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Clinical, epidemiological, nutritional and mental health characteristics of patients with chronic wounds

Características clínicas, epidemiológicas, nutricionais e de saúde mental de pacientes com feridas crônicas

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ABSTRACT

Objective

Identify the sociodemographic, clinical, nutritional and mental health profile of patients with chronic wounds treated at a specialized outpatient clinic in a border region.

Methods

Cross-sectional descriptive design epidemiological study with quantitative approach Data collection was carried out between June and October 2023. Variables associated with the clinical characteristics of wound healing, were assessed using the Pressure Ulcer Scale for Healing Tool; also, variables associated with sociodemographic, clinical, lifestyle, anthropometric and food intake data were used; and, in order to assess the emotional state, the Depression, Anxiety and Stress – the Short Form scale was used. The data were tabulated and reviewed using descriptive and inferential statistics. And the association between variables was assessed using statistical tests, considering the significance level $\alpha < 0.05$.

Results

There was a significant prevalence of chronic wounds among a predominantly elderly, female population with a low educational level. The majority of participants faced different health challenges, including chronic conditions, as well as difficulties with adequate nutritional management and regular physical activity. Psychological aspects were also highlighted, with a significant portion of the sample components showing symptoms of stress, anxiety and depression. Statistical analysis revealed important associations between the above symptoms and variables such as marital status, ambulation, alcoholic beverages intake and use of nutritional supplements, highlighting the complexity of the interactions between clinical conditions, lifestyle and mental health of individuals with chronic wounds.

Conclusion

It is concluded that continued clinical monitoring and research is essential to improve the quality of life and health outcomes of this population.

Keywords: Anthropometry. Epidemiology. Mental health. Public health. Wounds. Wound healing.

RESUMO

Objetivo

Identificar o perfil sociodemográfico, clínico, nutricional e de saúde mental dos pacientes com feridas crônicas de um ambulatório especializado em região de fronteira.

Métodos

Estudo epidemiológico de delineamento transversal e descritivo e com abordagem quantitativa. A coleta de dados foi realizada entre junho e outubro de 2023. Utilizaram-se variáveis referentes às características clínicas pertinentes à cicatrização das feridas, avaliadas por meio do instrumento Pressure Ulcer Scale for Healing; variáveis referentes aos dados sociodemográficos, clínicos, de estilo de vida, antropométricos e de ingestão alimentar; e para a avaliação do estado emocional, utilizou-se a escala Depression, Anxiety and Stress – Short Form. Os dados foram tabulados e analisados por meio de estatística descritiva e inferencial. E a associação entre variáveis foi por meio de testes estatísticos, considerando o nível de significância $\alpha < 0,05$.

Resultados

Verificou-se uma prevalência significativa de feridas crônicas entre uma população predominantemente idosa, feminina e com baixo nível educacional. A maioria dos participantes enfrenta diversos desafios de saúde, incluindo condições crônicas, além de dificuldades na gestão nutricional adequada e na prática regular de atividade física. Aspectos psicológicos também foram destacados, com uma parcela expressiva da amostra apresentando sintomas de estresse, ansiedade e depressão. A análise estatística revelou associações importantes entre esses sintomas e variáveis como estado civil, deambulação, bebidas alcoólicas e uso de suplementos nutricionais, destacando a complexidade das interações entre condições clínicas, estilo de vida e saúde mental dos indivíduos com feridas crônicas.

Conclusão

Conclui-se que a continuidade do acompanhamento clínico e da pesquisa é essencial para melhorar a qualidade de vida e os resultados de saúde dessa população.

Palavras-chave: Antropometria. Epidemiologia. Saúde mental. Saúde pública. Feridas. Cicatrização de feridas.

INTRODUCTION

Chronic wounds are ruptures in the surface of the skin involving one or more skin layers, which remain in the inflammatory phase for a longer period of time, delaying the proliferative phase, requiring more time for tissue healing such as more than four to six weeks [1,2]. The best known chronic wounds are pressure injuries, vascular ulcers and diabetic ulcers [2,3].

Any factor that causes interruption or alteration of the healing process can lead to extended time healing [1]. There are two types of factors, extrinsic and intrinsic, that directly interfere in the healing process, systemic factors (age, nutrition, chronic diseases, alcoholic beverages intake and smoking), which are those that affect the body, as well as local factors (mobility, necrotic tissue, foreign bodies, infection and tissue hypoxia) that affect the actual lesion [4,5].

