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Nutritional profile of people with pressure Injuries in home care

Perfil nutricional de pessoas com lesão por pressão em atendimento domiciliar

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Abstract

Nutritional intake and nutritional status correlate with the development of pressure injuries (PI), as well as their healing. Based on such premises, the purpose of this study was to verify the nutritional profile of patients bedridden with PI. Twelve patients, who were cared for at home by the Family Health Program teams of São José do Rio Preto, from July to August 2012, were studied. The results showed that 6 patients had stage II PI, 5 patients were stage III, and 1 patient was stage IV. According to the Subjective Global Nutrition Assessment (SGNA) 50% were considered in nutritional risk and 50% with malnutrition. According to the anthropometric indicators 16.7% were eutrophic, 25% were in nutritional risk and 58.3% were malnourished. The patients ingested 1465.3 ± 459 (SD) calories / diameter and 54.1 + 26.9 (SD) g protein / day. In relation to the intake of nutritional supplement, only 16.66% used some type. The caloric-protein intake may predict the development of PI and make healing difficult. Patients who received most of the protein and energy supply, as well as specific nutrients, tended to develop less PI and have better healing. Malnutrition may be associated with the development of more severe PI, which suggests that a nutritional assessment and performance of interventions assist in the prevention and treatment of PI. It is concluded that malnutrition may be a risk factor associated with the development and severity of PI in the home environment. Therefore, nutritional monitoring of these patients is important in both the prevention and the treatment of PI.

Keywords: Pressure Injury. Wound Healing. Nutritional Status. Nutritional Assessment.

Resumo

A ingestão nutricional e o estado nutricional correlacionam-se com o desenvolvimento de lesões por pressão (LPP), bem como com a cicatrização destas. Com base em tais primícias, o objetivo deste estudo foi verificar o perfil nutricional de pacientes acamados com LPP. Foram estudados 12 pacientes acompanhados no domicílio por equipes de Saúde da Família de São José do Rio Preto entre julho e agosto de 2012. Os resultados mostraram que 06 pacientes apresentavam LPP estágio II, 05 pacientes, estágio III e, 01 paciente, estágio IV. Pela ANSG, 50% foram considerados em risco nutricional e os outros 50%, com desnutrição. Pelos indicadores antropométricos, 16,7% eram eutróficos, 25%, em risco nutricional e 58,3%, desnutridos. Os pacientes ingeriam 1465,3 ± 459 (DP) calorias/dia e 54,1 + 26,9 (DP) g de proteína/dia. Em relação à ingestão de suplemento nutricionais, apenas 16,66% utilizavam algum tipo. O aporte calórico-proteico pode predizer o desenvolvimento de LPP e dificultar a cicatrização. Pacientes que receberam maior aporte proteico e energético, assim como nutrientes específicos, tenderam a desenvolver menos LPP e a apresentar melhor cicatrização. A desnutrição pode estar associada ao desenvolvimento de LPP mais graves, o que sugere que a avaliação nutricional e a realização das intervenções necessárias servem para auxiliar na prevenção e no tratamento de LPP. Conclui-se que a desnutrição pode ser um fator de risco associado ao desenvolvimento e gravidade da LPP no ambiente domiciliar. Portanto, o acompanhamento nutricional destes pacientes é importante tanto na prevenção quanto no tratamento de LPPs.

Palavras-chave: Lesão Por Pressão. Cicatrização de Feridas. Estado Nutricional. Avaliação Nutricional.

