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ORIGINAL ARTICLE

The psychometric properties of the Evaluation of Daily Activity Questionnaire in seven musculoskeletal conditions

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ABSTRACT

Purpose: The purpose of this study is to psychometrically test the Evaluation of Daily Activity Questionnaire in seven musculoskeletal conditions.

Materials and methods: One thousand and two hundred people with ankylosing spondylitis; osteoarthritis; systemic lupus erythematosus; systemic sclerosis; chronic pain; chronic upper limb disorders; or Primary Sjögren's syndrome completed the Evaluation of Daily Activity Questionnaire, Health Assessment Questionnaire and Short-Form Health Survey v2. We examined internal construct validity using Rasch analysis, internal consistency, concurrent validity with the Health Assessment Questionnaire and Short-Form Health Survey v2. Participants repeated the Evaluation of Daily Activity Questionnaire to assess test–retest reliability.

Results: The 12 domains satisfied Rasch model expectations for fit, local dependency, unidimensionality and invariance by age and gender, in each musculoskeletal condition. Internal consistency was consistent with individual use (Cronbach's $\alpha > 0.90$); concurrent validity was strong (Health Assessment Questionnaire: $r_s = 0.60$–0.92; Short-Form Health Survey v2 Physical Function: $r_s = -0.61$ to -0.91) and test–retest reliability excellent (Intra-Class Correlation Coefficient(2,1) = 0.77–0.96).

Conclusion: The Evaluation of Daily Activity Questionnaire satisfied Rasch model requirements for construct validity and has good reliability and validity in each MSC. The Evaluation of Daily Activity Questionnaire can be used as a measure of everyday activity in practice and research with people with musculoskeletal conditions.

➤ IMPLICATIONS FOR REHABILITATION

- The Evaluation of Daily Activity Questionnaire evaluates users' ability to perform common daily activities (in 12 domains) that were identified as problematic by people with seven musculoskeletal conditions (i.e., osteoarthritis, systemic lupus, ankylosing spondylitis, chronic pain, chronic upper limb conditions, systemic sclerosis, Sjogren's syndrome).
- Most patients considered the Evaluation of Daily Activity Questionnaire was the right length and would be helpful for discussing everyday problems with an occupational therapist.
- The 12 domains have good reliability and validity and can be combined into two components: Self-Care and Mobility.
- The Evaluation of Daily Activity Questionnaire is suitable for use both in clinical practice and research and a User Manual is available for therapists and researchers.

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Introduction

A fifth of adults have long-term musculoskeletal conditions; a third of whom experience activity limitations [1]. In the UK, over 3 million adults with musculoskeletal conditions are disabled by pain, fatigue, reduced hand function, and/or mobility restrictions [2]. Thorough assessment is needed to effectively identify activity abilities and participation but few rheumatology occupational therapists in the United Kingdom (UK) use standardised measurement tools during their assessments. This is because measurement tools commonly used in rheumatology out-patient clinics and research (e.g., the Health Assessment Questionnaire [3] and the Arthritis Impact Measurement Scales 2 [4]) include too few activities to be of use for treatment planning. Many occupational therapy departments have, therefore, devised their own non-standardised checklists, with differing activities and rating scales [5,6]. Unfortunately, such checklists cannot be used for research and audit, or within clinical practice to evaluate changes in clients' abilities, as they lack validity and reliability.

The Evaluation of Daily Activity Questionnaire was developed in the early 1990s in Sweden to address these problems. It is a patient-reported outcome measure evaluating common symptoms and measuring, in depth, activity limitations in rheumatoid

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Supplemental data for this article can be accessed here.

Table 1. Domains within the self-care and mobility components of the evaluation of daily activity questionnaire.

