

The Elderly with Pressure Ulcer in Household: What has Dealing with Nutrients and Immunonutrients Shown?

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ABSTRACT

The objective of this study was to research the use of nutrients and immunonutrients in household nutritional therapy for elderly patients with pressure ulcer (PU). **Methods:** A literature review of scientific articles indexed in databases: Scielo, Pubmed/Medline, Lilacs/Bireme Latindex, Elsevier and DOAJ, in Portuguese, English and Spanish, with emphasis in the last 10 years. **Results:** Six types of hyperproteic dietary supplement were identified, enriched with special nutrients such as zinc, selenium, vitamin A, C, E, arginine and omega-3 fatty acid, used in PU patients. The enriched formulas may increase the immune cells proliferation, reduce oxidative stress, decrease inflammation and optimize healing. **Conclusion:** The home nutrition therapy and nutrients are essential tools to treat and prevent nutritional deficiencies and possible complications, and reintegrate the elderly into his/her family nucleus, favoring comfort and quality of life.

KEY WORDS

Home Care; Nutrition Therapy; Aged; Pressure Ulcer.

INTRODUCTION

The representation of the elderly in the world population is estimated at approximately 10% (705 millions). In 2050, according to demographic projections, the number of people aged 60 and older, will be almost two billions [1]. The aging fragility associated with morbid conditions such as changes in mobility, neurological and mental status, bowel functions and nutritional status are characteristics of a prone population to the formation, recurrence and complication for pressure ulcers (PU) [2].

The PUs are a worldwide problem and are described as localized lesions of the skin and/or underlying tissue, usually over a prominent bone, caused by pressure, friction or shearing, or even by combining these factors [3]. In addition to worsen the quality of life of hospitalized patients, PU increases the length of stay and cost of treatment [4]. In this context, home care emerges as a strategy able to offer greater possibility of comfort and proximity to family, to reduce readmissions, the risk of infection, the hospital stay for treatment and rehabilitation and the costs of care [5].

Simultaneously with the emergence of home care, wide and multidisciplinary care model, Home Nutrition Therapy (HNT) materialized as a genre of growing expansion to the present day. The HNT began to stand out in the 1980s and since then is a greater tendency to proceed with hospital care at home [6].

The aim of this study was to review the literature on the use of nutrients and immunonutrients used in household nutritional therapy for elderly patients with pressure ulcer.

MATERIALS AND METHODS

This study consists of a literature review on the topic, using indexed scientific articles in: Scielo, Pubmed/Medline, Lilacs/Bireme Latindex, Elsevier and DOAJ - Directory of Open Access Journals, in Portuguese, English and Spanish, with emphasis on the last 10 years, using the following descriptors: home care, nutritional therapy, elderly, pressure ulcer. The most relevant researches that met the following inclusion criteria were selected: articles on home care approach, elderly patients with pressure ulcer, as well as studies conducted in this population in home nutrition therapy, and containing at least

one of the selected descriptors. The survey was conducted during the months from September to December 2015.

Exclusion criteria were: articles in other languages and studies that did not specifically address theme.

43 publications were selected, two were from the Ministry of Health, 3 from the Brazilian Society of Parenteral and Enteral Nutrition, 2 publications in Congresses, 4 theses and 32 articles. Figure 1 shows the flowchart for selection of the articles searched in this review.

RESULTS AND DISCUSSION

Home Care

Home Care (HC) is a set of ambulatory activities, which includes the general mode of health care provided in household, and includes and represents the service, visit and home care [7]. HC aims: to promote the participation of the patient and his/her family in the proposed treatment; benefit the restoration of independence and/or preserve the autonomy of the patient; restore the patient in his/her household; through closer the health team to the family, providing humanized and comprehensive care; besides contributing to the optimization of hospital beds and outpatient care, in order to reduce costs [8].

In HC, the interventions are carried out by a multidisciplinary team. To know the reality in which the patient is inserted is primordial to the planning, organization, implementation and control of care needed, having as main goal the promotion, maintenance and restoration of health. The responsibility between health staff and patient should be mutual, stressing the patient's role in his/her health-disease process [9].

In 1947, the home care has emerged in the United States and, a decade later spread to Europe. In Cuba, through the primary health care team, these services started in 1986 [10]. In Brazil, in 1949, the first organized form of HC was created through the Medical Home Assistance of Urgency Service (SAMDU, in Portuguese). The Home Care Service of Hospital of Public Servers of the State of São Paulo, in 1963, was the first institution in the public sector where the HC worked as a planned activity. Following a worldwide trend, in the early 1990s, the organized service came in the form of home care, focused on private companies, in large urban centers [8].

