

# RIASE

REVISTA IBERO-AMERICANA DE SAÚDE E ENVELHECIMENTO  
REVISTA IBERO-AMERICANA DE SALUD Y ENVEJECIMIENTO

## **BENEFITS OF NUTRITION IN THE NURSING CARE OF PATIENTS WITH PRESSURE INJURIES IN HOSPITAL SETTINGS**

## **BENEFÍCIOS DA NUTRIÇÃO NOS CUIDADOS DE ENFERMAGEM A DOENTES COM LESÕES POR PRESSÃO EM CONTEXTO HOSPITALAR**

## **BENEFICIOS DE LA NUTRICIÓN EN LOS CUIDADO DE ENFERMERÍA A PACIENTES CON UPP EN EL ÁMBITO HOSPITALARIO**

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Received/Recebido: 2023-04-04 Accepted/Aceite: 2023-04-04 Published/Publicado: 2023

DOI: [http://dx.doi.org/10.60468/r.riase.2023.9\(1\).604.90-113](http://dx.doi.org/10.60468/r.riase.2023.9(1).604.90-113)

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**VOL. 9 NO. 1 JANUARY 2023**

## ABSTRACT

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**Introduction:** The pressure injuries (PI) are a major public health problem, as they significantly decrease people's quality of life and, on the other hand, increase costs and the burden on health care services. Nursing interventions are essential to act in their prevention through the implementation of strategies to reduce all these negative impacts. It is important that health professionals, individuals and caregivers are aware of the role that nutrition has in health, once that it is essential to provide sufficient energy to support growth tissue and subsequent healing.

**Objective:** To identify the benefits of nutritional therapy to the person in promoting PI healing.

**Methodology:** The methodology used was based on a systematic literature review, which included the development of the research question, the search in scientific databases, the analysis and interpretation of the selected articles, and the synthesis and presentation of the results obtained. For the selection of articles and formulation of the research question the PICO methodology was used.

**Results:** Applied the methodology, a final set of selected 9 articles was obtained, which suggest there is scientific evidence that adequate nutrition therapy is essential for wound healing.

**Conclusion:** Based on the scientific evidence, appropriate nutrition therapy for people with chronic wounds seems to contribute to better wound healing as well as to a decrease in health care costs. Assumptions about the contribution of nursing to care, should be replaced by empirical evidence about the actual contributions of the nursing profession to care, and chronic wound prevention is an indispensable indicator of the quality of care.

**Keywords:** Chronic Wound/Pressure Injury; Nursing Care; Nutrition Therapy; Prevention.

## RESUMO

**Introdução:** As lesões por pressão (LP) são um grande problema de saúde pública, pois diminuem significativamente a qualidade de vida das pessoas e, por outro lado, aumentam os custos e os encargos nos serviços de saúde. As intervenções de enfermagem são fundamentais de forma a atuar na sua prevenção através da implementação de estratégias para diminuir todos estes impactos negativos. É importante que os profissionais de saúde, indivíduos e cuidadores estejam consciencializados do papel que a nutrição tem na saúde, uma vez que a mesma é essencial para providenciar energia suficiente para suportar o crescimento tecidual e posterior cicatrização.

**Objetivo:** Identificar os benefícios da terapia nutricional à pessoa na promoção da cicatrização de LP.

**Metodologia:** A metodologia utilizada alicerçou-se numa revisão sistemática da literatura, que incluiu o desenvolvimento da pergunta de investigação, a pesquisa em bases de dados científicos, a análise e a interpretação dos artigos selecionados bem como a síntese e apresentação dos resultados obtidos. Para a seleção de artigos e formulação da pergunta de investigação utilizou-se a metodologia PICO.

**Resultados:** Aplicada a metodologia, obteve-se um conjunto final de 9 artigos selecionados, os quais sugerem existir evidência científica de que uma terapia de nutrição adequada é essencial para a cicatrização de feridas.

**Conclusão:** Com base na evidência científica, a terapia de nutrição adequada às pessoas com feridas crónicas parece contribuir para uma melhor cicatrização, bem como para uma diminuição dos custos em saúde. Suposições sobre a contribuição da enfermagem para o cuidado, devem ser substituídas por evidências empíricas acerca das contribuições reais da profissão de enfermagem para o cuidado e, a prevenção de feridas crónicas, é um imprescindível indicador da qualidade dos cuidados prestados.

**Palavras-chave:** Cuidados de Enfermagem; Ferida Crónica/Lesão por Pressão; Prevenção; Terapia de Nutrição.

## RESUMEN

**Introducción:** Las UPP son un importante problema de salud pública, ya que disminuyen significativamente la calidad de vida de las personas y, por otro lado, aumentan los costes y la carga de los servicios sanitarios. Las intervenciones de enfermería son esenciales para prevenir las UPP mediante la aplicación de estrategias que reduzcan todos estos efectos negativos.

**Objetivo:** Identificar los beneficios de la terapia nutricional para la persona en la promoción de la cicatrización de la PL.

**Metodología:** La metodología utilizada se basó en una revisión sistemática de la literatura, que incluyó la elaboración de la pregunta de investigación, la búsqueda en bases de datos científicas, el análisis y la interpretación de los artículos seleccionados, y la síntesis y presentación de los resultados obtenidos. Para la selección de los artículos y la formulación de la pregunta de investigación se utilizó la metodología PICO.

**Resultados:** Aplicada la metodología, se obtuvo un conjunto final de 9 artículos seleccionados, que sugieren que existen pruebas científicas de que una terapia nutricional adecuada es esencial para la cicatrización de las heridas.

