

REVIEW

QUALITY OF LIFE IN PATIENTS WITH NON-HEALING WOUNDS, WITH PARTICULAR FOCUS ON ASSESMENT TOOLS – A LITERATURE REVIEW

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Abstract

Aim: The aim of this study was to analyze published studies focusing on quality of life (QoL) in patients with non-healing wounds, with particular focus on assessment tools. **Design:** Type of study – literature review. **Methods:** Articles focusing on QoL in patients with non-healing wounds were searched for in various electronic databases using relevant terms. The search was limited to articles in English issued between January 2014 and April 2019, in the electronic databases Scopus, PubMed, and CINAHL. **Results:** In total, 24 studies were found which met the established criteria. **Conclusion:** Non-healing wounds significantly affect patients' QoL. Research is leading towards the creation of a standardized QoL tool in patients with chronic wounds, which could be included in the wound care standard care protocol. There are many generic and specific tools for evaluating QoL in patients with non-healing wounds, differing in length and complexity. The Wound-QoL was created by comparing and simplifying proven tools, and the follow-up research has proven it to be internally consistent, valid and reliable, and, due to its ease of use, suitable for re-measuring QoL.

Keywords: assessment tools, chronic wounds, non-healing wounds, quality of life, review.

Introduction

Almost everyone will experience wounds during the course of life. With some wounds the healing process proceeds without complications, but others are accompanied by difficulties in the healing process and involve additional negative phenomena. Complicated wounds include chronic wounds, hard-to-heal wounds, and non-healing wounds, all of which can have a significant impact on the quality of life (QoL) of patients, regardless of the stage of life at which the wound occurs. Non-healing wounds are an interdisciplinary problem, affecting all specializations. They are encountered by healthcare professionals in all departments, in hospitalized patients and outpatients, affecting patients multifactorially (Gottrup et al., 2001). Healthcare professionals who treat patients with wounds often face the dual challenge of meeting patient expectations of rapid and problem-free healing, as well as early diagnosis and effective therapy settings. However, patients are also encountered whose wounds cannot be healed, and the main goal is to, at least, maintain or improve the QoL of the patient (Woo et al., 2018).

A key factor when treating patients with non-healing wound is their emotional comfort. In addition to physical signs and symptoms, patients suffer other manifestations: social isolation, loss of self-confidence, frustration, depression, dissatisfaction, body image disorders, decreased willpower, impotence, feelings of dirtiness, anxiety, anger, discrimination, and rejection by partners. Assessment and treatment of these factors is just as important as the technical aspects of wound care. Emotional and psychological support are essential (Gonzalez de la Torre et al., 2017).

According to Pokorná and Leaper (2015), non-healing wounds are a multi-disciplinary problem multifactorially conditioned. They represent significant health and economic costs. They can also cause significant social and psychological disruption, not only for the person suffering from the non-healing wound, but also for their relatives and other lay carers. The severity of the impact on an individual may not always be due to the type and extent of damage but may be more determined by the patient's experience and the impact on the QoL of the person affected (Augustin et al., 2012). There are a number of scientific sources describing how non-healing wounds significantly affect the QoL of an individual, and QoL is an important aspect of holistic approaches to the treatment of non-healing wounds (Brtan Romić et al., 2015; Lentsck et al., 2018; Santos et al., 2017).

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It is important for healthcare providers to know patients' views on their QoL. Individual areas of QoL can affect the healing process. Detailed and up-to-date information on QoL can therefore be useful in designing a treatment plan and preventative measures.

Most of the assessment tools for measuring QoL take account of a number of areas – physical, mental and social, and everyday living. It is important to address all of these areas.

Aim

The aim of this study was to analyze published studies focusing on QoL in patients with non-healing wounds with particular focus on assessment tools and instruments.

Methods

Design

A literature review.

Eligibility criteria

Criteria used to select eligible studies were: original articles focusing on QoL related to non-healing wounds published in selected scientific electronic databases over the last five years (2014–2019).

The exclusion criteria were: studies which did not describe the relationship between QoL and non-healing wounds, studies which did not focus on tools and instruments for QoL evaluation, articles and reviews published outside of the indicated time period, and studies published in non-reviewed journals.

Search Strategy

Electronic scientific databases Scopus, PubMed, and CINAHL were electronically searched and subsequently hand searched to retrieve relevant sources. English was chosen as the search language.

The search strategy was implemented via the following steps: an initial search was performed using the keywords: “non-healing wound”, OR “nhw”, OR “chronic wound”, AND “quality of life”, OR “qol” in electronic databases. The search was not limited by the inclusion of “assessment tools” among the keywords, since such a search would have been too narrow. It was included in the process of exclusion of unsatisfactory publications, instead.

The search was restricted to full text studies, published between January 2014 and April 2019. The survey was not restricted to a specific care setting (both inpatient and outpatient settings were taken into account). In general, only articles focusing on the relationship between non-healing wounds and QoL were considered.

The results of the initial search were combined into a single set. Duplicities were removed and then the titles, abstracts and full texts of the obtained articles were independently assessed for final inclusion.

Study Selection inc. PRISMA flow diagram

A total of 412 publications were identified in three databases (Scopus n = 285; PubMed n = 72; CINAHL n = 55) and merged into one list. The list was stripped of 102 duplicate citations to 310 articles, and, after screening of titles and abstracts, 278 studies were excluded for not meeting the inclusion criteria.