With the transition in the epidemiological profile in Brazil, chronic diseases have emerged with high prevalence rates, such as Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM) and obesity. Consequently, complications arising from these diseases such as chronic wounds have appeared [6]. In Brazil and worldwide, they represent a public health problem, due to the vast number of patients with changes in skin integrity. In fact, the chronicity process causes economic impacts, such as high public spending and increased demand for treatment specialized service [7,8].

Due to the complexity of chronic wounds, care becomes a dynamic process that requires special care, as wounds evolve quickly, resist different treatments and arise as a result of predisposing conditions that hinder normal healing [9]. Thus, in addition to the basic procedures in the care

process, which include cleaning, dressing, debridement and drug therapy, nutritional therapy has become more prominent in this process [4,9]; in fact, nutrition is crucial for wound healing, given that a deficient nutritional intake, as well as an inadequate nutritional conditions, can result in the healing development or delay [10,11].

Furthermore, individuals with chronic wounds face a significant psychological impact; they require continuous medical care, have decreased functional capacity, depend on the support of family and friends for their basic needs and experience different clinical manifestations [12]; these are situations that negatively influence social relationships and self-esteem; whether or not these factors are combined, they can lead to mental disorders, bearing a direct effect on the healing process [6,12,13].

Therefore, with regard to the complexity of chronic wounds, we emphasize the relevance of investigating this topic as a way of optimizing preventive measures and adequate treatments, in addition to providing data to support assistance, resource management and research that supports and substantiates this topic. Considering that this investigation aimed to identify the clinical-epidemiological, nutritional and mental health profile of patients with chronic wounds these patients were followed up at a specialized outpatient clinic in a border region.

METHODS

Epidemiological, observational, cross-sectional and descriptive design study, with a quantitative approach; the investigation was approved by the Research Ethics Committee of the State University of Western Paraná, under Decision number 6,031,899, considering Resolution No. 466/2021 of the National Health Council. The study was carried out between July and October 2023 and involved 84 individuals, aged between 26 and 84 years, who attended the specialized chronic wound clinic of the Unified Health System, in the city of Foz do Iguaçu (PR).

Forms regarding sociodemographic, health, anthropometric characteristics and eating habits were administered to all the surveyed participants using the face-to-face interview method. As to the anthropometric data, weight, height and abdominal circumference were measured in patients who were able to walk, using a digital scale, a portable stadiometer and an inelastic measuring tape, respectively. Abdominal circumference was measured by positioning the measuring tape at set anatomical points recommended in the literature, midway between the iliac crest and the lower costal margin, with the patient standing. And for patients who were unable to walk, knee height, knee circumference and arm circumference were measured using an inelastic tape and, consequently, weight and height were estimated according to the formulas of Chumlea et al. [14], as well as abdominal circumference. The classification of nutritional status was performed by calculating the Body Mass Index (BMI) and the cut-off points adopted were those recommended by the World Health Organization [15], that is, low weight (BMI <18.5 kg/m²); eutrophy (BMI 18.5-24.99 kg/m²); overweight (BMI 25-29.99 kg/m²) and obesity (BMI >30.00 kg/m²) for adults aged 18 to 59 years and, according to Lipschitz [16], for those aged 60 years or older, being underweight (BMI <22 kg/m²); eutrophy (BMI 22-27 kg/m²) and overweight (>27 kg/m²). For the classification of cardiovascular risk, the WHO establishes as a cut-off point for "increased cardiovascular risk" and "substantially increased" an abdominal circumference measurement equal to or greater than 94 and 102 cm in men and 80 and 88 cm in women, respectively [17].

To assess the total caloric and nutrient intake of participants, the *Recordatório Alimentar Habitual* (RAH, Habitual Dietary Recall) [18] food survey was used, in which participants reported

what they usually consume, considering the type of foods and their quantity per meal. With the data obtained, the calculation of total calories and nutrients ingested was performed using the Dietobox Software. Based on the nutritional recommendations for patients with chronic wounds, the adequacy of total caloric and protein intake was individually verified [19]. It should be noted that caloric and protein recommendations are based on the classification of the patient's nutritional status and weight (kg), respectively. The adequate intake of essential micronutrients in the healing process, namely vitamin A, vitamin C, vitamin E, iron, zinc and selenium, were assessed according to the recommendations of the Dietary Reference Intakes (DRIs) [20], which takes into account age group and gender. Thus, after individually calculating the nutrients ingested daily, those amounts were verified for their adequacy.

