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Development, validation and clinical use of the FLQA-I, a disease-specific quality of life questionnaire for patients with lymphedema

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Summary

Background: It is known from clinical practice that lymphatic diseases can be associated with reductions of quality of life (QoL). Due to the lack of validated methods, only few studies however have systematically investigated the QoL in lymphedema. The aim of the study was 1) to develop a standardized QoL questionnaire specific for lymphedema and 2) to assess the QoL in these patients.

Patients and methods: We developed and tested the FLQA-I, a novel QoL questionnaire developed specific for use in lymphedema on the basis of the previously validated FLQA vein questionnaire. The questionnaire consists of 92 items that refer to the following scales: Physical status, everyday life, social life, emotional well-being, treatment, satisfaction and profession/ household. 392 patients with primary (n = 246) and secondary (n = 146) lymphedema were included in the validation study.

Results: The FLQA-I showed good internal consistency; Cronbach's alpha was higher than 0.75 in all scales. There were no floor and ceiling effects and satisfactory item selectivity. The test-retest reliability, sensitivity to change and convergent validity with other psychometric instruments were satisfactory. Clinically, patients with lymphedema showed markedly impaired QoL in all fields, compared to persons with early stage venous insufficiency, and comparable reductions of QoL, compared to patients with venous leg ulcer.

Conclusion: These data indicate that the FLQA-I is a reliable and valid questionnaire for the assessment of QoL in lymphedema. Since the QoL is impaired in many patients with lymphedema, QoL evaluation may be helpful for clinical diagnostics as well as for outcome measurement of specific edema therapy.

Key words

Quality of life, lymphedema

Zusammenfassung

Entwicklung, Validierung und klinische Anwendung des FLQA-I, eines krankheitsspezifischen Lebensqualitätsfragebogens für Patienten mit Lymphödemen
Hintergrund: Aus klinischer Erfahrung ist bekannt, dass lymphatische Erkrankungen mit Einschränkungen der Lebensqualität (LQ) verbunden sein können. Angesichts des Fehlens validierter Erhebungsmethoden haben jedoch nur wenige Studien die LQ bei Lymphödemen systematisch untersucht.

Ziel der vorliegenden Studie war 1) die Entwicklung eines standardisierten, spezifischen LQ-Fragebogens für Patienten mit Lymphödemen, 2) die Ermittlung der LQ bei diesen Patienten.

Patienten und Methoden: Wir entwickelten und testeten den FLQA-I, einen neuen LQ-Fragebogen für den Einsatz beim Lymphödem, auf der Basis eines zuvor validierten FLQA-Fragebogens für Venenerkrankungen. Der Fragebogen besteht aus 92 Items zu den folgenden Skalen: Körper, Alltagsleben, Sozialleben, Psyche, Behandlung, Zufriedenheit und Beruf/Haushalt. 392 Patienten mit primären (n = 246) und sekundären (n = 146) Lymphödemen wurden in die Validierungsstudie eingeschlossen.

Ergebnisse: Der FLQA-I zeigte gute interne Konsistenz; Cronbach's alpha war in allen Skalen > 0,75. Boden- und Deckeneffekte lagen nicht vor, die Item-Selektivität war befriedigend. Auch die Test-Retest-Reliabilität, Veränderungssensitivität und konvergente Validität mit anderen psychometrischen Instrumenten war befriedigend.

Aus klinischer Sicht zeigten Patienten mit Lymphödem im Vergleich zu Patienten mit frühen Stadien der Veneninsuffizienz deutlich verminderte LQ sowie vergleichbare Belastungen wie Patienten mit venösen Ulzera.

Schlussfolgerungen: Die vorliegenden Daten zeigen, dass der FLQA-I ein zuverlässiger und valider Fragebogen zur Bestimmung der LQ bei Lymphödemen ist. Angesichts der verminderten LQ bei vielen Patienten mit Lymphödemen kann die LQ-Erhebung für die klinische Diagnostik wie auch für die Evaluation der spezifischen Ödemtherapie von Interesse sein.

