

Selected indicators, determining functioning of patients of the Comprehensive Chronic Wound Treatment Programme. Pilot study

Wybrane determinanty warunkujące funkcjonowanie pacjentów objętych programem Kompleksowego Leczenia Ran Przewlekłych. Badanie pilotażowe

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Słowa kluczowe: jakość życia, trudno gojąca się rana, program Kompleksowego Leczenia Ran.

Abstract

Introduction: Difficult-to-heal injuries are an increasing problem for today's healthcare systems. Patients claim that limitations in self-care, lack of specialised knowledge, absence of support from others perceived subjectively, and low self-esteem are the most common factors affecting the quality of their lives. Pain, exudation, and unpleasant smell increase medical treatment expenses and have a destructive influence on patients' functionality in terms of complications and frequent hospitalization.

Aim of the research: Assessment of selected determinants conditioning the functioning of patients qualified for the Comprehensive Treatment of Chronic Wounds Program (KLRP-1).

Material and methods: Thirty-one adults meeting the inclusion criteria were selected for the program. A prospective-observational study with the use of estimation and observation methods was conducted on the basis of the developed research protocol containing wound assessment tools, gathering data concerning pain perception, the functioning of patients in everyday life, and their subjective opinions of their life. The study was conducted during the first and the last visit of patients to the Surgery Clinic of Podkarpackie voivodeship, which implements protocols of Ambulatory Specialised Care (pl. AOS) and of the Comprehensive Chronic Wound Treatment Programme (KLRP-1).

Results: The most common negative symptoms were excessive exudation (83.9%), pain (77.3%), and unpleasant smell (3.2%). In spite of the self-care capabilities declared by patients, most of them were not able to treat their wounds independently and needed the help of other persons (96.8%). The more intense the pain, the lower the subjective assessment of quality of life.

Conclusions: Wound aetiology, degree of damage, or self-care ability do not affect the everyday physical functionality in patients.

Streszczenie

Wprowadzenie: Występowanie trudno gojących się ran staje się coraz częstszym problemem dla obecnych systemów opieki zdrowotnej. Według pacjentów ograniczenie możliwości samodzielnej pielęgnacji, brak specjalistycznej wiedzy, subiektywne odczuwany brak wsparcia ze strony innych osób oraz niska samoocena są najczęstszymi czynnikami obniżającymi jakość ich życia. Ból, wysięk, nieprzyjemny zapach zwiększają koszty leczenia i wpływają destrukcyjnie na funkcjonowanie pacjentów ze względu na ryzyko wystąpienia powikłań i częstą hospitalizację.

Cel pracy: Ocena wybranych determinantów warunkujących funkcjonowanie pacjentów objętych programem Kompleksowego Leczenia Ran Przewlekłych (KLRP-1).

Materiał i metody: Badaniem objęto 31 osób dorosłych spełniających kryteria doboru. Przeprowadzono badanie prospektywno-obszawacyjne z wykorzystaniem metod szacunkowych i obserwacyjnych. Na podstawie opracowanego protokołu badawczego, zawierającego narzędzia do oceny ran, narzędzia zbierające dane o percepcji bólu i funkcjonowaniu pacjentów w życiu codziennym, a także ich subiektywnej oceny jakości życia dokonano oceny klinicznej i kwestionariuszowej pacjentów. Badanie przeprowadzono w dwóch etapach – podczas pierwszej i ostatniej wizyty pacjentów w poradni chirurgicznej województwa podkarpackiego, która realizuje protokoły Ambulatoryjnej Opieki Specjalistycznej (AOS) oraz programu Kompleksowego Leczenia Ran Przewlekłych (KLRP-1).

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Wyniki: Najczęstszymi, negatywnymi objawami związanymi z ranami były: nadmierny wysięk (83,9%), dolegliwości bólowe (77,3%) i nieprzyjemny zapach (3,2%). Pomimo deklarowanych przez pacjentów możliwości samoopiekuńczych, większość z nich nie potrafiła samodzielnie pielęgnować ran i wymagała pomocy drugiej osoby (96,8%). Zaobserwowano również, że ogólny wskaźnik bólu jest skorelowany z jakością życia w domenie fizycznej. Im wyższe są doznania bólowe, tym niższa jest subiektywna ocena jakości życia.