Some municipal experiences started in the 1990s and 2000 stood out, advancing the design of Home Care as a modality that should be articulated in network, organized by Home Care Services (HCS). To expand and qualify the Home Care in the Unified Health System (UHS), it was created the "Best Program in Home - The Hospital Safety in the Comfort of your home-" initiative of the Brazilian Federal Government, which defines the HC under the Unified Health System (UHS) and enables health establishments covered with HC service [11].

In order to structure the fundamental aspects of this program, such as construction/agreeing on indicators for monitoring and adequacy of information systems, it was created the Monitoring and Evaluation Manual Best Program in Home in 2014 [12]. The Home Nutrition Therapy is one of the Home Care components.

Home Nutrition Therapy

Nutritional and clinical care to the patient in his/her home defines Home Nutrition Therapy (HNT), which aims to restore or maintain the highest level of convenience, functionality and health of the patient, associated with a reduction in health-care costs. The HNT when well indicated, has a satisfactory cost-benefit ratio, with proper planning and adequate monitoring by specialized staff. It can be established in oral, enteral or parenteral dietary and should be part of the clinical monitoring of medium and high complexity patients [13].

The home nutrition therapy, on the recommendation of the American Society of Parenteral and Enteral Nutrition (ASPEN), should be reserved for those patients who cannot meet the nutritional needs through oral ingestion and that do not require hospitalization, giving preference to enteral nutrition [8]. The Enteral Nutrition Therapy (ENT), since the 1950s, promoted great success in feeding approaches for patients who cannot feed themselves by the physiological via. In addition to providing stabilization or improvement of nutritional status, the Enteral Nutrition (EN) became special and increasingly sophisticated, taking important role in maintaining the quality of life and support the Human Right to Adequate Food (HRAF). To be safe and effective, the EN depends on the development of enteral access devices, mixtures of nutrients and enteral formulations [6].

The Home Enteral Nutrition Therapy (HENT) aims to improve and/or maintain nutritional status of the patient, as well as the humanization of care, the lowest risk of the patient getting infections, the reduction of post-operative stress, the best response to surgical treatment, the collaboration for greater availability of hospital beds and reduction in hospital costs [14].

There are not many publications on HENT in Brazil, however, the State Department of Health of the Federal District (SDH-FD) published in 2009 the Ordinance No. 94 which sets standards and criteria for the registration of patients using formulas for special purpose in home care system and dispensing of them. The indication of ENT and prescription of its access via is performed by the doctor; the dietary prescription and nutritional assessment by the nutritionist. In the system of attendance, patients are re-evaluated every 3 months. Patients receiving enteral nutrition for probes and orally, patients with cancer, epidermolysis bullosa, cystic fibrosis, inborn errors of metabolism, disabsortive syndromes, allergy to heterologous

proteins in pediatrics, severely malnourished patients with Chronic Kidney Disease, Acquired Immunodeficiency Syndrome (AIDS) and elderly are included in the program [8].

After the publication of Ordinance No. 94, SDH-FD, a research was conducted by Zaban & Novaes, with patients using this service between 2000 and 2005. The incidence (new cases/millions of inhabitant/year) and the prevalence (total of cases/millions of inhabitant) of HENT found in studies of the researchers were 147.98 and 175.64, respectively. The main diseases that led to home enteral nutrition were neurological (34.25%), gastrointestinal (26.5%) and neoplasms (13.75%). 45.9% of patients were children, 34.9% elderly and 19.2% adults. A cost of 2.65 times lower of HENT in relation to hospital ENT was evident [15].

Another study conducted by the same authors examined the demographic, epidemiological and nutritional profile of 141 elderly registered in HENT program, of SDH-FD. It was observed a larger number of female patients as compared with those of the male, with an average age of both groups of 75.82 years. The most prevalent diseases were the Stroke sequelae (42.6%) and neoplasms (22.7%). It was found a prevalence of malnutrition of 69.7%, regardless of gender and age [16].

There is a high prevalence of malnutrition in elderly patients in home [17, 18]. Malnutrition is one of the most important risk factors in the development of pressure ulcers [19].

Pressure ulcer in elderly

Pressure ulcers (PU) also known as decubitus ulcers or bedsores, are a major problem of public health worldwide. One of the most important risk factors in its development and its severity is malnutrition. Patients who are malnourished are more likely to develop it, so it has proven that the deficient nutritional status plays an important role in the genesis of PU and a clear relation to its severity [19].

