciências da Saúde, Portal de Periódicos CAPES e National Library of Medicine. Resultados: 43 estudos compuseram esta revisão. Em 42, foi observado o emprego de um único método avaliativo, com predomínio dos instrumentos de avaliação: Escala de Braden (n = 37, 86%); seguida da Escala de Waterlow (n = 7, 16,2%); e, Escala de Norton (n = 6, 13,9%). Apenas um único estudo (2,3%) utilizou métodos avaliativos combinados: instrumentos distintos e presença de comorbidades. Em dois estudos, a avaliação se deu por meio da análise de um aspecto clínico específico (estado nutricional). Conclusões: Os principais indicadores preditivos para avaliação do risco de lesão por pressão em adultos e idosos hospitalizados são provenientes de instrumentos de avaliação. Sugere-se, contudo, o desenvolvimento de pesquisas voltadas para a análise da confiabilidade e validação de tais instrumentos em populações específicas.
Palavras-chave: Lesão por Pressão; Saúde do Idoso; Saúde do Adulto; Hospitalização.

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INTRODUCTION

The motivation for developing this study arose during the Undergraduate Nursing Course, more specifically in practical teaching and extension activities focused on adult and elderly health and injury care. Empirically, it was observed that pressure injuries were present in hospitalized patients in the most diverse sectors, such as medical and surgical clinics, orthopedics, urology, gynecology, among others.

Recognized as an adverse health event and, sometimes, as a negative indicator of the quality of care, pressure injuries should be the focus of knowledge and updating by nursing professionals, especially with regard to predictive indicators of their appearance [1].

This type of injury is defined by the National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP) as "localized injury to the skin and/or underlying tissue over a bony prominence as a result of pressure or pressure in combination with shear and/or friction" [2,3]. Regarding the degree of impairment, it can be classified as: grade 1, with the presence of intact skin with non-blanchable hyperemia; grade 2, with partial skin loss, exposure of the dermis or blister with serous content; grade 3, with total skin loss and exposure of the subcutaneous tissue, which may present granulation, slough and necrosis; and, grade 4, with total skin loss and exposure of other structures [2-4].

In addition to the costs related to the health system, patients, families and the community are significantly affected by physical, social and economic consequences [5]. Specifically in patients, the impact occurs in a relevant way in terms of pain and negative self-image, worsening of quality of life, psychological trauma and increased length of hospital stay [6].

Therefore, the recognition of predictive factors of pressure injury allows the evaluation and detection of characteristics that suggest some type of change in the skin, which can be considered a warning sign for the appearance and installation of the injury [7].

In addition to nursing classification systems, such as NANDA-I [8] and ICNP [9], which standardize several phenomena, especially those related to the risk of pressure injury, some assessment instruments – such as the Braden Scale, Norton Scale, Waterlow Scale, and Gosnell Scale – are widely used in clinical practice aimed at hospitalized adults and elderly individuals [5].

In this context, by gathering the knowledge produced on the predictive indicators of pressure injury, it is possible to increase nursing action in the prevention of pressure injuries, precisely because they are one of the most common preventable complications during hospitalization [6].

Therefore, there is a need for a more detailed and current look at the subject, recognizing the relevance of prevention in nursing care. Therefore, the objective of this research is to present the knowledge produced on the predictive indicators of pressure injury in hospitalized adults and elderly individuals.

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METHODS

This is an integrative literature review, developed between April and June 2024, following the PRISMA recommendations [10].

The purpose of this type of review is to synthesize the knowledge already produced on the subject studied [11].

Thus, through the PCC strategy – P: Population (adults and elderly); C: Concept (predictive indicators of pressure injury); C: Context (hospitalization) – the guiding question was elaborated: "What knowledge is produced on the predictive indicators of pressure injury in hospitalized adults and elderly?".

Searches were carried out in the following databases: Latin American and Caribbean Literature in Health Sciences (LILACS), CAPES Periodicals Portal (CAPES) and National Library of Medicine (NLM) (PubMed), based on the search strategies presented in Table 1.

Table 1 – Search strategies used in the databases.

DATABASE	SEARCH STRATEGIES
LILACS	Pressure Injury AND Elderly Health [Subject Descriptor] OR Adult Health AND Hospitalization [Subject Descriptor]
CAPES	Pressure Injury and Adult [Subject Descriptor] and Hospitalization [Subject Descriptor]
PubMed	((Pressure Ulcer [MeSH Terms]) AND (Adult Health [MeSH Terms]) AND (Middle Aged [MeSH Terms]) AND (Hospitalization [MeSH Terms]))

Source: Prepared by the authors.