Publications were excluded which:

- did not relate to both non-healing or chronic wounds and QoL;
- did not focus on tools and instruments for QoL evaluation;
- were oriented only on cost effectiveness;
- were oriented on effectiveness of specific products, materials, drugs, equipment, or therapeutic procedures;
- focused on experience of specific types of wound: open abdomen, diabetic foot, etc. (unless the abstract stated explicitly that conclusions could be generalized for all non-healing wounds);
- did not have an available abstract;
- did not address QoL in general, but focused only on specific areas, e.g., pain;
- were general monographs;
- analysed QoL with non-healing wounds for specific race, ethnicity, etc.;
- were published in languages other than English.

The remaining 32 articles were reviewed in full-text, eight of which did not meet the inclusion criteria. Finally, 24 articles (19 quantitative studies, two qualitative studies, and three systematic reviews) were included in the review (see flowchart in).

Evaluation of quality of articles

Papers selected for retrieval were assessed by two independent reviewers (LK and AP) for methodological quality prior to inclusion in the literature review. Any disagreements were resolved by discussion.

Data extraction

Data were independently extracted by two reviewers from studies included in the review. Extracted data included: study setting, study population, assessment tools used for QoL evaluation, country, and outcomes relevant to the literature review objectives. As mentioned above, disagreements were resolved by discussion.

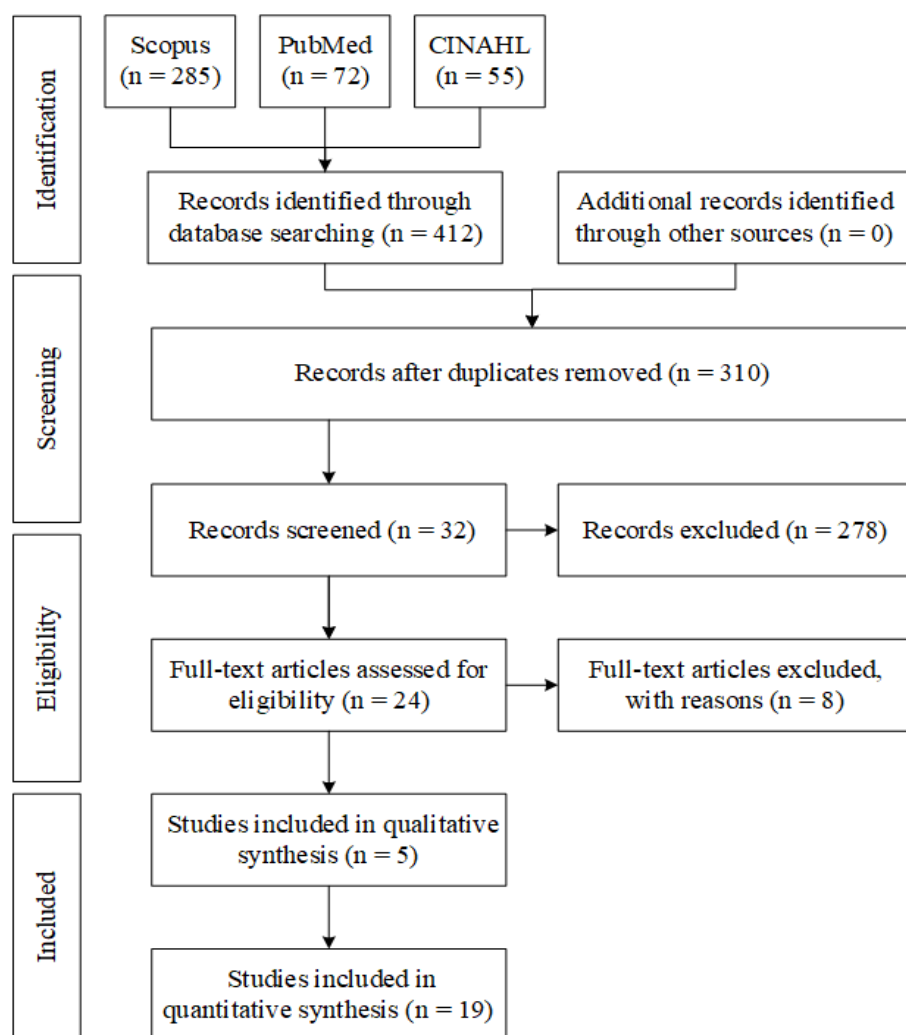


Figure 1 Flow diagram – PRISMA recommendations

Results

The majority of articles which were included focused on assessment of QoL with non-healing wounds using one or more assessment tool or instrument. Some articles focused on verification of validity, feasibility and reliability of a particular assessment tool or its translation. Some articles focused on comparison of selected assessment tools. Systematic reviews represented a special category. An overview of the articles included is provided in Tables 1 and 2.

Of the articles included, 18 concerned patients with chronic wounds (one article narrowed its interest to chronic wounds of the lower limb) and six focused on leg ulcers (two of which focused on venous leg ulcers).

With regard to the provision and type of care or care setting, six studies related to out-patient care, four to nursing service or home care, three articles incorporated in-patient care, two described patients who self-treated, and four studies included mixed care.

In the case of five articles, the type of care was not fully clear, or retrieval of data was not applicable (for systematic reviews).

Outside of systematic reviews, the number of patients in individual studies varied from a minimum of ten to a maximum of 519 (the average being 108 patients).