The variables related to the clinical characteristics associated to wound healing were assessed using the Pressure Ulcer Scale for Healing (PUSH). This instrument was developed and validated in 1996 by the PUSH Task Force of the NPUAP, a group specialized in pressure injuries, to be used to assess the healing process [21]. In 2005, it received a cross-cultural adaptation into Portuguese [22]. PUSH is divided into three parameters, namely: (a) wound area: related to the greatest length versus the greatest width (cm²). After multiplying the two measurements to obtain the wound area, values ranging from 0 to >24 cm² and scores ranging from 0 to 10 are found, depending on the area obtained; (b) amount of exudate: classified with scores of 0 (absent), 1 (small), 2 (moderate) and 3 (large); and; (c) appearance of the wound bed: defined as the type of tissue prevalent in this region, specified with scores 0 (closed wound), 1 (epithelial tissue), 2 (granulation tissue), 3 (slough) and 4 (necrotic tissue) [22,23]. The total score is obtained by adding the subscales, from 0 (healed wound) to 17 (severe condition). The initial use of PUSH addressed pressure injuries, but studies have expanded this scope to other categories of chronic wounds [23].

To assess mental health, the Depression, Anxiety and Stress – Short Form (DASS-21) scale developed in 1995 [24] was used; this scale has been translated and validated for Brazil in 2014 [25]. The scale is made up of 21 questions, which refer to how the participant felt in the previous week, grouped into 3 subscales with 7 questions for depression, anxiety and stress. Responses are based on a 4-point Likert type scale: 0 – did not apply at all; 1 – applied to some degree or for a short time; 2 – applied to a considerable degree or for a good part of the time; 3 – applied a lot or most of the time. Scores for each subscale are determined by adding the scores of the items in the same subscale and multiplying them by 2.

The data were tabulated in the Microsoft Excel program, version 2016 and reviewed through descriptive statistics, using the Minitab® statistical program version 19.2020.1, considering the significance level $\alpha < 0.05$. Descriptive statistics were used to characterize the population, through frequency distribution, obtaining absolute numbers, rates, averages, medians and standard deviations. The sociodemographic, clinical, anthropometric, dietary and lifestyle characteristics of the participants were quantitative. Data normality was verified using the Kolmogorov-Smirnov normality test (p -value < 0.010). The reliability and consistency of the subscales used in relation to the data obtained from the sample were verified through Cronbach's alpha coefficient. According to the literature, Cronbach's alpha measures the precision of the research instrument used [26]. Furthermore, the consistency qualification according to Cronbach's alpha can be considered weak ($\alpha < 0.6$), moderate ($0.6 \leq \alpha < 0.7$), good ($0.7 \leq \alpha < 0.8$), very good ($0.8 \leq \alpha < 0.9$) or excellent ($\alpha \geq 0.9$) [27]. And alpha values above 0.7 are considered satisfactory reliability [28]. Finally, the binary logistic regression test was performed and used to model the relationship between a dependent variable and one or more dichotomous independent variables; we highlight that the dependent variables of

this study are depression, anxiety and stress subscales (from the DASS-21 school), as well as healing (from the PUSH scale), considering the significance level $\alpha < 0.05$.

RESULTS

In this survey 84 individuals affected by chronic wounds participated. Regarding the classification of chronic wounds, venous (51.2%) wounds were the most frequent, followed by diabetic wounds (25.0%), other wounds (21.4%) (burn injuries, trauma and osteomyelitis), pressure injury (2.4%) and arterial wounds (1.2%).

Table 1 indicates that in this study there was a predominance of female participants (55.9%), patients over 60 years of age; in other words older adults had greater participation (53.6%). It is worth noting that the average participants' age was 60.85 years, which is the age group that characterizes older adults. Regarding marital status and education, it was found that there was a predominance of married individuals or in common law marriage (44.1%); as to education there were individuals who were in the range of illiterate to completed elementary education (78.6%). Furthermore, when adding the frequency of single, divorced and widowed individuals, we find 55.9% (n=47) of the participants, that is, the majority. Regarding family income, the majority responded that they received equal to or greater than 1 minimum wage (91.7%) and regarding professional activity, the majority responded that they do not work or are retired (71.4%) (Table 1).

Table 1 – Frequency distribution of users followed up at a chronic wound clinic, according to socioeconomic and demographic variables, dichotomized (n=84). Foz do Iguacu/PR, 2023.