Wnioski: Etiologia rany, stopień uszkodzenia czy zdolność pacjentów do samoopieki nie determinują postrzeganej jakości życia chorych związanej z funkcjonowaniem.

Introduction

Prophylactics and treatment of hard-to-heal wounds have been an interdisciplinary challenge in medicine for many years. Despite technological progress, and modern methods of local and endovascular treatment of wounds, the number of patients seeking professional care and cure is rising rapidly. Civilisation diseases are the main factors predisposing to disorders of peripheral blood supply and hypoxigenation that cause tissue destruction over time [1].

Hard-to-heal wound issues affect more than 20 million people in the world, but there are no constructive reports concerning such a scale in Poland. It is estimated that hard-to-heal wound issues in Poland may concern some 1–1.5% of the population [2]. The number of patients with hard-to-heal wounds amounted to 576.4 thousand in Poland in 2016 [3]. Therefore, health systems complying with prophylactics, diagnostics, healing, as well as with preferences and capabilities of patients, face a challenge.

Bearing in mind that a wound is a result of basic disease that interferes with blood circulation and tissue nutrition, preventive and therapeutic measures should be implemented at the level of primary healthcare and with the further possibility of consultation and treatment within specialist centres of wound treatment.

Health care guidelines, developed by national and global experts, enable the standardisation of methods of prevention, diagnosis and treatment, based on standards in medicine that uses reliable scientific evidence, i.e. evidence-based medicine (EBM) [4–6].

Numerous scientific reports show evidence that patients with coexisting, difficult-to-heal wounds experience a reduced level of quality of life. In line with patients' opinions, the limited self-care, shortage of specialised knowledge, as well as the subjective perception of lack of support are the most common determinants lowering their quality of life. Moreover, coexisting somatic ailments such as pain, exudate, and unpleasant smell increase the medical expenses of treatment and indicate the ongoing inflammatory process in the wound or even a risk of systemic infection [7]. The appearance of anxiety disorders, depression, and associated social isolation as well as lowering of physical activity are the consequences of incomplete or even lack of professional patient care [8–10].

Improving patients' quality of life is possible through intensification and standardisation of professional care, which involves the patronage and the pa-

tients' treatment by specialised interdisciplinary teams, focused on improvement of patients, through minimisation of ailments related to chronic wounds. Recommendation and implementations of the Comprehensive Chronic Wound Treatment Programme [11], aimed at patients with chronic wounds, are one of the health benefits, being reimbursed by the Polish National Health Fund (pl. NFZ), challenge specialists, but it also gives them possibilities of effective therapeutic action and at the same time raise their professional prestige.

Aim of the research

Evaluation of selected determinants (aetiology, wound depth, pain intensity, self-care capacity) affecting subjective assessment of functioning (expressed in the WHOQOL-BREF questionnaire) by patients enrolled in a nation-wide chronic wound management programme (KLRP-1), over a 4-week observation period.

Material and methods

A prospective-observational study with the use of both estimation and observation methods was designed. After analysing available literature, a research protocol was developed. The protocol consisted of wound assessment tools (Wagner, RYB, NPIAP classification) and tools collecting data on the perception of pain (McGill Pain Questionnaire – MPQ) and on the functionality of patients, according to their subjective assessment of the quality of life (WHOQOL-BREF questionnaire). The degree of self-care was assessed on the basis of the Barthel scale.

The study area was a selected surgical clinic within the Podkarpackie voivodeship, implementing standards of Ambulatory Specialised Care (AOS) and standards of the Comprehensive Wound Treatment Programme (KLRP-1).

The research was conducted for a period of 7 months (from 1.10.2021 to 1.05.2022). Sixty-five people fulfilling the recruitment criteria were qualified for the study. These criteria were specified during the stage of study preparation (vascular wound within the lower limbs, wound area of approx. 1.24 sq. inch, partial skin thickness damage (NPIAP II degree), time of wound occurrence longer than 6 weeks, and self-care capacity over 20 points according to Barthel).

