

A COMPARISON OF TWO RECENTLY DEVELOPED HEALTH STATUS INSTRUMENTS FOR PATIENTS WITH ARTHRITIS: DUTCH-AIMS2 AND IRGL

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SUMMARY

Two multidimensional health status instruments of rheumatic diseases, the Dutch-AIMS2 and the IRGL (Impact of Rheumatic diseases on General health and Lifestyle), were compared in a sample of 284 rheumatoid arthritis patients with regard to their measurement properties and usefulness for research purposes. Both questionnaires showed an excellent reliability (Cronbach's α), and were highly comparable with regard to their construct and convergent validity. Second-order factor analysis confirmed the physical, psychological and social health dimensions for both questionnaires. The comparability between the instruments was established by high intercorrelations between the physical and psychological health dimensions. Sufficient convergent validity was indicated by the strong correlations between the physical functioning scales and clinical and laboratory measures. The main differences between both questionnaires relate to their length and emphasis on health aspects. The Dutch-AIMS2 is characterized by a more extensive assessment of the physical dimension and the additional measurement of general health aspects. The shorter IRGL exclusively assesses the main health dimensions with a more comprehensive measurement of the psychological and social dimensions. The instrument that reflects the subject in question most adequately should be chosen.

KEY WORDS: Rheumatoid arthritis, Health status questionnaire, Quality of life.

OUTCOME assessment of rheumatic diseases is increasingly characterized by multidimensional approaches to assess the health status of patients which is, in accordance with the World Health Organization (WHO) [1], defined as physical, psychological and social well-being. Assessing these health dimensions requires other instruments than the sole use of clinical and laboratory data, and has resulted in the development of different self-report health status instruments. The conceptual and practical usefulness of self-report data has, for example, been demonstrated for the outcome assessment of natural history and treatment effects in rheumatoid arthritis (RA), the prediction of mortality or the utilization of and demand for health care services [2-8].

In recent decades, various multidimensional health status instruments have been developed, translated and validated for the Dutch RA population: the Arthritis Impact Measurement Scales (AIMS) [9, 10], the Sickness Impact Profile (SIP) [11, 12] and the Health Assessment Questionnaire (HAQ) [13-15]. Of these instruments, the AIMS most comprehensively reflected the physical, psychological and social health dimensions [10, 16], but it was at that time also characterized by a number of psychometric problems [17, 18]. For these reasons, a new instrument that was derived from the AIMS was empirically developed for the Dutch arthritis population to assess the physical, psycholo-

gical and social aspects of health status in a more sophisticated way: the IRGL (Invloed van Reuma op Gezondheid en Leefwijze = Impact of Rheumatic diseases on General health and Lifestyle) [17, 19]. Recently, a revised and strengthened version of the AIMS, AIMS2, was developed and translated for application in the Dutch population of RA patients [18, 20]. Both questionnaires, the IRGL and the Dutch-AIMS2, have proved to be reliable and valid instruments [17, 19, 20], and are widely used in the Dutch arthritis population.

When selecting an instrument for use in clinical practice and research, its suitability depends on the assessment of intended health constructs, the measurement efficiency and its user friendliness. In order to facilitate the making of a decision regarding an outcome measure and to allow direct comparisons of RA samples in which one of the questionnaires was used, the Dutch-AIMS2 and the IRGL were compared with regard to their psychometric properties and usefulness for different research purposes.

METHODS

Procedure

Three hundred and thirty-seven consecutive out-patients from three hospitals in widely separated parts of the Netherlands were asked by their rheumatologists to participate in this study. Questionnaires were administered during a routine visit when clinical and laboratory data were also collected. Inclusion criteria were a minimum age of 20 yr and a diagnosis of RA assessed by a rheumatologist according to the 1987 ACR criteria [21]. Correctly completed questionnaires were returned by 284 patients (85%).

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Measures

Self-report data. Patients completed the two questionnaires: the Dutch-AIMS2 [20] and the IRGL [19]. In order to control order effects, a cross-balanced procedure was applied (for a further description of the questionnaires, see the Results; for a detailed description of the AIMS2 see Meenan *et al.* [18], for the IRGL see Huiskes *et al.* [17, 19]). In addition, the sex, age, social status, level of education, income and disease duration of patients, and use of medication, were recorded.