The severe protein-calorie malnutrition modifies the inflammatory response, immune function and tissue regeneration, making the individual more vulnerable to the appearance of PU. The main nutritional indicators related to the development of PU are: body weight, anemia, reduced caloric intake due to lack of appetite and food restrictions imposed by the treatment. For the elderly, include the communication and cognitive impairment, aid dependency to eat, the use of drugs that interferes with appetite and increases the loss of nutrients and psychosocial factors such as isolation and depression [20]. In this context, the elderly is more susceptible to changes in nutritional status due to compatible changes with aging and presence of preponderant risk factors such as genetic predisposition, inflammatory and nutritional status, physical inactivity and comorbidities often associated [21].

The imbalance between the rates of protein synthesis and degradation may result in sarcopenia. Protein synthesis may be stimulated by various signals, such as functional overload, metabolic demand and hormones. Some of these are anabolic hormones such as growth hormone (GH), growth factor (IGF-I), testosterone and insulin, which increase muscle mass by stimulating protein synthesis and/or inhibiting protein catabolism. Circulating levels of these hormones are modified by aging process, potentially contributing to sarcopenia [22].

Multicentre study held in several hospitals in Brazil, from 2009 to 2011, shows a prevalence of 16.9% of PU and 52.4% of malnourished patients. Fifteen years earlier, IBANUTRI showed that malnutrition was present in 48% of hospitalized patients. Malnutrition still remains extremely prevalent [23].

The PUs are lesions resulting from ischemia caused by the extrinsic and prolonged compression of the skin, bones and surrounding tissues. The bony prominences are the most affected sites. Elderly and critically ill patients are the most affected [24].

The European Pressure Ulcer Advisory Panel (EPUAP) and the National Group for the Study and Advisory of Pressure Ulcer - Spain (NGSAPU) adopted the classification of PUs as to their stage of depth: Stage I - non-blanching erythema of intact skin, the precursor lesion of the skin; Stage II - partial thickness skin loss involving epidermis, dermis, or both (abrasion/flictena); Stage III - full thickness loss of skin and may include lesions or even necrosis of subcutaneous tissue, extending to the underlying fascia, but not through this; Stage IV - extensive destruction, tissue necrosis or muscle lesion and/or exposed bone or supporting structures [25].

The PU affects approximately 9% of all hospitalized patients, particularly the elderly, and 23% of bedridden patients in home care. Often, it results in deformities, pain and prolonged treatments, besides being a difficult problem to solve. Epidemiological evaluation studies of the PU occurrence are being developed in some Brazilian hospitals. One of them, conducted in public hospital shows that from 78 patients with PU, 68% developed lesion in the hospital. It is noted a marked occurrence of this lesion, associated with the mobility of factors and fragility of the elderly [1].

External and internal factors influence the development of pressure ulcer. Extrinsic factors are pressure, shearing and friction, which may be isolated or combined. Intrinsic factors include low arteriolar pressure, poor nutrition, reduced mobility and advanced age, among others. A study conducted in a public hospital in Fortaleza noted that the age of patients with PU was predominantly elderly. Advanced age contributes to reducing the texture, elasticity, frequency of cell replacement and healing process time [26].

Various tools are used to assess the risk of PU development. The scales of Braden and Waterlow, both validated in Brazil, are the most used in people [20]. By knowing and detecting the predominant risk factors in the PU appearance in elderly patients and the influence on sensory perception, mobility, moisture, activity and nutrition, it is possible to develop and systematize prophylactic actions by the multidisciplinary team [2].

The PU is not directly proportional to the development of a country. In Spain, in 2005, a prevalence of 8.91% was estimated in hospitals, 9.11% in centers of Primary Care and 13% in geriatrics. In Canada, the rates indicated 26% in health institutions and 25% in hospitals. The prevalence rates in Germany were 5.3% to 28.3% in hospitals; Iceland 8.9% and Italy 8.3%. In the United States the values reached 15% [27].

Some studies in Brazil show the prevalence of PU in patients under home care. Chayamiti & Caliri investigated patients in a Health District of Ribeirao Preto, SP and 70.2% had risk of PU and a prevalence of 19.1%. Most of the population studied was elderly, 76.6% [5]. In a study of 194 elderly patients in Fortaleza/Ceará, a prevalence of 31.4% and 13.2% of moderate risk for PU was identified [28]. From 313 elderly patients evaluated and enrolled in Home Care Regional Center of Ceilândia (NRAD-CEI) in the Federal District, 82 showed PUs occurrence records, representing 26.2% [29].

The pressure ulcer prevention is one of the biggest challenges in the care of the elderly in home, especially the bedridden. Thus, it is understood that, to provide comprehensive care and with quality, the difficulties related to the elderly patients, the own social condition and the link with the family as provider of conditions for the provision of care must be considered [30].

