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Nursing Interventions in Prevention and Healing of Leg Ulcers: Systematic Review of the Literature

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Abstract

Aim: To identify nursing interventions aimed at persons with venous, arterial or mixed leg ulcers.

Methodology: Carried out research in the EBSCO search engine: CINAHL Plus with Full Text, MEDLINE with Full Text, MedicLatina, Academic Search Complete, sought full text articles, published between 2008/01/01 and 2015/01/31, with the following keywords [(MM "leg ulcer") OR (wound care) OR (wound healing)] AND [(nursing) OR (nursing assessment) OR (nursing intervention)], filtered through initial question in PI[C]O format.

Results: The different etiologies of leg ulcer require a specific therapeutic and prophylactic approach. Factors that promote healing were identified: individualization of care, interpersonal relationship, pain control, control of the exudate, education for health self-management, self-care, therapeutic adherence, implementation of guidelines of good practice and auditing and feedback of the practices.

Conclusion: Person-centred care and practices based on evidence improves health results in prevention and treatment of leg ulcers.

Keywords: Leg ulcer; Nursing; Interventions

Introduction

Currently, the needs of healthcare clients are increasingly demanding and complex, as a result of the increase in average life expectancy [1,2], and the prevalence of chronic illnesses, such as leg ulcers. The possibility of ulceration increases with age, due to which an exponential increase in its incidence and prevalence is expected [3]. Leg ulcers can be defined as ulceration below the knee on any part of the leg [4], including the foot, and is classified as a chronic wound, that is, a wound that remains stuck in any of the phases of the healing process for a period of six weeks or more, or that requires a structured intervention of nursing care [5,6]. There are several known leg ulcer etiologies, among which those of venous origin are the most common, at 70% of the cases, followed by those that are arterial in origin, at 10 to 20% of the cases, and those of a mixed a etiology, at 10 to 15% of the cases [7]. The main causes of the appearance of leg ulcers are chronic venous hypertension, arterial disease or a combination of the two [5,6]. The less frequent causes are neuropathy; infection, vasculitis, neoplasia, blood and metabolic disorders, or lymphedema and disorders that are iatrogenic in origin [5,6]. The relevance of this problem is supported by statistics, in which 1.5 to 3 in every 1000 individuals have leg ulcers, with increased prevalence at higher ages, leading to 20 for every 1000 individuals aged more than 80 years [2,8]. The literature mentions that leg ulcers are interpreted as "a forever healing experience" [9,10], associated with the fact that 50% of the time, community healthcare nurses are involved in treating leg ulcers. The presence of pain was presented in 49-90% of cases, where 50% of venous ulcers heal after four months, 20% of venous ulcers heal between four months and one year, 20% require a period greater than two years to heal, 8% remain unhealed even after eight years and 69-26% recur in the first year [9].

The repercussions of leg ulcers also have an effect on healthcare costs, where in 1-2% of the total health budget in Western countries [11], of which Portugal is part [4,12,13]. In European countries, an economical investment of approximately 6.5 million euros/year is estimated in the treatment of leg ulcers [14]. Its impact interferes significantly human living, affecting the performance of day-to-day activities, quality of life, functional capacity and self-esteem, work absenteeism, financial problems, isolation, sleep disorders and the development of mental illness [15,16].

Hence, systematization is proposed of nursing interventions to the venous, arterial or mixed leg ulcers.

Methodology

Carried out research in the EBSCO search engine: CINAHL Plus with Full Text, MEDLINE with Full Text, MedicLatina, Academic Search Complete, sought full text articles, published between 2008/01/01 and 2015/01/31, with the following keywords: [(MM "leg

ulcer") OR (wound care) OR (wound healing)] AND [(nursing) OR (nursing assessment) OR (nursing intervention)], filtered through initial question in PI[C]O format. As a starting point in the systematic review of the literature, the following question was formulated in PI[C]O [16] format: "In relation to persons with venous, arterial and mixed leg ulcers (Population), what are the nursing interventions (Intervention) that can influence healing (Outcomes)?" The EBSCO search engine was queried, with access to two databases: CINAHL Plus with Full Text, MEDLINE with Full Text, MedicLatina, Academic Search Complete, sought full text articles, published between 2008/01/01 and 2015/01/31, with the following keywords: [(MM "leg ulcer") OR (wound care) OR (wound healing)] AND [(nursing) OR (nursing assessment) OR (nursing intervention)].