Thirty-one people who had 4 visits to the clinic within 30 days participated in the main study. Clini-

Table 1. Socio-demographic data of patients

Parameter	N	%
Totality of patients	31	100
Sex:		
Female	12	38.7
Male	19	61.3
Age:		
42–64 years old	8	25.8
65–74 years old	13	41.9
75+	10	32.3
Education:		
Primary	17	54.8
Vocational	12	38.7
Secondary	2	6.5
Residence:		
Small town	5	16.1
Rural	26	83.9
Parameter	N	%
Marital status:		
Married	18	58.1
Widowed	12	38.7
Single	1	3.2
Basic source of income:		
Work	6	19.4
Pension	21	67.7
Retirement	15	48.4
Living conditions:		
Satisfactory	1	3.2
Good		
Very good		

cal and questionnaire assessments were made during their first and the last visits in a surgical clinic (4-week interval). The assessment was done by a qualified person (nurse) competent in assessing health and wound healing.

Ethical issues

The Bioethics Committee of the University of Rzeszów (Resolution No. 2018/01/07b) approved the study protocol. In addition, the guidelines of the Declaration of Helsinki were followed in the course of the research [12].

Participants were informed about the purpose of the study and could withdraw at any time without giving any reason.

Statistical analysis

IBM SPSS v. 21 statistical package was used in the research. To check the normality of distributions, the Shapiro-Wilk test of normality was applied. Descriptive statistics (arithmetic mean, median, and frequency distributions) were used to analyse the distributions. In the case of quantitative variables with a normal distribution, Student's *t*-test was used to test the differences between the means. Non-parametric tests were also used: the Mann-Whitney *U* test, the Wilcoxon signed-rank test, and the Kruskal-Wallis test. A significance level of *p*-value < 0.05 was assumed.

Results

Study participants

Thirty-one people from a group of 65 qualified for the Comprehensive Chronic Wound Treatment Programme were enrolled for statistical analysis during the study period. Twelve (38.7%) women and 19 (61.3%) men took part in the study. The average age of participants was 71.48 ± 10.972 years, the youngest person was 39, and the oldest one was 90. The largest group of participants were those over 65 (74.2%) years old, those in relationships (58.1%), and the widowed (38.7%). Most of the respondents lived in the countryside (83.9%) earned a living mainly from their pension (67.7%), and declared satisfactory and good living conditions (96.8%) (Table 1).

Self-care capabilities were limited (58.1%, Barthel 21–25 points) and were satisfactory (48.1%, Barthel 86–100 points) within the tested group. However, despite declared self-care capabilities, most of the respondents were unable to treat their wounds on their own (93.5%) and needed the help of another person (96.8%).

Data on the aetiology and treatment of wounds

By the time of admission to a specialist outpatient clinic for the treatment of chronic wounds, most of the patients had been consulted or treated by a specialised doctor (38.7%), family doctor (primary health care physician) (35.5%), or nurses specializing in the treatment of wounds (12.9%), and one person had applied self-healing (3.2%).

The time since the wound firstly appeared in a patient, within the tested group, ranged from 2 months to 36 months. In 4 cases (12.8%), more than one wound was confirmed in a lower limb, (the deepest wound was evaluated for the purpose of this study). All wounds were located at the lower part of the lower limbs, in particular lateral shin (41.9%), medial shin (45.2%), and foot (22.2%), and wounds with an aetiology of chronic venous insufficiency (51.6%) predominated (Table 2).

Table 2. Aetiology of wounds

Wound aetiology	Research stage			
	Phase 1		Phase 2	
	N	%	N	%
Bedsore	1	3.2	1	3.2
Mixed ulceration	6	19.4	6	19.4
Arterial ulceration	3	9.7	3	9.7
Venous ulceration	16	51.6	16	51.6
Diabetic Foot Ulceration (DFU)	6	19.4	6	19.4
Total*	31	–	31	–

*Neither the number of patients nor the percentage add up to 31 patients or 100% of wounds because some of the patients had several wounds with various aetiologies simultaneously (4 patients).