**Conclusión:** Según las pruebas científicas, una terapia nutricional adecuada para las personas con heridas crónicas parece contribuir a una mejor cicatrización de las heridas, así como a una disminución de los costes sanitarios. Las suposiciones sobre la contribución de la enfermería a los cuidados deben ser sustituidas por pruebas empíricas sobre las contribuciones reales de la profesión enfermera a los cuidados y, la prevención de heridas crónicas, es un indicador indispensable de la calidad de los cuidados.

**Descriptor:** Cuidados de Enfermería; Herida Crónica/Lesión por Presión; Prevención; Terapia Nutricional.

## INTRODUCTION

The pressure injuries (PI) represent a significant problem worldwide, being a good indicator of the quality of care and patient safety. In fact, PI are included in the strategic goals outlined by the Ministry of Health in the National Plan for Patient Safety 2021-2026 (PNSD 2021-2026), namely monitoring, and recording their incidence through digital tools. The existing literature on the overall incidence of PUs in Portugal is not extensive, but data from 2007 indicate that the average prevalence of PUs is around 11.5% in hospital care<sup>(1)</sup>. There are also data stating that in medical and emergency services this incidence is significantly higher than in other services<sup>(2)</sup>.

According to the Ordem dos Enfermeiros (Portuguese Nurses Order), PI is defined as a lesion located on the skin, caused by insufficient blood irrigation, usually associated with pressure. It occurs mostly in bony prominences such as the sacral region, the heels, and the occipital region. It can be associated with the use of medical devices or prolonged standing in the same position. In addition, sliding, twisting and friction forces are also responsible for the appearance of PI<sup>(2)</sup>.

Nursing care is very important to PI, so it is possible to obtain health gains in this area when properly addressed and performed according to the specificity of each case; when nursing interventions are applied in this area, a higher effectiveness rate in PI prevention is obtained. PI risk assessment allows for the identification of patients who will benefit most from PI prevention nursing care. One of the tools that can be used to assess this risk is the Braden scale which, according to the Directorate-General for Health, should be applied within 6 hours after patient admission and every 48 hours in hospital inpatients<sup>(3)</sup>.

Healthcare costs are exacerbated by the incidence of PI's, since they affect the working capacity and independence of patients and increase the consumption of resources by health-care institutions<sup>(4)</sup>. Thus, the health importance of CL becomes evident, as well as the need to implement measures for prevention and maintenance of effective health care. These factors are reflected in an increasing investment in nutrition by countries like Portugal.

The National Program for the Promotion of Healthy Eating (PNPAS) was created in 2012 at the national level, included in the priority health programs of the National Health Plan. It is based on the WHO premise that "The promotion of healthy eating and the prevention and control of all forms of malnutrition, in particular overweight and obesity, is a national health priority". Additionally, the area of agriculture and food was increased by 23.5% in the State Budget, with the goal of investing in the promotion of healthy, safe and balanced food in the face of geopolitical instability caused by the war in Ukraine. Inadequate food contributed, in 2019, to 7.3% of DALYs (Disability-adjusted life years) and to 11.4% of mortality, according to the PNPAS.

Malnutrition can be defined as a state where there is a deficiency or excess of energy, protein and other nutrients, thus causing adverse effects either on tissues, functionality and patient outcomes<sup>(5)</sup>. Identification of patients who are at nutritional risk is accomplished through assessment tools such as the Body Mass Index [BMI] or the Malnutrition Universal Screening Tool [MUST].

### *Objective*

To identify the benefits of nutritional therapy to the person in promoting the healing of Pressure Injury.

## METHODS

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### *Ethical aspects*

We did not request the opinion of the Ethics Committee as this was a secondary study. In formulating the problem, we were concerned with the principles of clarity, objectivity, and accuracy, so that the results could be an added value for nursing care in PI treatment and prevention in hospital settings. The analysis of the data extracted from the selected studies was developed in line with the principle of respect for the results obtained in these studies and by these researchers. Authors were referenced according to the rules of good academic and scientific practices.

### *Study type*

The choice of an integrative literature review aimed to provide access to current knowledge about the issue under study and, consequently, contribute to the incorporation of the findings of this study in practical contexts. The methodological procedures used involved the following steps: 1) identification of the starting question; 2) definition of inclusion and exclusion criteria; 3) definition of the information to be extracted from the studies; 4) analysis of the included articles; 5) presentation and discussion of results and 6) synthesis of knowledge<sup>(17)</sup>.

### *Methodological procedures*

The PICO methodology was used to develop the research question: population (P), intervention (I), comparison (C) and outcome (O). In order to answer the objective defined in the previous step, the following question was designed: In people with PUs (population), is there evidence to suggest that nutrition therapy (intervention) promotes wound healing (outcomes)?

The search was conducted using the EBSCOhost search engine, in the CINAHL Complete and MEDLINE Complete databases, with the following descriptors and Boolean operators: ("chronic wounds" OR "chronic ulcers" OR "pressure ulcer" OR "non-healing wounds" OR "hard to heal wound") AND ("eating healthy" OR "diet" OR "nutrition" OR "dietary quality" OR "dietary intake" OR "food healthy diet" OR "healthy eating") AND ("benefits" OR "advantages" OR "positive effects" OR "importance" OR "impact" OR "success" OR "value").

In order to limit the search, the following inclusion criteria were selected: (i) full text; (ii) time period between 2012 and 2022; (iii) English, Spanish and Portuguese. As exclusion criteria, we considered all duplicate articles and those that were not in line with the objective of this study. After this search, a total of 32 articles were obtained. However, one of the

se articles was repeated and, as such, was excluded, resulting in 31 articles submitted for analysis.