Clinical and laboratory data. Prior to administering the questionnaires, the following disease measures were obtained: ARA functional classes [22], erythrocyte sedimentation rate (ESR), absence or presence of rheumatoid factor and bone erosions. From a subsample of 80 consecutive patients from one hospital, additional data were available on joint scores (Ritchie score) [23], grip strength and radiographics according to the classification of Steinbrocker [22].

Statistics

Only those scales were used in the analyses which allowed comparisons between the two questionnaires, i.e. the physical, psychological and social functioning scales, and the disease impact scales. The two questionnaires were analysed as follows.

- (1) Reliability was assessed by determining the internal consistency (Cronbach's α) [24] of the scales and the stability of the scales (test-retest reliability). Test-retest reliability was assessed by determining internal consistency as well as Pearson's product moment correlation coefficients between two measurement points within a subsample of 67 consecutive patients from one hospital who completed the Dutch-AIMS2 twice with a time interval of 1 month.
- (2) Construct validity was explored by conducting a principal component factor analysis with varimax rotation.
- (3) Comparability of the instruments was assessed by computing Pearson's product moment correlation coefficients between the corresponding scales of both questionnaires.
- (4) Convergent validity was assessed by computing Pearson's product moment correlation coefficients with clinical and laboratory measures, disease duration and demographic variables (age, education, income).

Normal distribution of the self-report, clinical and laboratory data was determined by skewness and kurtosis cut-offs of <0.1 , and by viewing the normal probability plots. In the case of skewness (depressed mood scale of the IRGL, self-care scale of the Dutch-AIMS2 and grip strength), square root transformation was applied which resulted in normal distributions of the skewed variables. All statistical analyses were carried out with the SPSS 6.1/Windows statistical package.

RESULTS

Sample

The sample was predominantly female (70%) and married or living with a partner (68%). Of the subjects,

25% had primary and 60% had secondary education. The mean age (\pm s.d.) was 60 yr (\pm 14.5). Mean disease duration (\pm s.d.) was 15.1 yr (\pm 11.2). The majority of the patients were classified according to functional class II or III (class I: 4%; class II: 64%; class III: 29%; class IV: 3%). The rheumatoid factor was positive in 75% and erosions were established in 76% of the patients. The mean ESR (\pm s.d.) was 29.4 (\pm 19.9). Most of the patients used non-steroidal anti-inflammatory drug (NSAID) and/or disease-modifying anti-rheumatic drug (DMARD) medication (80 and 81%, respectively); only a minority had oral corticosteroids or paracetamol (27 and 23%, respectively). Patients who did not return the questionnaires did not differ significantly from respondents with respect to sex, age, social status, disease duration, clinical status (ARA class, ESR, the absence or presence of the rheumatoid factor and erosions) or the use of medication. The patients of the two subsamples who were selected for the purpose of convergent validity ($n = 80$) and test-retest reliability ($n = 67$) also did not differ from the main sample with respect to these characteristics.

Descriptive comparison of the Dutch-AIMS2 and the IRGL

Questionnaires were compared with regard to their content and construction, use of response categories and time interval, scoring and the length of the questionnaires.

Content and construction. The instruments differ with respect to their method of construction and emphasis on different health aspects. The Dutch-AIMS2 was designed *a priori* and focuses more on the assessment of physical aspects than on psychological and social aspects. The aim of the empirically developed IRGL was to measure the different health dimensions in an equal constraint. Consequently, the psychological and social functioning scales are assessed more comprehensively (see Table I for the number of scales and the number of items for each health dimension). The health dimensions are assessed by the two questionnaires as follows.

(1) Physical functioning. The Dutch-AIMS2 measures the physical dimension through six functional status scales (mobility, walking and bending, hand and finger function, arm function, self-care, household tasks) and one pain scale. The IRGL dimension of physical functioning is an abridged adaptation from the Dutch-AIMS and consists of three scales (mobility, self-care and pain). The functional status is measured by assessing the use of upper and lower extremities (respectively, self-care and mobility).

