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The relative contribution of domains of quality of life to overall quality of life for different chronic diseases

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Abstract

This study examined the contribution of the quality of life (QoL) domains physical, social and psychological functioning to the explanation of overall QoL. Various disorders may differentially affect QoL domains due to disease-specific factors and, consequently, the relationship between QoL domains and overall QoL may vary between diseases. We therefore studied this relationship for several diseases as well as the differential impact of these diseases on QoL. The present study had a cross-sectional design. We selected patients (aged 57 years and older) with one of the following eight chronic medical conditions: lung disorder, heart condition, hypertension, diabetes mellitus, back problems, rheumatoid arthritis, migraine, or dermatological disorders. The total group of respondents included 1457 patients and 1851 healthy subjects. Regression analyses showed that the domain of psychological functioning contributed to overall QoL for all disorders, whereas physical and social functioning contributed to overall QoL for some disorders. Differences were found between most patient groups and healthy subjects with respect to physical functioning; with respect to social and psychological functioning some groups differed from the healthy group. Explanations for the findings and implications for clinical practice are discussed.

Key words: Chronic disease, Health status, Psychological adaptation, Quality of Life, Social adjustment

Abbreviations: MOS (SF-20) – Medical Outcome Study Short-Form General Health Survey; QoL – quality of life

Introduction

In the last few decades, quality of life (QoL) has become an important outcome measure in both social scientific studies and medical trials [1]. The World Health Organization Quality of Life assessment (WHOQOL) group has defined QoL as ‘Individuals’ perception of their position in life in the context of the culture and the value system in which they live and in relation to their goals, ex-

pectations, standards and concerns’ [2]. The WHOQOL definition of QoL focuses attention on the patient’s perspective on QoL and assumes an evaluation of several life domains by the patient [3, 4]. This definition of QoL has influenced the definitions used in many other studies [1, 4–6]. For example, Gill et al. [6] refer to QoL as a ‘uniquely personal perception, denoting the way that individual patients feel about their health status and/or non-medical aspects of their lives’. Despite the

influence of the WHOQOL definition of QoL, operationalisation of QoL still varies across different studies [7].

Different conceptualisations of QoL have been used, ranging from the general to the more specific [4]. General definitions refer to QoL as the perception of life in general and are conceptually different from health-related QoL, which represents health-related problems in several life domains. Health-related QoL can address disease-specific issues and more generic health-related problems [8]. There are different ways to hierarchically order the concepts of QoL, for example in generic- and disease-specific measures of health-related QoL [9]. Furthermore, a distinction has been made between global QoL, the underlying dimensions of QoL, and the components each dimension consists of [10, 11].

Spilker's hierarchical QoL model [1] ranged from highly general to more specific. This model included overall QoL and separate domains of QoL, as well as a third level covering specific aspects of each domain. For example, measures of anxiety or depression are specific aspects of the domain of psychological functioning; participation in social activities can give an impression of social functioning, whereas functional limitations or activities of daily living are part of the physical domain of QoL. The overall assessment of QoL, defined as 'an individual's overall satisfaction with life, and one's general sense of personal wellbeing' [1] covers the first level of Spilker's model [5]. This level can be interpreted as a global impression of the overall QoL of patients and corresponds to the WHOQOL definition of QoL. The separate domains of QoL form the second level in Spilker's model. The most widely used domains of QoL are psychological, social and physical functioning. Some studies add other domains of QoL, for example, somatic sensation and occupational function [12], economic status [1], cognitive functioning, personal productivity and intimacy [5]. In general, physical, social and psychological functioning are assumed to reflect QoL rather well. Finally, the third level of Spilker's model consists of the specific aspects of each domain of QoL.

Spilker's model assumes that QoL variables at a lower level determine QoL variables at a higher level [13]. Although this notion is appealing, thus far, little empirical research has been conducted to

assess the relations between lower level assessments of QoL and higher level assessments (i.e. overall QoL). From a theoretical point of view, this might be of importance, since it provides insight into the concept of QoL. As follows from Spilker's model, the distinction between measuring functional status on domains of QoL (Spilker's level 2) and a more general perception of QoL (Spilker's level 1) is relevant. Two issues illustrate the distinction between both levels of QoL. First, measuring functional status provides detailed information about the consequences of an illness and makes it possible to determine which domains have been affected by the illness and to what extent [14]. Patients' overall perception of QoL, on the other hand, may be more resistant to change and therefore less applicable to measure changes in the patients' condition as a consequence of illness. This hypothesis has been confirmed by Cummins [15], who proposed that people, due to their ability to adapt to changing factors in their environment, try to maintain a stable level of wellbeing. Second, domains of QoL probably do not fully cover the QoL of patients. An overall judgement of QoL, on the other hand, requires patients to evaluate several life domains and to combine the weightings of these domains into a 'generic value judgement' of life in general [4]. Therefore, such an overall judgement may better reflect patients' QoL.