The following inclusion criteria were considered: articles available in full text, with free access, published in the last 10 years, in Portuguese, Spanish and English. Duplicates were excluded, considering the first indexed database.

For the best methodological organization, a protocol was developed to guide the development of the integrative review. Thus, after identifying the findings in the databases and applying the limits, a selective analysis was carried out, with reading of the title and abstract of the articles. Next, a critical analysis was performed, with analysis of the response to the proposed guiding question [11].

The articles included in the review had their identification data (database, reference, title, authors, year of publication and country of publication), general characteristics (objectives, methods, population, results and conclusions) and specific characteristics (indicators used in the assessment of the skin seeking to prevent

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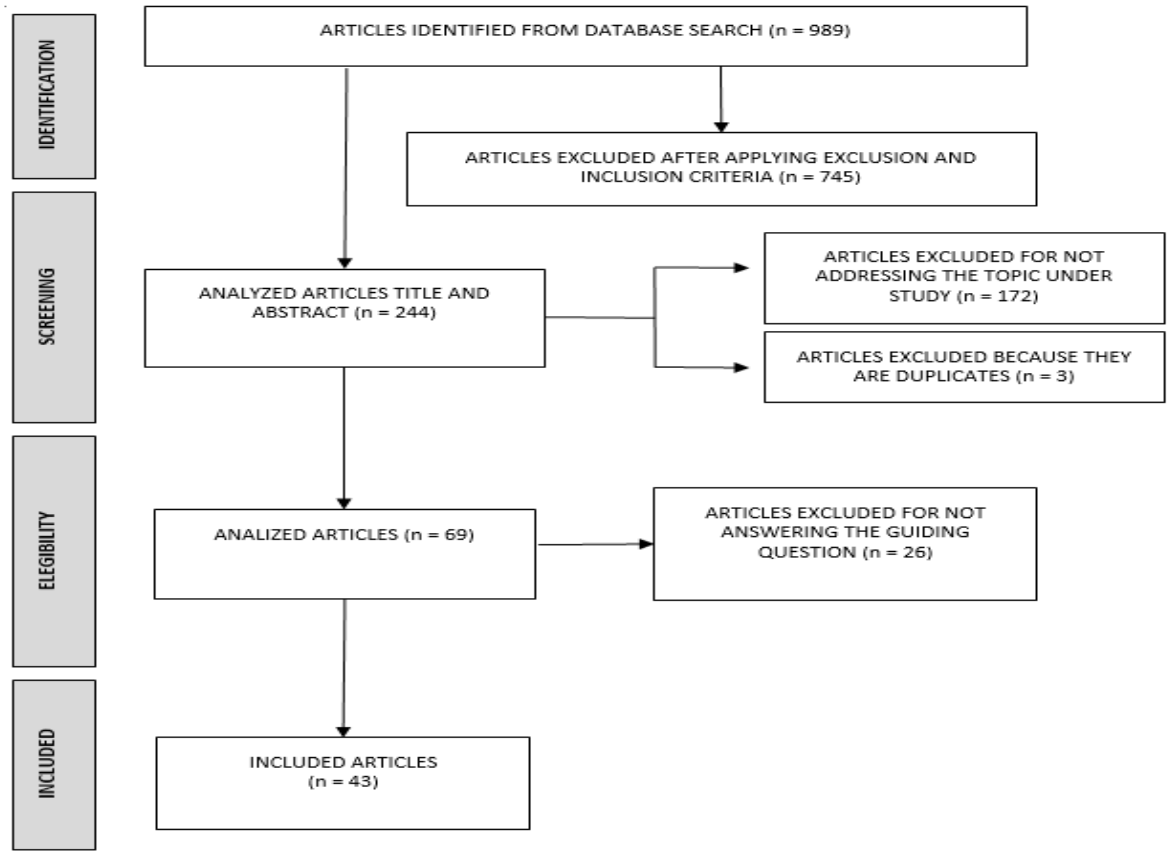
pressure injuries; definition of these indicators; measurement of these indicators; and characteristics and values indicative of normality and skin alteration, seeking to prevent pressure injuries in hospitalized adults and elderly people) tabulated in a Microsoft Excel spreadsheet, version 2023.