(2) Psychological functioning. Two new scales of negative affect were added to the Dutch-AIMS2 to measure psychological functioning: mood and level of tension. The IRGL assesses the psychological dimension somewhat more comprehensively as positive and negative affect by three already existing scales (anxiety, depressed mood and cheerful mood), of which the

reliability and validity have been studied in the Dutch population [25, 26].

(3) Social functioning. Corresponding to the broad conceptualization and operationalization of social well-being in other research areas, the social health aspects are measured differently in both questionnaires. In the Dutch-AIMS2, two new designed scales refer to the quality of social functioning: social activities and support from family and friends. The IRGL distinguishes between qualitative and quantitative aspects of social functioning in accordance with the conceptualization of Cohen and Wills [27]. The qualitative aspect in the IRGL is measured by three scales of a Dutch validated social support scale [28]: perceived support, actual support and mutual visits. The quantitative aspect is assessed by the size of the social network (number of friends and the number of neighbours with whom one associates).

(4) Disease impact. Both questionnaires contain scales which assess the impact the disease has on the patient's life. For the Dutch-AIMS2, these are the 'satisfaction' scale which establishes the patient's satisfaction with 12 health areas, and the 'work' scale which measures the ability of the patients to carry out work (if they still work). The 'arthritis-impact' scale of the Dutch-AIMS2 measures the evaluation of their own health status in comparison to others and may be less comparable to the impact scales of the IRGL. The IRGL assesses the impact of the disease with one 'impact'

scale that measures the general impact of RA on several domains of daily life (e.g. work, activities, leisure, relationships, sexuality, food, sleep). The scale can be divided into four subscales of which only the 'impact on activities' scale is applied for the purpose of this study.

Response category and time interval. The questionnaires differ in the application of response categories for the three health dimensions: the Dutch-AIMS2 predominantly uses two kinds of five-point scales (always/every day-usually/most days-sometimes/some days-rarely-never); the IRGL mainly uses one kind of four-point scale (almost never-sometimes-often-almost always). A further aspect concerns the use of time intervals. Most questions of the Dutch-AIMS2 refer to the patient's functioning within the last month, whereas time intervals in the IRGL are taken from the original scales: the physical functioning scales refer to the previous month, the psychological scales to the previous week (depressed and cheerful mood) and previous month (anxiety), and the social functioning scales to the previous half-year.

Scoring. In the Dutch-AIMS2, item responses are adjusted to a 0-10 range, with 0 representing a good health status and 10 representing a poor health status (e.g. higher values of pain, mobility, and hand and finger function indicate a poor health status). By calculating the average mean, an overall physical, psychological and social interaction scale can be pro-

TABLE I
Health status scores and internal consistency (Cronbach's α) of the Dutch-AIMS2 and the IRGL scales*

Dutch-AIMS2			IRGL		
Scales (number of items)	Mean (s.d.)	α	Scales (number of items)	Mean (s.d.)	α
Physical functioning					
Mobility (5)	2.68 (2.22)	0.82	Mobility (7)	17.31 (6.52)	
Walking and bending (5)	5.46 (2.56)	0.80			
Hand and finger function (5)	3.64 (2.53)	0.89	Self-care (8)	22.60 (6.61)	
Arm function (5)	2.59 (2.47)	0.88			
Self-care (4)	1.54 (2.19)	0.85			
Household tasks (4)	2.93 (3.04)	0.88			
Pain (6)	5.18 (2.29)	0.86	Pain (6)	15.58 (4.75)	
Psychological functioning					
Level of tension (5)	3.89 (1.97)	0.88	Anxiety (10)	18.64 (5.65)	0.92
Mood (5)	2.86 (1.55)	0.80	Depressed mood (6)	3.42 (3.65)	0.92
			Cheerful mood (6)	11.42 (4.22)	0.93
Social functioning					
Support (4)	3.25 (2.55)	0.90	Perceived support (5)	15.77 (3.80)	0.94
Social activities (4)	5.08 (1.16)	0.65	Actual support (3)	6.69 (1.81)	0.68
			Mutual visit (2)	5.80 (1.37)	0.72
			Social network†		
			Neighbours (1)	2.27 (0.85)	
			Friends (1)	2.10 (0.77)	
Disease impact					
Satisfaction (12)	3.93 (2.16)	0.91	Disease impact (10)	21.79 (6.62)	0.91
Work (4)	4.39 (2.70)	0.77	Impact activities (5)	12.73 (4.34)	0.88
Arthritis impact (1)	4.95 (2.04)				

