

Influence of ulceration etiology on the global quality of life and its specific dimensions, including the control of pain, in patients with lower limb vascular insufficiency

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Abstract

Introduction: The results of previous studies suggest that the quality of life in patients with lower limb ulcerations is markedly poorer than in the general population – with regard to physical, mental and social spheres. This complex character of that parameter necessitates comprehensive analyses of its specific aspects, including the level of the acceptance of illness and associated pain symptoms.

Aim: To compare the quality of life and its specific dimensions in patients with lower limb ulcerations of various etiology.

Material and methods: Patients with the ulcerations resulting from venous ($n = 101$) or arterial pathologies ($n = 98$), or having mixed etiology ($n = 99$) were examined with the: 1) Skindex-29 instrument, 2) Acceptance of Illness Scale, 3) Beliefs about Pain Control Questionnaire, and 4) Coping Strategy Questionnaire.

Results: The average quality of life related to physical symptoms was significantly higher in patients with venous ulcerations. Patients with ulcerations of arterial etiology more frequently used catastrophizing, and less often ignored pain sensations, used coping self-statements, and increased their activity levels; they were characterized by lower levels of control and poorer ability to decrease the pain. The internal locus of pain control increased proportionally to the global quality of life scores and levels of illness acceptance. Control over pain and ability to decrease the pain were more effective in individuals who used ignoring pain sensations, increasing the activity level, coping self-statements, and reinterpreting pain than in those using catastrophizing or praying and hoping strategies.

Conclusions: Physical complaints seem to be the basic determinant of the quality of life in patients with the lower limb ulceration, irrespective of its etiology.

Key words: Skindex-29, pain control, quality of life, ulceration.

Introduction

Lower limb ulcerations constitute an important clinical problem. Most lesions of this type are located within the crural region and have a vascular (venous, arterial or mixed – arteriovenous) etiology [1–5]. Due to their chronic character, lower limb ulcerations considerably limit patients' functional abilities and have a negative impact on their quality of life [6, 7].

The results of previous studies suggest that the quality of life in patients with lower limb ulcerations is

markedly poorer than in the general population – with regard to physical, mental and social spheres [2, 6, 8–17]. However, most of those aforementioned studies included patients with ulcerations of venous etiology. In contrast, comparative analyses of patients with the lesions of arterial and mixed etiology have not been performed thus far. In turn, those patients can be characterized by different levels of the quality of life perception due to various pathogenesis and prognosis of their disease. Moreover, it should be remembered that the health-related quality

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of life (HRQL) is defined as an influence, perceived subjectively, of a disease and its treatment on the physical, mental and emotional status, and social and economic situation of the patient, as well as on the spiritual level, functional well-being, satisfaction with therapy, and the sphere of sexual experiences, intimacy, and self-image of the body [18–21]. This complex character of that parameter necessitates comprehensive analyses of its specific aspects, including the level of the acceptance of illness and associated pain symptoms.

Aim

In view of those aforementioned considerations, the aim of this study was to compare the quality of life and its specific dimensions (acceptance of illness and pain coping strategies) in patients with lower limb ulcerations of venous, arterial, and arteriovenous etiology.

Material and methods

Ethical considerations

The protocol for this study was accepted by the Local Bioethical Committee at the *Collegium Medicum* in Bydgoszcz. All participants gave their informed consent to participate in the study.

Patients

This study included 298 consecutive patients with lower limb ulcerations (discontinuity of the skin associated with the loss of tissue) resulting from venous (chronic venous insufficiency – CVI; normal range of the ankle-brachial index, i.e. 0.9–1.3; $n = 101$) or arterial pathologies (lower limb atherosclerosis – LLA; values of the ankle-brachial index ≤ 0.9 , suggesting ischemia of the lower extremities; $n = 98$), or having mixed etiology (arteriovenous ulceration; $n = 99$), treated at the Venous