In the present study, we focused on the contribution of the domains of QoL, i.e. physical, social and psychological functioning, to overall QoL. Consequently, the purpose of this study was to investigate the extent to which physical, social and psychological functioning explained overall QoL. In this study, we only measured the first and second levels of Spilker's model, since the literature shows great consensus concerning the conceptualisation of these levels of QoL. Specifically, we studied (a) whether physical, social and psychological functioning contributed differentially to overall QoL and (b) to what extent these domains together explained overall QoL.

Since different diseases may have a differential effect on the functioning of patients in domains of QoL, we studied the relationship between domains of QoL and overall QoL within several disease groups. Only a few studies have compared disorders with respect to QoL [16–22]. Differences among disorders may concern the specific domains

which have been affected, as well as the extent to which specific domains have been affected by the illness. Consequently, the contribution of the specific domains to overall QoL may differ between diseases. In the literature, some support has been found for the notion that disorders differentially affect domains of QoL [16, 19, 20]. Most studies agree that chronic medical conditions have a strong negative effect on physical functioning [21]. The effects of medical conditions on the psychological functioning of patients with a long-term illness are less straightforward. Whereas some studies did find differences in psychological functioning [22] between patients with a chronic disorder and healthy subjects, other studies found no differences in psychological functioning in patients with or without a chronic condition [17]. Therefore, it is important to compare several disorders with respect to QoL, since previous studies found differences in functioning between disorders on domains of QoL. As a result of disease-specific factors, such as specific symptoms or limitations, different medical disorders may have a differential impact on the domains of QoL and, consequently, the contribution of separate domains to overall QoL may vary in different groups of patients.

Methods

The present study was based on data collected in the Groningen Longitudinal Aging Study (GLAS). GLAS was a population-based prospective follow-up study of the psychological and social determinants of disease, functional disability, wellbeing and utilisation of care in older people [21, 23–27]. The primary objective of this study was to identify the psychosocial factors that influence the trajectory of QoL, independently or in interplay with disease-related factors. In 1993, a baseline assessment was carried out in a sample of 5279 persons of 57 years and older. Since then, several cohort studies have been conducted in which participants who experienced a particular disorder were followed up for 12 months after the onset of the disorder.

Source population

The source population consisted of late middle-aged and older people, living independently or in

adapted housing for elderly people in the north of the Netherlands. The study population comprised 8723 persons aged 57 and older on 1 January 1993, and all participants were registered with general practitioners participating in the Morbidity Registration Network Groningen (RNG). The RNG consists of 27 general practitioners who register every doctor–patient encounter in a computerised health information system; all these general practitioners participated in the study. In the Netherlands, approximately 99% of the non-institutionalised elderly are registered with a general practitioner who keeps full medical records. By letter, general practitioners asked potential participants for permission to provide the GLAS research team with their names and addresses. A total of 1937 patients refused (22%). Of the remaining 6786 patients, 1277 declined participation when contacted by the research team, and 152 had died or left the practice by the time contact was initiated. Another 78 participants were excluded because of severe cognitive impairments at baseline (Mini-Mental State Examination score of 16 or lower) [27]. Useful baseline data were available for 5279 research participants (62%; 5279/(8723–152)). With respect to subject non-response bias, non-response was not random but associated with the female gender and with higher age. Objectives, design and matters of representativeness of the GLAS study have been described earlier [21, 23]. The results showed no evidence of non-response bias relevant to the issues addressed in our study. The GLAS baseline assessment was carried out in 1993 and consisted of an interview and a mailed questionnaire. The research participants were interviewed face-to-face in their homes ($n = 4792$) or by telephone ($n = 487$) by well-trained middle-aged women who were not acquainted with the interviewees.

Patients and healthy subjects

In this study, patients with specified diseases and a healthy subgroup were selected from the baseline sample. We selected the eight chronic medical conditions that were most prevalent in the baseline sample by means of a checklist. In order to study the separate effect of each specified illness on the QoL of the patients involved, only patients with one disorder were included; thus, patients with co-

morbidity ($n = 1690$) were excluded from the analyses.