The analysis of the level of evidence of the studies followed the method proposed by Melnyk and Fineout-Overholt [12], which classifies them into: Level I, when it is a systematic review or meta-analysis of randomized controlled clinical trials; Level II, well-designed randomized controlled clinical trial; Level III, well-designed clinical trial without randomization; Level IV, well-designed cohort and case-control studies; Level V, systematic review of descriptive and qualitative studies; Level VI, evidence derived from a single descriptive or qualitative study; Level VII, opinion of authorities and/or expert committees.

RESULTS

Initially, 989 articles were identified; however, through the application of the eligibility criteria, 244 were considered. After selective and critical analysis, 43 articles comprised this review – 36 (83.7%), indexed in PubMed; three (7%), in LILACS; and four (9.3%) in CAPES (FIGURE 1).

Figure 1 - Flowchart of article selection prepared based on PRISMA[10] recommendations.



Source: Prepared by the authors.

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Of the 43 studies included in this review, most were published in the last five years (74.4%); in Asia (37.2%) and North America (37.2%) – with only five publications (11.6%) identified in Brazil.

With regard to predictive indicators of pressure injuries in hospitalized adults and elderly individuals, 42 studies used a single assessment method. In these, the following assessment instruments predominated: Braden Scale (n = 37, 86%); followed by the Waterlow Scale (n = 7, 16.2%); and the Norton Scale (n = 6, 13.9%). In two studies (4.6%), the assessment was performed through the analysis of a specific clinical aspect – in this case, nutritional status. Only one study (2.3%) used combined assessment methods, namely: BWAT (Bates-Jensen Wound Assessment Tool), PUSH (Pressure Ulcer Scale For Healing), PrePURSE (Pressure Ulcer Risk Score Evaluation), Cubbin-Jackson Scale, Gosnell Scale, PURPOSE-T (Primary or Secondary Pressure Ulcer Risk Assessment Tool) and presence of comorbidities (TABLE 1).

Table 1 – Predictive indicators of pressure injury in hospitalized adults and elderly people.

REFERENCES	PREDICTIVE INDICATORS OF PRESSURE INJURY
Aghazadeh et al., 2020 [5] ; Aloweni et al., 2018 [13] ; Bai et al., 2020[14]; Bereded & Salih & Abebe, 2018[15]; Brophy et al., 2021[16]; Chaboyer et al. 2017[17]; Cortés et al, 2018[18]; Cox et al., 2022[19]; Debon et al., 2018[20]; Díaz-Icaro & Gómez-Heras, 2020[21]; Edsberg et al., 2022[22]; Farias & Queiroz, 2022[23]; Garcia et al., 2021[24]; Gupta et al. 2020[6]; Ham et al., 2016[25]; Ho et al., 2017[26]; Hyun et al., 2013[27]; Jiang et al. 2014[28]; Jiang et al., 2020[29]; Labeau et al., 2020[30]; Lee et al., 2019[31]; Linnen et al., 2018[32]; Liu et al., 2019[33]; Lopes et al., 2020[34]; Moreira & Simões & Ribeiro, 2020[2]; Mutair et al., 2019[35]; Oe et al., 2020[36]; Padula et al., 2016[37]; Pickham et al., 2018[38]; Rashvand et al., 2019[4]; Santamaria et al., 2013[39]; Serpa et al., 2020[40]; Sousa & Kapp & Santamaria, 2020[41]; Shaw et al., 2014[42]; Wang et al., 2014[43]; Yoshimura et al., 2016[44]; Yoshimura et al., 2020[45].	Braden Scale
Brophy et al., 2021[16]; Chaboyer et al., 2017[17]; Díaz-Caro & Gómez-Heras, 2020[21]; Jiang et al., 2020[29]; Lovegrove & Fulbrook & Miles, 2018[46]; Smith et al., 2017[47]; Sternal & Wilczyński & Szewieczek, 2016[48]; Wang et al., 2014[43].	Waterlow Scale
Cox et al., 2022[19]; Díaz-Caro & Gómez-Heras, 2020[21]; Jiang et al., 2014[28]; Jiang et al., 2020[29]; Schoeps & Tallberg & Gunningberg, 2016[49]; Wang et al., 2014[43];	Norton Scale
Díaz-Caro & Gómez-Heras, 2020[21].	Gosnell Scale