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INTRODUCTION

Home care associated with home-based nutritional therapy aims to ensure adequate nutritional support and provide a better quality of life for sick individuals of any age in their homes through the monitoring of a health team, as well as to work on the prevention of comorbidities, such as the development of Pressure Injury (PI), and reduce treatment costs.[1]

Several risk factors, including malnutrition, are associated with the development of pressure injuries, that is, malnourished patients are more likely to develop them compared to normal weight patients. Both insufficient nutritional intake and poor nutritional status have been correlated with the risk of developing these lesions as well as prolonged healing time due to their negative impact on healing. [2, 3, 4]

The most important extrinsic factors in the development of PI are pressure, friction and shear forces. The intrinsic factors that put the individual at high risk for PI development are: age, sex, activity limitation, need for personal hygiene aid and / or urinary incontinence, anemia, infection, and deficiencies in nutritional status. Both food intake and nutritional status correlate with PI development as well as wound healing. [5, 6]

In the NPUAP guidelines for the prevention of pressure injury, the importance of nutritional assessment and nutritional therapy for the prevention of PI are cited in two of the four items. [4]

Following the occurrence of PI, conventional treatment measures are: use of medication, maintenance of skin integrity, control of excess pressure on bone prominences, repositioning and change of decubitus, and still provide adequate nutritional support, since deficiencies in the nutritional status can impair the elasticity of the skin and, in the long run, lead to the development of anemia and a reduction of oxygen in the cells. [7]

An assessment of the nutritional status of the client is essential for obtaining data related to the risk of diminished skin integrity. In addition, assessment and monitoring of nutritional status prevent severe protein-calorie malnutrition profiles that alter tissue regeneration, inflammatory reaction, and immune function. 8

Proteins are directly related to the immune system and are essential to body tissues. Thus, the presence of protein malnutrition due to nutritional deficiency causes skin and muscle lesions, in addition to hindering the repair process of damaged tissues. [9]

In patients with PI, the loss of lean mass is faster than its recovery due to the inflammatory phase. Therefore, individuals with weight loss and protein-calorie malnutrition who have chronic wounds will need an increase in caloric and protein intake, since the wound consumes energy to fight infection, produce collagen, and advance toward healing. [10]

The use of specific nutritional supplements for healing has the capacity to accelerate the healing process of pressure injuries in non-malnourished patients, and these effects are more distinct in the first weeks. [11] However, the supplementation of a single nutrient does not demonstrate a consistent benefit. However, recent literature provides some potential benefits of concomitant supplementation of arginine, zinc, and antioxidant vitamins. [12]

Among the nutrients cited with the ability to assist in the healing process, arginine appears to be a precursor of proline which, in turn, incorporates collagen. Vitamin C (ascorbic acid) assists in the absorption of iron, participates in the metabolism of several amino acids, is essential for the synthesis of collagen, and promotes the proliferation of fibroblasts. Vitamin E participates in the synthesis of coagulation factors, which is a prerequisite for wound healing. Zinc is a cofactor of many enzymes that promote protein synthesis, cell division, and collagen formation. [4, 9, 13]

It should also be emphasized the importance of adequate fluid intake which helps to hydrate the wound site, to assist in oxygen perfusion, and to act as a solvent for minerals, vitamins and amino acids. Unless medically contraindicated, fluid intake should be 30 ml/ kg; 01 ml/ kcal ingested or, at least, 1500 ml/ day. [9]

The importance of performing this study is justified by the influence of nutritional status on the healing of pressure ulcers in bedridden patients. Studies of this nature are essential for the practice of prevention and treatment of these injuries for all health professionals. This

descriptive study has the general objective of verifying the nutritional profile of bedridden patients with pressure ulcers.

METHODS

All 12 patients included in the Family Health Program of Health Districts III and IV of the Municipality of São José do Rio Preto were studied from July to August 2012. The patients were attended by the resident nutritionist of the Multiprofessional Residency Program (Multiprofessional Residency in Health in Primary Care with emphasis in the Family Health Strategy - FAMERP), in agreement with the Municipal Health Department of São José do Rio Preto.

The inclusion criteria were: patients older than 18 years; in home care residing in the area covered by Districts III and IV; accompanied by the Family Health Team; the presence of PI at any stage of evolution; consent of the patient or the family to participate in the work and signing the Informed Consent Form (ICF). Patients who did not meet all the inclusion criteria were excluded from the study.