Based on the colour classification of wounds (red-yellow-black – RYB), the wounds tested were evaluated as the following: red – 12.9%, red-yellow – 56.1%, yellow – 25.8%, and black – 12.9%. The depth of damage was variable, and the assessment was based on a simple NPIAP classification; therefore, the wounds were classified as follows: II – incomplete skin damage (29.0%), III – complete skin damage (58.1%), and IV – damage penetrating to tendons, muscles (12.4%). Foot skin and tissue damage associated with diabetes foot ulcers (DFU) (6 patients – 19.4%) were classified according to Wagner's grade classification (grade 3 – 12.9%, grade 4 – 6.5%, grade 5 – 3.2%).

The area of damaged tissue varied and ranged from 6 square inches (36.6 cm²) to 24.8 square inches (160.0 cm²) in the first stage of the examination (on admission). In the second stage of examination (after 4 weeks) the area of damaged surface covered from 5 sq. inches (29.65 cm²) to 23.25 square inches (150 cm²). Most common negative symptoms related to the wounds were as follows: exudate (83.9%), pain ailments (77.3%), and stench (3.2%).

During the process of local treatment the following methods of debridement were applied: scraping (100%), classical necrectomy (12.9%), interactive dressings (100%), wound debridement and tissue revitalisation with the use of medical larvae (MDT – maggot debridement therapy) (25.8%), sub-atmospheric pressure (NPWT – negative pressure wound therapy) (12.9%). Additionally, compression therapies (71.0 %) were carried out as a supporting treatment method.

Wound and functioning based on WHOQOL

The interval between the wound appearing for the first time was different and ranged from 2 to 36 months. Patients with venous insufficiency ulcers (51.6%) located at the lower part of the leg (77.8%) dominated the study. A smaller group comprised people with diabetes (19.4%) with lesions located within

the foot (DFU) – these were evaluated according to the Wagner classification.

Full-thickness skin damage was confirmed in 71.0% of the patients (except for diabetes with DFU – in this group, deep destruction affected 100.0% of patients) and the average area of wound surface was from 5.58 square inches to 6.67 square inches.

Based on the assessment of the wound (RYB classification), performed during the first stage of study, as well as on the amount of pus, and on the pain intensity, it should be assumed that the most of patients had wounds with signs of infection.

In Table 3, average values of the 4 domains (WHOQOL) were compiled. In addition, the average values also concern the first and the second stages of the study and the 2 groups of patients (defined by wound type). Also, the overall satisfaction rate during the first stage of the study and higher average values of facets of the quality of life were noted among patients with venous ulceration than among patients with other wound types. The significance of differences in WHOQOL distributions between subjects with venous ulceration and subjects with another type of wound was checked with the use of the Mann-Whitney *U* test. After data analysis the hypothesis was adopted that the type of wound does not affect the level of functionality of patients (in their subjective assessment of the quality of life) in the first or in the second stage of the study.

Moreover, an analysis of the differences between the subjective assessments of life satisfaction resulting from the original depth of the wound (determined during the first stage of the research) was also made. The analysis regarded both stages of research (I and II), and it regarded only 2 categories of wounds: II-incomplete and III-complete skin damage (according to NPIAP). Only 2 categories of wounds were selected due to the plurality of these categories.