*Theoretical scale range. Dutch-AIMS2: for all scales 0-10. IRGL: mobility and self-care 8-28; pain 6-25; anxiety and disease impact 10-40; depressed and cheerful mood 0-20; perceived support and impact activities 5-20; mutual visit 2-8; actual support 3-12; social network 1-4.

†Scores are categorized in norm classes [19].

duced. In the IRGL, scales differ in their ranges (see Table I) and are scored in the original direction (e.g. higher values on pain, and lower values on mobility and self-care indicate a poor health status).

Length of the questionnaires. The Dutch-AIMS2 is a more extensive questionnaire than the IRGL, mainly because of the assessment of additional health aspects, such as patients' priority areas for improvement, attribution of health problems, perception of current and future health, and a number of medical aspects (co-morbidity, medication usage, type of rheumatic disease, disease duration). The Dutch-AIMS2 consists of 71 questions with 112 single items. It takes about 20 min to complete. The IRGL focuses exclusively on the aforementioned health dimensions and consists of 16 questions with 68 single items. It takes about 15 min to complete.

User friendliness. Both questionnaires are self-administered and can be completed without (professional) assistance. As far as is known, there are no major comprehension problems with the questionnaires. In addition, the response rate was high (85%) and almost all questions were answered by the respondents.

Reliability

As demonstrated in Table I, the internal consistency of the scales of both questionnaires is highly satisfactory. The alpha coefficients in most cases exceed 0.80 for the Dutch-AIMS2 and 0.90 for the IRGL, which indicates sufficient reliability for clinical use and patient selection, respectively [24]. Even the somewhat lower alphas of the 'social activities' and 'work' scales of the Dutch-AIMS2 (0.65 and 0.77, respectively), as well as the 'actual support' and 'mutual visit' scales of the IRGL (0.68 and 0.72, respectively), exceed the threshold value of 0.60, which indicates sufficient reliability for research purposes [24].

In order to assess the test-retest reliability of the Dutch-AIMS2, Cronbach's α as well as Pearson's product moment correlations between the two assessment points with a time interval of 1 month were calculated in the subgroup of 67 patients. Results of internal consistencies (between 0.86 and 0.96) and Pearson's product moment correlations (between 0.73 and 0.92) revealed a high test-retest reliability for the physical, psychological and social health dimensions of the Dutch-AIMS2. The strength of the alpha coefficients was similar to those previously established for the physical and psychological dimensions of the IRGL [29].

Construct validity

In order to determine the construct validity of the health dimensions, a principal component factor analysis with varimax rotation was conducted. The 'disease impact' scales were excluded from this analysis, because we assumed that they would be related to all health dimensions. The criterion for factor extraction was the scree test [30] which resulted in a three-factor solution. As demonstrated in Table II, the intended constructs

TABLE II
Factor analysis of the Dutch-AIMS2 and the IRGL*

	Factor 1: 'physical'	Factor 2: 'psychological'	Factor 3: 'social'
Dutch-AIMS2			
Mobility	0.80	0.18	-0.18
Walking and bending	0.80	0.17	-0.10
Hand and finger function	0.78	0.11	-0.07
Arm function	0.80	0.08	-0.03
Self-care	0.78	0.13	-0.05
Household tasks	0.85	0.09	-0.06
Pain	0.68	0.40	0.00
IRGL			
Mobility	- 0.80	-0.10	0.17
Self-care	- 0.83	-0.16	0.07
Pain	0.64	0.36	-0.03
Dutch-AIMS2			
Level of tension	0.20	0.74	-0.17
Mood	0.38	0.73	-0.17
IRGL			
Anxiety	0.19	0.84	-0.21
Depressed mood	0.21	0.84	-0.10
Cheerful mood	-0.14	-0.75	0.24
Dutch-AIMS2			
Support	0.07	0.28	- 0.56
Social activities	0.27	0.00	- 0.69
IRGL			
Perceived support	-0.02	-0.31	0.59
Actual support	0.08	-0.05	0.67
Mutual visit	-0.18	-0.22	0.72
Social network			
Neighbours	-0.16	0.07	0.62
Friends	0.08	-0.24	0.49