Inclusion criteria gave priority to the problematic related articles, using quantitative and/or qualitative methods. With regard to the exclusion criteria, were excluded all articles or guidelines for clinical practice with no co-relation with the object of study, repeated in the databases.

The process for searching and selecting material for analysis is explained in Table 1.

	Protocol
	Identification:
	No. of cases identified: CINAHL -310 No. of cases identified: MEDLINE - 433 No. of cases identified: MedicLatina - 31 No. of cases identified: Academic Search Complete - 24
	Screening:
	No. of duplicated cases that were removed - 384 No. of cases selected - 414
	Inclusion Criteria (complete reading):
	No. of full text articles with inclusion criteria - 11 No. of full text articles without inclusion criteria - 403
	Articles Included (levels of evidence [16]): Level I - 2; Level II - 1; Level IV - 3; Level V - 4; Level VI - 1

Table 1: Process for searching and selection for the systematic review of the literature.

Results

In order to make the methodology used easy to understand and transparent, the list of 11 articles selected is explained (Table 2) for the body of analysis, which formed the basis for the preparation of the discussion and the corresponding conclusions, having been subjected to classification by levels of evidence.

Level of evidence/ Articles	Method	Participants	Interventions	Results
Level of Evidence - V [23]	Systematic Review of the Literature	Review of 3 guidelines (Medline and Cochrane)	Critical review of the guidelines in order to prepare a set of recommendations	Recommendations are prepared on how to assess leg ulcers, as well as how to treat the different aetiologies: venous, arterial and mixed.
Level of Evidence - V [8]	Systematic Review of the Literature	31 articles relating to people with venous and/or mixed leg ulcers.	The articles were analysed in order to be able to perceive failure to comply with the treatment.	Pain, discomfort and different lifestyles are some of the reasons why leg ulcer patients did not comply with the treatment. Healthcare professionals must focus on problems reported by the patients in order to be able to help them overcome these problems and to motivate them to take the treatment.
Level of Evidence - V [14]	Systematic Review of the Literature	Publications on social support and persons with leg ulcers.	Several studies are compared in order to establish a relationship between the effect of social support on the healing of venous leg ulcers as well as on recurrence.	Social support is important for persons with venous leg ulcers, as this support is necessary during as well as after the wound is healed, in order to prevent recurrence.
Level of Evidence - V [18]	RCT	All the people with leg ulcers in the region of Skaraborg (Sweden).	Identification of people with leg ulcers, their aetiology, prevalence and ongoing treatment.	It was observed that venous leg ulcers continue to be the most prevalent, followed by arterial leg ulcers. In general, there is a reduction in prevalence in relation to previous studies.

Level of Evidence - I [21]	Systematic Review of the Literature	325 database articles (Cinahl, Medline and Cochrane)	Critical review of the articles found in order to prepare a set of recommendations	Recommendations are prepared on how to assess and intervene among patients with arterial leg ulcers, on the following points: debridement, dressing selection, infection control, nutrition, pain control.
Level of Evidence - I [22]	Systematic Review of the Literature	180 database articles (Medline and Cochrane)	Critical review of the articles found in order to prepare a set of recommendations	Recommendations are prepared on how to assess, prevent and treat people with venous leg ulcers.
Level of Evidence - IV [6]	Retrospective study	Eight people with mixed leg ulcers treated by two specialist nurses	Identify the role of the specialist nurse in controlling ulceration	The ulcers heal in between 6-30 weeks after the first application of an inelastic bandage system. This intervention was well tolerated by all the patients, and no adverse effects were recorded
Level of Evidence - IV [12]	Prospective study	5 persons with leg ulcers, with assistance at home and over the telephone, for 12 weeks	Identify the strategies in the promotion of therapeutic compliance	Individualisation of information, training/instruction increases therapeutic adherence.
Level of Evidence - V [13]	Systematic review of the literature	5 articles resulting from searches on MEDLINE, British Nursing Index and Cumulative Index to Nursing and Allied Health Literature (CINAHL).	Control the level of exudate in leg ulcers	Appropriate control of the exudate minimises the impact on quality of life, damage to the wound bed, on the perilesional skin, reduces the risk of infection, days required for healing of the wound and health costs
Level of Evidence - VI [3]	Case Study	A person with a venous leg ulcer	Analyse the influence of self-care on leg ulcer healing	The capacity for self-care stimulated by the patient's empowerment, reduces the need for seeking health care
Level of Evidence - IV [24]	Case Study - control	11 persons with pressure ulcers and 20 with leg ulcers, in primary care	Verify the advantages of the use of absorbent dressings in controlling the exudate of venous ulcers	The control of exudate promotes healing of chronic wounds, control of pain and negative psychosocial effects associated with the smell and change of dressings.

