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Comparison of two approaches to measuring change in health status in rheumatoid arthritis: the Health Assessment Questionnaire (HAQ) and modified HAQ

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Abstract

As an alternative to the calculation of change scores for health status questionnaires used in clinical trials or longitudinal studies, transitional questions have been developed for patients to assess changes directly themselves. Here the original Health Assessment Questionnaire (HAQ) is compared with a modified version of the HAQ (MHAQ) which contains transition questions used at follow up. These, together with a set of standard rheumatological tests, were all completed by 100 patients with rheumatoid arthritis on two occasions, three months apart. Change scores were calculated for the HAQ and for the clinical measures and compared with the MHAQ. The results were strikingly in favour of encouraging patients to assess their own degree of change through the use of transition questions in the MHAQ.

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Considerable attention has been given to the reliability and validity of questionnaires designed to assess health status and quality of life in patients with rheumatoid arthritis (RA).[1] Oddly, given their common application as outcome measures, less notice has been paid to their ability to detect changes over time.[2 3]

The most common way in which health status instruments tend to be used to assess change is to calculate the difference between patient's scores on two occasions, often as before and after measures in trials of specific interventions.[4 5] Some rheumatologists, however, recommend that their use should also be a feature of routine clinical practice. Wolfe and Pincus suggest that to promote a 'common tongue' to facilitate dialogue and increase knowledge about rheumatic diseases, a standardised health status questionnaire should be 'administered at every clinic visit to every patient with rheumatic disease . . .'.[6]

Without clear indication that these questionnaires are sensitive to the often subtle, yet subjectively important, changes which may occur in RA, however, the advisability of burdening patients and clinic staff with their repeated completion is questionable.

As an alternative to the calculation of change scores (the difference between the score at one assessment and the next), transition questions at follow up directly ask patients to assess whether they are the same, improved, or worse on specific functions compared with a specified previous occasion. A questionnaire which includes this approach is the modified version of the Health Assessment Questionnaire (HAQ) developed by Pincus *et al*,[7] who showed that they could reduce the number of items on the questionnaire from 20 to eight to include refinements without adding to the overall length. The additional questions recorded any help received to accomplish the tasks and changes in degree of difficulty over the past six months. These two sets of questions were then examined as possible predictors of the third modification: the patient's level of satisfaction with their ability to perform the function. In the original study the transition questions were used to assess changes in difficulty over the six months before the interview. It was thus a retrospective question, without an anchor point, and used in that study as a predictor of the level of satisfaction with the ability to perform tasks. In the study reported here, the original HAQ was completed on two occasions and the modified HAQ (MHAQ) transition questions were used at follow up. This allowed a direct comparison of the sensitivity of the transition questions completed by the patient with that of the calculated HAQ change scores.

Patients and methods

PATIENTS

The results reported here are part of a larger study comparing the sensitivity to changes over time of a number of different health status measures. One hundred and two consecutive patients with classical or definite RA were invited to take part in a series of interviews and clinical tests to be conducted over a six month period. The patients were all regular attenders at the rheumatology department of the Nuffield Orthopaedic Centre, Oxford, where completion of health assessment questionnaires was not a regular feature of their visits, and received standard rheumatological care during the period of the study. No patient refused to take part in the first interview but one withdrew due to work commitments and another died before the end of the study. This analysis is therefore based on the 100 patients for whom complete data are available.

Twenty one (21%) of the sample were men. The mean age was 56 years (SD 12·2) and mean disease duration was 13 years (SD 9·0). The distribution by American Rheumatism Association (ARA) functional class was as follows: class 1, 5%; class II, 92%; class III, 3%. Seventy four per cent of the patients were married or

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cohabiting. Sixty per cent were coded as social class I, II, or III (non-manual) (registrar generals classification).

RHEUMATOLOGICAL MEASURES

Within 24 hours of completion by patients of health status instruments, a set of standard rheumatological measures (as used in the Mallya and Mace index[8]) were used to assess disease severity; all assessments were completed on all occasions by the same person. The Ritchie articular index was used to assess joint tenderness. Grip strength was assessed as the average of three attempts with each hand squeezing a bag inflated to 30 mmHg. Pain was represented by the patient on a 10 cm visual analogue scale. The duration of morning stiffness was coded on a four point scale.[8] Erythrocyte sedimentation rate (ESR) was measured by the Westergren method and haemoglobin by Coulter counter. With the exception of grip strength and haemoglobin a higher score represents more severe disease activity.