*Loadings above 0.45 are printed in bold.

of physical, psychological and social functioning were strongly supported in both questionnaires (loadings above 0.45 are printed in bold). In particular, the high loadings of the physical and psychological functioning scales (around 0.80) confirmed the assessment of clearly distinguishable dimensions. Only the pain scale of both questionnaires also loaded modestly on the psychological factor (0.40 and 0.36, respectively), reflecting the multidimensional nature of pain [31]. The moderate loadings of the social functioning factor (between 0.49 and 0.72) indicate the more heterogeneous assessment of this construct. In total, the three-factor solution explains 61% of the total variance.

Comparability between the Dutch-AIMS2 and IRGL

Comparability was assessed by calculating bivariate correlations between the corresponding scales of the two questionnaires. As demonstrated in Table III, the correlations between the corresponding scales (printed in bold) were high for the physical and psychological dimensions and disease impact scales (all exceeding 0.60), and indicate the measurement of rather identical constructs (see the Note at the end of the Discussion). The weaker relationship between the social functioning scales again demonstrates the somewhat different assessment of this dimension. Both scales of the Dutch-AIMS2 were moderately related to the comparable qualitative scales of the IRGL (between 0.41 and 0.48),

TABLE III
Pearson's correlation coefficients between the Dutch-AIMS2 and the IRGL scales*

Physical functioning					
Dutch-AIMS2	IRGL				
	Mobility	Self-care	Pain		
Mobility		-0.65	0.46		
Walking and bending		-0.54	0.51		
Hand and finger function		-0.78	0.43		
Arm function		-0.70	0.52		
Self-care		-0.65	0.42		
Household tasks		-0.70	0.43		
Pain		-0.54	0.82		
Psychological functioning					
	Anxiety	Depressed mood	Cheerful mood		
Level of tension		0.63	-0.45		
Mood		0.67	-0.52		
Social functioning					
	Perceived support	Actual support	Mutual visit	Social network	
				Neighbours	Friends
Support			0.35		0.26
Social activities			0.45		0.22
Disease impact					
	Disease impact	Impact activities			
Satisfaction		0.60			
Work		0.63			
Athrits impact		0.40			

*All correlations significant at $P < 0.001$; associations between similar scales are printed in bold.

but only weakly related to the quantitative scales of the IRGL (between 0.22 and 0.35).

Convergent validity

Correlations with demographic variables and disease duration. As physical health in rheumatic diseases has partly been shown to be related to disease duration, age and socioeconomic status [2, 3, 32], these correlations were also calculated for the two questionnaires. Correlations of health aspects with demographic variables (age, education and income level) and with disease duration correspond greatly in the two questionnaires (because of the large sample size, only correlation coefficients of $P < 0.001$ are mentioned). The physical functioning scales of both questionnaires were all related to age (between |0.22| and |0.30|) and disease duration (between |0.22| and |0.37|), indicating a worse functioning with older age and longer disease duration, with the exception of the relationship between age and the pain scales of both questionnaires. The impact scales of both questionnaires were also related to disease duration (between |0.24| and |0.30|), indicating a greater impact with longer disease dura-

tion. In addition, functional status scales of both questionnaires ('mobility' and 'hand and finger function' of the Dutch-AIMS2, and 'self-care' of the IRGL) were related to income and educational level (between |0.22| and |0.24|), indicating a worse functioning for a lower socioeconomic status. As expected, no substantial correlations (above $r = 0.21$) were found with the sex or social status of the patients. In addition, none of the psychological and social functioning scales of both questionnaires were substantially related to demographic variables or disease duration.