Components: domain numbers and names	
Self-care	Mobility
1 Eating/drinking	4 Bathing/showering
2 Personal care	6 Moving around indoors
3 Getting dressed/undressed	9 Moving and transfers
5 Cooking	11 Moving around outside/shopping
7 Cleaning the house	12 Gardening/household maintenance
8 Laundry/clothes care	
10 Communication	

arthritis [7,8]. Patients normally complete it at home, allowing them time to reflect on their abilities and activity limitations. It normally takes between 25 and 35 min to complete [6]. During appointments, therapists can then quickly focus on the problems identified, reducing the need for detailed interviews. We have already developed an English Evaluation of Daily Activity Questionnaire, which has recently been linguistically and culturally validated for use in the UK (from the original Swedish version) [9,10] and shown to be psychometrically robust for use with patients with rheumatoid arthritis [11]. Each of the 12 Evaluation of Daily Activity Questionnaire domains is unidimensional and these domains cluster into two components: Self-Care and Mobility (see Table 1; and Supplementary Document S2).

The Evaluation of Daily Activity Questionnaire has also been used in other musculoskeletal conditions in Sweden [12–14] but has not been psychometrically tested. Thus, the aim of this paper is to assess the psychometric properties of the Evaluation of Daily Activity Questionnaire with other musculoskeletal conditions to assess its suitability for use in clinical practice and research. As a first step we demonstrated content validity of the Evaluation of Daily Activity Questionnaire to ensure it reflects the symptoms, condition impact and activity limitations experienced by people with other musculoskeletal conditions, as these could differ from rheumatoid arthritis [15]. The musculoskeletal conditions were ankylosing spondylitis; osteoarthritis; systemic lupus erythematosus; systemic sclerosis [scleroderma]; chronic (i.e., >3 months) pain (i.e., fibromyalgia; widespread, back or neck pain); chronic hand/upper limb disorders; and Primary Sjögren's Syndrome [15]. The conditions included are those most frequently referred to Rheumatology occupational therapists. While other musculoskeletal conditions are prevalent, these are either less often referred to occupational therapy (e.g., polymyositis) or have similar impacts on daily activities as rheumatoid arthritis (e.g., psoriatic arthritis). During the study, although a condition infrequently referred to occupational therapy, the opportunity arose to include people with Primary Sjögren's Syndrome. We now report the internal construct validity; internal consistency; concurrent validity and test–retest reliability.

Materials and methods

Participants and data collection

Ethical approval was obtained from the Greater Manchester West Research Ethics Committee (11/H1014/5) and the University of Salford Research Ethics Panel. To ensure as representative as sample as possible we used a range of recruitment strategies: from National Health Service (NHS) out-patient departments (19 Rheumatology, three Orthopaedic/Hand clinics); four General Practices; the UK Primary Sjögren's Syndrome Registry; and randomly selected members of 10 patient organisations: the National Ankylosing Spondylitis Society; Lupus UK; Raynaud's and Scleroderma Society; Scleroderma Society; Back Care; Fibroaction; the Fibromyalgia Association; the British Sjögren's Syndrome Association; RSI Action (a repetitive strain injury organisation); and a private physiotherapy practice linked with RSI Action.

Potential participants were invited to participate by research nurses or occupational therapists in the NHS sites, and by staff in the patient organisations, in person, by mail or via the organisations' websites. Those recruited via patient organisations completed telephone screening and consent procedures with a member of the research team (Y. P.).

Participants meeting the following criteria were eligible: a confirmed diagnosis of one of the seven musculoskeletal conditions; ability to read, write and understand English; no change in any disease-modifying medication (which could affect test-retest reliability) in the last three months (and not about to); and no other medical condition(s) limiting their activities of daily living. Other medical conditions associated with that musculoskeletal condition were acceptable, e.g., people with systemic lupus erythematosus could also have secondary osteoarthritis, fibromyalgia or internal organ involvement.

After providing informed written consent, participants were given or mailed a questionnaire booklet to complete at home and return by mail. The booklet included: questions to describe the recruited population: age, gender, marital, educational and employment status, disease duration and medication regimen, as well as the measures described below. Two to three weeks later, participants were mailed the Evaluation of Daily Activity Questionnaire to complete at home a second time (to evaluate test–retest reliability). Two reminders were sent if necessary.