Introduction

Quality of life (QoL) issues are of increasing importance in most fields of medicine. Although clinical experience indicates that QoL can be severely impaired in lymphedema, only few studies have focused on this topic. Sitzia [13] et al. showed that patients with lymphedema experienced impaired QoL especially in the fields of physical mobility, energy and pain. Several further studies have not evaluated QoL but psychosocial strain. They indicate that lymphedema has a profound impact on the patients' well-being and on everyday life [10, 14].

In order to evaluate the QoL of patients with different forms of lymphedema, we therefore established and evaluated a new QoL questionnaire that should be applicable to all forms of lymphedema. The questionnaire is based on a previously-validated and published QoL questionnaire, the FLQA - V [1]. The development and validation of the novel questionnaire is presented in this publication.

Patients and methods

The FLQA-I has been developed in accordance with international principles on the development of QoL questionnaires [4, 8, 12]. First, 67 patients with primary and secondary lymphedema were given one open and 6 structured questions regarding the impact of the disease on their social relationships, physical well-being, emotional well-being, treatment, daily activities, and profession as well as on their satisfaction in general. The answers were checked for identical or similar contents, the resulting 134 items were presented to an expert panel, including dermatologists, lymphologists, psychologists and statisticians who selected items of higher clinical priority. Moreover, a series of 28 generic (not lymphedema-specific) items was included from the FLQA-v, a validated version for vein diseases [1]; these items substituted similar items named by the patients, thus assuring relevance for lymphedema. The "generic" items constitute the basis version of the FLQA-c, a core of all FLQA modules [3] which permits a direct comparison of different diseases (see Fig. 1).

After that, the questions were further selected to 92 final items and arranged in the following 7 *a-priori* scales which are similar to the FLQA for vein diseases: Physical complaints, everyday life, social life, emotional status, (stress due to) treatment, satisfaction with different areas of life and profession/household. The attribution to the scales were based on a consensus of the expert panel relating to the item content, but not to statistical procedures.

The resulting pilot questionnaire was validated in the present study.

In the first sample, 181 consecutive patients (inpatients) with lymphedema were included on the day of admission to the Földiklinik for lymphology, Hinterzarten/Germany (Table I). Four patients refused to take part or did not return the questionnaires. Of these remaining 177 patients, 110 had primary lymphedema and 67 had secondary lymphedema, mostly due to mastectomy for breast cancer. The patients were treated with specific lymphtherapy [5].

Briefly, the treatment included bandaging, manual lymph drainage and physiotherapy.

In a second sample, 211 outpatients with lymphedema from the same clinic were recruited for a cross-sectional study, including 136 patients with primary lymphedema and 76 patients with secondary lymphedema.

Validation procedures

The data on construct validity and internal consistency were gained from both samples, whereas the follow-data for the testing of responsiveness and test-retest reliability were derived from the inpatient sample only.

Reliability: Internal consistency and test-retest reliability
Internal consistency of the scales was determined based on the FLQA-I questionnaires of the whole study population. Test-retest reliability was assessed by correlating the QoL scales of the first sample in a retest 12-14 days after the first survey. During this time, the patients already underwent their first sessions of lymphologic therapy.

Convergent (construct) validity

Construct validity was determined by correlating the results of comparable scales of the FLQA with the following questionnaires:

Questionnaire recording functional capacity in everyday living (ALLTAG) (Bullinger 1993) [4]. This questionnaire was designed to evaluate generic QoL problems in everyday life. 29 items can be assigned to the following scales: daily performance, physical well-being, psychological well-being, social activities, joy of living and satisfaction with medical treatment.

Comparison data of healthy persons were gained from Bullinger et al. [4], data from patients with CVI and venous leg ulcers were taken from Augustin et al [1].

2. Nottingham Health Profile (NHP) (Hunt 1981) in a validated German version by Kohlmann (1996) [7, 9]. This questionnaire is widely used to assess the generic QoL in different medical conditions and in healthy populations. The questionnaire includes 38 items that refer to the following scales: Pain, sleep, emotional reactions, energy, social isolation, physical mobility.

The scores of these scales were correlated with the corresponding FLQA scales.

Sensitivity to change

Sensitivity to change was evaluated by a pre/post-comparison of the inpatients after 4 weeks of specific lymphatic therapy.