With the latter we proceeded to the respective selection, which was performed in two stages. First by reading the titles, abstracts and keywords, and then by reading them in full. At the end of the first stage, 18 articles were selected, and at the end of the second stage, the number of selected articles was reduced to 9, which met all the weighted criteria for data collection and analysis. These research stages are shown in Figure 1<sup>7</sup>.

## RESULTS

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In order to answer the proposed objectives, several articles were read and their content was analyzed. The characteristics and main results obtained are summarized in Table 1<sup>7</sup>.

## DISCUSSION

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Through the identification of the main results obtained in the nine articles included in this literature review, it was possible to understand that nutrition and hydration play a key role in PI prevention and healing. Guerra, Monsanto, and Brás<sup>(6)</sup> underline the importance of awareness of the role of nutrition among health professionals, individuals, and caregivers for a better application of nutrition in PI prevention and healing.

In addition, monitoring the risk of developing PI's plays an essential role in nursing care, as they allow adaptation of PI prevention and treatment to each patient<sup>(6)</sup>.

Nutritional assessment, more specifically, needs attention at the time of admission to the care institution and whenever there is a change in the patient's condition that may increase the risk of malnutrition<sup>(7)</sup>. This type of assessment, in addition to identifying patients at higher risk of malnutrition, allows nurses to apply specific and individualized teaching, rather than the routine provision of nutritional supplements to patients with PI's. MUST is one of the instruments that can be used to perform this assessment<sup>(4)</sup>. In Portugal, the risk assessment instrument recommended by the DGS is the Braden Scale, which assesses the risk of developing PI through six risk factors, including nutrition: sensory perception (ability to react significantly to discomfort), humidity (level of skin exposure to humidity), activity (level of physical activity), mobility (ability to change and control body position), nutrition (habitual diet) and friction and sliding forces<sup>(3)</sup>.

Through the analytical results we can also perform the nutritional evaluation of each patient, more specifically at the level of available proteins by determining the serum levels of pre-albumin and albumin. Albumin levels lower than 3.1 g/dl indicate patients more susceptible to developing PI<sup>(13)</sup>.

Most authors refer to undernutrition (low weight and overweight) as a point to be considered in PI prevention and healing, however, the literature production is limited and does not allow obtaining concrete scientific evidence regarding this factor. In underweight, for example, there is a decrease in fat and lean mass and, consequently, the pressure on bony prominences increases<sup>(4)</sup>. On the other hand, in these cases the protective layer offered by the adipose tissue is diminished and ends up influencing the development of PI's<sup>(6)</sup>. In addition, both underweight and overweight can be representative of a deficient intake of adequate nutrients (energy, protein, vitamins, and minerals), which also influences the development of PI's<sup>(4)</sup>.

In the healing process, there is an increase in the energy consumed by the body in order to maintain the cellular activity required for healing activities. Increasing caloric intake in patients with PI or at risk of developing it then becomes a priority. According to Moor (2019)<sup>(12)</sup>, the source of energy comes from nutrients such as carbohydrates and fat, so the use of protein as an energy source should be avoided so that these substances are available in adequate amounts for the processes of cell growth and repair<sup>(13)</sup>.

Fatty acids, present in fat, despite being a source of energy, also interfere with the synthesis of cell membranes and the development of inflammatory mediators<sup>(11)</sup>.

Regarding proteins, Manley and Mitchell (2022)<sup>(11)</sup> highlight their role in tissue recovery, fibroblast proliferation, collagen synthesis, angiogenesis and immune function, making them essential in all stages of healing. Proteins such as arginine and glutamine play a significant role in these processes. Given their importance in this process, the identification of patients whose protein levels are inadequate is essential and can be accomplished by determining analytical levels of pre-albumin and serum albumin<sup>(7)</sup>.

Although Taylor (2016)<sup>(4)</sup>, mentions that the evidence supporting the influence of adequate hydration on the development of PI is scarce, it has been found that hydration plays a particularly important role in skin integrity and repair. More specifically, it contributes to blood flow in the injured area<sup>(12)</sup> and provides maintenance of skin tone, which is important in preventing potential infections and/or skin lesions<sup>(14)</sup>. Adequate fluid intake is furthermore necessary for intracellular processes such as collagen synthesis<sup>(7)</sup>. Moor (2019)<sup>(12)</sup> recommends a minimum fluid intake of 1600 ml to cope with PI healing. However, this is significantly lower than what is recommended by the WHO for a healthy adult – at least



2 liters per day – so there is some ambiguity regarding this factor, namely because it is argued that patients with PI need an increased fluid intake.

On the other hand, Moor (2019)<sup>(12)</sup> stresses the relevance of iron in collagen synthesis and blood circulation, a role also played by fluids. Manley and Mitchel (2022)<sup>(11)</sup> also emphasize its influence on the immune response. Iron absorption requires an adequate intake of vitamin C, which is also important for collagen synthesis and immune system function<sup>(12)</sup>.

Substances such as zinc and copper also reveal important functions in the healing process, such as the formation of epithelialization and granulation tissue, B and T lymphocytes and neutrophil proliferation and protein synthesis<sup>(11)</sup>.

Regarding vitamin intake, vitamin E and vitamin A play an important role in the immune and inflammatory response and in tissue formation. On the other hand, vitamin K acts in the blood coagulation process through the production of prothrombin and in the initial phase of healing by participating in the production of proteins. The functions performed by these nutritional compounds in the healing process lead us to the conclusion that, in the presence of PI, the needs for these substances increase. The optimal amount that should be ingested is not yet known.