Variable	Total	
	n	%
Gender		
Female	47	55.9
Male	37	44.1
Age group		
18-59 years	39	46.4
>60 years	45	53.6
Marital status		
Single/Divorced/Widowed	47	55.9
Married/Common law marriage	37	44.1
Education		
Illiterate to elementary	66	78.6
Medium to higher education	18	21.4
Family income		
<1 minimum wage	7	8.3
≥1 minimum wage	77	91.7
Works professionally		
No	60	71.4
Yes	24	28.6
Grand total	84	100.0

Furthermore, in the dichotomized variables, individuals who do not practice physical activity still predominated (78.5%); who do not engage in leisure activities (60.7%); who do not drink alcohol (85.7%); who do not use tobacco (89.3%); those who cannot walk and those who walk using support or those who have difficulty walking (64.3%); individuals with only one wound (83.3%); individuals with

one wound for a period longer than 6 months and who have been followed up at the wound clinic for more than 6 months (63.1%); patients with presence of chronic disease (70.4%); with inadequate BMI classification, both adults (79.5%) and older adults (75.5%), with the majority having a high BMI; patients with presence of cardiovascular risk according to the abdominal circumference classification (88.1%); with inadequate consumption of total calories (83.3%), proteins (82.1%), zinc (53.6%), vitamin A (90.5%), vitamin C (92.9%) and vitamin E (94.1%); those with adequate consumption of only iron (70.2%) and selenium (91.7%) and patients with poor chronic wound healing (61.9%). Regarding the use of nutritional supplements, the majority reported not using any (79.7%) (Table 2).

Table 2 – Frequency distribution of users followed up at the chronic wounds outpatient clinic, according to health, lifestyle and nutritional variables, dichotomized (n=84). Foz do Iguaçu/PR, 2023.

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Variable	Total	
	n	%
Physical activity		
No	66	78.5
Yes	18	21.5
Leisure activity		
No	51	60.7
Yes	33	39.3
Alcoholic beverages consumption		
No	72	85.7
Yes	12	14.3
Currently smoking		
No	75	89.3
Yes	9	10.7
Wanders		
No/Support/Difficulty	54	64.3
Alone	30	35.7
Number of wounds		
1 wound	70	83.3
>wound	14	16.7
Chronic wound time		
<or equal to 6 months	31	36.9
> 6 months	53	63.1
Follow-up in outpatient clinic		
<or equal to 6 months	31	36.9
> 6 months	53	63.1
Chronic disease		
No	24	28.6
Yes	60	71.4
BMI classification for adults		
Adequate	8	20.5
Inadequate	31	79.5
BMI classification for older adults		
Adequate	10	22.2
Inadequate	35	77.8
Abdominal circumference classification		
No risk	10	11.9
With risk	74	88.1
Total calories		
Adequate	14	16.7
Inadequate	70	83.3

Table 2 – Frequency distribution of users followed up at the chronic wounds outpatient clinic, according to health, lifestyle and nutritional variables, dichotomized (n=84). Foz do Iguacu/PR, 2023.

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Variable	Total	
	n	%
Proteins		
Adequate	15	17.9
Inadequate	69	82.1
Iron		
Adequate	59	70.2
Inadequate	25	29.8
Zinc		
Adequate	39	46.4
Inadequate	45	53.6
Selenium		
Adequate	77	91.7
Inadequate	7	8.3
Vitamin A		
Adequate	8	9.5
Inadequate	76	90.5
Vitamin C		
Adequate	6	7.1
Inadequate	78	92.9
Vitamin E		
Adequate	5	5.9
Inadequate	79	94.1
Nutritional supplement		
No	67	79.1
Yes	17	20.3
Grand total	84	100.0

It is important to highlight that those considered possible predictors of the outcome conditions investigated, i.e. the dependent variables (depression, anxiety, stress and healing), were selected among the independent variables. Therefore, for the binary logistic regression analysis, a total of 27 dichotomized independent variables were selected and assessed to help in the data analysis; they are reported in Tables 1 and 2. The skin color/race variable could not be dichotomized, but considered important, especially in epidemiological studies; it is worth noting that 58.3% (n=49) of the population is white.

Regarding the assessment of the chronic wounds healing using the PUSH scale, most study's participants (61.9%) presented wounds with unsatisfactory healing, that is, the majority of the scores were high (Table 3). Actually the average score for chronic wounds with unsatisfactory healing was 12.9, while the cut-off score defined by the authors for wounds with unsatisfactory healing was set at 9.

Table 4 shows the result of the statistical analysis of the data collected in the form of mean, standard deviation, median, maximum value and minimum value for the scale and subscales used in the present study. To analyze the reliability and internal consistency of the subscales applied to the participants, namely depression, anxiety and stress (DASS-21), Cronbach's alpha coefficient was calculated. The three subscales used in the investigation yielded a Cronbach's alpha coefficient value equal to or greater than 0.80.