Table 1. Sociodemographic and clinical characteristics of study participants

Parameter	Venous ulcerations ($n = 101$)	Arterial ulcerations ($n = 98$)	Mixed ulcerations ($n = 99$)	<i>P</i> -value
Age [years]	66.2 \pm 11.3	65.7 \pm 9.8	67.8 \pm 10.2	0.283
Gender, <i>n</i> (%):				
Women	69 (68.3)	34 (34.7)*	69 (69.7)	< 0.001
Men	32 (31.7)	64 (65.3)*	30 (30.3)	
Marital status, <i>n</i> (%):				
Single	12 (11.9)	18 (18.4)	8 (8.1)	0.104
Married	64 (63.4)	63 (64.3)	61 (61.6)	
Widowed	25 (24.8)	17 (17.3)	30 (30.3)	
Place of residence, <i>n</i> (%):				
Countryside	20 (19.8)	22 (22.4)	19 (19.2)	0.030
Towns up to 30 000	8 (7.9)	19 (19.4)	11 (11.1)	
Towns 30 000–100 000	8 (7.9)	21 (21.4)	13 (13.1)	
Cities > 100 000	65 (64.4)	36 (36.7)	56 (56.6)	
Educational level, <i>n</i> (%):				
Elementary	18 (17.8)	35 (35.7)	24 (24.2)	0.320
Vocational	48 (47.5)	32 (32.7)	50 (50.5)	
Secondary	32 (31.7)	22 (22.4)	20 (20.2)	
Higher	3 (3.0)	9 (9.2)	5 (5.1)	
Professional status, <i>n</i> (%):				
Professionally active	11 (10.9)	4 (4.1)	4 (4.0)	0.056
Professionally inactive	90 (89.1)	94 (95.9)	95 (96.0)	
Clinical characteristics of ulceration:				
Ankle-brachial index	1.15 \pm 0.80*	0.59 \pm 0.15	0.74 \pm 0.08	0.032
Ulceration area [cm ²] ¹	7.0 (2.5–15.75)	6.5 (3.0–12.5)	5.5 (2.25–12.5)	0.666
Duration [months]	36 (8–96)	18 (7–60)	36 (11–120)	0.716

¹Median (interquartile range); *significantly different compared to other groups.

Ulceration Outpatient Clinic in the Department and Clinic of General Surgery in Bydgoszcz (in 2008–2010). Inclusion criteria of this study comprised an established diagnosis of the underlying vascular condition with the resulting lower limb ulcerations. The occurrence of the following factors was the basis for excluding a patient from the test:

- ulcerations with mixed etiology, non-vascular etiology and other causes (neuropathic ulcer, diabetic foot ulcer, traumatic ulceration pressure ulcers, rheumatoid vasculitis, pyoderma gangrenosum, skin cancer),
- or unknown etiology,
- chronic comorbidities other than CVI and LLA (diabetes, rheumatoid arthritis, systemic lupus erythematosus and other autoimmune diseases, musculoskeletal diseases, bedridden),
- incomplete medical documentation.

Detailed characteristics of study participants are summarized in Table 1.

Protocol of the study

It appeared to be a comparative research which evaluated the parameter differences of the quality of life within patients with lower limb ulcerations of venous, arterial, and arteriovenous etiology. The questionnaires applied in the research (Skindex-29, AIS, BPCQ, CSQ) were filled in one-off by patients, usually during the very first or second visit in our clinic.

This study was designed as a questionnaire survey and included the following instruments: 1) Skindex-29 instrument for the quality of life assessment in patients with dermatologic conditions, 2) Acceptance of Illness Scale (AIS), 3) Beliefs about Pain Control Questionnaire (BPCQ), and 4) Coping Strategy Questionnaire (CSQ).

Skindex-29: The Skindex-29 questionnaire includes 29 statements dealing with the potential effects of the dermatologic condition on various components of life quality: A) physical symptoms from the skin – 7 items: 1) hurting, 2) burning or stinging, 3) itching, 4) bothering by water (bathing, washing hands), 5) irritation, 6) sensitivity, and 7) bleeding; B) emotional sphere – 10 items: 1) worrying that the condition may be serious, 2) feeling depressed, 3) worrying about getting scars, 4) feeling ashamed, 5) worrying that the condition may get worse, 6) being angry, 7) being embarrassed, 8) being frustrated, 9) being humiliated, and 10) being annoyed by the condition; and C) psychosocial functioning – 12 items: 1) quality of sleep, 2) work and hobbies, 3) social life, 4) tendency to stay at home, 5) being close with the others, 6) tendency to do things by the patient her/himself, 7) showing affection, 8) interactions with others, 9) being a problem for the loved ones, 10) desire to be with people, 11) interference with sex life, and 12) being tired [22–24]. The Polish version of the questionnaire, adapted in 1999 after approval of authors of the original instrument, was used [25]. The respondents scored the abovementioned parameters

with regards to the last month preceding the study, giving the frequency (never, rarely, sometimes, frequently, all the time) with which they have experienced any of the problems. Those answers were scored between 1 and 5 points, respectively. One's quality of life was expressed by the sum of points which could range between 29 (highest quality – the lack of negative effects of the condition) and 145 (the poorest quality – maximal negative influence of the condition). Specific dimensions of the quality of life were interpreted in an analogous way with regards to physical symptoms (between 7 and 35 points), emotional sphere (10–50 points), and psychosocial functioning (12–60 points). The reliability of the used Skindex-29 scale expressed by the α Cronbach's index amounted to 0.94 overall, 0.93 for physical symptoms, and 0.94 each for emotional sphere and psychosocial functioning. The split-half reliability of the test was 0.92.