Studies made by Brtan Romić et al. (2015), Santos et al. (2017), and Lentsck et al. (2018) confirmed that participants considered the presence of wounds to have a significant effect on their lives, which would last for a relatively long time. QoL is therefore represents a significant factor in holistic approaches to non-healing wound treatment.

Tulleners et al. (2019) demonstrate that wound care treatment at a specialist multidisciplinary wound care center leads to an improvement in QoL, a reduction in hospitalizations, and better access to evidence-based practices, compared to treatment from multiple uncoordinated services.

Table 1 Articles included in the review (Part 1)

Authors	Type of study	Year	Assessment tool	Country	Patients	Main findings
Olsson et al.	systematic review	2019	SF-36, SF-12, EQ-5D, SF-6D	Singapore	N/A	Patients with chronic wounds have poor HRQoL. Strategies of wound management should focus on improving HRQoL and reduction of costs related to wound.
Tulleners et al.	quantitative study	2019	EQ-5D-5L	Australia, UK	29	Access to wound care in a wound healing center leads to an increase in QoL, fewer hospitalizations, and better access to consistent evidence-based practices.
Kapp et al.	qualitative study	2018	Interview	Australia	25	An ongoing effort is needed to minimise negative effects of chronic wounds on domains of QoL.
Lentsck et al.	quantitative study	2018	FPQLI-WV	Brazil	53	While chronic wounds had a negative impact on patient's lives, overall QLI and domains were found to be high. The best evaluated domain was family, and the worst was health.
Sommer et al.	quantitative study	2018	Wound-QoL	Germany	72	Proxies tended to report lower health-related QoL in the Wound-QoL than their relatives with chronic wounds. The perspective of the patients themselves should be preferred.
Augustin et al.	quantitative study	2017a	FLQA-w, CWIS, WWS, EQ-5D	Germany	154	The FLQA-w, CWIS and WWS are valid, sensitive and reliable tools for the measurement of HRQoL in leg ulcers. Differences were found in clinical feasibility and patient acceptance.
Augustin et al.	quantitative study	2017b	Wound-QoL, EQ-5D, FLQA-w	Germany	227	The Wound-QoL (easy-to-use one-page questionnaire) is a valid instrument for the assessment of QoL in patients with chronic wounds.
Augusto et al.	quantitative study	2017	CWIS	Brazil	30	The CWIS-UNIFESP/EPM (Cardiff Wound Impact Schedule-Federal University of Sao Paulo School of Medicine) was found to be valid and internally consistent.
Deufert & Graml	quantitative study	2017	Wound-QoL	Germany	59	Even if wound care appears optimal, the QoL of patients with chronic wounds can be impaired. Care could be optimized if based on daily usage of Wound-QoL.
Kapp & Santamaria	quantitative study	2017	CWIS	Australia	113	A reduction in the financial and personal costs experienced by patients with chronic wounds is necessary. To enhance well-being, we need to give attention to QoL.
Kim et al.	quantitative study	2017	SF-36, SF-12	USA	59	The SF-12 showed a higher total survey completion rate.
Santos et al.	quantitative study	2017	FPQLI-WV	Brazil	27	There was an improvement in HRQoL for the sample studied in the period. The predictors of changes were pain and religious practice.
Sommer et al.	quantitative study	2017	Wound-QoL	Germany	100	The Wound-QoL is convenient for measurement of outcomes in clinical trials and in routine practice. Integration into electronic systems is suggested

Table 2 Articles included in the review (Part 2)

Authors	Type of study	Year	Assessment tool	Country	Patients	Main findings
Domingues et al.	quantitative study	2016	FLQA-w, FPQLI-WV	Brazil	200	The cultural adaptation of FLQA-w was found to be reliable, valid, and easy to understand and apply.
Hopman et al.	quantitative study	2016	SF-12, EQ-5D	Canada	519	Chronic leg ulceration has a significant negative impact on HRQoL. Measurement of factors related to changes in QoL will contribute to development of strategies for prevention and wound care.
Miertová et al.	quantitative study	2016	FLQA-w	Slovakia	61	Education is an important factor in patient adherence. Education helps to develop appropriate behavior (ability to self-care) in patients.
Upton et al.	quantitative study	2016	WOWI, CWIS	Australia	85 + 49	The WOWI is a valid and reliable tool for assessment of QoL of people with chronic wounds. The study found a clear relationship between stress and prolonged wound healing.
Monari et al.	quantitative study	2015	PRISM	Italy	77	PRISM is a sensitive tool for obtaining information about patient expectations and suffering, and is suitable for patients who are unable to complete the questionnaires.
Brtn Romić et al.	quantitative study	2015	WHOQOL-BREF, WHOQOL-BREF-IPQ	Croatia	100	Study results showed no age and sex correlation with QoL. It found that the disease mostly affected social relationships and patient satisfaction with their health.
Augustin et al.	quantitative study	2014a	Wound-QoL	Germany	100	Wound-QoL is a reliable, easy-to-use, and valid questionnaire for the measurement of HRQoL in chronic wounds.
Augustin et al.	systematic review	2014b	106 assessment tools	Germany	N/A	QoL and patient preferences are essential in the measurement of patient perspectives in care and research. Validated methods and tools are recommended. Instruments should be checked for validity, reliability, and feasibility.
Blome et al.	quantitative study	2014	FLQA-w, CWIS, WWS, Wound-QoL	Germany	154	Wound-QoL (derived from FLQA-w, CWIS, WWS) is internally consistent, valid, and responsive in leg ulcer patients in the virtual validation analysis. It can be used to measure HRQoL in patients with chronic wounds.
Gorecki et al.	systematic review	2014	3 generic and 11 specific	UK	N/A	Outcomes important in pressure ulcers are inadequately covered by generic and chronic wound-specific instruments.
Wellborn & Mocerri	qualitative study	2014	Interview	USA	10	Family, friends, and caregiver relationships are very important for patients in helping them to cope with the disease process.