We selected patients who were diagnosed with one of the following eight different chronic diseases: lung disorder ($n = 159$), heart condition ($n = 284$), hypertension ($n = 405$), diabetes mellitus ($n = 102$), back problems for at least 3 months ($n = 117$), rheumatoid arthritis or other joint complaints ($n = 227$), chronic headache or migraine ($n = 77$), and serious dermatological disorders such as psoriasis and eczema ($n = 86$). The total group of patients we selected from the baseline assessment consisted of 1457 patients. In addition to the eight different groups of patients, one healthy group of 1851 persons without any chronic illness was included in the study.

Measures

Data were collected by means of semi-structured interviews and self-report questionnaires. These self-report questionnaires were partly administered during the interview and partly filled in directly after the interview.

Chronic conditions

A checklist of 19 chronic medical conditions was used in the interview part of the baseline data collection to identify the different patient groups in the study. Participants indicated whether they had any of these conditions in the 12 months prior to the interview. The Dutch Central Office for Statistics used the same procedure in its Health Survey Interview [28]. To reduce potential reporting bias by patients, only 'active' conditions were included – 'active' refers to conditions for which a general practitioner or a specialist had been consulted or medicines had been used during the 12 months prior to the interview [21]. The conditions were asthma or chronic bronchitis, pulmonary emphysema, heart condition, hypertension, (consequences of) stroke, diabetes mellitus, back problems for at least 3 months or slipped disc, rheumatoid arthritis or other joint complaints, migraine or chronic headache, serious dermatological disorders such as psoriasis and eczema, kidney disease, cancer, thyroid gland disorder, stomach ulcer, multiple sclerosis, other diseases of the nervous system such as Parkinson's disease or epilepsy, liver disease or gallstones, prostate dis-

ease, and leg ulcer. Results from other studies showed that these were usually conditions for which acceptable agreement was observed between self-reports and medical registrations [29, 30]. The present study concerned patients with the eight most prevalent chronic medical conditions together with a group of healthy subjects.

Specific domains of QoL

Physical functioning (six items), *social functioning* (one item) and *psychological functioning* (five items) were measured by the Medical Outcome Study (MOS) Short-Form General Health Survey (SF-20) [31]. Physical functioning and psychological functioning were measured during the interview part of the baseline assessment. Social functioning was measured by means of self-report. The physical functioning subscale measured the extent to which health interfered with activities such as climbing stairs and going for a walk. The social functioning scale assessed the interference of health with normal social activities such as visiting friends or family. Psychological functioning measured mood, including anxiety and depression, and wellbeing. All subscales varied from 0 to 100; higher scores indicated better functioning.

Overall QoL

Cantril's ladder measured overall QoL [32]. This scale was part of the questionnaire which patients filled in after the interview and measured overall QoL on a scale ranging from 0 to 10. Patients answered the following question: 'Here is a picture of a ladder. Suppose we say that the top of the ladder represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?'

Socio-demographic variables

The socio-demographic variables sex, age, marital status and educational level were assessed during the baseline interview. Marital status consisted of two categories, namely with or without a partner. Educational level consisted of six categories, which were reduced to four, ranging from less educated to highly educated [33]. Recent studies support the view that socio-demographic factors may to some extent contribute to the explanation of overall

QoL. Sprangers et al. [16] reported that, independent of the kind of illness, older age, being female, being less educated and living without a partner were related to a lower QoL. Therefore, the analyses in this study were corrected for these demographic variables.

Data analysis

First, we calculated mean scores and standard deviations for all domains of QoL and overall QoL to study the differences between the groups under study. Differences in mean scores were statistically tested with analysis of variances and Dunnetts T3 test for *post hoc* analysis. We performed regression analyses of the QoL domains and overall QoL on the demographic variables age, sex, marital status and educational level, to control for these background variables. The standardised residuals were used as dependent variables for the analysis of variance to test the differences between the healthy group and the different patient groups. Since inequality of variance was found, we performed Dunnetts T3 *post hoc* test. We then performed bivariate correlation analyses to study the associations between domains of QoL and overall QoL. In addition, multiple regression analyses were performed to assess the relative contribution of the several domains of QoL to overall QoL. On the basis of the theoretical model applied in a previous study [4], we supposed that a physical disorder not only directly affects patients' overall QoL, but also through an effect on physical, social, and eventually, psychological functioning. Therefore, we performed a hierarchical regression analysis. First, to adjust for the influence of socio-demographic characteristics, the variables age, sex, marital status and educational level were brought into the analysis. In the next step, the QoL domains were entered hierarchically into the analysis: The domain of physical functioning was first entered, followed by social functioning and, finally, psychological functioning. The outcome measure was overall QoL measured by Cantril's ladder. Entering the QoL domains hierarchically into the analysis meant that the contribution of each domain was corrected for the contributions of the other domains. The β coefficients of the three domains in the final regression model show the independent (direct) relationships of the separate domains with

overall QoL, after all the variables have been entered into the analysis.