Acceptance of Illness Scale (AIS): Acceptance of Illness Scale consists of eight statements, describing the negative consequences of poor health with regards to four dimensions: 1) limitations imposed by the disease, 2) lack of self-sufficiency, 3) feeling of being dependent on other people, and 4) lowered self-esteem. The respondents scored each statement using a 5-item scale: from 1 (definite agreement) to 5 (definite disagreement). The sum of points (between 8 and 40) reflects the overall level of the acceptance of illness. Lower scores corresponded to the lack of illness acceptance, poor adjustment, and the strong feeling of mental discomfort [26]. The Polish adaptation of AIS used in this study is characterized by high reliability and accuracy [27].

Beliefs about Pain Control Questionnaire (BPCQ): BPCQ questionnaire includes 13 statements pertaining to individual beliefs about the control of pain: at a personal level (internal control), offered by a healthcare professional (powerful others), or as a result of chance. The participant can express his/her opinion using the 6-item Likert scale. The results are expressed separately for each of three pain control loci. The internal locus of pain control can be scored from 5 to 30 points, while 4 to 24 points are available in case of the remaining two indices. The higher value of a given locus corresponds to its more important role in the control of pain [28, 29].

Coping Strategies Questionnaire (CSQ): Coping Strategies Questionnaire is composed of 42 statements pertaining to various methods of coping with experienced pain. The subjects answered according to the 7-item Likert scale (from 0 – never, to 6 – always). Based on the replies, one can determine seven indices characterizing the frequency of using various pain coping strategies: 1) diverting attention, 2) reinterpreting pain sensations, 3) catastrophizing, 4) ignoring pain sensations, 5) praying and hoping, 6) coping self-statements, and 7) increasing the activity level. Each of those strategies can be scored between 0 and 36 points; a higher score corresponds to more frequent utilization of a given strategy. Additionally,

CSQ contains two questions related to the effectiveness of control over pain and ability to decrease the pain. Each of them is scored using the 7-item scale (from 0 – being unable to control/decrease the pain, to 6 – being able to control/decrease the pain completely) [30]. The Polish version of the instrument, characterized by high reliability and psychometric accuracy, was used [28].

Statistical analysis

Statistical characteristics of continuous variables are presented as arithmetic means and their standard deviations (SD) or as medians and interquartile ranges. The normal distribution of continuous variables was tested using the Shapiro-Wilk test. The values of continuous variables in patients with ulcerations of various etiologies were compared with the Kruskal-Wallis test. Power and direction of relationships between various characteristics of quality of life was determined using the Spearman's rank coefficient of correlation (R). All calculations were carried out using Statistica 7 (StatSoft®) package, with the level of significance assumed at $p \leq 0.05$.

Results

Groups of patients with ulcerations of various etiology did not differ significantly in terms of average levels of global quality of life determined with Skindex-29 questionnaire, as well as in terms of the average quality of life in the emotional sphere and psychosocial functioning. In contrast, participants from various groups differed significantly in terms of average quality of life related to physical symptoms. The average level of this dimension of the quality of life was significantly higher (as suggested by lower values of the Skindex-29 scales) in a group of patients with venous ulcerations than in individuals with the ulcerations of arterial and mixed etiology. Analyzed groups did not differ significantly in terms of the average levels of the acceptance of illness scale and various dimensions of pain control. In turn, significant intergroup differences pertained to pain coping strategies. Patients with ulcerations of arterial etiology declared significantly more frequent catastrophizing, and significantly less frequent ignoring of pain sensations, use of coping self-statements, and increasing the activity level. Addition-

Table 2. Mean values of quality of life parameters in groups of patients with lower limb ulcerations of various etiology