All study participants underwent a complete nutritional assessment at the beginning of the study. They were also informed about the physical discomforts that anthropometric measurements might cause, which was described in the ICF. The evaluation was performed by the nutritionist, using a specific protocol.

The nutritional status of the patients was classified according to clinical and nutritional evaluation, anthropometric evaluation, and food history. The clinical and nutritional evaluation consisted of data collection of patient identification, health history, weight loss, PI classification and the measurement of its area (in mm). The location and stage of PI were diagnosed by a nurse in the Family Health Team responsible for the patient. The PI classification followed the NPUAP North American panel and the lesions were photographed for better analysis with prior patient consent, documented in the TCLE. [4, 14]

The anthropometric evaluation was made according to the physical conditions of the patient, being performed from either direct measurements or estimative calculations. In cases of direct measurement, portable instruments (digital scale, stadiometer, adipometer, and tape measure) were used. The variables analyzed were: age, weight, height, brachial circumference (BC), wrist circumference (WC), calf circumference (CC), abdominal circumference (AC), tricipital cutaneous pleura (TCP) and knee height (KH). [15]

In the non-bedridden patients, the following methodology was used in the anthropometric evaluation:

- Current weight: was measured on a portable digital scale, with a maximum capacity of 150 kg, with calibrated 100 g divisions, with the patient standing on the center of the scale base, with an empty bladder, barefoot, and with light clothing.

- Height: was measured using a portable stadiometer (Sanny®), with an extension of 210 cm, divided into 0.1 cm. The patient was positioned standing, barefoot, with his/her back to the graduated shaft, heels together, erect, and arms extended at their side.

- Skinfolds / folds: four skinfolds (triceps, bicipital, subscapular, and suprailiac) were measured using a Lange Skinfold Caliper adipometer (Cambridge Scientific Industries). These measurements were obtained by the arithmetic mean of three consecutive measurements at the same point. The percentage of total body fat for males and females was estimated from the sum of the four skinfolds measured, using the regression equations of Durnin and Womersley. [16]

- Brachial circumference (BC): was obtained as the arithmetic mean of 03 measurements taken, in cm, using the inextensible tape measure, at the midpoint between the acromion and the olecranon of the right arm, hanging parallel to the trunk.

The Body Mass Index (BMI) was calculated from the variables of weight and height, and for the interpretation of these data the classification of the World Health Organization (WHO, 1997) was used for adults.[17] For the elderly, the classification was according to Lipschitz (1994).[18]

On the other hand, based on the other

variables collected (BC and skinfolds), Arm Muscle Circumference (AMC) and Arm Muscle Area (AMA) were calculated. The results of TCP, BC, AMC, and AMA obtained were compared to the reference values of the Frisancho table (1981) and were classified according to Blackburn (1979). [19,20]

In cases in which it became impossible to gauge height, an estimate was made from the equations of Chumlea et al. (1985) cited by Cuppari. [15]

For the estimation of weight, according to Rabito et al. (2005), BC, AC, and CC were measured in centimeters.[21]

In order to evaluate the food intake of patients who were fed orally (OF), the 24-hour food recall method was used to calculate caloric and protein intake, using specific software for the calculation (Avanutri®). This same software was also used to calculate the caloric and protein value of enteral nutrition.

The estimate of nutritional requirements was calculated based on the Harris & Benedict equation (1919) and subsequent calculation of the daily energy expenditure.[15]

The calculation of protein requirements followed the criteria of Posthauer (2006), in which 1.2 to 1.5 g of protein / kg of body weight are recommended for patients with stages I, II, III or IV PI. [10] Next, the energy and protein requirements were compared with the values obtained in the calculation of food intake, collected through the application of the food recall. [9]

After the nutritional evaluation, the patients received specific and individualized nutritional guidelines according to their clinical and nutritional profile. Patients using nasogastric, nasoenteric or ostomy tubes (gastrostomy or jejunostomy) were instructed to administer a semi-artisanal enteral diet, with intermittent and gravitational infusion of 3/3 hours, 6 times a day. The volume and caloric density of the diet were adjusted according to the nutritional needs of the patient, aiming to reach 30 to 35 calories/kg of weight/day and at least 1.2 to 1.5g protein/kg of weight/day following The Nutrition Therapy Guidelines for Patients with Pressure Ulcers. [22]