Results

Socio-demographic variables

Table 1 shows the scores on demographic variables for each separate medical condition and for the healthy group.

Significant differences were found among the groups with respect to age, sex, educational level and marital status, which is not unexpected considering the large sample size. The largest difference between the groups was found with respect to sex. In the group with a heart condition, relatively more patients were male. In the groups with migraine, rheumatoid arthritis, back problems, diabetes mellitus or hypertension, on the other hand, relatively more patients were female.

Differences between patient groups and healthy subjects in QoL domains

Table 2 shows the mean scores of the groups of patients and the healthy group for the MOS scales.

First, the mean scores on domains of QoL in the patient groups and healthy subjects were compared, in order to study the differential effects of the medical conditions on the physical, social and psychological functioning of the patients.

Various patient groups, with the exception of patients with hypertension, diabetes mellitus and dermatological problems, scored significantly lower on *physical* functioning than did healthy subjects. Regarding *social* functioning, significantly lower scores were found for patients with lung disorders, a heart condition, back problems, rheumatoid arthritis and migraine compared with healthy subjects. Furthermore, patients with lung disorders and migraine reported a lower *psychological* functioning than did healthy subjects; remarkably, no other patient groups differed significantly from the healthy group in this respect.

To summarise these results, patients with lung disorders and those with migraine reported lower functioning than did healthy subjects in all domains of QoL, whereas, in contrast, patients with hypertension, diabetes mellitus or dermatological

Table 1. Mean scores and standard deviations (in parentheses) of demographic characteristics for patients with chronic medical conditions and healthy subjects

Chronic medical conditions										
	Healthy subjects N = 1851	Lung disorder N = 159	Heart condition N = 284	Hypertension N = 405	Diabetes mellitus N = 102	Back problems N = 117	Rheumatoid arthritis N = 227	Migraine N = 77	Dermatological disorders (N = 86)	Statistics
Age										
Mean (SD)	68.5 (8.1)	69.9 (7.7)	71.3 (7.9)	69.2 (7.5)	71.3 (7.8)	68.2 (8.2)	69.9 (8.4)	65.5 (7.6)	67.3 (8.2)	$F = 8.1^*$
Sex										
Male	48.7%	54.7%	66.2%	34.1%	36.3%	32.5%	28.6%	26.0%	48.8%	$\chi^2 = 133.5^*$
Female	51.3%	45.3%	33.8%	65.9%	63.7%	67.5%	71.4%	74.0%	51.2%	
Educational level										
I	32.1%	45.3%	32.4%	35.8%	49.0%	29.0%	37.2%	33.8%	25.6%	$\chi^2 = 45.6^{***}$
II	27.3%	28.9%	26.0%	29.6%	20.6%	30.8%	28.8%	24.7%	27.9%	
III	28.7%	22.0%	28.2%	23.7%	23.5%	32.5%	22.5%	28.5%	31.4%	
IV	11.9%	3.8%	13.4%	10.9%	6.9%	7.7%	11.5%	13.0%	15.1%	
Marital status										
No partner	28.3%	32.7%	26.4%	34.1%	36.3%	35.0%	37.0%	22.1%	26.7%	$\chi^2 = 19.6^{***}$
Partner	71.7%	67.3%	73.6%	65.9%	63.7%	65.0%	63.0%	77.9%	73.3%	

Note. Differences between the groups with respect to demographic characteristics were tested by means of analysis of variance and χ^2 tests. I = elementary school; II = lower vocational training; III = secondary school/intermediate vocational training; IV = higher vocational training/university.

* $p < 0.001$; ** $p < 0.01$; *** $p < 0.05$.