Thus, these nutritional components play an important role in the prevention of PI and its healing process<sup>(7)</sup>. One of the ways to achieve this is by taking nutritional supplements. However, all patients need an individual assessment of whether they will be able to benefit from nutritional supplements<sup>(4)</sup>.

In addition to supplements, there are other ways to increase the nutritional load ingested. These include increasing the protein and energy in food without changing the volume of food intake, and high-energy snacks in which these substances are present in large quantities that can be ingested efficiently.

If oral intake is not possible, alternative methods that ensure adequate nutrition should be adopted<sup>(7)</sup>. Examples of these are: parenteral feeding, introduction of a nasogastric tube/percutaneous gastrostomy/gastric tube. The choice of method should be individualized taking into consideration the needs and clinical status of each patient.

However, Carolyn Taylor (2016)<sup>(4)</sup> states that the influence of supplements on PI development is not significant, but with regard to healing, they have beneficial factors that should be taken into consideration during this process.

According to Emily Haesler (2018)<sup>(9)</sup>, factors such as overweight and obesity influence lifestyle activities that increase the risk of developing PI's such as decreased mobility; increased risk of friction and shear; increased pressure loading on skin and tissues; increased risk of intertriginous dermatitis and other types of skin damage due to moisture; and increased risk of compromise of the vascular and lymphatic systems that support the skin and tissues.

According to Marianna Monou, *et al* (2020)<sup>(8)</sup> in patients with a previously installed pathology, the priority of treatment is the disease itself. However, PI's often present themselves as consequences of that pathology. The pain and comorbidities associated with the disease cause loss of appetite and inappropriate nutrient intake<sup>(11)</sup>, which leads to increased metabolic load and thus risk of skin breakdown or reduced healing, as energy and protein reserves are driven to their use elsewhere<sup>(4)</sup>. Thus, malnutrition will lead to increased complications, such as longer healing and recovery time of PI's among patients.

The importance of the nurse's role in the prevention and subsequent treatment of PI's is transversal to all articles. Nutrition is a risk factor for the onset of PI's, thus the need to intervene in this area through nutritional control and monitoring; administration of parenteral nutrition; nutritional therapy; feeding (self-care assistance) and diarrhea control was highlighted. Therefore, to intervene effectively, it is necessary to take into account weight (body mass); nutritional status (biochemical indicators); gastrointestinal function and bowel elimination.

### *Study limitations*

The limitations of this integrative literature review included: the selection of articles that addressed this topic considering the previously outlined inclusion and exclusion criteria, since the existing literature on the relationship between PI's and nutrition is scarce. Inclusively, it was found that the amount of literature produced in the last 5 years for this topic was small, so there was a need to extend the time frame to 7 years. The fact that the research design opted only for articles written in English and Portuguese was also a limiting factor in terms of the results obtained, as it led to the loss of other potentially important international research written in other languages. This happens because there are no scientific studies conducted by nurses in clinical practice that effectively compare the effect that nutrition therapy has when intervening in people with PI.

### *Contributions to Nursing*

Nutrition plays a crucial role in nursing care for patients with PUs in hospital settings. Proper nutrition can help improve wound healing, prevent complications, and promote recovery.

This study can make a significant contribution to the nursing profession by providing valuable information about the importance of nutrition in patients with PI's. Nurses can use this information to develop individualized care plans that meet the specific nutritional needs of each patient.

In addition, this study may help raise awareness among nurses about the importance of nutritional assessment and continuous monitoring of the dietary intake of patients with PI's. This may lead to better interprofessional coordination, resulting in an improvement in the quality of care provided.

## **FINAL CONSIDERATIONS**

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It is critical that nutrition be considered an integral part of nursing care for people with PI's, as proper nutrition can significantly improve tissue healing and prevent complications.

Nutritional assessment should be performed upon patient admission to a care facility and monitored regularly, especially when there are changes in the patient's clinical condition. Nurses should use nutritional assessment tools, such as the Braden scale and the MUST instrument, to identify persons at nutritional risk and develop individualized care plans to meet their specific nutritional needs.

Providing effective nursing care to people with PI's requires a multidisciplinary approach, with the collaboration of healthcare professionals, including nurses, dietitians, physicians, and other professionals. Awareness and involvement of these professionals is critical to ensure a comprehensive and effective approach to the care of patients with PI.

Although nutrition is recognized as a critical factor in nursing care for people with PI's, there is still a significant gap in scientific research on the topic. The lack of scientific evidence and statistical data hinders the development of clear guidelines and protocols for the prevention and treatment of nutrition-related PI's.

Additionally, PI's are a significant problem worldwide and an important indicator of health-care quality and patient safety. Lack of research in this area can negatively affect the quality of care for these people and can lead to complications and unfavorable outcomes.

It is critical that more research be invested in investigating the relationship between nutrition and PI's, with the goal of identifying best nutrition practices for prevention and treatment of these injuries. Future studies on this topic may provide valuable information for nurses and other healthcare professionals, enabling them to provide more effective, high-quality care to patients with PI.