Impact of nutrition therapy in elderly patients with PU

It is known that tissue repair is affected by the nutritional status of the patient and there is an additional need for large amounts of calories, proteins, vitamins and minerals so that the physiological mechanisms are efficient. Several substances used in diets such as omega 3 fatty acid, arginine, zinc, selenium and vitamins A, C and E have been studied, as well as its relationship to immunity [31].

The nutritional therapy in patients with pressure ulcer has the primary objective to ensure the nutritional needs to maintain the nutritional status. The use of formula with a higher protein content and immunomodulating nutrients in the treatment of these patients is recommended by national policy that addresses the Nutrition Therapy for patients with PU [32].

The formulas enriched with immunomodulators may increase defense cell proliferation, reduce cellular oxidative stress and alleviate the acute inflammatory response and therefore pos-

sibly optimize the healing process of wounds [33]. Chart 1 shows some formulas used in the PU treatment available in the Brazilian market.

Nutrients and immunonutrients involved in the treatment of PU

The healing process consumes energy, using mainly the carbohydrate in the form of glucose. For the body does not use proteins in the healing process, the adequate supply of calories is important [33]. It is recommended from 30 to 35 kcal/kg/day of energy and from 1.2 to 1.5 g/kg/day of protein, and 1 ml/kcal of liquid intake [34]. Patients with several ulcers and/or very large, situations of high catabolism, and without other comorbid conditions, it can be evaluated the provision of protein from at least 1.5 g/kg/day. During tissue synthesis, the lipids are required. They should represent from 20 to 25% of caloric intake. Its importance in the healing process is due to be essential components of cell membranes, especially in situations of high tissue replacement as in healing an ulcer. The omega-3 series fatty acids are also important to present anti-inflammatory, immunomodulatory and vasodilator function in healing process [35].

The main immunonutrients used in enteral formulations for PU treatment are arginine and glutamine, amino acids carrying substrate function in biochemical pathways responsible for mediating the synthesis of collagen and the immune response. The arginine is a substrate for ornithine, nitric oxide and proline, which result in vasodilation, synthesis and deposition of collagen, and it is a conditionally essential amino acid required during active growth phase as in the healing process, diabetes and stress situations. The most abundant free amino acid in the body is glutamine. It is classified as a non-essential amino acid, its synthesis, in critical situations of metabolic stress, does not meet the demand required by the body. In healing, glutamine has been shown to be important because it is related to collagen synthesis and proliferation of inflammatory cells [33].

Despite the suggestion of a greater supply of some micronutrients, the need for vitamins and minerals is the one established by the Dietary Reference Intake (RDI). Vitamin A accelerates the healing, for stimulating collagen synthesis. It is required for the synthesis of proteoglycans and glycoproteins, helping to maintain a healthy epidermis. Vitamin C acts on the formation of collagen, on the function of neutrophils and macrophages in the inflammatory phase, acts as a reducing agent, protecting the copper and iron from oxidative damage, and participates in all stages of healing. Vitamin E maintains the integrity of the membranes by preventing oxidation of the phospholipids that compose them. Zinc, copper and selenium also seem to be beneficial in the healing process [3, 33]. Zinc is a cofactor for the formation of collagen, it has antioxidant

activity and is important in protein synthesis [36]. Copper participates in cross-linking reactions, in the synthesis of collagen and elastin and in the elimination of free radicals. Selenium is an important mineral in the protection, because it is necessary for the functioning of the glutathione system, responsible for the management of inflammation injury induced by oxidative stress [37-43].

Currently, the intervention work in patients with PUs, are made with nutritional supplements enriched with various nutrients (vitamin C, arginine, zinc). Randomized controlled trials have demonstrated an improvement in healing with the use of these enriched formulas. Evidence suggests that nutritional supplementation with this type of formula produces a reduced risk of developing PU in patients at risk, though, studies of secondary prevention, by its heterogeneity, do not provide accurate conclusions. However, considering the results of recent studies, it looks like that supplements enriched in zinc, vitamin C and arginine could accelerate the healing of PUs [35]. Chart 2 presents some studies of important nutrients for the treatment of PU.

CONCLUSION

Several studies point to the presence of certain nutrients that may positively interfere in the healing process of pressure ulcers. There are different types of supplements available and effective immunomodulatory agents and directed to clinical and nutritional applications.

The ideal moment to nutritional intervention is the period before the appearance of lesions, however it is known that often the nutritional therapy is not initiated early and supplementation is done at home with clinically stable condition, and thus it becomes an essential tool to reduce possible physiological and immunological risks, and reintegrate the elderly to his/her household and health care.

The therapeutic benefits of nutrition should be encouraged by professional teams throughout the treatment of pressure ulcers and, also preventively, as evidence shows the positive effects of specific nutrients for the reversal of lesions and hence, less morbidity and discomfort for the elderly patients.

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