Table 2: Body of analysis.

Discussion of the Data

The evaluation of the awareness, expectations, quality of social support, need for information, education, training and instruction on healthy lifestyles, wound care, physical exercise and elevation of lower limbs were important to control venous leg ulcers. The patient, that feel involved, with the use of easy language to promote understanding, increases the motivation, self-efficacy and capacity for self-care [12].

The creation of spaces (Leg Clubs) has proved to be a fundamental strategy in therapeutic compliance [10]. The nurses with specific training in the area of leg ulcers promote social interaction between patients with the same type of ulcer, evaluate the support required by each individual, provide training aimed at self-care and case management, provide the corresponding treatment and constant monitoring [4-9]. The result of the implementation of this project was the reduction in pain intensity, significant progress in healing and an increase in quality of life, specifically at the workplace, in moods, in mobility, sleep patterns and other aspects [10]. The positive effect of this model is also reflected at the social level [9], given that more extended social contact with people who have or had the same problem, reduces social isolation and provides effective coping mechanisms for dealing with the crisis situation - the illness [3,4,16].

On initial assessment, it is crucial to cover the history of health: associated co-morbidities, habitual therapy, psycho-emotional state, influence of odor on social life, nutritional state, presence and intensity of pain and individual treatment preference [12]. In evaluating the amount of exudate, it is recommended to document the saturation of the absorbent dressing and support/compression bandage, instead of rating it as minimum (+), moderate (++) and high (+++), in order to increase the record's objectivity [4]. If the perilesional skin is macerated, this indicates that the dressings must be applied more frequently, or that the selected material is not the most suited for controlling the exudate. In leg ulcers subjected to compression therapy [14], in venous a etiology, dressings that allow for evaporation of the exudate through their semi-permeable covering cease to be effective. In light of the above, the use of hydrofibre and alginates is recommended [13]. The application of negative pressure on the wound bed and the use of protective sprays/creams on the surrounding area are measures to be considered in the case of ulcers with hard-to-control exudate [13,14].

The application of compression bandages is considered an essential element in the treatment of venous leg ulcers. The effect of compression on mixed leg ulcers can be beneficial in reducing local edema, in improving microcirculation, contributing to improving arterial flow and improving venous as well as lymphatic drainage. Still, the application of compression on legs with mixed a etiology requires strong additional care, as it is generally contraindicated for the reduction of arterial flow, causing greater tissue damage, as shown in study [6], with the use of inelastic bandage. The number of layers to be applied is normally decided based on the malleolar circumference, based on the manufacturer's instructions (one layer is applied when the malleolar circumference is ≤25 centimeter's, and two layers when it is >25 cm). However, in mixed etiology, it is recommended to start the treatment with only one layer, for less elevated compression levels. The

interventions provided by specialist nurses when dealing with chronic wounds increase gains in health, due to their expertise in using tools for assessing compressive therapy: Doppler ultrasound and ankle-brachial index (ABI).