## REFERENCES

1. Ferreira PL, Miguéns C, Gouveia J, Furtado K. Risco de desenvolvimento de úlceras de pressão: Implementação nacional da escala de Braden. Loures: Lusociência - Edições técnicas e científicas. 2007.
2. Ferreira MM. Prevenção da úlcera por pressão: contributos da enfermagem de reabilitação (Master's thesis). 2019. Repositório IPVC. Available from: [http://repositorio.ipvc.pt/bitstream/20.500.11960/2281/1/Margarida\\_Ferreira.pdf](http://repositorio.ipvc.pt/bitstream/20.500.11960/2281/1/Margarida_Ferreira.pdf)
3. Braden E. Versao adulto e pediátrica (Braden Q). Lisboa: Direção-Geral da Saúde. 2011. Available from: [https://www.dgs.pt/departamento-da-qualidadenasauade/ficheirosanexos/orientacao\\_ulceraspdf-pdf.aspx](https://www.dgs.pt/departamento-da-qualidadenasauade/ficheirosanexos/orientacao_ulceraspdf-pdf.aspx)
4. Taylor C. Nutrition and pressure ulcers: putting evidence into practice. *Journal of community nursing*. 2016 ago 1;30(4).
5. Oliveira KD, Haack A, Fortes RC. Estado nutricional de idosos e prevalência de lesão por pressão na assistência domiciliar. *Revista Enfermagem Atual In Derme*. 2017 Oct 9. Available from: <https://doi.org/10.31011/reaid-2017-v.2017-n.0-art.551>
6. Guerra A, Monsanto F, Brás F. A implicação da Nutrição na cicatrização das Úlceras por Pressão: uma Revisão Sistemática da Literatura. Available from: <http://hdl.handle.net/10400.26/36940>
7. Marston W, Tang J, Kirsner RS, Ennis W. Wound Healing Society 2015 update on guidelines for venous ulcers. *Wound repair and regeneration*. 2016 Jan;24(1):136-44. Available from: <https://doi.org/10.1111/wrr.12396>
8. Monou M, Daldas I, Sivetidou S, FNSCOPE IK. Prevalence of Malnutrition and Use of Nutritional Care Therapy in Rehabilitation Inpatients. *International Journal of Caring Sciences*. 2020 set 1;13(3):1662-7.
9. Haesler E. Evidence Summary: Prevention of pressure injuries in individuals with overweight or obesity. *Wound Practice & Research: Journal of the Australian Wound Management Association*. 2018 Sep;26(3):158-61.
10. Caldini LN, Silva RA, Melo GA, Pereira FG, Frota NM, Caetano JÁ. Nursing interventions and outcomes for pressure ulcer risk in critically ill patients. *Rev Rene*. 2017 18(5), 598-605.
11. Manley S, Mitchell A. The impact of nutrition on pressure ulcer healing. *British Journal of Nursing*. 2022 Jun 23;31(12):S26-30. Available from: <https://doi.org/10.12968/bjon.2022.31.12.S26>
12. Moor F. Role of nutrition in pressure ulcer management. *Journal of Community Nursing*. 2019 Feb 1;33(1).
13. Saghaleini SH, Dehghan K, Shadvar K, Sanaie S, Mahmoodpoor A, Ostadi Z. Pressure ulcer and nutrition. *Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine*. 2018 Apr; 22(4):283. Available from: [https://doi.org/10.4103/ijccm.IJCCM\\_277\\_17](https://doi.org/10.4103/ijccm.IJCCM_277_17)
14. Rabess C. Understanding the link between wound care and nutrition. *Journal of Community Nursing*. 2015 Aug 1;29(4):60-5. Available from: <https://static1.squarespace.com/static/58ecdbfc1b631b84dc3237ed/t/58f0f8f244024397>

15. Golden, C., Allison, E., Cheung, W. et al.  
Nutrition: Fall in fish catch threatens human health. *Nature* 534, 317-320 (2016). Available from: <https://doi.org/10.1038/534317a>
  
16. Calleja Fernández A, Vidal Casariego A, Cano Rodríguez I, Ballesteros Pomar MD. Malnutrition in hospitalized patients receiving nutritionally complete menus: prevalence and outcomes. *Nutr Hosp*. 2014 Dec 1;30(6):1344-9. Available from: <https://doi.org/10.3305/nh.2014.30.6.7901>.
  
17. Mota De Sousa LM, Furtado Firmino C, Alves Marques-Vieira CM, Silva Pedro Severino S, Castelão Figueira Carlos Pestana H. Revisões da literatura científica: tipos, métodos e aplicações em enfermagem. *Rev Port Enf Reab [Internet]*. 2018 June 23 [cited 2023 Feb 12]; 1(1):45-54. Available from: <https://rper.aper.pt/index.php/rper/article/view/20> .

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**Authors' contributions**

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PP: Study design, data analysis, review and discussion of results.

MG: Study coordination, study design, data collection, storage and analysis, review and discussion of results.

AJ: Study coordination, study design, data collection, storage and analysis, review and discussion of results.

AC: Review and discussion of results.

AD: Review and discussion of results.

LL: Review and discussion of results.

All authors read and agreed with the published version of the manuscript.