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Cox et al., 2022[19].	Cubbin-Jackson Scale
Macedo et al., 2021[1].	BWAT (Bates-Jensen Wound Assessment Tool)
Macedo et al., 2021[1].	PUSH (Pressure Ulcer Scale For Healing)
Aloweni et al., 2018[13].	PrePURSE (Pressure Ulcer Risk Score Evaluation)
Cheng et al., 2020[50].	PURPOSE-T (Primary or Secondary Pressure Ulcer Risk Assessment Tool)
Gupta et al., 2020[6]; Santamaria et al., 2013[39].	Nutritional status
Santamaria et al., 2013[39].	Presence of comorbidities

Eleven studies (25.5%) presented conceptual definitions of predictive indicators [1,13-22]; 18 (41.8%) revealed methodological details regarding the application of indicators [1,2,4-5,13-14,17,20-30]; and 21 (48.8%) cited the indicative standards of normality [1,2,5,13,15-16,19,21,23,24,26,30-39].

In this sense, the Braden Scale, applied in 15 studies (34.9%), can be defined as a valid and easy-to-apply instrument that allows qualifying and quantifying the etiological factors for reduced tissue tolerance to prolonged compression [13-14,20,23,31-32,38,40]. Composed of six subscales (sensory perception, skin moisture, activity, mobility, nutrition, and friction and shear), each of which can be assigned from 1 to 3 or 4 points, scoring a total that varies from 6 to 23 points – where the lowest score indicates greater risk and the highest score indicates greater risk [20].

Similarly, the Cubbin-Jackson Scale, identified in one study (2.3%), considers, in addition to factors similar to the Braden Scale such as mobility, nutrition, and sensory perception, also oxygenation in its risk scale [19].

As for the Norton Scale, it was applied in three studies (7%), however, the definition of the instrument was not presented. However, it is known that it consists of five subscales (physical condition, mental condition, activity, mobility and continence), which can receive from 1 to 4 points, where 1 indicates the worst quality indicator and 4 the best quality indicator – totaling up to 20 points [21,28,43,49].

The Waterlow Scale, present in one study (2.3%), is considered an instrument that categorizes the level of risk of pressure injury through a management plan for guidance and recording of the interventions [46]. It consists of seven items, namely: weight and height ratio

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(BMI), skin type, sex and age, degree of malnutrition, continence, mobility and special risk factors, with scores ranging from 1 to 64. As an example, patients with a score between 10 and 14 were at risk; between 15 and 19, high risk; and above 20, very high risk [17,43,48].

Similarly, the Bates-Jensen Wound Assessment Tool (BWAT) scale, used in one study (2.3%), was defined as a long scale that thoroughly assesses the existing injury. It has 13 items that assess size, depth, edges, detachment, type and quantity of necrotic tissue, type and quantity of exudate, edema and hardening of peripheral tissue, skin color around the pressure injury, granulation tissue and epithelialization - the assessment is performed using a five-point scale, where 1 indicates the best condition of the wound and 5, the worst condition. The total score of the scale is obtained by adding all items and can range from 13 to 65 points, with higher scores indicating the worst condition of the pressure injury [1].

The PUSH Scale (Pressure Ulcer Scale for Healing, present in one article (2.3%), is defined as a short and easy-to-apply scale. Basically, it consists of three parameters for evaluating the healing process and intervention results: area, amount of exudate and appearance of the pressure injury bed. The scores of these parameters, when added together, generate a total score that can range from 0 to 17, with higher scores indicating worse conditions of the injury and lower scores indicating improvement in the healing process [1].

The PURPOSE-T Scale (Primary or Secondary Pressure Ulcer Risk Assessment Tool), used in one study (2.3%), is considered a comprehensive structure for assessing the risk of pressure injury, distinguishing primary and secondary factors [50].

The Pressure Ulcer Risk Score Evaluation (prePURSE), used in one study (2.3%), consists of five items that predict the risk of pressure injury: age, weight at admission, abnormal skin appearance, friction/shearing problem and surgery next week [13].

Regarding the level of evidence, 26 (60.5%) were classified as Level IV; nine (21%) as Level VI; three (7%) as Level I; two (4.6%) as Level II; two (4.6%) as Level VII; and one (2.3%) as Level III, according to Melnyk; Fineout-Overholt [12].

DISCUSSION

In the scientific literature, there is some difficulty in establishing a consensus regarding predictive indicators of pressure injuries in hospitalized adults and elderly individuals. There is a wide range of scales, instruments and clinical indicators that consider basic and specific dimensions in this assessment. Therefore, it is necessary to choose at least one tool that is appropriate for the intended assessment, with the context of application and the sensitivity of that predictive factor as a guiding element, given that reliable instruments interfere with the reliability of the assessments [5-14,20,23,27-28,31-32,38,40,46,50].