Correlations with clinical and laboratory data. The correlation coefficients between clinical and laboratory measures (ESR, Ritchie score, grip strength, functional ARA class and radiographic score) and the physical functioning scales were significant for all scales of both questionnaires, with the expected exception of the correlation between pain and the radiographic score (see Table IV). The strength of the correlations was almost the same for the questionnaires. The physical functioning scales were strongly related to functional class and grip strength (between |0.27| and |0.67|, in most cases exceeding |0.50|), and moderately related to

TABLE IV
Pearson's correlation coefficients between clinical and laboratory measures and the physical functioning scales of the Dutch-AIMS2 and the IRGL*

	Functional class (n = 284)	Grip strength (n = 80)	Ritchie score (n = 80)	Radio-graphics (n = 80)	ESR (n = 284)
Dutch-AIMS2					
Mobility	0.51	-0.54	0.40	0.34	0.37
Walking and bending	0.50	-0.30	0.47	0.27	0.32
Hand and finger function	0.50	-0.67	0.41	0.46	0.28
Arm function	0.50	-0.57	0.36	0.32	0.26
Self-care	0.48	-0.54	0.35	0.28	0.26
Household tasks	0.61	-0.55	0.44	0.33	0.30
Pain	0.40	-0.29	0.50		0.22
IRGL					
Mobility	-0.55	0.54	-0.54	-0.30	-0.41
Self-care	-0.52	0.67	-0.36	-0.49	-0.25
Pain	0.37	-0.30	0.57		0.23

*All correlations significant. If n = 284: P ≤ 0.001. If n = 80: r > 0.22, P < 0.05; r > 0.30, P < 0.01; r > 0.37, P < 0.001.

the Ritchie score (between |0.35| and |0.57|; in most cases exceeding |0.40|). The weaker correlations were with radiographics (between |0.27| and |0.49|; in most cases exceeding |0.30|) and ESR (between |0.20| and |0.41|; always exceeding |0.20|), probably reflecting current disease activity rather than the patient's health status.

DISCUSSION

Self-report measures offer an easy and inexpensive possibility to gain insight into the patient's perceived health status and quality of life which is not offered by clinical and laboratory data. The advantages of disease-specific, multidimensional instruments compared to generic instruments or single-dimensional quality of life-measures consist of the detailed and specific information about health areas which are affected by the disease and which may change through therapeutic interventions. The comprehensive assessment of health aspects can serve as an important complementary tool in outcome assessment, therapeutic interventions and long-term care [2-8].

For the evaluation and selection of an appropriate instrument, several criteria, such as the measurement of essential health areas, user friendliness, and high reliability and validity standards of an instrument may function as a necessary guide. The results of this study indicate that both instruments, the Dutch-AIMS2 and the IRGL, meet the needs and criteria of a sophisticated and comprehensive multidimensional health instrument. In addition, both instruments provide similar, but slightly different indicators of health.

In line with previous findings [17, 19, 20], reliability in terms of internal consistency is highly satisfactory for both instruments. The somewhat higher alpha of the IRGL may be due to the larger numbers of items within most scales as well as the empirical development of this questionnaire in contrast to the *a priori* development of the Dutch-AIMS2. In addition, a high test-retest reliability is indicated by our data for the Dutch-

AIMS2, as has been previously demonstrated for the physical and psychological scales of the IRGL [29].

The construct validity of the Dutch-AIMS2 and the IRGL is confirmed by the results of the second-order factor analysis. The assessment of the three discrete components of health status, i.e. the physical, psychological and social functioning, is strongly supported for both questionnaires. Similar satisfactory results have also been demonstrated in previous studies for the Dutch-AIMS2 [20] and the IRGL [17, 19].

Comparability and similarity between the questionnaires were supported by strong intercorrelations within the physical and psychological health dimensions and disease impact scales, and to a lesser extent within the social functioning scales. Whereas the social scales of the Dutch-AIMS2 emphasize the extent and possibility of participating in social activities and receiving support from family and friends, the social scales of the IRGL reflect the size of the social network as well as the extent and possibility of the exchanged support.