The frequency of scores for the DASS-21 subscales was classified as normal or symptomatic, with the sum of frequencies in scores from mild to extremely severe being considered symptomatic. It can be seen that most of the patients surveyed did not present symptoms of stress (72.6%), anxiety

Table 3 – Wound healing of users followed up at a chronic wound clinic (n=84), according to the PUSH scale. Foz do Iguaçu/PR, 2023.

Scale (Min-Max score)	Statistic					
	n (%)	M	SD	Me	Min	Max
PUSH (0-17)						
Unsatisfactory healing	52 (61.9)	12.9	1.99	13	9	17
Satisfactory healing	32 (38.1)	5.6	1.89	5.5	2	8

Note: M: Mean; SD: Standard Deviation; Me: Median; Min: Minimum score; Max: Maximum score.

Table 4 – Cronbach's alpha and descriptive statistics in the DASS-21 subscales of users followed up at the chronic wound outpatient clinic (n=84). Foz do Iguaçu/PR, 2023.

Scale (Min-Max; cut score)	Statistic					
	α	M	SD	Me	Min	Max
DASS-21(0-42)						
Stress (>14)	0.82	11.0	10,0	9	0	42
Anxiety (>7)	0.80	7.9	9,1	4	0	38
Depression (>9)	0.89	8.5	10,8	4	0	42
PUSH (0-17)	-	10.5	3,9	11.5	2	17

Note: α, Cronbach's alpha; M: Mean; SD: Standard Deviation; Me: Median; Min: Minimum score; Max: Maximum score.

(64.3) and depression (64.3); however this does not exclude the fact that there was a small number of patients who presented mild, moderate, severe and extremely severe symptoms of these mental health conditions. Actually 27.4% (n=23), 35.7% (n=30) and 35.7% (n=30) presented, symptoms of stress, anxiety and depression respectively (Table 5).

Table 6 presents the binary logistic regression analysis, in which the dependent variable anxiety was statistically significant, i.e., $p < 0.05$, in relation to the dichotomized independent variables gender, marital status, ambulation, supplementation and protein consumption. In this connection, the Odd Ratio (OR) – probability ratio, of the independent variables women (OR=4.11); single, widowed and divorced (OR=3.19); those could not walk and those who walked with support and difficulty (OR=3.20); patients who used nutritional supplements (OR=3.36) and those with adequate protein intake (OR=4.02); patients with symptoms of depression (OR=32.0) and stress (OR=14.7) had a higher odds ratio of experiencing anxiety symptoms. The dependent variable depression presented a statically significant result only for the dichotomized independent variables walking and stress, that is, patients who did not walk and those who walked with support or difficulty and experiencing symptoms of stress, presented 3.2 times and 7.67 times more chance of developing symptoms of depression respectively. And finally, regarding the dependent variable healing, it presented a significant result only for the dichotomized independent variable supplementation, suggesting that patients who take some type of nutritional supplementation were 4.11 times more likely to experience unsatisfactory chronic wound healing.

Table 5 – Frequency distribution of users monitored in the chronic wounds outpatient clinic (n=84). Foz do Iguaçu/PR, 2023.

DASS-21	Frequency Distribution											
	Normal		Mild		Moderate		Severe		Extremely Severe		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Stress	61	72.6	7	8.3	8	9.5	4	4.8	4	4.8	84	100.0
Anxiety	54	64.3	5	5.9	8	9.5	4	4.8	13	15.5	84	100.0
Depression	54	64.3	10	12.0	7	8.3	5	5.9	8	9.5	84	100.0

Note: DASS-21: Depression, Anxiety and Stress.

Table 6 – Binary logistic regression of anxiety, depression and healing variables against independent variables (n=84). Foz do Iguaçu/PR, 2023.

Variable	Binary logistic regression		
	OR	IC	p*
Anxiety			
Gender ¹	4.11	1.413	0.006
Marital status ²	3.19	1.160	0.019
Wandering ³	3.20	1.163	0.029
Supplementation ³	3.36	1.211	0.031
Protein ⁴	4.02	1.393	0.024
Depression			
Wandering ³	3.20	1.163	0.029
Unsatisfactory Healing			
Supplementation ³	4.11	1.559	<0.049

Note: *p<0.05. Odd Ratio (OR): ¹male; ²married/common law marriage; ³yes; ⁴adequate. CI: Confidence Interval.