HEALTH STATUS MEASURES

The HAQ[9] is a measure of functional limitations wherein patients rate, on a four point scale, the degree of difficulty they have experienced during the last week with 20 tasks grouped into the eight areas of dressing, rising, hygiene, reach, walking, eating, grip, and activities. The responses are based on the criteria of the ARA functional class rating system of 'normal' (no difficulty=0) 'adequate' (some difficulty=1) 'limited' (much difficulty=2), and 'unable to do' (=3). For any area where the respondent has help or uses some aid or device to assist them, the score for that section is recorded as 'limited'. Scores are based on the highest within each group and may also be expressed as an overall mean score ranging from 0 to 3.

Table 1 Items on the modified Health Assessment Questionnaire transitional scales

Compared with three months ago, how difficult is it now (this week) to . . . *(for each item respondents choose from 'less difficult', 'the same', more difficult')*
Dress yourself, including tying shoelaces and doing buttons? (*dressing*)
Get in and out of bed? (*rising*)
Lift a cup or glass to your mouth? (*eating*)
Walk outdoors on flat ground? (*walking*)
Wash and dry your entire body? (*hygiene*)
Bend down to pick up clothing from the floor? (*reach*)
Turn taps on and off? (*grip*)
Get in and out of a car? (*activities*)

Table 2 Mean (SD) scores for Mallya and Mace[8] variables at time 1 (n=100)

Variable	*Mean (SD)*
Ritchie index	12·14 (6·95)
Grip strength	103·82 (55·29)
Pain (VAS)*	3·76 (1·93)
Morning stiffness	2·38 (1·08)
ESR†	47·06 (29·39)
Haemoglobin	11·99 (1·54)
HAQ score‡	1·73 (0·73)

*VAS=visual analogue score.
†ESR=erythrocyte sedimentation rate.
‡HAQ=Health Assessment Questionnaire.

For the modified form of the HAQ (MHAQ)[7] patients are asked to assess, for one preselected question from each of the eight areas, the degree of change in difficulty in accomplishing that specific task: 'compared with three months ago, how difficult is it now to . . .?' (table 1). Responses were 'less difficult now'=0; 'no change'=1; and 'more difficult now'=2. Although the full MHAQ also takes account of satisfaction with function, aids used and help received, the transition questions are used alone as the measure of change. The MHAQ was administered at the second interview (time 2).

A global transition item was also completed at the second interview. All patients were asked 'Thinking of any overall effects your arthritis may have on you: how would you describe yourself compared with the last time I interviewed you (three months ago). Are you: much better, slightly better, the same, slightly worse or much worse'.

Change scores for rheumatological and health status measures were calculated as the difference between the score at time 1 and time 2. Pearson correlation coefficients were calculated for the correlations between the change scores and MHAQ scores.

Results

One hundred patients with RA completed the questionnaires and clinical tests on two occasions, three months apart. Table 2 shows the mean scores for Mallya and Mace variables at time 1. Table 3 shows the Pearson correlation coefficients between change scores for the rheumatological measures and the HAQ. The only rheumatological measures with which HAQ change scores correlate are grip strength, which shows a significant relation with reach and activities, and ESR which is associated with reach. In contrast there are significant relations between nearly all of the rheumatological measures and the MHAQ transition items (table 4). When expressed as summary scores the total HAQ also correlates with pain at 0·26 ($p<0·01$).

To further examine the validity of the HAQ change and MHAQ transition scores correlation coefficients were calculated with the patient's global transition item. All of the MHAQ transition questions displayed a high correlation (range 0·56–0·77) all of which are significant at $p<0·001$, a level which none of the HAQ change score correlations (range 0·08–0·37) achieved.

Discussion

Health status measures provide an important adjunct to conventional measures in the assessment of patients. The validity of instruments such as the HAQ has been examined by a number of methods including direct observation of patients' behaviour.[10] Sensitivity to change over time may, however, be considered a distinct criterion in the evaluation of such instruments.[2] For most purposes, such as in clinical trials or monitoring clinical care, this is a particularly important requirement. A number of studies have examined the HAQ in this

Table 3 Correlation coefficients (Pearson) for clinical variable change scores with transitional Health Assessment Questionnaire (HAQ)

Change scores on HAQ	Ritchie index	Grip strength	Pain	Morning stiffness	ESR†	Haemoglobin	Global
Dressing	−0·16	0·03	0·02	0·11	0·11	−0·17	0·25
Rising	0·04	−0·10	0·13	0·00	0·16	−0·06	0·19
Eating	−0·07	−0·03	0·05	0·07	0·02	−0·16	0·08
Walking	0·12	−0·20	0·16	0·12	0·12	−0·06	0·28*
Hygiene	0·03	−0·16	0·07	0·10	0·25	−0·09	0·34*
Reach	0·25	−0·29*	0·16	0·15	0·32	−0·11	0·29*
Grip	0·16	−0·23	0·12	−0·06	−0·03	0·17	0·11
Activities	0·12	−0·34**	0·09	0·12	0·17	−0·03	0·37*
Total HAQ	0·18	0·41**	0·26*	0·20	0·29*	0·16	0·45**

*p<0·01; **p<0·001.
†ESR=erythrocyte sedimentation rate.