Measurement instruments

The English Evaluation of Daily Activity Questionnaire includes two parts: Part 1 comprises 10 numerical rating scales, scored on a 0 (no) to 10 (severe) scale, to assess symptom severity, mood and life satisfaction. Part 2 comprises 120 activities in 12 domains, scored on a 3-point (0 = no difficulty, 3 = unable to do) scale which assesses ability to perform daily activities. If the person would not normally perform that activity, there is a "not applicable" option. For example, if they had never learnt to drive then "drive a car, e.g., holding a steering wheel, turning car keys or changing gear" would be "not applicable". Each item is answered twice on the same page by rating performance without (Section A) and then with (Section B) ergonomic solutions (e.g., alternative methods, assistive devices, environmental modifications). Items are summed to produce total scores for Sections A and B within each domain, with any score reductions between Sections A and B denoting the impact of ergonomic solutions on improving activity ability. If there are missing items within a domain, a total domain score cannot be calculated. Higher scores indicate greater activity limitations [8,10,11]. The EDAQ and EDAQ Manual are available for download [9,10].

The comparator health measures selected are those widely used in Rheumatology, validated in a range of musculoskeletal conditions and pragmatic choice as the same questionnaire was used across all conditions [16].

The Medical Outcomes Survey 36 item Short-Form Health Survey version 2 (known as the SF36v2) includes 36 items from which subscales of Physical Function, Bodily Pain, Vitality and Mental Health can be calculated using Quality Metric Health Outcomes™ Scoring Software 4.5 [17–20]. Lower scores denote worse health states.

The Health Assessment Questionnaire includes ability to perform 20 daily activities rated on a 0–3 scale (0 = not at all difficult, 3 = unable to do) [3] using the Health Assessment

Questionnaire 20 method, in which the total score is obtained by summing all 20 items (0–20 = mild; 21 = 40 = moderate; and 41–60 = severe disability). This method was used as the Health Assessment Questionnaire 20 does not weight items worse if an assistive device is used, as occurs when normally scoring the Health Assessment Questionnaire [21,22]. Higher scores denote greater activity limitations.

Hand pain was measured using a numeric rating scale of pain in the hand and wrists during moderate activities (e.g., cooking a meal, doing housework, doing light gardening) in the past week on a 0 (no) to 10 (severe) scale.

The Quality of Life Scale measures satisfaction with participation (e.g., work, relationships, health) in 16 items on a 7-point scale (1 = terrible to 7 = delighted) [23]. Lower scores denote worse quality of life.

Perceived health status was measured using a 5-point numeric rating scale asking "Considering all the ways that your condition affects you, how have you been over the past month?" (1 = very good: no symptoms and no limitations to normal daily activities to 5 very poor: very severe symptoms and inability to carry out most activities).

Perceived change in health status: At Test 2 only, this was measured using a 5-point numeric rating scale by asking "Overall, how much is your arthritis troubling you now compared to when you last completed this questionnaire a few weeks ago?": (1 = much less; 2 = somewhat less; 3 = about the same; 4 = somewhat more; 5 = much more).

Acceptability of the Evaluation of Daily Activity Questionnaire: Closed questions were included to identify participants' views about whether the Evaluation of Daily Activity Questionnaire would be helpful in discussions with occupational therapists (not at all, a little, moderately, very); and the number of activities included in the Evaluation of Daily Activity Questionnaire (too many, about right, too few).