Despite the observed differences in the subjective assessment of the quality of life, it was not observed

Table 3. Comparison of the 4 domains of the WHOQOL with the wound types and the stage of study

WHOQOL domains		Venous ulceration			Other wound type		
		Mean	Standard deviation	N	Mean	Standard deviation	N
Stage I	Physical health domain	47.10	13.18	16	42.62	15.59	15
	Psychological domain	49.48	14.42	16	42.50	13.01	15
	Social relationships domain	66.15	11.17	16	58.33	13.36	15
	Environment domain	54.88	9.41	16	48.54	11.62	15
	General perception of QoL	39.84	23.37	16	42.50	18.78	15
Stage II	Physical health domain	54.02	9.83	16	48.57	12.65	15
	Psychological domain	56.51	11.28	16	50.56	11.01	15
	Social relationships domain	66.67	10.54	16	60.00	11.44	15
	Environment domain	58.59	8.95	16	54.79	10.75	15
	General perception of QoL	62.50	11.18	16	60.00	13.53	15

Table 4. Assessment of the 4 domains (of WHOQOL) by patients, depending on the depth of the wound and the stage of research

WHOQOL domains		NPIAP Pressure Injury Stages						Test <i>U</i> M-W* P-value
		Stage 2			Stage 3			
		Mean	Standard deviation	N	Mean	Standard deviation	N	
Stage I of study	Physical health domain	48.41	11.86	9	45.04	15.55	18	0.631
	Psychological domain	50.93	10.98	9	45.37	15.58	18	0.253
	Social relationships domain	70.37	7.35	9	60.19	13.87	18	0.053
	Environment domain	59.38	5.18	9	49.13	12.07	18	0.023
	General perception of QoL	55.56	6.59	9	37.50	22.28	18	0.023
Stage II of study	Physical health domain	53.17	12.04	9	52.38	11.62	18	0.781
	Psychological domain	56.48	9.11	9	53.47	12.15	18	0.375
	Social relationships domain	70.37	7.35	9	62.04	11.86	18	0.059
	Environment domain	62.85	4.54	9	54.69	11.25	18	0.027
	General perception of QoL	62.50	12.50	9	60.42	12.31	18	1.000

The Mann-Whitney *U* test.

that the depth of wound determined the functionality and the quality of life of subjects.

Significance of variance of the distributions (Mann-Whitney *U* test) was noticed in the case of the assessment of quality of life in the domain of social relationships (in stage I and II of study) and only during the first stage of the research in case of the patients' overall perception of quality of life (Table 4).

In conclusion, patients with superficial ulceration (incomplete skin damage – NPIAP Stage 2) showed significantly higher levels of life satisfaction than patients with deeper wounds (full thickness extension – NPIAP Stage 3). In the case of other domains of quality of life test (WHOQOL-BREF), a hypothesis was made that there is no significant dependence be-

tween the depth of a wound and the level of patients' functionality according to their subjective assessment of their quality of life.

Pain assessment and functioning based on WHOQOL

Wound-related pain along with the use of painkillers, classified to the 1st and 2nd step of the WHO analgesic ladder, was declared by 77.3%. Pain intensity was assessed using the Melzack Questionnaire (MPQ). It was observed that the average values of the pain ratings significantly decreased in the assessment at the end of the second stage of the study (from 12.55 to 11.37) in comparison with the first stage (from 24.32 to 18.67) (Table 5).

Table 5. Descriptive statistics of pain rating indexes

Pain assessment indices	Mean	Median	Min.	Max.	Standard deviation	N of valid
Overall pain rating:						
In Phase I of the study	24.32	21.00	2.00	75.00	18.67	31
In Phase II of the study	12.55	11.00	0.00	50.00	11.37	31
Number of selected pain categories:						
In Phase I of the study	9.45	9.00	1.00	20.00	6.09	31
In Phase II of the study	6.71	7.00	0.00	15.00	4.22	31

Normality tests of the distribution

Pain assessment indices	Kolmogorov-Smirnov*			Shapiro-Wilk		
	Statistics	DF	Significance	Statistics	DF	Significance
Overall pain rating:						
In Phase I of the study	0.149	31	0.078	0.898	31	0.006
In Phase II of the study	0.159	31	0.045	0.852	31	0.001
Number of selected pain categories:						
In Phase I of the study	0.137	31	0.143	0.917	31	0.020
In Phase II of the study	0.165	31	0.031	0.940	31	0.081

*With Lilliefors significance correction, DF – degrees of freedom.