All the patients studied were monitored monthly to evaluate the acceptance of the enteral formula and to monitor the nutritional status and the evolution of the PI's healing. The data obtained were charted in an Excel 2016® worksheet. In addition, for independent samples, a Student's t-Test was performed in order to compare the nutritional evaluation methods and the possible differences between need and food intake. All statistical tests were applied with significance level of 5% or ($P < 0.05$) and the software used was Minitab 17 (Minitab Inc.). The research was approved by the Research Ethics Committee of FAMERP with the CAAE number: 04088612.7.0000.5415.

RESULTS

Of the 12 patients evaluated, 06 were females and 06 males, with a mean age of 74 ± 14.1 (SD) years.

It was observed that 33.3% of the subjects had Alzheimer's Disease, 25% had Parkinson's Disease, 25% had Stroke Sequela, 8.3% had Hepatic Cirrhosis, 8.3% had Cancer, 8.3% had Chronic Obstructive Pulmonary Disease COPD, and 8.3% had Tetraplegia. It is noteworthy that some patients presented more than one clinical diagnosis.

All patients used at least one type of medication. The more frequently used medications were antihypertensive used by 33.3% of the patients, anticonvulsive by 33.3%, and antiulcerous by 25%.

According to SGNA, 75.0% of the patients reported weight loss in the last 6 months. In 33.3% of them, weight loss was greater than 10%, and 55.5% did not know how to quantify weight loss or previous weight. In relation to the gastrointestinal symptoms, 33.3% reported that they persisted for more than two weeks, of these, 50% reported intestinal constipation, 50% dysphagia, and 25% vomiting.

It was verified that 91.6% of the patients were bedridden and 8.3% wandered with help. And only 8.33% presented edema, which was located in the upper limbs. All patients had PI at one or more sites. Of these, 91.7% had stage II

PI and 41.7% had stage III PI, with a total of 21 lesions among all stages. The areas of the body most affected by PI were the sacral (33.3%), calcaneus (33.3%), and trochanteric regions (19.0%).

The locations and stages of PI's are shown in Table 1.

In the categorization of nutritional status according to the SGNA, it was verified that 50.0% were considered at nutritional risk, 41.7% with mild / moderate malnutrition, and 8.3% with severe malnutrition.

According to the BMI's of the 11 elderly patients studied, 25.0% were eutrophic and 75.0% were underweight. However, when considering all the anthropometric indicators, 16.7% were considered eutrophic, 25% with nutritional risk, 16.7% with light caloric-protein malnutrition, 16.7% with moderate caloric-protein malnutrition, and 25% with severe caloric-protein malnutrition.

Table 2 compares the results of the different nutritional assessment methods used in the study. No significant statistical difference was found for nutritional risk and malnutrition classified according to SGNA and anthropometric evaluation (p = 0.4003 and p = 1.0000, respectively).

Table 1 – Distribution of PI's according to location and their stage of evolution according to NPUAP. São José do Rio Preto / SP. 2012.

	Sacral		Calcaneus		Trochanteric		Other Locations	
	n	%	n	%	n	%	n	%
Stage 1	01	14.3	03	42.8	-	-	-	-
Stage 2	03	42.8	03	42.8	02	50.0	03	100
Stage 3	02	28.6	01	14.4	02	50.0	-	-
Stage 4	01	14.3	-	-	-	-	-	-
Total	**07**	100	07	100	04	100	03	100

Table 2 – Distribution of patients according to the classification of nutritional status considering the anthropometric indicators. São José do Rio Preto / SP. 2012.