**Ethical Disclosures**

**Conflicts of Interest:** The authors have no conflicts of interest to declare.

**Financial Support:** This work has not received any contribution, grant or scholarship.

**Provenance and Peer Review:** Not commissioned; externally peer reviewed.

**Responsabilidades Éticas**

**Conflitos de Interesse:** Os autores declararam não possuir conflitos de interesse.

**Suporte Financeiro:** O presente trabalho não foi suportado por nenhum subsídio ou bolsa.

**Proveniência e Revisão por Pares:** Não comissionado; revisão externa por pares.

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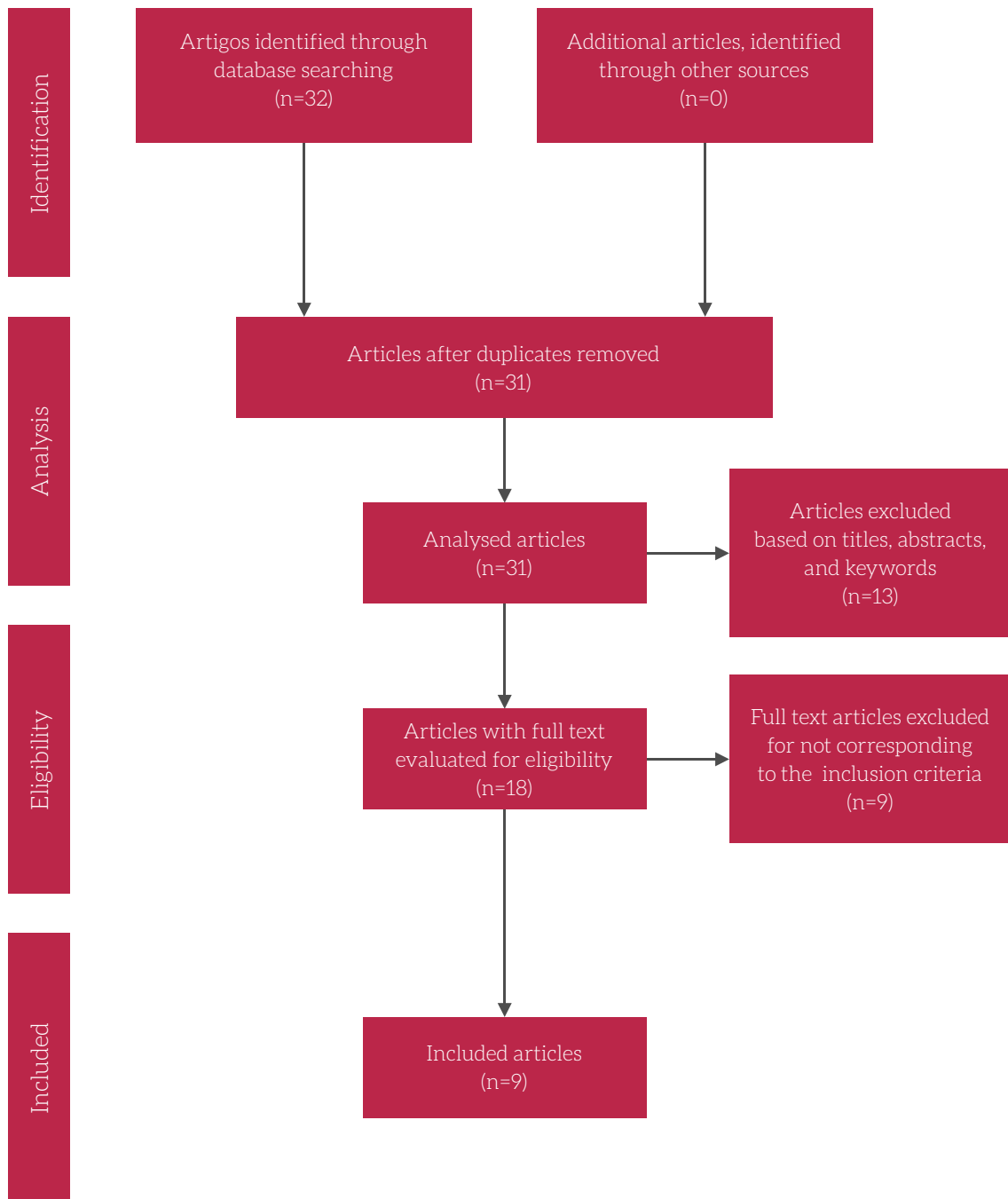


Figure 1 - 2020 PRISMA diagram for the presentation of the research methodology.<sup>8</sup>



**Chart 1 - Identification of the studies and main results.** →<sup>κ</sup>

Authors/Year/Method	Objectives	Results
<p>Guerra, A; Monsanto, F; Brás F (2020)<sup>(6)</sup>. Systematic literature review.</p>	<p>Evaluate the role of nutrition in PI healing.</p>	<p>In this study, the authors found that nutrition and hydration play a key role, understanding them as determining factors in the prevention and healing of PI. They also emphasize that adequate nutrition provides enough energy to sustain tissue growth and, subsequently, healing. They also focus on the importance of awareness of the role of nutrition, as well as of the prevention and treatment of PI among health professionals, individuals and caregivers, admitting that proper nutrition is essential to improve the healing phases of an injury.</p> <p>Reduced energy intake may lead to a decrease in adipose tissue and consequently a decrease in the protective layer, becoming a potential risk factor for PI development. They highlight nutrition as a major implication in the treatment and healing of PI, since an individual with an adequate nutritional status will favor the development of the entire healing process, bringing benefits to their health, more specifically in the reduction of healing time and reappearance of PI. It is also fundamental, the application and monitoring of the risk of developing PI, regardless of whether or not individuals have PI or are only at risk of developing it. The identification of warning signs is an important predictor for the readjustment of treatment and also for the prevention of the onset of PI.</p>