DISCUSSION

According to the survey, the sample of our investigation was predominantly composed of women, older adults, married, white complexion, Brazilian, with low education and low income. Most of the participants were retired. Studies with similar subjects are still scarce; however, studies with similar demographic findings were found. Thus, in a study that aimed to assess the prevalence of pressure injuries, diabetic and vasculogenic ulcers and associated factors in 339 older adults assisted in primary care, in the city of Teresina (PI), there was a higher rate of older adults in the age group between 60 and 70 years (55.8%), predominantly female (67.3%), with a partner (54%), without education (44.0%); the majority (72.3%) was retired and had a family income of 1 to 3 minimum wages (85%) [29]. Another paper reviewed the demographic, clinical and therapeutic profiles of patients treated at a Comprehensive Wound Treatment Unit, located in Vitória da Conquista (BA) and, among the 176 patients treated, 89 (50.6%) were female and had a mean age of 71.4 years [30]. Both studies cited above confirm the same demographic characteristics, thus enhancing the results of our investigation. A study carried out in Tanzania, which aimed to determine the clinical profiles of diabetic patients with foot ulcers who underwent major limb amputations, indicated that out of the 60 patients selected, 58.33% were male with 60.06 years average age [31].

It is important to highlight that older age is related to a greater susceptibility to developing chronic wounds, due to changes in the physiological system resulting from nutritional, metabolic, vascular and immunological modifications that affect the function and appearance of the skin. These changes can also lead to a slower healing process [32].

Regarding the level of education it allows defining which approach professionals can use to guide people affected by chronic wounds, since low levels of education can directly interfere with knowledge and education for self-care. Therefore, it is crucial that healthcare professionals use simplified language to help the user better understanding during the wound healing process [33,34].

The results regarding health variables and lifestyle habits suggest that patients with chronic wounds tend to have a sedentary lifestyle and have low engagement in leisure activities. On the other hand, most of these patients do not currently have smoking or alcohol consumption habits. Other researchers found similar results regarding sedentary lifestyle, as well as tobacco and alcohol use [8]. This information is important to understand the risk factors and their potential influence on the healing and recovery process of those patients. For example, considering a sedentary lifestyle

among a substantial number of the sample's participants and in view of the fact that physical activity constitutes a protective factor that minimizes susceptibility to chronic diseases, the importance of guidance and encouragement regarding the practice of physical activity is emphasized; in addition it is a variable with potential activity in glycemic and blood pressure control [35].

Chronic diseases can have serious consequences in chronic wounds conditions' patients, as they affect the body's ability to heal properly; in fact, chronic diseases can cause damage to blood vessels, reducing blood flow to the affected area, delaying healing and increasing the risk of infection [36]. In this study, 71.4% of the sample subjects had chronic diseases, and circulatory system diseases (77.3%) and endocrine diseases (48.5%) were the most frequent. Similar findings were obtained in a study carried out in an outpatient clinic located in the state of São Paulo/SP: the majority of patients had a comorbidity, with hypertension being the most frequent, followed by DM [37]. Another study, carried out in an outpatient stomatherapy nursing service, located in Cariri, Ceará, also found similar results, but DM was the most frequently described comorbidity in the participants' health records; hypertension was also prominent [8].

Wounds of venous origin (51.2%) followed by diabetic wounds (25.0%) were the most frequent wounds found in our investigation and are similar to those of a study conducted in a wounds dressing room at a Basic Health Unit of the Federal University of Amapá (UBS UNIFAP) in Macapá, AP, although wounds of diabetic origin (62.1%) were followed by those of venous origin (26.1%) [34]. According to the literature, the wounds' main site are the legs and approximately 80% of leg wounds are due to chronic venous insufficiency; 5% to 10% are of arterial origin and the remainder are of neuropathic origin. It should be observed that with the growth of the number of people with chronic diseases, such as DM and SAH, has been contributing to the increase in such skin lesions [8].

Regarding the anthropometric profile, according to the BMI of this study's participants, the majority of adults was obese (56.4%) or overweight (23.1%), as well as the majority of older adults were overweight (62.2%). In a prevalence study, assessing 320 medical records of patients with chronic injuries in the lower limbs, treated at a private hospital in Belo Horizonte/MG, the average age of the participants was 68.2 years and the average BMI was 27.5 kg/m², indicating excess weight (overweight or obesity) [38]. The results of a cross-sectional study, carried out with older adults with chronic wounds of venous origin, in the city of Guarapuava (PR), showed that the participants had also a high BMI [39]. A study, conducted in 2023, at the Stanford Advanced Wound Care Center, retrospectively reviewed the data from 167 older adults with injuries of venous origin covering the period from 2018 to 2019; it was found that 21.47% and 41.1% of the patients were overweight or obese, respectively [40]. In another study carried out with 36 people with chronic ulcers in the lower limbs and who were undergoing treatment at the wound clinic, obesity was found in 33.3% of the patients and an increase in abdominal circumference in 75% of the patients interviewed [41]. It is noteworthy that in our investigation, 88.1% had an increased abdominal circumference.