Table 2. Mean scores and standard deviations (in parentheses) of MOS Short-Form Questionnaire for patients with chronic medical conditions and healthy subjects

Chronic medical conditions									
	Healthy subjects N = 1851	Lung disorder N = 159	Heart condition N = 284	Hypertension N = 405	Diabetes mellitus N = 102	Back problems N = 117	Rheumatoid arthritis N = 227	Migraine N = 77	Dermatological disorders N = 86
MOS scales									
Physical functioning	81.20 (23.22)	64.05* (28.66)	66.37* (27.44)	75.99 (26.09)	69.95 (29.76)	55.84* (25.27)	60.13* (28.48)	73.46** (25.85)	81.59 (21.85)
Social functioning	89.30 (20.67)	76.75* (27.48)	81.44* (23.61)	88.36 (20.80)	84.57 (24.47)	78.58*** (24.60)	77.73* (25.65)	80.55** (23.56)	90.95 (15.02)
Psychological functioning	80.40 (17.11)	74.01* (19.55)	78.52 (17.99)	77.84 (16.06)	77.41 (20.39)	74.07 (18.75)	76.62 (17.44)	70.11*** (20.23)	76.09 (19.23)
Cantril's ladder	7.70 (1.42)	7.14* (1.53)	7.46 (1.46)	7.64 (1.33)	7.39 (1.39)	7.34 (1.50)	7.41 (1.55)	7.05*** (1.45)	7.63 (1.25)

Note. Patients with a specific condition were compared with subjects without any of the conditions after control for differences due to age, sex, educational level and marital status.

* $p < 0.001$; ** $p < 0.05$; *** $p < 0.01$.

disorders did not differ in any of the QoL domains compared to healthy subjects. Patients with heart conditions, back problems and rheumatoid arthritis scored lower than the healthy subjects in the physical and social domains of QoL.

Differences between patient groups and healthy subjects in overall QoL

With respect to overall QoL measured by Cantril's ladder, only patients with lung disorders and migraine reported a significantly lower overall QoL than did healthy subjects. This is in accordance with the findings mentioned above, since these patients also reported a lower functioning in all QoL domains. All other patient groups did not differ significantly from the healthy group with respect to overall QoL.

Correlations between QoL domains and overall QoL

Pearson's correlation coefficients were calculated between domains of QoL and overall QoL for each separate group. Table 3 shows the correlation coefficients for the patient groups and healthy subjects.

Correlation coefficients varied from 0.16 to 0.54; the strongest associations were found for patients with migraine between social functioning and overall QoL ($r = 0.53$, $p < 0.01$) and psychological functioning with overall QoL ($r = 0.54$, $p < 0.01$). For patients with dermatological disorders, physical functioning and overall QoL were not significantly correlated ($r = 0.16$, ns).

Contributions of QoL domains to overall QoL

First, correlation coefficients were computed for each domain of QoL with the other domains, which, for reasons of space, are not reported in a table but just discussed here. The strongest correlation coefficients were found for social functioning and physical functioning ($r = 0.45$, $p < 0.01$), psychological functioning and overall QoL ($r = 0.41$, $p < 0.01$), and social functioning and psychological functioning ($r = 0.32$, $p < 0.01$). Somewhat smaller correlation coefficients were found for social functioning and overall QoL ($r = 0.30$, $p < 0.01$), physical functioning and overall QoL ($r = 0.26$, $p < 0.01$), and physical

functioning and psychological functioning ($r = 0.22$, $p < 0.01$).

Regression analyses were performed to study the independent contribution of the domains of QoL to overall QoL for each medical condition and for the healthy subjects. Table 4 presents the independent contributions of the QoL domains in the final regression model after all domains have been entered into the analysis.

The regression analyses, described more extensively in the analysis section, were performed separately for each group of patients and the healthy subjects, following the same procedure.

In the final regression model, an important part of the variance of overall QoL for all medical conditions was explained by the domain of psychological functioning (β coefficients ranging from 0.24 to 0.41). For all disorders as well as for the healthy subjects, psychological functioning was related to overall QoL. Social functioning was independently related to overall QoL for healthy subjects ($\beta = 0.13$, $p < 0.001$) and patients with back problems ($\beta = 0.25$, $p < 0.05$), rheumatoid arthritis ($\beta = 0.21$, $p < 0.01$) and migraine ($\beta = 0.32$, $p < 0.01$). Physical functioning contributed to the explanation of overall QoL for patients with lung disorders ($\beta = 0.28$, $p < 0.01$) and hypertension ($\beta = 0.12$, $p < 0.05$) as well as for the healthy subjects ($\beta = 0.08$, $p < 0.01$). Since the group of healthy subjects included a larger number of subjects than the patient groups, smaller β coefficients were found to be significant in the healthy group.