Differences in distribution were statistically significant. This was confirmed by the Wilcoxon signed-rank test, according to which, the parameter p -value was lower than 0.1% ($p < 0.001$). Likewise, the number of selected categories describing pain (number of pain categories) was clearly lower at the second stage of the study than at the first stage.

To test, the relationship between pain scores and quality of life scores, a correlation analysis was performed. Kendall's tau-b correlation coefficients (non-parametric correlation coefficient specific for small samples) were used (Table 6).

It was observed that the overall pain rating correlated with the assessment of quality of life in the physical domain. Both in stage I and II of the study, the correlation of these variables was statistically significant, at the level of $p < 0.05$. A negative correlation was confirmed, i.e. indicating that a higher value in the pain scale was accompanied by a lower value in the quality of life assessment scale. The correlation of the number of selected categories describing pain with the assessment of quality of life in the physical domain was also statistically significant, but only at stage II.

Slightly lower values of correlation coefficients ($p < 0.05$) were noted at stage I of the study for the overall pain rating, the number of selected categories describing pain, and the overall life satisfaction than at stage II of the study. The discussed correlation coefficients were negative.

The level of self-care and functioning based on WHOQOL

Within the analysed sample, 13 patients were potentially capable of light self-care (86–100 points on the Barthel scale) while the others presented deficits in self-care activities, assessed according to the Barthel scale (21–85 points). In the case of all WHOQOL domains, slightly higher means of values of the quality of life were observed among patients with no self-care dysfunction than among patients with self-care limitations. Nevertheless, the test of equality of the distributions of the WHOQOL domains in these 2 categories of patients indicated acceptance of the hypothesis of equality of these distributions (Mann-Whitney U test). This means that there was no statistically significant influence on the level of self-care capacity in the assessment of quality of life among patients with chronic wounds (Table 7).

Discussion

The ongoing progress of civilisation contributes to an increase in life expectancy. Caring for the health needs that determine quality of life in chronic diseases is a growing challenge for health systems. According to scientific reports within the world literature, the occurrence of a difficult-to-heal wound is a factor strongly predisposing patients to deterioration of their functioning in all spheres of life, which over

Table 6. Kendall's tau-b correlation coefficients between the overall pain indicators and the quality of life evaluation

WHOQOL domains	Kendall's tau-b	Phase I of the study		Phase II of the study	
		Overall pain rating	Number of selected pain categories	Overall pain rating	Number of selected pain categories
Physical health	Correlation coefficient	-0.291	-0.253	-0.333	-0.301
	Relevance (2-sided)	0.026	0.055	0.012	0.025
	<i>N</i>	31	31	31	31
Psychological health	Correlation coefficient	-0.018	-0.005	-0.074	-0.109
	Relevance (2-sided)	0.891	0.972	0.581	0.425
	<i>N</i>	31	31	31	31
Social relationships	Correlation coefficient	0.033	0.053	0.131	0.089
	Relevance (2-sided)	0.808	0.701	0.344	0.526
	<i>N</i>	31	31	31	31
Environmental QOL	Correlation coefficient	-0.014	-0.032	-0.041	-0.058
	Relevance (2-sided)	0.918	0.810	0.757	0.666
	<i>N</i>	31	31	31	31
Global - Overall QOL	Correlation coefficient	-0.234	-0.199	-0.286	-0.287
	Relevance (2-sided)	0.085	0.148	0.046	0.049
	<i>N</i>	31	31	31	31

Table 7. Comparison of WHO quality of life domains in stages I and II of the research in terms of the Barthel capacity scale

WHOQOL domains		Level of functionality (Barthel index)						Test <i>U</i> <i>M-W</i> * <i>P</i> -value
		86–100 Independent			21–85 Moderate dependency			
		Mean	Standard deviation	<i>N</i>	Mean	Standard deviation	<i>N</i>	
Stage I of the study	Physical health domain	48.63	13.00	13	42.26	15.02	18	0.373
	Psychological domain	48.40	12.33	13	44.44	15.19	18	0.293
	Social relationships	64.74	14.89	13	60.65	11.00	18	0.352
	Environment domain	54.57	9.68	13	49.83	11.47	18	0.242
	General perception of QoL	44.23	19.51	13	38.89	22.23	18	0.540
Stage II of the study	Physical health domain	53.02	12.19	13	50.20	11.06	18	0.489
	Psychological domain	54.81	8.65	13	52.78	13.18	18	0.622
	Social relationships domain	66.03	13.38	13	61.57	9.54	18	0.275
	Environment domain	57.93	8.43	13	55.90	10.98	18	0.465
	General perception of QoL	62.50	11.41	13	60.42	13.04	18	0.921