Dimension	Venous ulcerations (n = 101)	Arterial ulcerations (n = 98)	Mixed ulcerations (n = 99)	P-value
Skindex-29:				
Global quality of life	80.65 ±18.85	87.62 ±19.45	86.29 ±17.10	0.115
Physical symptoms	19.86 ±4.66*	20.29 ±5.04	21.98 ±5.08	0.019
Emotions	28.67 ±7.38	31.27 ±7.44	30.47 ±6.41	0.139
Psychosocial functioning	31.52 ±9.23	35.07 ±8.40	33.83 ±7.89	0.104
Acceptance of Illness Scale (AIS):				
Level of illness acceptance	25.61 ±7.64	23.49 ±8.18	23.56 ±8.15	0.167
Beliefs about Pain Control Questionnaire (BPCQ):				
Internality	16.14 ±6.06	16.21 ±5.79	14.83 ±5.75	0.264
Powerful others	17.24 ±3.94	16.82 ±4.48	17.88 ±3.80	0.232
Chance	15.48 ±4.10	16.21 ±3.43	15.05 ±3.65	0.193
Coping Strategy Questionnaire (CSQ):				
Diverting attention	9.26 ±6.41	7.47 ±5.03	9.09 ±5.79	0.089
Reinterpreting pain	4.08 ±5.73	3.35 ±4.34	2.43 ±4.15	0.222
Catastrophizing	7.01 ±8.35	11.38 ±10.76*	9.15 ±9.09	0.016
Ignoring pain	7.45 ±6.25	5.21 ±5.47*	6.51 ±5.45	0.022
Praying and hoping	10.30 ±8.36	8.50 ±6.24	8.43 ±6.58	0.312
Coping self-statements	11.91 ±8.53	7.45 ±6.42*	10.26 ±7.46	0.001
Increasing the activity level	11.66 ±6.60	7.46 ±5.32*	9.58 ±5.66	< 0.001
Control over pain	4.63 ±1.34	3.29 ±1.68*	4.07 ±1.39	< 0.001
Ability to decrease the pain	4.03 ±1.39	2.45 ±1.63*	3.41 ±1.42	< 0.001

*Significantly different compared to other groups

Table 3. Power and direction of relationships between the utilization of various pain coping strategies (CSQ) and control over pain or ability to decrease the pain (Spearman's rank coefficients of correlation)

Strategy	Control over pain		Ability to decrease the pain	
	R	P-value	R	P-value
Diverting attention	0.05	0.370	-0.01	0.858
Reinterpreting pain	0.18	0.002	0.18	0.002
Catastrophizing	-0.66	< 0.001	-0.72	< 0.001
Ignoring pain	0.51	< 0.001	0.51	< 0.001
Praying and hoping	-0.21	< 0.001	-0.27	< 0.001
Coping self-statements	0.32	< 0.001	0.30	< 0.001
Increasing the activity level	0.43	< 0.001	0.42	< 0.001

ally, this group was characterized by significantly lower declared levels of control over pain and poorer ability to decrease the pain (Table 2).

The internal locus of pain control increased significantly in concert with the global quality of life improvement (i.e. decrease in Skindex-29 value; $R = -0.40$, $p < 0.001$) as well as with higher levels of illness acceptance ($R = 0.28$, $p < 0.001$). In contrast, poorer global quality of life and decreased levels of illness acceptance were associated with a stronger role of chance in the control of pain ($R = 0.18$, $p = 0.004$; and $R = -0.12$, $p = 0.043$, respectively). Neither the global quality of life ($R = -0.06$, $p = 0.316$) nor the level of illness acceptance ($R = 0.06$, $p = 0.298$) had a significant impact on the powerful others dimension of pain control.

Both control over pain and ability to decrease the pain were significantly better in individuals who used ignoring pain sensations, increasing the activity level, coping self-statements, and reinterpreting pain; in contrast, the degree of control over pain and ability to decrease it were significantly poorer in those using catastrophizing or praying and hoping strategies (Table 3).

The men characterized with a much greater sense of the global quality of life but also the level of illness acceptance. The women, on the other hand, were more resistant to pain and they applied more remedial strategies. The remaining sociodemographic variables were not characteristically correlated with the global quality of life (Skindex-29), acceptance of illness (AIS), and beliefs about pain control (BPCQ).

Discussion

This study revealed that patients with ulcerations of various etiology do not differ significantly in terms of global quality of life and its emotional and psychosocial dimensions, as well as in terms of the levels of illness acceptance. However, significant intergroup differences pertained to annoyance of physical symptoms – this was significantly higher in patients with ulcerations of arterial and mixed etiology. This finding is consistent with

literature data; many authors observed that the etiology of the ulceration is the main clinical determinant of physical discomfort experienced by the patient [10, 11, 13, 16, 31–34]. Additionally, the lack of significant intergroup differences in global quality of life and its various components suggests that patients with ulcerations of arterial and mixed etiology do not transfer unfavorable physical sensations associated with the disease onto other spheres of their quality of life.