Furthermore, overweight, obesity and increased abdominal circumference hinder venous return and, consequently, healing, due to impaired blood circulation and hypoventilation that reduce the perfusion of oxygen and nutrients to the tissue, especially in patients with venous insufficiency, causing increased venous hypertension and worsening of the inflammatory process, which may also be associated with the emergence or worsening of necrosis [42]. Other causes that can hinder healing include increased pressure on the tissues, chronic inflammation, immobility and worsening of comorbidities. Thus, to effectively manage chronic wounds in obese patients, an integrated treatment program that addresses not only the care of the wound itself but also the underlying factors that may be contributing to its formation and impaired healing is required [4,40].

Regarding the patients' food intake in this study, it was found that 83.3% presented inefficient consumption of total calories, 82.1% of proteins, 53.6% of zinc, 90.5% of vitamin A, 92.9% of vitamin C and 94.1% of vitamin E. In a clinical trial study, carried out with 27 patients under outpatient follow-up in Goiânia (GO), it was observed that the majority of participants (74.1%) were on a normocaloric diet before the clinical trial and, therefore, the diet did not meet their total caloric requirements. Furthermore, 77.8% and 100% of patients had low protein and vitamin A intake, respectively [43]. The study mentioned above that was carried out with 36 patients with chronic wounds, in Guarapuava/PR, showed that men and women had a vitamin A, vitamin C and zinc intake lower than the recommendations. Furthermore, women had lower intake of total calories and proteins [41]. Thus, nutrients play a crucial role in the wound healing process, especially in the case of chronic wounds. Therefore, for patients with chronic wounds, especially those with underlying conditions, it is important to assess and ensure nutrient adequacy through the diet or, if necessary, supplementation [11].

Regarding nutritional supplementation, 79.7% of the participants in our investigation stated that they did not make use of supplementation. No studies were found that questioned the use of nutritional supplements by the participants. It is worth noting that only intervention studies were found, which are valuable for directly evaluating the effects of supplements on specific conditions, such as the healing of chronic wounds. However, the high frequency of nutritional supplements lack of use, as well as the lack of studies that investigate their use, bear implications, requiring further studies; the importance of education and guidance, i.e. improved education about the importance of nutrients in wound healing and the potential benefits of supplementation, when necessary, may influence clinical practice and patient self-care. In order to advance understanding of the relationship between nutritional supplementation and chronic wound healing, it would be useful to perform additional studies that investigate not only the effects of nutritional supplements, but also the perceptions and barriers to their use by the patients and health professionals.

After applying the PUSH scale, 61.9% of the survey participants presented unsatisfactory wound healing, with an average total score of 12.9 on the scale. In a study carried out in Southeast Brazil (Minas Gerais and São Paulo states) in three specialized care units chronic wounds' patients, it was found that the sample (n=70) total average of the PUSH scale was 10.9 [44]. In 2021, in a study carried out in an Orthopedics and Traumatology Unit of a private and philanthropic health institution in São Paulo, with 94 participants with infected surgical wounds which took more than 4 weeks to heal, 10.3 was the total average score on the PUSH scale [45]. An international study, carried out in Helsinki, Finland, with 318 patients with wounds of venous origin, found an average of 9.9 on the PUSH scale [46].

To assess the reliability and internal consistency of the subscales applied to the participants, namely Depression, Anxiety and Stress (DASS-21), Cronbach's alpha coefficient was calculated. The subscales used in the investigation yielded a Cronbach's alpha coefficient value equal to or greater than 0.80. According to the researchers in social and applied sciences, 0.70 Cronbach's alpha is generally considered a satisfactory minimum [27]. Thus, the consistency qualification by Cronbach's alpha was classified for the three DASS-21 subscales as very good consistency, being 0.89 for depression, 0.80 for anxiety and 0.82 for stress [27]. Furthermore, the three subscales showed satisfactory reliability [28].