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Adequately inspecting the skin plays a vital role in preventing pressure injuries, allowing the detection of early signs [6]. Poor nutritional status is a contributing factor to the development of the injury; aging, humidity, shear and friction forces, immobility and hospitalizations for long periods of time are extrinsic and intrinsic factors for its formation, which is consistent with the results of this article [6-7].

The rate of pressure injuries is a measure of patient safety and an indicator of the quality of nursing care [51]. In order to reflect macroscopically on the impacts of pressure injuries in a global aspect, we will analyze their effects and relevance. The emergence of this type of injury significantly increases health costs, mainly due to the use of dressings, support surfaces, increased availability of nursing care time and medications [6]. In Europe, the prevalence of pressure injuries ranges from 4.6% to 27.2%; in Australia, 3% for inpatient wards and 11.5% for intensive care units; in China, there is a prevalence of 3.38% in hospitals [11]. More than 2.5 million patients in the United States develop pressure injuries, cumulatively costing approximately US$9 to 11 billion for treatment and resulting in 60,000 deaths from their complications each year [52].

Comparing hospital expenses, another study revealed that they are significantly higher associated with the presence of pressure injuries in the United States, with an average of $128,997 in costs for patients who have them and $78,454 for patients without the presence of pressure injuries [53]. Considering countries with less affluent health systems, their prevalence is higher, as in the case of Brazil with 40% in hospital emergency units and Ethiopia with 14.9% [11]. In past studies in Brazil, there was a certain variation among hospitalized patients who developed pressure injuries, both in profile and environment, 11.0% to 30.9% in intensive care units, 13.6% to 31.4% in surgical/clinical units [40], however, there are still discrepancies between the data found regarding the prevalence of these injuries.

When collecting relevant data regarding the international and national impacts of pressure injuries in hospitalized adults and elderly people, some limitations were identified for the preparation of this integrative review. One notable point was the scarcity of studies on the impact on actual health costs in the Brazilian health system [54]. Studies on predictive indicators of pressure injuries in this population are minimally found, since the main approach is to treat wounds after they have already developed [54,15]. Studies also reveal the ease of investigating the subject only in high- and middle-income countries; however, there is a deficiency in production regarding low-income or underdeveloped countries, even though they have higher prevalence of injuries in this population, such as Brazil, Thailand and Ethiopia with significant rates of 12.7%, 47.6% and 16% respectively [15]. In addition to the lack of publications, the high volatility of financial data,

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prevalence, and incidence were a challenge. The profile of PI development in intensive care is 11.0% to 30.9% and in surgical/clinical units 13.6% to 31.4%, as already mentioned in Brazil, and 2 to 26% in mixed environments in Canada [15,17,19,21-23,25,27-29,30,33-35,40-43,47-49,51-54], which is an impasse for an accurate determination of these data. Regarding incidence, there are variations from 23.1% to 59.5% in Brazil according to one author and from 0.4% to 38%, according to another. In addition to these instabilities, there is also a noticeable incompatibility between authors [1,54].

The following limitations were considered in this review: the time frame and the delimitation of publications in Portuguese, English, and Spanish.

CONCLUSIONS

By analyzing the scientific literature, this review gathered 43 findings that address the predictive indicators of pressure injuries in hospitalized adults and elderly individuals.

In 42 studies, the use of a single assessment method was observed, with a predominance of assessment instruments: Braden Scale (n = 37, 86%); followed by the Waterlow Scale (n = 7, 16.2%); and, Norton Scale (n = 6, 13.9%). Only one study (2.3%) used combined assessment methods: different instruments and presence of comorbidities. In two studies, the assessment was carried out through the analysis of a specific clinical aspect (nutritional status).

In this review, the impact of the use of predictive factors on health system costs, as well as other repercussions related to the hospital context, was not identified. Although there is consensus on the positive effects of early detection and prevention of injuries on quality of life, length of hospital stay, bed occupancy and cost reduction, the need for research aimed at analyzing the cost-effectiveness of the factors discussed here is highlighted. Furthermore, it is suggested that studies be carried out to assess the reliability and validation of the instruments and other assessment methods mentioned above in specific populations. This will help to mitigate misinterpretations and ensure the reliability of the findings.

However, it is believed that by presenting the knowledge produced about the predictive indicators of pressure injuries, this research presents an extensive contribution not only to clinical and scientific practice in the area of nursing, but to all those involving the health of adults and the elderly, whether at the level of care or management.

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