The variances explained by demographic variables together with the three domains of QoL did not differ much among the various disorders. For most disorders the percentages of explained variances ranged from approximately 20% for patients with heart conditions, hypertension, diabetes, dermatological disorders and healthy subjects to approximately 30% for patients with lung disorders, back problems and rheumatoid arthritis. Remarkably, for patients with migraine, the QoL domains and demographic variables explained 44% of the variance of overall QoL.

To sum up, the results of the regression analyses showed that the domains of QoL differed with respect to their contribution to overall QoL, yet the independent contribution of the domains depends on the type of disorder. In the final model,

Table 3. Pearson's correlation coefficients of MOS subscales with Cantril's ladder for patients with chronic medical conditions and healthy subjects

MOS scales	Chronic medical conditions								
	Healthy subjects	Lung disorder	Heart condition	Hypertension	Diabetes mellitus	Back problems	Rheumatoid arthritis	Migraine	Dermatological disorders
	0.20*	0.40*	0.24*	0.20*	0.34*	0.33*	0.24*	0.25**	0.16
	0.26*	0.36*	0.31*	0.24*	0.28*	0.38*	0.34*	0.53*	0.35*
	0.41*	0.43*	0.39*	0.40*	0.30*	0.42*	0.42*	0.54*	0.38*

* $p < 0.01$; ** $p < 0.05$; *** $p < 0.001$.

Table 4. Standardised regression coefficients (β) for patients with chronic medical conditions and healthy subjects of Cantril's ladder on MOS subscales, controlled for background variables

	Healthy subjects		Lung disorder		Heart condition		Hypertension		Diabetes mellitus	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Demographic characteristics										
Age	0.01		-0.07		0.05		0.05		0.07	
Sex	0.08*		0.11		0.13		0.12**		0.17	
Marital status	0.07*		0.07		0.08		0.13**		0.17	
Educational level	0.02	0.03	0.06	0.08	0.06	0.02	-0.03	0.04	0.07	0.05
MOS scales										
Physical functioning	0.08*	0.03	0.28*	0.11	0.12	0.05	0.12**	0.02	0.19	0.09
Social functioning	0.13***	0.04	0.07	0.03	0.14	0.05	0.08	0.03	0.14	0.02
Psychological functioning	0.35***	0.10	0.38***	0.11	0.32***	0.08	0.37***	0.12	0.24**	0.05
Total R^2		0.20		0.33		0.20		0.21		0.21
	Back problems		Rheumatoid arthritis		Migraine		Dermatological disorders			
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2		
Demographic characteristics										
Age	-0.02		0.15**		0.19		-0.02			
Sex	0.06		0.04		0.09		0.14			
Marital status	-0.03		0.14**		0.13		0.14			
Educational level	0.06	0.03	-0.02	0.05	0.11	0.12	0.15	0.10		
MOS scales										
Physical functioning	0.16	0.08	0.10	0.06	0.13	0.03	-0.03	0.00		
Social functioning	0.25**	0.08	0.21*	0.06	0.32*	0.18	0.19	0.8		
Psychological functioning	0.33*	0.09	0.34***	0.10	0.41*	0.11	0.27**	0.05		
Total R^2		0.28		0.27		0.44		0.23		

* $p < 0.01$; ** $p < 0.05$; *** $p < 0.001$.

psychological functioning was independently related to overall QoL for all patient groups. For patients with back problems, rheumatoid arthritis and migraine, social functioning also maintained a direct effect on overall QoL in the final model. In the groups of patients with lung disorders and hypertension, physical functioning was also related to overall QoL. Thus, although physical and social functioning were related to overall QoL for some disorders, psychological functioning showed the strongest independent relationship with overall QoL for all patient groups and healthy subjects.

Discussion

The main focus of the present study was to examine the contribution of QoL domains to the explanation of overall QoL. The results of the re-

gression analyses showed that the domain of psychological functioning contributed to overall QoL for all disorders and for the healthy subjects. Only for some disorders, i.e. lung disorder, hypertension, back problems, rheumatoid arthritis and migraine, did physical or social functioning contribute independently to overall QoL. For the healthy subjects, the physical, social and psychological domains all contributed significantly to overall QoL, although this may be due to sample size. Furthermore, we studied the differences between several medical conditions and a healthy group in functioning on QoL domains and overall QoL. The results showed that most patient groups reported a lower physical functioning than did the healthy subjects, with the exception of patients with hypertension, diabetes mellitus and dermatological disorders. With respect to social functioning, five of the eight patient groups were

impaired, whereas with respect to psychological functioning only patients with lung disorders and migraine differed from the healthy group. These results are consistent with earlier studies that found small differences between patients and healthy subjects with respect to psychological and social functioning [17, 34]. Stein et al. [34], for example, suggested that diagnosis as a variable is not a good predictor for social and psychological outcomes. Apparently, although there are differences between disorders with respect to the domains of QoL that have been affected, most disorders had an effect on physical functioning.