An important part of comprehensive care of patients with non-healing wounds is education. Several studies explicitly emphasize education in their conclusions. Wellborn and Mocerri (2014) state that:

“Participants cited knowledge deficits among nonspecialized healthcare providers and the discomfort, pain, and inconvenience of suffering as contributors to poor health-related quality of life (HRQoL). Participants described family, friends, and

caregiver relationships as being especially important in helping them cope with the disease process.”

Miertová et al. (2016) add that education plays an important role in patient adherence, which is reflected in patient self-management and treatment. Education helps to develop appropriate attitudes and behaviors in patients, which enhance their ability to self-care.

In their study of 154 patients, Blome et al. (2014) compared three established instruments: the Freiburg Life Quality Assessment for wounds (FLQA-w), the Cardiff Wound Impact Schedule (CWIS), and the Würzburg Wound Score (WWS). All three tools are quite lengthy, from four to seven pages, with a maximum of 47 items.

In response, the Wound-QoL was developed to be a concise multidimensional tool for use in clinical research and practice where time is limited, and multiple evaluations are often made. Comparative analysis by Augustin et al. (2017a) of 154 patients confirmed that FLQA-w, the CWIS, and the WWS were valid (correlation with EuroQoL-5D was $r = 0.70$ in the FLQA-w, $r = 0.47/0.67/0.68$ in the CWIS subscales, and $r = 0.60$ in the WWS), reliable (high internal consistency in all three questionnaires and their subscales was found, with Cronbach's alpha between 0.75 and 0.95), and sensitive tools for the evaluation of HRQoL in leg ulcers. Nevertheless, they differ in clinical feasibility and patient acceptance. All questionnaires and their subscales, except the CWIS Social, and the CWIS Physical and daily living, demonstrated responsiveness. Statistically significant differences were found when pre-treatment and post-treatment measurements were compared.

Therefore, there is a demand for a validated, simple-to-use instrument leading to reproducible, sensitive, and feasible information from the perspective of patients. Additionally, the widespread use of these tools would be preferable in order to make data comparable. The Wound-QoL is a one-page questionnaire constructed to meet the requirements mentioned above. It was designed based on existing assessment tools, whose contents were stripped down to the most essential items (Augustin et al., 2017b).

The total Wound-QoL score and the three single scales showed good internal consistency (Cronbach's alpha between 0.85 and 0.92). Construct validity measured by correlation with the EQ-5D scale was satisfactory ($r = 0.65$, $p < 0.001$). Feasibility was high with $< 1\%$ of missing items, and high patient acceptance ($> 95\%$ approval). Mean completion time was 2.4 minutes. The implementation questionnaire Wound Act was perceived as a helpful tool for health carers (Augustin et al., 2014a).

Blome et al. (2014) found the Wound-QoL to be internally consistent (Cronbach's alpha between 0.71 and 0.91), valid ($r = 0.48$ to 0.69), and responsive ($r = 0.18$ to 0.52) for German leg ulcer patients in a virtual validation analysis. It can be used as a concise and easy-to-understand tool to assess HRQoL in patients with chronic wounds, especially leg ulcers.

Sommer et al. (2017) calculated test-retest reliability with the intraclass correlation coefficient (ICC) for the Wound-QoL. The data indicated ICCs between 0.79 and 0.86, which can be considered evidence of excellent reliability. The study concluded that the integration of the assessment tool in electronic systems would support broader use of the instrument for patients with chronic wounds. The implementation of the Wound-QoL in clinical practice may contribute to an improvement in patient-centered care and thus increase HRQoL of patients with non-healing wounds. Further research also verified that the Wound-QoL is a straightforward, valid tool for the longitudinal assessment of QoL in patients with non-healing wounds, and proved that the questionnaire is suitable for use in clinical routine, clinical trials and quality of care studies (Augustin et al., 2017b).

Even where wound care management appears optimal, the QoL of those with chronic wounds is often impaired. By using the Wound-QoL on daily basis, the care of people with chronic wounds could be optimized according to patient-related outcome factors (Deufert & Graml, 2017).

A similar event to the creation of the Wound-QoL is the development of the Well-being in Wounds Inventory (WOWI). The instrument was developed by Upton et al. (2016) as simple to administer and complete, offering healthcare professionals a valid (discriminant validity was assessed by comparing the scores of respondents with poor, moderate, or good health status, as assessed by the EQ VAS; convergent validity – correlation between the CWIS and “wound worries” $r = 0.60$, “personal resources” $r = 0.64$, and total “well-being” $r = 0.69$) and reliable (Cronbach's alpha 0.93 for “personal resources”; 0.82 for “wound worries”; and 0.91 for total “well-being”) measure of QoL in patients with chronic wounds. The authors of the study recommend that healthcare practitioners take account of QoL as part of a holistic treatment plan, in order to maximize patient outcomes.