*Mann-Whitney *U* test.

time leads to a decrease in the subjective quality of life and an increase in the costs of functioning [7, 13].

The development of programs for prevention and treatment of injuries in outpatient conditions, aimed at patient-centred care, should increase real diagnostics and therapy capabilities. No scientific research was found in the available literature concerning functionality of patients encompassed by the Comprehensive Chronic Wound Treatment Program. This study may be one of the first reports addressing selected issues resulting from the implementation of the Comprehensive Wound Treatment Program.

In our own study, conducted on a group of 31 patients with chronic wounds, it was pointed out that after inclusion into the health care group, the level of quality of life perceived by patients during the 4-week observation period improved. All average values of satisfaction levels in the physical, psychological, social relations, and environmental domains, and the general perception of quality of life were higher ($p < 0.05$). Conducting therapeutic and care activities, based on the Polish Association of Wound Healing guidelines, contributing to the reduction of complaints associated with somatic ailments of a wound, thus translating into a better subjective quality of life.

Coexisting, negative ailments related to chronic wounds influence the functionality of patients in their daily life, thus affecting to a high degree with the sphere of mental health [14, 15].

Yan *et al.* confirmed in their studies high prevalence rates of depression and anxiety within a group of 216 patients with chronic wounds. Symptoms of depression were observed in 37% of patients, and symptoms of anxiety were diagnosed in 36.6% of patients [8]. These results are confirmed in the study conducted by Polikandrioti *et al.*, which provides evidence of an inverse relationship, i.e. a low level of anxiety or depression determines a better quality of life [16]. In addition, Bui *et al.* concluded that people diagnosed with depression are at 3-fold higher risk of developing active ulceration than people without depression. Apart from the increased risk, coexisting depression impairs the immune function of patients, which increases the risk of infection [14].

In our own study, tools measuring the level of stress and depression were not used; instead, clinical and questionnaire assessments were carried out using WHOQOL. When assessing the psychological domain, it was shown that mental burdens associated with the occurrence of a chronic wound predispose patients to a reduced quality of life. Based on the analysed data, it was also assumed that the aetiology of the wound, wound surface area, and limitations in self-care negatively affect the functioning of patients. Statistical analyses carried out indicate that these variables do not affect the functioning in patients'

opinions expressed in the WHOQOL questionnaire (patients from within the study sample).

In the analysed material it was pointed out that, regardless of the level of self-care declared by respondents, it was necessary to have the help of another person in dressing wounds located within the lower limbs. However, the level of self-care abilities was not correlated with the assessment of quality of life ($p > 0.05$).

Age-related limitations and coexisting diseases predispose caregivers to possess special qualifications in long-term care. Erfurt-Berge *et al.* assessed the quality of life and its determinants among family members of patients with chronic wounds. The presented results indicate that a chronic wound in a patient negatively affects his/her family members by introducing anxiety and frustration into their life and limit their leisure time due to the time spent on broadly understood care, which confirms the partial or total incapacity of patients for self-care [17].

In a study conducted by Ozkan *et al.* with the participation of 134 patients, it was proven that the increased level of independence of patients significantly improved their subjective quality of life [18]. Sometimes, despite the physical capabilities of patients, self-care insufficiency resulting from psychological and social problems becomes problematic. Current scientific publications clearly indicate limitations in the field of self-care among patients with chronic wounds of varying severity, which are induced by many factors, thus generating pressure to increase the education of patients and caregivers from the moment of diagnosis of the disease [17–19].