Classification	SGNA	Anthropometric Evaluation	p
Well Nourished	0 (0%)	2 (16.7%)	-
Nutritional Risk	6 (50%)	3 (25%)	0.4003
Malnourished	6 (50%)	7 (58.3%)	1.0000

Table 3 presents the mean values of the anthropometric measures obtained in the nutritional evaluation of the general casuistry, and separated by gender. When comparing the anthropometric parameters of men and women, there is a statistically significant difference between men and women for the measurements of weight, CC, AMC, AMA, body fat (BF) and lean mass (LM). It is possible to observe that the men studied have body volumes of fat and lean mass in quantities greater than those of the women in question. Especially the value of lean mass in kilograms was statistically very significant with p = 0.0002.

Table 4 shows the mean values of caloric need and protein need, obtained through the use of the prediction equations proposed in the methodology of this study. In the same table, the average values of oral and enteral caloric and protein intake are also available; obtained through the analysis of food anamnesis using AVANUTRI® software.

In the statistical comparison by Student's t-Test between needs and caloric-protein supply, it was not possible to observe any statistical significance. Suggesting that the supply of calories and proteins was not far below the nutritional needs of subjects.

Regarding the use of nutritional supplements, 8.3% of the patients used protein modulus (powdered albumin) and 8.3% used multivitamin / polyminerals and ferrous sulfate.

Table 3 – Distribution of patients according to mean values and standard deviations (SD) for anthropometric variables. Sao Jose do Rio Preto. 2012.

Nutritional Parameters	Maximum Value	Minimum Value	General	Men	Women	p
Weight (kg)	63.8	30.2	47.7+11.9	55.7+6.9	39.8+10.2	0.0135*
BMI (kg/m2)	25.1	11.5	19.1+4.3	21.3+2.2	16.9+5.0	0.0952
BC (cm)	30.0	16.0	24.3 ± 4.4	26.5+1.6	22.2+5.3	0.1125
CC (cm)	29.0	20.0	25.3 + 3.4	28.0+1.1	22.5+2.6	0.0127*
AMA (cm)	24.0	13.2	20.6+3.6	23.1+0.6	18.2+3.7	0.0237*
AMC (cm)	36.5	7.3	28.0+11.0	35.1+5.0	20.8+10.8	0.0218*
TPC (mm)	25.0	6.0	11.8+5.0	10.8+3.6	12.7+6.4	0.5606
BF (%)	31.9	16.2	26.6+6.4	22.7+3.7	30.6+6.2	0.0274*
BF (kg)	17.2	8.2	12.7+4.5	12.8+3.3	12.6+5.8	0.9573
LM (%)	78.6	68.1	73.4+6.4	72.6+3.7	69.4+6.2	0.0275*
LM** (kg)	44.6	26	35.3+9.3	42.9+4.2	27.2+4.8	0.0002*

* Significant Value per T-test

Table 4 – Comparison between need and caloric-protein supply. São José do Rio Preto / SP. 2012.

	Caloric Need (kcal)	Average Caloric Supply (kcal)	p-Value
Total	1470.6 + 294.8	1465.3 + 459.0	0.9734
Body Weight	31.9+6.9	31.7+13.2	0.9620
	Protein Need (kcal)	**Average Protein Supply (kcal)**	**p-Value**
Total	63.3 + 15.9	59.1 + 20.8	0.5844
Body Weight	1.3+0.1	1.3+0.5	0.8593

DISCUSSION

The fact that most of the patients studied are elderly can be explained by the nature of the research, since situations of limited mobility, are usually due to chronic conditions and diseases, which are more frequent in this age group. [3]

Some risk factors associated with the development of PI are: use of some types of medication, reduced level of consciousness

and sensory perception, previous history of injuries, depleted nutritional status, immobility, and impaired immune system. [3] In the present study, 11 patients (92%) used at least one medication, and the most frequent ones were: antihypertensive - 04 patients (33.3%), anticonvulsant - 04 (33.3%), antiulcerous - 03 (25%) and anticholinesteric - 02 patients (16.6%). This characteristic of the individuals may have increased the chances of developing PI`s.