Sample size

As Rasch analysis was used to assess the construct validity of the Evaluation of Daily Activity Questionnaire Part 2, a sample size of at least 150 in each musculoskeletal condition was recruited. This number was determined from the need to ensure that a uniform distribution of patients was obtained across the construct of activity limitation, so that the precision of the estimate of both persons and items, across the construct, remains similar and a sufficient number of cases were collected within each musculoskeletal condition group to test for invariance across groups [24]. The sample does not need to be representative of the selected population, as the mathematical model is independent of distribution, but it should have a good distribution across the activity limitation domain, as well as sufficient cases within each diagnostic group [24]. At least, 79 sets of repeated responses were required in each musculoskeletal condition to demonstrate that a test–retest correlation of 0.7 differs from a background correlation (constant) of 0.45, with 90% power at the 1% significance level. A test re-test correlation of 0.7 is deemed a minimum acceptable level [25].

Statistical analyses

For Part 2 Evaluation of Daily Activity Questionnaire domains, total scores for each domain were summed from the raw scores for Sections A and B. Domain scores were summed to form the two component (Self-Care and Mobility) scores (see Table 1). Non-parametric statistics were used for classical psychometric testing as scores are ordinal.

Internal construct validity of the Evaluation of Daily Activity Questionnaire was tested through fit of data to the Rasch measurement model [26]. This process of Rasch analysis involves a series of tests of various assumptions such as stochastic ordering, local independence and unidimensionality [27]. Following an iterative process, the scale is assessed and, (if necessary) revised. The process is described in detail elsewhere [28,29]. Briefly, the stochastic ordering is assessed through fit statistics. Given *perfect* fit to the Rasch model, the (*z*-standardised) item and person residuals would have a mean value of 0 and a SD of 1. If the SD >1.4 then, broadly speaking, this is an indicator that there may be issues at the individual item level. If the mean value is positive, then this indicates that, on an average, the items are under-discriminating, and if the mean value is negative, then this indicates that, on an average, the items are over-discriminating. The Chi-square *p* values for each item (domain) should be non-significant (Bonferroni adjusted), indicating no deviation from model expectations. Unidimensionality is tested in a post-hoc procedure introduced by Smith [30]. Two independent sets of items were selected to derive two separate estimates of the trait for each individual. Under the assumption of unidimensionality, no difference in these estimates is expected. This was tested by a series of *t*-tests (one for each individual) [30], and the proportion of significant *t*-tests should be <5% to indicate unidimensionality. The property of invariance across groups (Differential Item Functioning), is tested for by age, gender and condition groups [24,26,27,31]. Ideal Fit and other indicators are shown at the bottom of the fit table. The unrestricted partial-credit model was used [32] using RUMM 2030 software [33].

In the current study, the Rasch analysis was used to test the 12 domain, two component model of the Evaluation of Daily Activity Questionnaire Part 2 (developed in our previous study in rheumatoid arthritis [11]) in each of the seven musculoskeletal conditions. (As the domain level approach was utilized in the RA validation, this same approach was retained for practicality and consistency). That is, the items within each domain (e.g., Eating) were summated into a domain score which was then entered into the analysis as 12 "super items" or testlets [34]. These were also subsequently grouped into the two components of Self Care and Mobility. If data are found to satisfy Rasch model assumptions, data can be transformed from an ordinal to an interval scale using Rasch transformation tables, if required [35,36]. Normally, summed (ordinal) total scores are calculated for Evaluation of Daily Activity Questionnaire domains. However, Rasch transformation to an interval scale allows for reliability testing using intra-class correlation coefficients (ICC(2,1)) and calculation of sensitivity to change statistics.

Internal consistency was tested using the Person Separation Index, obtained in the Rasch analysis, and Cronbach's alpha. Results of ≥0.8 are seen as good to excellent [37]. Both should be interpreted in the same way, with a value ≥0.85 consistent with individual-level use, and a value >0.7 consistent with group-level use.