For patients unable to complete questionnaires, it is possible to use PRISM (Pictorial Representation of Illness and Self Measure). PRISM is a valid, simple, and sensitive instrument for recording information about the patient's expectations and suffering in order to improve the overall physician-patient relationship (Monari et al., 2015).

Since most of the instruments are used directly by patients without intermediary, it is necessary for them to be translated and culturally adapted. The translated and adapted instruments also require validation. Examples are provided by Domingues et al. (2016) and Augusto et al. (2017). With regard to “traditional instruments”, a study by Kim et al. (2017) compared

Table 3 Assessment Tools mentioned in the studies

Abbreviation	Full Name	Items	Description
CWIS*	Cardiff Wound Impact Schedule	28	The CWIS is a validated tool for assessing QoL in patients with venous leg ulcers and diabetic foot ulcers (Price & Harding, 2004).
EQ-5D	European Quality of Life-5 Dimensions	6	The EQ-5D is a standardized instrument developed by the EuroQol Group as a measure of HRQoL that can be used for a wide range of health conditions and treatments. The EQ-5D consists of a descriptive system and the EQ VAS (Bharmal & Thomas III, 2006).
FLQA-w*	Freiburg Life Quality Assessment for wounds	23	The FLQA-w was developed on the basis of the “Freiburg questionnaire of quality of life in venous diseases”, which is very extensive – containing 81 items. After reduction, 23 items remained divided into the dermatological generic baseline version of the FLQA (FLQA-c) comprising 17 items, and a specific module of six items related to leg ulcers (Augustin et al., 2010).
FPQLI-WV*	Ferrans & Powers Quality of Life Index: wound version	34	The FPQLI-WV consists of 34 items divided into four areas: health and functioning (HF), socio-economic (SE), psychological / spiritual (PS), and family (F) (Santos et al., 2017).
PRISM	Pictorial Representation of Illness and Self Measure	1	PRISM is a non-verbal visualization tool. The authors decided to use this tool to avoid limiting further tests to assess QoL using interview methods that depend on the patient’s cognitive and cultural level (Monari et al., 2015).
SF-12	12 – Item Short Form Survey	12	The SF-12 is a shorter version of the SF-36 questionnaire. It has been designed to reduce the burden of longer tools used to measure QoL. SF-12 provides two summary results, a summary of physical components (PCS-12) and a summary of mental components (MCS-12) (Kim et al., 2015).
SF-36	36 – Item Health Survey	36	The 36-Item Short Form Health Survey questionnaire (SF-36) is a very popular instrument for evaluating HRQoL. The questionnaire contains a total of 36 items divided into eight dimensions. Individual dimensions are: physical functioning, physical limitations, physical pain, general health, vitality, social functioning, emotional problems, and mental health (Kim et al., 2015).
SF-6D	SF-6D	-	The SF-6D is a health classification derived from the SF-36. It consists of six multi-level dimensions. Any patient who completes the SF-36 or SF-12 can be uniquely classified by the SF-6D. The SF-6D describes a total of 18,000 medical conditions (Brazier et al., 2004).
WHOQOL-BREF	WHOQOL-BREF quality of life questionnaire	26	The WHOQOL-BREF questionnaire consists of 26 items, which measure the following domains: physical health, psychological health, social relationships, and environment. The WHOQOL-BREF is a shorter version of the WHOQOL-100. Psychometric studies showed the WHO-QOL-BREF to be a reliable and valid instrument, correlating highly with the WHOQOL-100 (0.89) (Brtan Romić et al., 2015).
WHOQOL-BREF-IPQ	Bref Illness Perception Questionnaire	9	The BREF-IPQ consists of a cognitive component questionnaire and an emotional questionnaire. The questionnaire consists of eight quantitative questions and one qualitative question about the causes of the disease. The questions relate to the impact of illness, duration, treatment, disease control, symptoms, and understanding of the disease; and one question is related to the emotional component of disease perception (Brtan Romić et al., 2015).
Wound-QoL*	Wound-QoL	17	The Wound-QoL measures QoL in patients with chronic wounds and is a shortened combination of the FLQA-w, CWIS, and WWS questionnaires. It consists of 17 items, which are always reviewed retroactively for the previous seven days. The tool provides three comprehensive results: physical, mental and everyday life (Blome et al., 2014).
WOWI*	Well-being in Wounds Inventory	19	The WOWI is a valid and reliable tool for measuring wellbeing that is easy to complete. Items are grouped into two domains: Personal Information and Wound Care (Upton et al., 2016).
WWS*	Würzburg Wound Score	19	The WWS is a valid instrument for measuring QoL in patients with leg ulcers and is more sensitive than generic tools to detect wound healing changes over time (Engelhardt et al., 2014). The WWS has a lower number of items (n = 19) compared to other questionnaires but does not provide the ability to evaluate different domains of QoL by calculating aggregate results (Augustin et al., 2014b).

*the specific tools for patient with wounds

the SF-12 and SF-36. Results indicated that the SF-12 had a higher completion rate than the SF-36. Therefore, we can assume that number of items in the instruments is relevant and important both for patients and carers.

Attention was given to QoL in patients who self-treat. Kapp et al. (2018) state that: “Continued effort is required to develop relationships and treatment regimens that are conducive to healing and optimize well-being. Additionally, healthcare systems should identify and address structural shortcomings of care services to create more patient-centred models of wound care in the community setting. It is imperative that healthcare funding is directed to people who have chronic wounds, in particular to alleviate the out-of-pocket costs experienced by self-funders. Continued attention to the QoL of people who have chronic wounds is required to minimise the negative effects of this condition and enhance well-being.”