A cross-sectional study compared the presence of malnutrition, weight loss, BMI and nutritional intake with the risk of PI, and it was found that malnourished patients and/or those who presented weight loss greater than 5% in the last month or greater than 10% in the last six months, and/or with a BMI below normal, and/or with insufficient nutritional intake, were more predisposed to the potential risk of developing PI. Of the factors analyzed, similarities were observed in the present study, because the majority of the study population had below normal weight and BMI. The caloric-protein intake was not statistically significant when compared to the needs. [2]

Some patients did not reach their nutritional needs, however, there was no statistical significance between their need and their nutritional intake. The adequate caloric-protein intake is important, since a situation of low ingestion can predict the development of PI and the difficulty in healing already established lesions. [2]

It should be noted that some causes of this decrease, such as persistent lack of appetite and dietary restrictions imposed by treatment, can aggravate the situation and should be diagnosed and resolved, or treated, as soon as possible. For the elderly, the dependence on help for eating, cognitive and communication impairment, use of medications that interfere with appetite, and increase loss of nutrients, and psychosocial factors, such as isolation and depression, are included. [17] Patients who received higher protein and energy intake, as well as specific nutrients, tended to develop less PI's and to present better healing. [2, 8]

Among the nutritional factors that interfere in the risk for the development of PI's are: inadequate dietary intake, poor habitual protein intake, low body mass index, weight loss, low values of skinfolds, and low serum albumin levels. [6] Insufficient dietary intake and weight loss may even influence the functional capacity of individuals. [2]

Nutritional deficiencies can be disastrous in patients with wounds, since they can impair the healing process and interfere with the body's ability to fight infection. [9]

The use of nutritional supplements improves the nutritional status of the patients and has been associated with a lower incidence of PI development. In addition, patients receiving specific supplements enriched with protein and containing high amounts of arginine, zinc and antioxidants, showed an improvement in healing. However, the study showed beneficial effects only for patients who are not malnourished and/or underweight. [11]

The use of nutritional supplements may be considered beneficial for elderly patients with a recent PI history residing in long-term care homes; this was the casuistry of the work. The study also proved that the use of nutritional supplements would not reduce the cure time, but the overall costs of PI care. [12]

In a case-control study of 746 patients in which more than half of patients with PI were malnourished, the impact of nutritional status on the development and severity of PI's at home was investigated. It was observed that even with sufficient pressure redistribution to avoid PI's, there was a high rate of development of this complication. Malnutrition was more strongly associated with the development of full-thickness PI, which suggests that nutritional management is important to prevent serious injuries in the home environment. [23]

Malnutrition causes reduction of connective tissue that protects the skin from external pressure damage, resulting in weakened tissue tolerance and probably leading to more severe PI's. Once a severe PI develops in a malnourished patient, the healing is slower. [23]

Adequate dietary intake and food intake assessment were significantly preventive factors for PI development. Protein intake was related to the development of PI's in the context of long-term care. Therefore, dietary intake will be the key factor in the context of home care as well. [23, 24]

Thus, we observed that the nutritional assessment and the implementation of the necessary interventions serve to detect and assist in the treatment of PI's in the home environment. The performance of the nutritionist is not limited only to the aspects related to the food supply, but also to the nutritional and dietary monitoring of the patients. Adequate follow-up of individuals restricted to the home is extremely important for improving nutritional status, ensuring greater autonomy for the sick individual, as well as preventing the occurrence of readmissions and, consequently, public spending on these patients. [1, 23]

CONCLUSIONS

Although we present a small population, all the patients included, within the study period, in the Family Health Program of São José do Rio Preto – of Health Districts III and IV, were evaluated. And our results agree with the literature findings that poor nutritional status is considered a risk factor associated with the development and severity of LPP in the home environment. Nutritional monitoring, which involves evaluation, diagnosis and early intervention for bedridden patients at home, is important both in the prevention of new lesions and in the treatment of those that have already developed. In this way, the performance of other studies with a larger sample is necessary to obtain better evidences of this subject.

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