Statistical analysis

All computations were calculated with the Statistical Package of Social Science (SPSS), version 9.0 for Windows. Comparative tests on interval data were performed using t-tests or univariate ANOVA with Student-Newman-Keuls-Adjustment. All statistical comparisons were two-sided, employing $p < .05$ as the level of significance.

Results

Characteristics of the sample

One-hundred seventy-seven (97 %) of 181 patients returned completed questionnaires, 4 refused to take part or did not return the questionnaires. There were no marked differences between participating and non-participating patients regarding age, sex, clinical diagnosis and education.

Reliability: Internal consistency and test-retest reliability

Internal consistency of the scales was satisfactory: Cronbach's alpha ranged from .85 (scales "treatment" and "social life") to .94 ("everyday life") (Table II). There were no pronounced floor or ceiling effects. Test-retest reliability ranged from $r = .59$ (scale "treatment") to $r = .87$ (scale "profession/ household").

Convergent (construct) validity

Comparable scales of the FLQA, the Alltag and the NHP showed correlations between 0.66 and 0.77. In detail, the FLQA-scale "Physical complaints" showed the highest correlation with the corresponding Alltag scale "Body" ($r = -0.70$). The FLQA-scale "Everyday life" correlated the most with the NHP scale "Physical mobility" ($r = 0.77$), but also significantly with the corresponding scale "Daily living" of the Alltag ($r = -0.70$). Regarding social life, strongest correlations were found between this FLQA scale

and the same scale in Alltag ($r = 0.69$). Accordingly, "Emotional well-being" of FLQA correlated well with „Emotions» in the Alltag ($r = -0.73$), but also with "Emotional reactions" of the NHP ($r = 0.72$). For the FLQA scale "Treatment" there are no comparable scales in the other questionnaires. Best correlations were observed with Alltag "Body" and "Daily Living", indicating certain cross-correlations of this scale. The FLQA-scale "Satisfaction" revealed the highest correlation with NHP "Emotional reaction", FLQA household/works with Alltag "Daily living" ($r = -0.54$) and "Body" ($r = -0.53$).

Sensitivity to change

There was satisfactory sensitivity to change among the in-patients in all scales except profession/housework (Table III).

Table III: Sensitivity to change of the FLQA-I, assessed in $n = 177$ inpatients after 4 weeks of specific lymph therapy. High values indicate decreased QoL

Scales	Specific lymphtherapy (n = 177)		
	Before	After	p
Physical complaints	2,47 ± 0,69	1,95 ± 0,60	< 0,001
Everyday life	2,92 ± 0,98	2,26 ± 0,86	< 0,001
Social life	1,99 ± 0,90	1,63 ± 0,68	< 0,001
Emotional well-being	2,68 ± 0,66	2,28 ± 0,64	< 0,001
Treatment	2,22 ± 0,97	1,84 ± 0,78	< 0,001
Satisfaction	3,08 ± 0,71	2,73 ± 0,76	< 0,001
Profession/household	2,34 ± 1,01	2,14 ± 1,01	n.s.

Table I: Socio-demographic and clinical data of the inpatient and outpatient study patients

	Inpatients		Outpatients		Total	
	n=	%	n=	%	n=	%
	177	100.0	211	100.0	388	100.0
Diagnoses						
Primary lymphedema	110	62.1	136	64.5	246	63.4
Secondary lymphedema	67	37.9	79	37.4	146	37.6
Sex						
Men	27	15.3	36	17.1	63	16.2
Women	150	84.7	175	82.9	325	83.8
Age (mean)	50,3	range 18-77	48,9	range 18-75	49,5	range 18-77

Table II: Distribution characteristics and reliability of the FLQA-I, assessed in both patient samples ($n = 177$ inpatients and $n = 211$ outpatients)

Scales	# Items	Mean	SD	Min	Max	n	MD %	BOT %	CEIL %	α	Test-retest correlation
Physical complaints	17	2.39	0.74	1.00	4.24	380	3.4	2.3	0	.91	.77
Everyday life	14	2.67	1.07	1.00	4.86	387	2.3	3.5	0	.94	.69
Social life	7	1.92	0.94	1.00	4.83	388	2.3	17.3	0	.85	.63
Emotional well-being	26	2.62	0.69	1.08	4.27	383	4.0	0.6	0	.88	.77
Treatment	8	2.22	0.89	1.00	4.86	375	5.1	9.5	0	.85	.59
Satisfaction	13	3.41	0.78	1.00	5.00	386	3.4	0.6	0.6	.89	.70
Household/work	7	2.20	1.04	1.00	5.00	345	14.7	11.3	0.7	.83	.87