Chart 1 - Identification of the studies and main results.↔↔

Authors/Year/Method	Objectives	Results
<p>Gould, L; Stuntz, M; Giovannelli, M; Ahmad, A; Aslam, R; Mullen-Fortino, M; Whitney, J D; Calhoun, J; Kirsner, R S; Gordillo, G M (2016)<sup>(7)</sup>. Integrative literature review.</p>	<p>Outlining the guidelines for PI treatment published in the journal Wound Healing Society in 2006.</p>	<p>The authors begin by stating that nutrition is valued and considered a significant factor in the prevention and treatment of PI 's, as is hydration, which plays an essential role in intracellular processes such as collagen synthesis.</p> <p>In their guidelines, they emphasize the need for a nutritional assessment upon admission to the care institution and whenever there is a change in the patient's condition that could increase the risk of malnutrition.</p> <p>They then emphasize the role of proteins in granulation tissue growth, and as such, the determination of pre-albumin and serum albumin levels can be a tool that allows the identification of patients whose protein levels are not the most appropriate.</p> <p>The authors also note that in patients with PI, resting energy expenditure increases while energy procurement may be inadequate, so calculation and adequacy of each patient's diet is essential to support their energy requirements.</p> <p>Finally, there is a reference to the fact that nutritional supplements may have (according to published data) a positive effect on the prevention of PF, particularly grade 1. Furthermore, knowing that malnutrition is associated with the development of PL, they advocate the use of alternative methods when it is not possible to ingest a nutritionally individualized diet orally (parenteral feeding, for example); an adequate diet contributes to anabolism (formation of more complex molecules from simpler molecules), essential in healing.</p> <p>However, despite these findings, the authors state that the number of definitive studies documenting the effectiveness of nutrition in healing PI 's is limited.</p>

**Chart 1 - Identification of the studies and main results.** ↔↔↔

Authors/Year/Method	Objectives	Results
<p>Taylor, C (2016)<sup>(4)</sup>. Integrative literature review.</p>	<p>Analyze whether there is high quality evidence to recommend specific nutritional measures in an attempt to prevent PI, as well as general recommendations for malnourished patients.</p>	<p>In this study, the author presents various risks of developing PUs associated with malnutrition factors. Thus, both overweight and underweight are recognized as factors that increase the risk of developing these lesions.</p> <p>The presence of disease can cause patients to lose appetite, which leads to increased metabolic load and, consequently, risk of skin breakdown or reduced healing, as energy and protein reserves are directed to other processes.</p> <p>It is noted that nurses should seek to correct any nutritional deficiency that the patient may have, for example, by using nutritional supplements.</p> <p>Nutritional supplements may reduce the development of PI, however, not to a significant degree. Rather than routinely providing nutritional supplements to patients with PI, nurses should carry out a nutritional assessment (using the MUST instrument) to identify those at risk of malnutrition, so that they can be provided with specific teaching to improve their nutritional intake.</p> <p>The hydration factor is also addressed, however, there is little evidence of how it affects the development of PI.</p> <p>Finally, the need for more research on the role of nutrition in promoting PI healing is highlighted, as these contribute to increased healthcare costs.</p>

Chart 1 - Identification of the studies and main results.↔↔

Authors/Year/Method	Objectives	Results
<p>Marianna Monou, <i>et al</i> (2020)<sup>(8)</sup>. Quantitative study.</p>	<p>To estimate the prevalence of malnutrition in rehabilitation patients and to describe the provision of nutritional care in a public Greek subacute rehabilitation facility.</p>	<p>Malnutrition is not seen as a priority in rehabilitation patients; their underlying pathologies and their functional and mobility difficulties are shown to have more priority. However, without proper nutritional care, malnutrition will lead to increased complications, such as longer healing and recovery time for pressure injuries among patients.</p> <p>The results of the study complement the existing literature and point to the need for better nutritional care of rehabilitation patients. For those patients who ate little food, 30% stated that they did not like the type of food offered, 30% did not like the smell/taste, 25% had anorexia, 5% had chewing/swallowing problems, and 5% stated that the food offered did not conform to their religious beliefs. Better nutrition may be slightly more expensive, but this is justified in the interest of quality of care and a better clinical outcome.</p> <p>All aspects of nutrition, including hospital food and oral supplements, overlap and are interdependent. Assistance with feeding should be provided, and when necessary, special utensils should be provided. A range of meals specially fortified in energy and protein should also be available in each hospital and prescribed accordingly to all at-risk or malnourished patients. Snacks and nutritious drinks should be kept on the ward and routinely offered between meals. In addition, clinically indicated oral supplements should be offered, as they can be extremely effective means of achieving nutritional goals and improving clinical outcome.</p>

**Chart 1 - Identification of the studies and main results.** ↔↔

Authors/Year/Method	Objectives	Results
<p>Haesler, E (2018)<sup>(9)</sup>. Systematic literature review.</p>	<p>Assess the relationship between overweight and obesity in the onset of PI.</p>	<p>Overweight and obesity are factors that impair health status. Due to this fact, it is possible to state that these individuals are more prone to the onset of PI. These factors influence many life activities that may influence the development of PI, such as:</p> <ul style="list-style-type: none"> <li>• Decreased mobility;</li> <li>• Increased risk of friction and shear;</li> <li>• Increased pressure load on the skin and tissues;</li> <li>• Increased risk of intertriginous dermatitis and other types of skin damage due to moisture that accumulates in the skin folds;</li> <li>• Increased risk of impairment of the vascular and lymphatic systems that support the skin and tissues.</li> </ul> <p>Promotion of optimal nutritional status is associated with superior health outcomes, including prevention and healing of PI. There is no specific evidence on the effectiveness of weight reduction in preventing or treating PI.</p> <p>Clinical guidelines recommend that individuals at risk of PI be assessed as being at risk of malnutrition and, because of this, receive an individualized diet under prescription.</p>