Table 4 Correlation coefficients (Pearson) for clinical variable change scores with Health Assessment Questionnaire (HAQ) change score (modified HAQ (MHAQ))

Transition items on MHAQ	Ritchie index	Grip strength	Pain	Morning stiffness	ESR†	Haemoglobin	Global
Dressing	0·35**	−0·30*	0·44**	0·33**	0·48**	−0·36**	0·71**
Rising	0·37**	−0·35**	0·43**	0·30*	0·46**	−0·33**	0·73**
Eating	0·37**	−0·34**	0·37**	0·25	0·39**	−0·10	0·56**
Walking	0·37**	−0·30*	0·49**	0·34**	0·39*	−0·23*	0·60**
Hygiene	0·35**	−0·38**	0·38**	0·31*	0·52*	−0·25*	0·69**
Reach	0·27*	−0·37**	0·32*	0·27*	0·39**	−0·24*	0·67**
Grip	0·39**	−0·40**	0·42**	0·32**	0·37*	−0·19	0·59**
Activities	0·31*	−0·30*	0·34**	0·27*	0·39**	−0·37**	0·65**
Total MHAQ	0·40**	0·40**	0·47**	0·35**	0·51**	0·32*	0·77**

*p<0·01; **p<0·001.
†ESR=erythrocyte sedimentation rate.

respect. The HAQ has been shown to distinguish between treatment and placebo groups in a study of treatment with auranofin.[11] Change scores over time in the HAQ agree with clinical and laboratory evidence of change.[4] In a study with a longer follow up period (12 years), however, there is evidence that HAQ scores deteriorate over time in patients with RA but that such deterioration in function is discrepant from trends over time in clinical variables.[3] The study reported here considered whether there are additional changes experienced by the patient that may not be as well reflected by the original format of the HAQ as by a modified form which directly elicits the transition judgements of the patients (MHAQ).

It has been observed that one of the main limitations of assessments such as the ARA functional scale is that important clinical changes are not detected,[12] yet the HAQ responses are based on this criterion. It is therefore perhaps not surprising that patients may repeatedly report that they have 'some difficulty' with a task while nevertheless having substantial changes in their health. This problem of insensitivity is exacerbated by the method of scoring the HAQ which increases a score to 'much difficulty' if the patient has aid from a person or device for that function. This makes changes over a three month period even less detectable beneath the fog of the respondent's routine practices and relations with carers.

There may be concern that it is not reasonable to expect patients to assess change themselves as validity may be compromised by the patient's mood, expectations,[13] or simple lack of recall. There are a number of alternative methods whereby sensitivity to change may be measured, but the approach adopted in this study was to compare two different expressions of change against changes indicated by the six items that constitute the Mallya and Mace index.[8] The results clearly indicate that the transition questions of the MHAQ are more strongly related to other rheumatological changes than are changes over time on conventional HAQ scores. Further evidence of the sensitivity of the MHAQ to changes which are important to the patient is provided by the correlations with the global transition item.

These results indicate that the MHAQ compares favourably with the calculation of change scores. It also has advantages over the global transition item, which though correlated with the rheumatological measures, obscures a feature of RA activity whereby some functions may improve while others are in decline. Additional advantages of the MHAQ transition questions are that there are fewer items and it is easier to score than the full HAQ. There are several barriers to the more widespread adoption of health status measures in clinical trials and expecially in clinical practice. One is that change scores lack intuitive meaning to clinicians. The other is that they may take time to calculate and interpret.[14] Patient's direct judgements of change via transition questions offer advantages in relation to the two problems, particularly in the context of busy clinical practice.

It is not argued that transition questions should replace conventionally formated health status instruments. It remains essential for most purposes to have a baseline measure of health status without which transition questions are less meaningful. Other studies have indicated that the HAQ may show disease progression not apparent through clinical variables alone[3] and be predictive of disability over time.[15] Following a baseline administration of the HAQ, however, subsequent assessments of the patient's

experience of RA may be more clearly provided by use of the MHAQ transition questions than by repeated use of the original questionnaire or by standard rheumatological measures alone.

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