SD Standard Deviation
 Min Minimum
 Max Maximum
 n Number of patients
 MD Missing data
 BOT Bottom effects
 CEIL Ceiling effects
 α Cronbach's Alpha

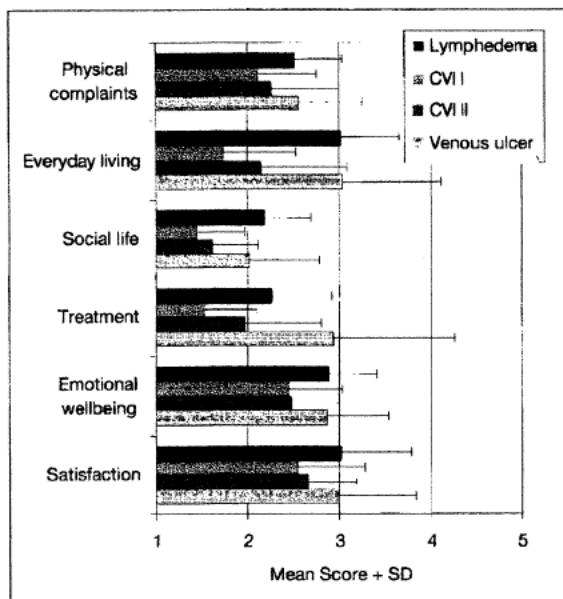


Fig. 1: Quality of life of patients with lymphedema ($n = 177$ inpatients), compared to patients with chronic venous insufficiency stage I and II ($n = 157$) and with venous leg ulcer ($n = 56$), as measured by the FLQA-c, a core questionnaire containing comparable items [3]. High values indicate low QoL. The patients with lymphedema and with venous leg ulcer showed significant reductions of QoL ($p < 0.001$) in all scales, compared to patients with chronic venous insufficiency stage I.

QoL comparison between patients with lymphedema, CVI and healthy persons

Patients with lymphedema showed significant reductions of QoL in all scales ($p < 0.001$) compared to patients with early stage chronic venous insufficiency (Fig. 1), a disease known to be associated with little QoL impairment [1]. The QoL reductions of the lymphedema patients were comparable or even mildly higher than the QoL of patients with venous leg ulcer (Fig. 1).

Discussion

The aim of this study was to validate the FLQA-I questionnaire, an instrument specific for patients with primary or secondary lymphedema of the arms or the legs. The development of the questionnaire was performed according to international principles [2, 6, 8, 12], including sample generation by patient surveys and expert rating. The validation steps were also oriented to the guidelines of test validation [11].

The validation results indicate that the FLQA-I is a valid instrument which can be used in the assessment of QoL in primary or secondary lymphedema. Major fields of QoL measurements are clinical studies, health economic studies and psychological research. According to the results of the present study, the FLQA-I seems to be appropriate for these purposes.

The clinical results of markedly impaired QoL are in accordance with a previous study by Sitzia [13]. Beside reducing the lymphedema, clinical treatment should also fo-

cus on other measures that could improve QoL in these chronically-ill patients, e.g. pain reduction, skin care, relaxation and psychological treatment.

It has to be emphasized that the measurement of QoL in patients with secondary lymphedema is affected by the primary disease, i.e. in most cases the malignoma. Hence, the "real" disease-specific QoL cannot be assessed. For clinical use, however, the lack of differentiation between malignoma-induced and lymphedema-induced QoL is not of great importance. Rather, the generally high impairments of QoL suggest that patients with lymphedemas of any origin should be checked for specific QoL reductions. In case of severe strain, psychosocial support should be considered.

Taken together, the FLQA-I is a valid and reliable QoL questionnaire specific for lymphedema. It has been proven to be feasible for QoL evaluations in outpatient and inpatient settings. However, further validation studies should be performed in order to reduce the number of items and scales.

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