Concerning nursing interventions in the prevention and treatment of venous, arterial or mixed leg ulcers, it is fundamental to: know the patient's clinical history (personal background, chronic pathologies, current state of the client) and the history of the ulcer (etiology, time, treatments efficacy) [6,12,14-20]. On meticulously evaluating the characteristics of the wound (size, depth, exudate, wound bed, type of tissues, perilesional skin, pain) [4,18], the decision must be made in partnership with the client (Table 3), in order to establish common goals [15,18,21-23].

Venous ulcer	Arterial ulcer	Mixed ulcer
Apply compressive therapy if the Ankle-Brachial Index (ABI) is greater than 0.8; Select the type of compression to be used: multi-layer compression system below the knee (general treatment); reduced compression system (in case the patient does not tolerate higher compressions); compression stockings (after the ulcer's healing); intermittent compression system (can be used in isolation or together with another compression system, in order to increase venous return); Select the compressive therapy material to be used: elastic bandages (long-stretch), considered more effective; non-elastic bandages (short-stretch), which cause less discomfort/pain; multi-layer elastic bandage systems (2, 3 or 4 layers); elastic stockings; multi-layered elastic stockings; zinc-impregnated bandage (Unna Boot) together with elastic bandages; Apply compression stockings with customised measurement, if the ulcer has healed; Refer for vascular surgery in the following situations: no reduction in the size of the ulcer after 30 days of treatment; ulcer present for more than 6 months; intolerance to compressive therapy; ineffectiveness in pain control; frequent recurrence.	Assess the lower limbs, frequently, in relation to: functional capacity; colouring, temperature; capillary reperfusion; sensitivity; presence of dorsalis pedis, posterior tibial pulse; signs of neuropathy. Perform cleaning of the wound with non-cytotoxic products; Do not debride dry and stable necrotic tissue without proper assessment of the perfusion through vascular surgery, not applying any moisture retaining bandage material; Debride the necrotic tissue, based on a multi-professional decision, using autolytic and enzymatic debridement. Provide training in the following structural areas: control of associated pathologies; giving up smoking and drinking; encouraging the ingestion of food rich in vitamin B6 (increases HDL-C and reduces triglycerides), such as: potato, banana, chicken breast, sunflower seeds, salmon, tuna, avocado, and others; prevention of chemical, thermal or mechanical trauma on the lower limbs; skin care; use of suitable footwear and non-compressive stockings; Institute a regular physical exercise programme, for patients with intermittent claudication, based on 30 to 60-minute walks (three days a week at least), wherein the patient may stop and rest in case of pain; Refer to vascular surgery if: ABI is lower than 0.8; signs and symptoms of infection; continued pain at rest, even with the limb dropped; absence of both, pedis and posterior tibial pulses; If ABI is lower than 0.5, refer urgently for observation by vascular surgery.	Apply reduced compression (between 23-30 mmHg) in the presence of oedema; Refer for vascular surgery, if there is no healing development and ABI is lower than 0.5.

Table 3: Nursing interventions in venous, arterial and mixed leg ulcers.

Thus, the treatment must involve pain prevention [10], preparation of the wound bed [6-9], wound cleaning [14-16], management of products to be applied to the bed and perilesional skin [7], joint selection of the type of material for application of compressive treatment and preparation of a physical exercise plan [8,14-18], continuous client empowerment [23], and referral to specialties' in case of allergic reactions [13], need for supplementary therapies and/or non-effective treatments carried out in which the ulcer/state of the client deteriorates.

Conclusions and Implications for the Practice of Nursing

The presence of social support was the aspect most mentioned by the people as essential in their process of adaptation, whether provided by significant persons, or through contact with people in similar situations (self-help groups) or by the nurse. The education for health self-management was considered the most important in controlling co-morbidities, in the reduction of other existing risk factors and for creating physiological conditions that favored better healing. The monitoring of the ulcer's characteristics, physical activity, nutritional diet, promote healing and improved the perceived quality of life. Continuous and up-to-date training of nurses providing care to leg ulcer patients emerged as another aspect positively associated with the effectiveness and excellence of the interventions carried out. An approach centred on the patient and on pain control, mainly when the therapeutic plan involves compression on the wound bed, is key determinants in increasing participation and involvement in the therapeutic plan.

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