Regarding the mental health of the participants, after applying the DASS-21, it was found that 27.4% (n=23), 35.7% (n=30) and 35.7% (n=30) of the patients exhibited symptoms (mild, moderate, severe or extremely severe) of stress, anxiety and depression respectively. In a study carried out

in Sudan, North Africa, with patients (n=12) suffering of diabetic origin chronic wounds, in which the DASS-21 test was also applied, it was observed that 44.56%, 44.32% and 49.11% of the patients exhibited symptoms (mild to extremely severe) of depression, anxiety and stress respectively [47]. In China, a self-assessment scale for anxiety and depression was used in 216 hospitalized patients with chronic wounds; the results indicated that 36.6% of the participants experienced anxiety symptoms and 37% presented depression symptoms [48]. In a Brazilian study carried out in the outpatient clinic of the Skin Commission of a University Hospital located in the city of João Pessoa, PB, depressive symptoms were assessed in 40 older adults' patients, using a geriatric depression scale; symptoms were observed in 40% of the sample [49]. These studies highlight that the mental health of patients with chronic wounds is an important and global concern, as rates of stress, anxiety and depression symptoms observed in different contexts suggest the need for integrated approaches that consider not only wound care but also the psychological support of patients, including interventions that can reduce the psychological impact of chronic wounds and improve patients' quality of life [6].

When performing binary logistic regression, statistically significant correlations were found with the dependent variable anxiety and the independent variables gender ($p<0.006$) (women tend to present more anxiety symptoms), marital status ($p<0.019$) (single, divorced and widowed patients may manifest more symptoms of anxiety than married patients), walking ($p<0.029$) (patients who do not walk and walk with support or difficulty are more susceptible to symptoms of anxiety), supplementation ($p<0.031$) (patients who use nutritional supplements present more symptoms of anxiety), protein intake ($p<0.024$) (the greater the protein consumption, the more symptoms of anxiety appear), depression ($p<0.000$) and stress ($p<0.000$) (patients who experience symptoms of depression and stress are more likely to exhibit symptoms of anxiety).

In a study with 167 patients in Taiwan, it was suggested that quality of life - which is related to symptoms of anxiety and depression - of male patients was worse than that of women with chronic wounds (<0.037) [50], which is inconsistent with the findings of our study. However, a study in Helsinki argues that symptoms and treatments for chronic wounds affect the patients' psychological health, harming quality of life more severely in female patients [46].

A study with 85 patients with wounds found that those whose marital status was separated/divorced had a worse quality of life, which was indicated by the physical aspects ($p=0.042$) and emotional aspects ($p=0.014$) domains when compared with the other patients [52]. Other researchers also observed worse quality of life, in the psychological domain, in separated/divorced patients (<0.009) [51].

A study with 140 patients carried out at a chronic wound care clinic in Jakarta, Indonesia, showed a significant correlation between wound discomfort and psychological issues; in other words, discomfort was significantly associated with psychological problems, including stress, depression and anxiety ($p<0.005$) [52]. It is worth noting that mobility issues were identified as causing the most frequent discomfort; specifically, difficulty walking (52.6%), difficulty performing daily activities (48.6%), getting up easily (32.9%) and experiencing throbbing pain as reported by patients (50%).

Regarding protein consumption with the presence of anxiety symptoms, there are no studies that confirm this finding. The authors suggest that anxious patients engage more with treatment, increasing their protein intake as recommended for healing [19].

When correlating the dependent variable depression with independent variables, also from binary linear regression analysis, statistical significance was found with wandering ($p<0.029$) and presence of stress symptoms ($p<0.000$). In this sense, a study with 53 patients with chronic wounds,

who were undergoing treatment in two specialized wound clinics, linked to the Nursing Departments of two higher education institutions in the city of Guarapuava (PR), found a worse quality of life for individuals who felt pain when walking ($p=0.004$) [53].

Finally, using Pearson's chi-square test, a statistically significant correlation was identified in those patients who used nutritional supplements with worse wound healing. It should be noted that there is no research that confirms this finding, but the literature recommends supplementation to improve the supply of essential nutrients in the healing process [19]. In this sense, patients with worse healing may be more concerned with nutritional therapy or have received more guidance from health professionals.

CONCLUSION

This study allowed a broader look at the clinical, nutritional and psychological profile of individuals with chronic wounds treated at a specialized outpatient clinic, showing how complex the evolution of these wounds is and the numerous factors that affect their healing and, consequently, the patients' emotional well-being. Furthermore, it was noted that most individuals had chronic wounds with unsatisfactory healing, which highlights the importance of therapeutic interventions that value systemic and local factors that affect the healing process, as well as adequate nutritional support.

Finally, the study findings enhance the importance of a multifaceted approach to the care of chronic wounds, which encompasses medical care, nutritional and psychotherapeutic support, improving the quality of life of patients, optimizing the healing process and looking at the individual as a whole.

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