An interesting fact discovered by Sommer et al. (2018) based on comparison of differences between patient- and proxy-reported HRQoL using the Wound-QoL, is that proxies tended to report lower HRQoL. The authors conclude that proxy-reports can be helpful if patients are unable to provide information, although caution should be taken when interpreting the results. The patient’s own report remains preferable.

A special group of articles included in our literature review comprised three systematic reviews. Augustin et al. (2014b) suggest that Patient Reported Outcomes (PROs), in particular QoL and patient preferences, are indispensable constructs in the assessment of patient perspectives in clinical care, clinical research, and health service research. The use of validated methodologies is recommended, and, in most cases, validated instruments are available. The review contains references to 106 such instruments. Any instrument used should be checked for validity, scientific rigor, and feasibility. Gorecki et al. (2014) focused their research on assessment tools for chronic wounds with particular reference to pressure ulcers. The review described three general and 11 specific instruments. Olsson et al. (2019) conclude that patients with chronic wounds have poor HRQoL in general, and wound-related costs are substantial. Development and implementation of wound management strategies that focus on increasing HRQoL, and effectively reduce costs or rationalization of costs for this patient group are urgently needed.

Discussion

This literature review focused on recent progress in the assessment of QoL in patients with non-healing wounds.

The majority of articles describe use of one or more assessment tool or instrument for the measurement of QoL. The most commonly used tools were (number of times used): the Wound-QoL (six), CWIS (five), EQ-5D (five), FLQA-w (five), SF-12 (three), WWS (two) and SF-36 (two). An overview of assessment tools is provided in Table 2.

Although many of the assessment instruments are powerful tools (with high internal consistency, reliability, and validity) that can measure QoL in patients with non-healing wounds, some are very lengthy, complex, and difficult to administer. This can be problematic, since most patients are elderly. They could benefit from concise, easy-to-use questionnaires.

The review showed that several such assessment tools have been developed in the last five years (the WOWI, Wound-QoL, and PRISM) or have become more popular and more widely used (the SF-12). Obviously, it would be ideal to select one instrument from those available that would be universally accepted as the standard for assessing QoL for chronic wounds patients. Its implementation in clinical day-to-day practice would improve patient-centered care, and, thus, the HRQoL of patients with chronic wounds. Integration in electronic information systems would support broader use of the measure for patients with non-healing wounds (Sommer et al., 2017).

Education is an important factor in wound care, both for patients and healthcare staff. For healthcare providers, high-quality education ensures appropriate selection and use of tools and methods – from prevention and management of wound risk, through appropriately selected and performed wound care, to patient preparation for self-care or handover to subsequent home care. Adequate education for patients and their family members not only helps improve wound care, but also significantly increases satisfaction with the course of the treatment, and helps to set realistic expectations (Miertová et al., 2016; Wellborn & Mocerri, 2014). In this regard, it is advantageous to organize wound care in wound-healing centers, where care is provided comprehensively and no problems can arise due to the isolated provision of services (Tulleners et al., 2019).

Limitation of study

A limitation of this literature review is that it only included studies published in English and available in electronic databases. On the other hand, a strength

of the study is that there were no limitations in terms of patient age, type of care, clinical setting, and type of assessment and QoL evaluation tools.

Conclusion

Non-healing wounds significantly affect patients' QoL. This literature review verified that this is a relevant topic for research and has, in fact, been the focus of a number of studies over the past five years. Measuring QoL forms a significant part of holistic approaches and patient-centred care in the context of the treatment of non-healing wounds, and it is important to monitor the impact of wounds on different areas of QoL. Research is therefore heading towards the creation of a standardized QoL tool for patients with chronic wounds, which could be included in the wound care standard protocol. Using measurement results, it would be desirable to establish which dimensions most affect QoL, and, by influencing them, improve the QoL of patients.

There are many generic and specific tools and instruments for evaluating QoL in patients with non-healing wounds. They differ in length and complexity. Since most patients with non-healing wounds are elderly, it is desirable to create a standardized tool that is short and simple to complete, yet sufficiently reliable. A candidate for such a tool is the Wound-QoL, which was created by comparing and simplifying proven tools, and the follow-up research has proven the Wound-QoL to be internally consistent, valid and reliable, and, due to its ease of use, suitable for re-measuring of QoL and tracking changes in quality of life related to the wound-healing process. Translations and cultural adaptations are an integral part of accessibility to patients. The Wound-QoL is already available in 20 languages, including Czech, and is to be validated and tested in Czech clinical practice in a prospective study.

Ethical aspects and conflict of interest

The authors solemnly declare that the manuscript has not yet been published or submitted for publication by another journal. They have no conflict of interest regarding the topic, creation and publication of this article, and it received no support from commercial organizations. The authors declare that the present study involves no conflicts of interest. All used bibliographical sources have been cited.

Author contributions

Conception and design (LK, AP), data analysis and interpretation (LK, AP), manuscript draft (LK), critical revision of the manuscript (AP), final approval of the manuscript (AP, LK).