Both the global quality of life and its various dimensions represented moderate levels in our patients, similar to the levels of illness acceptance. Similar levels of the life quality (87.03 pts) were previously reported by Szewczyk *et al.* [12], who used to the same Sxindex-29 instrument in venous ulceration patients. Consequently, the quality of life in ulceration patients seems to be greater than that in individuals with psoriasis (92.65 pts) [25, 35, 36], but poorer than in the case of trophic disorders of the lower limb skin without associated discontinuity (61.17 pts) [12].

Many previous studies, including research with numeric pain score which was performed in our center [12, 32], confirmed that pain is the main determinant of poor quality of life in patients with leg ulcerations [2, 6, 8–11, 13, 14, 16, 37]. Additionally, a few authors point to a significant relationship between the intensity of pain and other clinical characteristics of ulceration: its area and duration of the vascular disease [8, 9, 31]. The evidence was complemented by the results of our study which revealed that the level of both illness acceptance and global quality of life are determined by the profile of pain control in a given patient. We observed that most patients with lower limb ulcerations are characterized by the external locus of pain control. In contrast, literature data suggest that it is the internal locus that constitutes the optimal mechanism of pain control [20, 31, 38]. The internality-based model of pain control promotes the involvement of the patient in the process of therapy and care [28]. Another favorable model of pain control pertains to the co-existence of internal and powerful others (medical) locus of control. Under such circumstances, the patient

is aware of the availability of external support, and is simultaneously being motivated to be actively involved in the control of pain. In contrast, the complete dependence of the control of pain on the powerful others and chance has a negative effect on the status of the patient and his/her involvement in the therapeutic process [20, 28]. Our analysis of correlation revealed that more favorable internal locus of pain control is promoted by higher levels of the quality of life and illness acceptance; in turn, lower values of those parameters promoted a more passive attitude to the disease-related pain. Therefore, we observed some kind of a specific vicious circle: according to previously mentioned literature data, the intensity of pain is the strongest variable deteriorating the quality of life in patients with lower limb ulceration; simultaneously, our findings suggest that the poorer quality of life is associated with a less favorable profile of pain control in this group of patients. This finding suggests quite an obvious conclusion: one should aim at strengthening the internal locus of pain control in patients with lower limb ulcerations – particularly that according to previous studies, the negative influence of physical symptoms on the quality of life is associated with their subjectively perceived annoyance rather than with the objectively confirmed presence and intensity [8, 9].

In view of the aforementioned facts, during another stage of our analyses we verified the usefulness of various pain coping strategies in the context of their potential application for strengthening the internal locus of control. We observed that the most favorable results in pain control were achieved by those patients who used active strategies and denial of negative experiences; in contrast, relying on chance and catastrophizing exerted negative effects on the level of pain control. This above-mentioned finding confirms the psychologists' opinion according to which the task-oriented strategies are more desirable and provide better possibilities of control over the pain [28]. In this context, it is particularly alarming that patients with ulcerations of arterial etiology (associated with a higher intensity of pain) represented a markedly less favorable model of the pain coping strategy as compared to other analyzed groups. Similar distribution of various pain coping strategies in patients with lower limb ulcerations was previously reported by Hareendran *et al.* [8] and Herber *et al.* [10]. Consequently, we believe that the currently promoted holistic model of care should include teaching and consolidation of task-oriented pain coping strategies in the case of patients with ulcerations of arterial etiology.

We observed that most of the patients with lower limb ulcerations are characterized by the external locus of pain control and we concluded that the must to do is to strengthen the internal locus of pain control among the diseased patients, to enhance their quality of life feeling. Nevertheless, the weak point of our studies is the lack of repeated evaluation of the quality of life, accep-

tance of illness and the pain defining parameters which should be made after the congeneric therapy implementation and the education of diseased patients (mainly on the ways of handling with the disease resulted limits).

Conclusions

This study showed that physical complaints represent the basic determinant of the quality of life in patients with lower limb ulcerations of various etiology. Poorer quality of life related to physical symptoms, documented in patients with ulcerations of arterial and mixed etiology, results from the utilization of suboptimal pain coping strategies: passive acceptance and catastrophizing.

Conflict of interest

The authors declare no conflict of interest.

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