It was observed that pain was a strong factor determining the deterioration of functioning in terms of physical activity ($p < 0.001$). During the initial examination in a specialist clinic (first visit of the study participants to a specialist clinic), the level of pain was assessed, and it was found that most of the respondents had taken painkillers. The level of pain found among patients was then estimated in the range from 24.32 to 18.67 points. The level of pain significantly decreased after the 4-week wound treatment and at the end of the second stage of the study (second visit of the subjects to the clinic); it was estimated in the range of 12.55 to 11.37 points. After being covered by the health benefit, called the Comprehensive Wound Treatment Program (pl. *program Kompleksowego Leczenia Ran*), the perceived quality of life in terms of pain ailments became significantly higher than during the period before the start of treatment within the program.

Ren *et al.*, in a group of 162 patients, confirmed a negative correlation between such variables as pain and quality of life. The higher pain ailments negatively determined the perceived quality of life ($p < 0.01$) [10]. Lentsck *et al.* [20] and Santos *et al.* [21] concluded in their publications that pain is a separate predic-

tor of quality of life. Dickinson *et al.*, in their studies, indicated the need for reliable and comprehensive pain assessment, paying attention to patients with a wound in the course of DFU, where pain ailments are often omitted due to coexisting neuropathy [22].

Within our study, due to the small sample size, patients with DFU were not classified (only patients with venous ulcers and other wounds were analysed). Moreover, whereas in this group of 6 (19.4%) no signs of neuropathy-associated hyperalgesia were confirmed in all DFU patients, such features were diagnosed only in 2 of the 3 subjects with limb ischaemia – a postulate arises that pain ailments resulting from the aetiology of the wound should be subjected to detailed analysis in another planned study. Correct diagnosis and treatment of pain allow minimising not only physical, as well as psychological and social effects resulting from a chronic wound.

Analysing the data obtained in the study, no statistically significant correlation between sociodemographic variables and patients' perception of quality of life were found.

Pajardi *et al.* in their study proved that younger people reported a much higher quality of life compared to older study participants [23]. Identical conclusions were reached by Wu *et al.*, who confirmed younger patients' wounds healed faster, which is conditioned by a better clinical condition, fewer coexisting diseases, better nutritional status, and rare problems associated with blood vessel dysfunction [24]. Vogt *et al.* came to similar conclusions that with increasing age, perceived satisfaction with life is lower [25].

Studies conducted in China showed also that the quality of life of patients with lower education was lower compared to other respondents [15]. This conclusion is confirmed by the studies of Wolf *et al.*, who observed that people with insufficient health awareness experienced functional disorders in terms of physical and mental health [26].

Patients with a wound in the course of DFU are at particular risk of ulceration recurrence. It happens in 40% of patients within 1 year, in 65% within the next 5 years, and in 90% within 10 years. Co-existing neuropathy and peripheral arteriosclerosis diseases (PAD) significantly impede, and sometimes prevent, the process of wound healing. A group of these patients experience a reduced quality of life due to several complications and a high risk of amputation [27, 28].

The period of the COVID-19 pandemic made it difficult to access medical care; patients avoided leaving home for fear of falling ill. Therapeutic and healing processes were difficult or impossible, because of which the clinical condition of some patients deteriorated. The presented results show the wide range of problems faced by patients with chronic wounds. The development and implementation of systemic so-

lutions such as the Comprehensive Wound Treatment Program (pl. *program KLR*) can improve the quality of life of patients and accelerate wound regeneration processes, as well as increase the knowledge base and the possibilities of preventive actions.

The identified problems occurring among patients with chronic wounds have been described in our study and might contribute to the improvement of the guidelines according to which treatment and care activities are carried out.

Conclusions

Such variables as wound aetiology, level of destruction, or self-care ability of patients do not determine the observed physical functionality of patients in terms of quality of life. However, pain sensation associated with chronic wound negatively influenced their perception of quality of life. The greater the pain, the lower the subjective assessment of the quality of life.

Conflict of interest

The authors declare no conflict of interest.

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