Convergent validity was highly satisfactory and nearly identical for both questionnaires. The modest correlations of both instruments with demographic variables, indicating a greater dysfunctioning with older age, a longer disease duration and a lower socioeconomic status, had been previously reported for the IRGL [17, 19] and for other health instruments [2, 3, 32]. In addition, the strong correlations between the clinical and laboratory data and the physical functioning scales were similar to previous findings of the Dutch-AIMS2 [20], the IRGL [4, 17, 19, 33] as well as other validated self-report questionnaires [3, 6, 32]. Results indicate that the scales of both questionnaires assess the intended construct of physical functioning, and may serve as complementary information to clinical and laboratory data. Convergent validity of the psychological and social scales, which was not assessed in this study, had been previously established

for the Dutch-AIMS2 [20] and for the IRGL [25, 26, 34, 35].

For the valid assessment of outcome research, sensitivity to change forms an essential part of the evaluation of an outcome measure. A sufficient sensitivity to change in order to detect clinically meaningful alterations after total hip replacement in osteoarthritis (OA) and RA patients has been shown in previous research for the IRGL [36]. For the Dutch-AIMS2, studies are being undertaken to assess its sensitivity to change.

Results suggest that both questionnaires are almost identical in their high methodological standards. Differences between the instruments relate rather to their content and focus on different health aspects. The Dutch-AIMS2 measures the physical health dimension more extensively by the broader assessment of activities of daily living, and assesses additional health aspects that are not included in the IRGL, such as patients' evaluation of their health status in comparison to others, patients' priority areas for improvement, attribution of health problems, perception of current and future health, and a number of medical aspects (co-morbidity, medication usage, type of rheumatic disease, disease duration). The IRGL measures the psychological and social dimensions more comprehensively. For example, the assessment of positive affect in the psychological health dimension, which has shown to be independent of and distinctive from negative affect in previous research [37], lacks an equivalent scale in the Dutch-AIMS2. Quantitative aspects of the social health dimension, such as the size of the social network, which is a major accompanying component of a chronic disease with ongoing disability [35], are also not represented in the Dutch-AIMS2.

The selection of an instrument must be guided by a clear definition of which health aspects are most important to assess. Depending on the research purposes and practical needs of health care providers, both questionnaires may be useful in a different way with regard to the field of interest. The focus of the Dutch-AIMS2 on the physical functioning dimension with the extensive assessment of activities of daily living may, for example, be preferred for the evaluation of physiotherapeutic interventions or surgical procedures. As an internationally applied instrument, the Dutch-AIMS2 may also be more suitable for cross-cultural research purposes. The comprehensive assessment of psychological and social aspects, as is the case in the IRGL, may be recommended in the detection of beneficial or deleterious side-effects of therapeutic interventions, or the multidisciplinary planning and decision making of long-term care.

The brevity of an instrument and its user friendliness function as an additional selection criterion in the routine assessment of the patient's health status. For the clinical practice, the IRGL, with its exclusive focus on the main health dimensions, may be preferred because it takes less time to complete, whereas the uniform scale ranges of the Dutch-AIMS2 facilitate interpretation of the data.

The results of this study facilitate direct comparisons

between two widely used multidimensional health instruments, the Dutch-AIMS2 and the IRGL, in order to make a decision regarding an appropriate outcome measure. The instruments are similar in their high reliability and validity standards, but differ slightly in their focus on different health aspects. Both can be used optimally as complementary evaluations of clinical outcome, therapeutic interventions and long-term care. The instrument that reflects the subject in question most adequately should be chosen.

**Note:* In order to facilitate comparisons between studies in which one of the two instruments has been used, regression formulae between the most comparable physical and psychological functioning scales of the questionnaires were computed that permit the estimation of scale scores from the Dutch-AIMS2 into the IRGL:

Walking and bending = $-0.30 \times \text{Mobility} + 10.63$

Hand and finger function = $-0.30 \times \text{Self-care} + 10.41$

Pain = $0.39 \times \text{Pain} - 0.93$

Level of tension = $0.23 \times \text{Anxiety} - 0.41$

Mood = $0.29 \times \text{Depressed mood} + 1.88$

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