References

- Augustin, M., Herberger, K., Rustenbach, S. J., Schäfer, I., Zschocke, I., & Blome, C. (2010). Quality of life evaluation in wounds: validation of the Freiburg Life Quality Assessment-wound module, a disease-specific instrument. *International Wound Journal*, 7(6), 493–501. <https://doi.org/10.1111/j.1742-481X.2010.00732.x>
- Augustin, M., Carville, K., Clark, M., Curran, J., Flour, M., Lindholm, J., Matsuzaki, K., Moffatt, C., Pattison, M., Price, P., White, W., Young, T. (2012). International Consensus. Optimizing wellbeing in people living with a wound. An expert working group review. *Wounds International*. https://www.researchgate.net/publication/230560329_International_consensus_Optimising_wellbeing_in_people_living_with_a_wound_An_expert_working_group_review
- Augustin, M., Baade, K., Herberger, K., Protz, K., Goepel, L., Wild, T., & Blome, C. (2014a). Use of the Wound-QoL instrument in routine practice: feasibility, validity and development of an implementation tool. *Wound Medicine*, 5, 4–8. <https://doi.org/10.1016/j.wndm.2014.04.001>
- Augustin, M., Langenbruch, A. K., Herberger, K., Baade, K., Goepel, L., Blome, C. (2014b). Quality of life measurement in chronic wounds and inflammatory skin diseases: definitions, standards and instruments. *Wound Medicine*, 5, 29–38. <https://doi.org/10.1016/j.wndm.2014.04.008>
- Augustin, M., Baade, K., Heyer, K., Price, P. E., Herberger, K., Wild, T., Engelhardt, M., & Debus, E. S. (2017a). Quality-of-life evaluation in chronic wounds: comparative analysis of three disease-specific questionnaires. *International Wound Journal*, 14(6), 1299–1304. <http://doi.wiley.com/10.1111/iwj.12803>
- Augustin, M., Conde Montero, E., Zander, N., Baade, K., Herberger, K., Debus, E. S., Diener, H., Thomas Neubert, T., & Blome, C. (2017b). Validity and feasibility of the Wound-QoL questionnaire on health-related quality of life in chronic wounds. *Wound Repair and Regeneration*, 25(5), 852–857. <http://doi.wiley.com/10.1111/wrr.12583>
- Augusto, F. D. S., Blanes, L., Nicodemo, D., & Ferreira, L. M. (2017). Translation and cross-cultural adaptation of the Cardiff Wound Impact Schedule to Brazilian Portuguese. *Journal of Tissue Viability*, 26(2), 113–118. <https://doi.org/10.1016/j.jtv.2016.12.002>
- Bharmal, M., & Thomas III, J. (2006). Comparing the EQ-5D and the SF-6D descriptive systems to assess their ceiling effects in the US general population. *Value in Health*, 9(4), 262–271. <https://doi.org/10.1111/j.1524-4733.2006.00108.x>
- Blome, C., Baade, K., Debus, E. S., Price, P., & Augustin, M. (2014). The “Wound-QoL”: a short questionnaire measuring quality of life in patients with chronic wounds based on three established disease-specific instruments. *Wound Repair and Regeneration*, 22(4), 504–514. <http://doi.wiley.com/10.1111/wrr.12193>
- Brazier, J., Roberts, J., Tsuchiya, A., & Busschbach, J. (2004). A comparison of the EQ-5D and SF-6D across seven patient groups. *Health Economics*, 13(9), 873–884. <https://doi.org/10.1002/hec.866>
- Brtnan Romić, R., Brtnan, A., Romić, I., Cvitanović, H., Duvančić, T., & Lugović-Mihčić L. (2015). Quality of life and perception of disease in patients with chronic leg ulcer. *Acta Clinica Croatica*, 54(3), 309–314.
- Deufert, D., & Graml, R. (2017). Disease-specific, health-related quality of life (HRQoL) of people with chronic wounds – a descriptive cross-sectional study using the Wound-QoL. *Wound*