This study shows that the separate QoL domains made a limited contribution to the explanation of overall QoL. Impairments in one or more of the domains of QoL do not automatically result in an impairment of overall QoL. Measuring domains of QoL and overall QoL seem to be two different ways to study the impact of an illness on the lives of patients. For example, we found that physical functioning contributed to overall QoL for only a few disorders, whereas most patient groups did show a lower physical functioning than the healthy group did. Furthermore, few patient groups were impaired with respect to psychological functioning compared to the healthy subjects, while psychological functioning contributed to the explanation of overall QoL for all disorders. On the other hand, for patients with lung disorders and migraine, who were impaired with respect to all three QoL domains, the three domains of QoL explained the largest amount of variance of overall QoL. When two domains of QoL were affected, namely in patients with a heart condition, back problems or rheumatoid arthritis, somewhat less variance of overall QoL was explained. For the patient groups that were impaired with respect to only one domain or were not impaired at all, the amount of variance explained by the three domains of QoL did not differ from that of the healthy group. It seems as if the separate domains of QoL contribute most to the explanation of overall QoL when the impact of the disease is profound, i.e. when it extends to all domains of QoL.

With respect to overall QoL, it appeared that most chronically ill patients did not differ from the healthy subjects. Comparable results were found by Cummins [35, 36], who reported a 'gold standard' for subjective wellbeing which he had found

for many different people with different nationalities. According to Cummins [36], people tend to maintain a certain level of wellbeing, regardless of changes in their environment. Only when these changes exceed a certain threshold will environmental factors affect the subjective wellbeing of people [15]. The finding that most patient groups did not differ from the healthy group supports this hypothesis of 'homeostasis' and shows that patients eventually adapt to their illness to a certain extent. Patients with lung disorders and migraine differed from the healthy subjects for all three domains of QoL. This may have led to them exceeding the threshold of homeostasis and made it no longer possible for them to maintain a normal level of wellbeing and, in our case, overall QoL.

The results showed that more diseases affected the physical domain of QoL than the psychological domain. However, we also found that psychological functioning in particular and physical functioning to a lesser degree contributed to the explanation of overall QoL. Similar results have been found by Suurmeijer et al. [4], who also reported that psychosocial variables explained more variance of a judgement of overall QoL than clinical variables. Our findings support a hierarchical relationship between the QoL domains, which we assumed in the regression model we applied. Moreover, we found moderately strong correlations between physical functioning on the one hand and psychological and social functioning on the other, which underlines this assumption.

Since the primary aim of our study was to examine the relative contribution of the separate QoL domains to overall QoL, in order to avoid bias due to co-morbidity, we decided to select patients with only one medical condition. By doing so, it was also possible to study the specific effects of a single disorder on the QoL domains of the patients involved. On the other hand, this may have led to selection bias: Most elderly people have more than one co-morbid condition and, consequently, we may have selected the somewhat healthier elderly people from the sample. Therefore, the findings concerning the impact of disease on QoL should be interpreted cautiously.

This study has a few shortcomings. First, patients with prevalent disorders of unknown duration have been included. Therefore, within groups, patients probably varied with respect to the du-

ration of their illness: Some patients in the advanced stages of their illness may already have adapted to their illness, whereas other patients were at the beginning of the process. Depending on the kind of illness, patients in advanced stages of the illness may already have deteriorated significantly, whereas patients at the beginning of the course of an illness may have been much healthier. Therefore, the patient groups in the study were probably heterogeneous. Second, the data used in this study are cross-sectional and therefore do not provide insight into the longitudinal effects of functioning on domains and overall QoL and a subsequent effect of domains on overall QoL. Physical, social and psychological functioning are probably subject to fluctuations in time, for example due to the course of the illness. Therefore, the relationships between domains and overall QoL may also change over time. It might be interesting to study the relationship between changes in functioning in QoL domains with overall QoL in patients with different illnesses. Furthermore, since the data are cross-sectional, it is not possible to test statistically the hierarchical ordering of the physical, social and psychological domains. We assumed that physical functioning affects psychological functioning through social functioning, but we cannot exclude the possibility of inverse relationships or feedback loops. Furthermore, the hierarchy among the QoL domains may differ across disorders. For example, conditions mainly characterised by motor or vitality problems, such as back problems or rheumatoid arthritis, probably first affect the physical functioning of patients, whereas conditions such as dermatological disorders, which affect patients' appearance, may first have an effect on social functioning.