**Chart 1 - Identification of the studies and main results.** ↔↔

Authors/Year/Method	Objectives	Results
<p>Nunes Caldini, L; Alves Silva, R; Alencar Melo, G A; Fernandes Pereira, F G; Marques Frota, N &amp; Áfio Caetano, J (2017)<sup>(10)</sup>. Analytical study.</p>	<p>Establish relationships between interventions and nursing outcomes for the diagnosis “Risk of PI” in critically ill patients.</p>	<p>Nutrition is a risk factor for the onset of PI. In this article, regarding nutrition the following Nursing interventions were highlighted:</p> <ul style="list-style-type: none"> <li>• Nutritional control;</li> <li>• Nutritional monitoring;</li> <li>• Administration of parenteral nutrition;</li> <li>• Nutritional therapy;</li> <li>• Feeding (self-care assistance);</li> <li>• Diarrhea control.</li> </ul> <p>These interventions are key to preventing and treating PI. In order to know how to intervene, it is necessary to take into account the following nursing outcomes:</p> <ul style="list-style-type: none"> <li>• Weight: body mass;</li> <li>• Nutritional status: biochemical indicators;</li> <li>• Gastrointestinal function;</li> <li>• Intestinal elimination.</li> </ul>

Chart 1 - Identification of the studies and main results.↔↔

Authors/Year/Method	Objectives	Results
<p>Manley, S; Mitchell, A (2022)<sup>(11)</sup>. Integrative literature review.</p>	<p>Identify how nutrition plays a role in nursing care in PI healing.</p>	<p>PI treatment, in clinical terms, involves: holistic assessment, risk assessments, and preventive measures.                      Malnutrition is the most common complication in wound healing and has been defined as one of the factors in the development of PI.                      The PI needs the following nutritional components to have better healing: macronutrients, micronutrients, iron, and fluids.                      Proteins, particularly arginine and glutamine, are essential for tissue recovery, fibroblast proliferation, collagen synthesis, angiogenesis, and immune function. When there is not the necessary amount in the body, the injury continues to develop inflammatory response.                      Fatty acids are essential for the synthesis of cell membranes, as an energy source, and are important in the development of inflammatory mediators.                      Iron is needed for the immune response, collagen synthesis, and for oxygen transport.                      Vitamin C is essential for collagen formation, proper immune response, and iron absorption.                      Zinc and copper are necessary for the formation of epithelialization and granulation tissue, B and T lymphocytes and neutrophil proliferation, and protein synthesis.                      Vitamin E is essential for the immune system and for healthy tissue formation. Vitamin A increases the inflammatory response and helps in collagen formation.                      The pain and comorbidities associated with older people can affect patients' appetite, thus leading to inappropriate eating.                      In the elderly, the risk of dehydration is high because there is an increase in fat mass and decrease in lean mass, which leads to a decrease in the amount of water stored in the body. Proper hydration allows the creation of a moist environment necessary for the transport of nutrients to the lesion.</p>

Chart 1 - Identification of the studies and main results.↔↔↔

Authors/Year/Method	Objectives	Results
<p>Moor, F (2019)<sup>(12)</sup>. Case Study.</p>	<p>Highlight the role of nutrition in the prevention and treatment of PI 's, provide practical advice, and demonstrate the resources produced by the Nutrition and Pressure Ulcer Task and Finish Group.</p>	<p>There is an association between prolonged development and healing of PI 's and weight loss and malnutrition.</p> <p>The healing of PI 's involves additional energy consumption by the body. The energy must come from carbohydrates and fats because using alternatives, such as proteins, decreases the availability of these for processes such as cell growth and repair.</p> <p>Fluid intake of at least 1600 ml is essential for proper blood circulation and skin tightness.</p> <p>Vitamin C plays an important role in iron absorption, collagen synthesis, and ultimately in the function of the immune system. Zinc also plays roles in the latter two and in the formation of fibroblasts.</p> <p>Iron is important in the synthesis of collagen and in the blood circulation of the affected area.</p> <p>These factors have an influence on the proliferative phase and the maturation and remodeling phase of wound healing.</p> <p>The authors suggest methods to increase protein and energy intake: food fortification, in which the amount of this substance is increased without changing the volume of food eaten, and high-energy snacks that allow the individual to ingest the appropriate values of the substances more efficiently.</p>



**Chart 1 - Identification of the studies and main results.** ←↵

Authors/Year/Method	Objectives	Results
<p>Saghaleini, S H; Dehghan, K; Shadvar, K; Sanaie, S; Mahmoodpoor, A &amp; Ostadi, Z (2018)<sup>(13)</sup>. Integrative literature review.</p>	<p>Evaluate the relationship between nutrition and hydration in the prevention and treatment of PI.</p>	<p>Serum albumin levels and nutritional status are the most relevant factors when assessing the likelihood of PU development. Patients with albumin levels below 3.1 g/dl were found to be more likely to develop PI. Unintentional weight loss (5%-10%) was also associated with the development of PI.</p> <p>Vitamin K is critical for the production of prothrombin and other proteins responsible for wound healing. These proteins are necessary for the initial phase of the healing process.</p> <p>Hydration plays a vital role in maintaining skin integrity and repair. Adequate water intake is necessary for blood flow to injured tissues and to prevent further destruction of skin tissue.</p> <p>For the healing process to be expedited, and although the optimal nutritional intake is not known, it is important to note that energy, protein and vitamin A, C and E needs as well as zinc needs are increased. Thus, hyperprotein supplements are effective and reduce the incidence of PI by up to 25% in patients at risk.</p>