- Medicine*, 16, 29–33.
<https://doi.org/10.1016/j.wndm.2017.01.006>
- Domingues, E. A. R., Alexandre, N. M. C., & da Silva, J. V. (2016). Cultural adaptation and validation of the Freiburg Life Quality Assessment – Wound Module to Brazilian Portuguese. *Revista Latino-Americana de Enfermagem*, 24. <https://doi.org/10.1590/1518-8345.0289.2684>
- Engelhardt, M., Spech, E., Diener, H., Faller, H., Augustin, M., & Debus, E. S. (2014). Validation of the disease-specific quality of life Wuerzburg Wound Score in patients with chronic leg ulcer. *Vasa*, 43(5), 372–379. <https://doi.org/10.1024/0301-1526/a000378>
- González de la Torre, H., Quintana-Lorenzo, M. L., Perdomo-Pérez, E., & Verdú, J. (2017). Correlation between health-related quality of life and venous leg ulcer's severity and characteristics: a cross-sectional study: a cross-sectional study. *International Wound Journal*, 14(2), 360–368. <https://doi.org/10.1111/iwj.12610>
- Gorecki, C., Nixon, J., Lamping, D. L., Alavi, Y., & Brown, J. M. (2014). Patient-reported outcome measures for chronic wounds with particular reference to pressure ulcer research: a systematic review. *International Journal of Nursing Studies*, 51(1), 157–165. <https://doi.org/10.1016/j.ijnurstu.2013.03.004>
- Gottrup, F., Holstein, P., Jørgensen, B., Lohmann, M., & Karlsmar, T. (2001). A new concept of a multidisciplinary wound healing center and a national expert function of wound healing. *Archives of Surgery*, 136(7), 765–772. <https://doi.org/10.1001/archsurg.136.7.765>
- Hopman, W. M., Vandenkerkhof, E. G., Carley, M. E., Harrison, M. B. (2016). Health-related quality of life at healing in individuals with chronic venous or mixed-venous leg ulceration: a longitudinal assessment. *Journal of Advanced Nursing*, 72(11), 2869–2878. <http://doi.wiley.com/10.1111/jan.13054>
- Kapp, S., & Santamaria, N. (2017). The financial and quality-of-life cost to patients living with a chronic wound in the community. *International Wound Journal*, 14(6), 1108–1119. <http://doi.wiley.com/10.1111/iwj.12767>
- Kapp, S., Miller, C., & Santamaria, N. (2018). The quality of life of people who have chronic wounds and who self-treat. *Journal of Clinical Nursing*, 27(1–2), 182–192. <http://doi.wiley.com/10.1111/jocn.13870>
- Kim, P. J., Kumar, A., Elmarsafi, T., Lehrenbaum, H., Anghel, E., Steinberg, J. S., Evans, K. K., & Attinger, C. E. (2017). Comparison of completion rates for SF-36 compared with SF-12 Quality of Life Surveys at a Tertiary Urban Wound Center. *The Journal of Foot and Ankle Surgery*, 56(5), 1031–1035. <https://doi.org/10.1053/j.jfas.2017.05.001>
- Lentsck, M. H., Baratieri, T., Trincaus, M. R., Mattei, A. P., Miyahara, H., & Sangaleti, M. (2018). Quality of life related to clinical aspects in people with chronic wound. *Revista da Escola de Enfermagem da USP*, 52. <https://doi.org/10.1590/s1980-220x2017004003384>
- Miertová, M., Dlugošová, K., Ovšonková, A., & Čáp, J. (2016). Chosen aspects of quality of life in patients with venous leg ulcers. *Central European Journal of Nursing and Midwifery*, 7(4), 527–533.
- Monari, P., Pelizzari, L., Crotti, S., Damiani, G., Calzavara-Pinton, P., & Gualdi, G. (2015). The use of PRISM (Pictorial Representation of Illness and Self Measure) in patients affected by chronic cutaneous ulcers. *Advances in Skin & Wound Care*, 28(11), 489–494. <https://doi.org/10.1097/01.ASW.0000471977.92623.65>
- Olsson, M., Järbrink, K., Divakar, U., Bajpai, R., Upton, Z., Schmidtchen, A., & Car, J. (2019). The humanistic and economic burden of chronic wounds: a systematic review. *Wound Repair and Regeneration*, 27(1), 114–125. <http://doi.wiley.com/10.1111/wrr.12683>
- Pokorná, A., & Leaper, D. (2015). Assessment and documentation of non-healing, chronic wounds in inpatient health care facilities in the Czech Republic: an evaluation study. *International Wound Journal*, 12(2), 224–231. <https://doi.org/10.1111/iwj.12372>
- Price, P., & Harding, K. (2004). Cardiff Wound Impact Schedule: the development of a condition-specific questionnaire to assess health-related quality of life in patients with chronic wounds of the lower limb. *International Wound Journal*, 1(1), 10–17. <https://doi.org/10.1111/j.1742-481x.2004.00007.x>
- Santos, V. L. C. G., Oliveira, A. D. S., Amaral, A. F. D. S., Nishi, E. T., & Junqueira, J. B. (2017). Quality of life in patients with chronic wounds: magnitude of changes and predictive factors. *Revista da Escola de Enfermagem da USP*, 51, e03250. <https://doi.org/10.1590/S1980-220X2016049603250>
- Sommer, R., Augustin, M., Hampel-Kalthoff, C., & Blome, C. (2017). The Wound-QoL questionnaire on quality of life in chronic wounds is highly reliable. *Wound Repair and Regeneration*, 25(4), 730–732. <http://doi.wiley.com/10.1111/wrr.12578>
- Sommer, R., Hampel-Kalthoff, C., Kalthoff, B., Neht, C., Scherfer, E., Winkler M., & Blome, C. (2018). Differences between patient- and proxy-reported HRQoL using the Wound-QoL. *Wound Repair and Regeneration*, 26(3), 293–296. <http://doi.wiley.com/10.1111/wrr.12662>
- Tulleners, R., Brain, D., Lee, X., Cheng, Q., Graves, N., & Pacella, R. E. (2019). Health benefits of an innovative model of care for chronic wounds patients in Queensland. *International Wound Journal*, 16(2), 334–342. <https://doi.org/10.1111/iwj.13033>
- Upton, D., Upton, P., & Alexander, R. (2016). Well-being in wounds inventory (WOWI): development of a valid and reliable measure of well-being in patients with wounds. *Journal of Wound Care*, 25(3), 114–120. <https://doi.org/10.12968/jowc.2016.25.3.114>
- Wellborn, J., & Mocer, J. T. (2014). The lived experiences of persons with chronic venous insufficiency and lower extremity ulcers. *Journal of Wound, Ostomy and Continence Nursing*, 41(2), 122–126. <https://doi.org/10.1097/WON.000000000000010>
- Woo, K., Conceição, V. L., & Alam, T. (2018). Optimising quality of life for people with non-healing wounds. *Wounds International*, 9(3), 6–14.