A subject that needs further attention concerns the result that the amount of variance explained by the three domains of QoL was not very large. This can partly be explained by the fact that both the QoL domains and overall QoL were measured in a relatively simple way; for instance, overall QoL was measured by one single item. We measured QoL on only two levels of Spilker's model [1], which means that no underlying factors of the three QoL domains were discriminated. Moreover, we measured the three domains of QoL by means of the SF-20, which measures the effects of a dis-

ease on functioning. As a consequence, this measure focuses only on those aspects of QoL that are related to health. We realise that the aspects of physical, social and psychological functioning we measured do not entirely explain overall QoL, since health probably plays a relatively small part in QoL [37]. Other important factors than the three major domains of QoL contribute to overall QoL [37]. Although, in general, these three domains of QoL are studied to represent QoL, factors such as personal resources or life events are likely to affect patients' overall QoL.

By measuring functioning on domains of QoL, additional information about other factors that affect the overall QoL of patients may have been overlooked. Verkerk et al. [38] provided a theoretical explanation that offers a wider perspective on the assessment of QoL. Their model includes the capability of people, which refers to the opportunity people have to achieve a certain desired situation, despite their functioning on specific life domains. For example, although a disabled person may not be able to perform certain activities by himself, he can manage to have a satisfying social life by asking friends to accompany him. This patient is more capable than other patients who are not able to change their situation, which consequently may affect their QoL. This explanation is consistent with Cummins's hypothesis of homeostasis, namely that people try to maintain a stable level of wellbeing, regardless of small environmental changes [15].

Another important issue concerns the judgement of patients of their overall QoL. The assumption has been made that patients make judgements about different aspects of their lives and combine these into a general judgement about the overall quality of their lives. The question is whether patients actually do make such a general judgement. Campbell et al. [39] state that 'life as a whole is a concept of such breadth that few people are accustomed to thinking of their situation in such a way'. According to Rogerson [7], the interpretation of overall judgements of QoL is rather difficult, while the same results can be explained by different underlying factors. It may well be that people have different operationalisations in mind, and even within subjects, these operationalisations may change over time due to changing priorities during the course of life or due to

changing life circumstances, such as certain life-events.

The result of this study that domains of QoL and an overall judgement of QoL imply two different ways of looking at QoL may be of consequence for health professionals, since measuring QoL can be helpful in determining the right treatment for a specific patient. In this case, the choice for one of the measures to assess the QoL of a patient depends on the kind of information needed. For example, when a doctor wants to know if his patient's physical functioning is good enough to participate in a rehabilitation programme, he needs detailed information about the physical domain of QoL. When a health professional is interested in patients' overall wellbeing as a result of a particular treatment, asking for a judgement of overall QoL can be sufficient. Another finding that may be important for clinical practice is that, in this study, patients with lung disorders and migraine were much worse off than the other patient groups in this study. With respect to physical functioning as well as social and psychological functioning, these patients reported a lower functioning than the healthy subjects did. This implies that these patients may benefit from a more multidisciplinary treatment, for example aimed at the psychological consequences of these illnesses, rather than just paying attention to the medical aspects of these illnesses.

A more conceptual implication of this study concerns the definition of QoL: The terms 'quality of life' or 'health-related quality of life' are used for domains of QoL as well as general perceptions of QoL, and therefore, the use of this term leads to confusion. A good solution may be to refer to functioning in domains of QoL as physical, social and psychological functioning and reserve the term 'QoL' for more general, subjective perceptions about life as a whole.

To conclude, this study assessed the relationship between domains of QoL and overall QoL. Previous studies have noted a distinction between both perspectives on QoL, namely a general conceptualisation of QoL or dividing QoL into several components [1, 4, 7]. The present study has advanced this discussion by assessing the relative contribution of the domains of QoL and showing that the three domains of QoL do not explain the total variance of overall QoL. Furthermore, this

study has compared patients with various kinds of disorders, which has only been performed by a few other studies [16]. It would be interesting to study the functioning of patients in domains of QoL and overall QoL longitudinally to investigate whether the contributions of the domains to overall QoL change over time and whether these contributions are affected by the course of the illness.

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