Concurrent validity was tested in each musculoskeletal condition using Spearman's correlations by comparing the numeric rating scale scores in the Evaluation of Daily Activity Questionnaire Part 1 for pain, fatigue and mood with the SF36v2 Bodily Pain, Vitality (fatigue) and Mental Health scales, and the scores for each Part 2 domain were compared with: the Health Assessment Questionnaire 20; SF-36v2; hand pain numeric rating scale; Quality of Life Scale; and differing perceived health status question (as detailed above). Correlations are interpreted as: very strong (0.8–1.00); strong (0.6–0.79); moderate (0.4–0.59); weak (0.20–0.39); and very weak (0.00–0.19) [37]. We hypothesised that there would

be strong positive correlations between Evaluation of Daily Activity Questionnaire domain scores and Health Assessment Questionnaire 20 scores and strong negative correlations with the SF36v2 Physical Function scale, as these measures also assess activity limitations. We hypothesised that there would be moderate negative correlations with SF36v2 Bodily Pain, SF36v2 Vitality and Quality of Life scale measures, and moderate positive correlations with hand pain and perceived health as these factors are known to influence or are influenced by activity limitations.

Discriminant validity was tested using Kruskal–Wallis tests to evaluate differences in Part 2 domain scores for each musculoskeletal condition in the different perceived health status groups.

Test–retest reliability was assessed for those stating they were "about the same" at Test 2, using linear weighted kappa for numeric rating scales of Part 1 and each activity in Part 2 [38]. Levels of agreement are interpreted as <0.20 = poor; 0.21–0.40 = fair; 0.41–0.60 = moderate; 0.61–0.80 = good; 0.81–1.00 = very good [39]. Intra-class correlation coefficients (ICC(2,1: two-way random, consistency, average measures model in SPSS) for Rasch transformed Evaluation of Daily Activity Questionnaire domain scores (see below) were also calculated with a 95% confidence interval. An intra-class correlation coefficient ≥ 0.75 was considered to be excellent [40].

Sensitivity to change was assessed with the Standard Error of Measurement and the Minimal Detectable Change_{95} score (i.e. a statistical estimate of the smallest detectable change corresponding to change in ability) [41,42]. These cannot be calculated from Evaluation of Daily Activity Questionnaire domain scores which are summed from ordinal data [43]. Accordingly, Rasch transformed scores for the 12 Evaluation of Daily Activity Questionnaire domains, conditional upon fit to the model, for each condition, were first created [10]. Raw scores for each Evaluation of Daily Activity Questionnaire domain were first transformed to the metric (in logits) then linearly transformed to produce an interval-level scale of the same range for each domain for each condition. Rasch transformed scores were then used to calculate the Standard Error of Measurement and the Minimal Detectable Change_{95}.

Floor and ceiling effects were considered present if $>15\%$ of participants achieved either the lowest (floor, i.e., at, or close to, zero) or highest (ceiling, i.e., at, or close to, the maximum) scores in any domain [44,45]. For the EDAQ, lower scores represent fewer difficulties, and higher scores represent more difficulties.

Acceptability was assessed by calculating the percentages of optional responses for the number of activities in the Evaluation of Daily Activity Questionnaire and its helpfulness in discussing daily activity problems with an occupational therapist.

The Statistical Package for Social Science v20 [46] was used for validity and reliability analyses and MedCalc [47] for linear weighted kappa for Part 1 numeric rating scales and Part 2 individual item reliability testing.

Results

Participants

Overall, 1231 NHS patients were screened, of whom 908 (74%) were eligible and willing to take part. About 3365 letters were mailed via patient organisation and 615 (18%) members responded. Of these 1523 people, 1414 (93%) consented and 1205 (85%) returned the Test 1 questionnaires. Participants recruited from the NHS or patient organisations within each musculoskeletal condition were not significantly different in age, gender or condition duration. However, groups were different for educational level in ankylosing spondylitis, chronic pain and chronic hand/upper limb disorders, with patient organisation members having higher educational attainment (data not shown). Five were withdrawn from the Chronic Upper Limb Disorders group as they did not have eligible conditions, meaning 1200 (84.5%) participated: 691 (58%) from the NHS and 509 (42%) from patient organisations. Test 2 was returned by 943 (79%) participants. Median time between Test 1 and Test 2 was 49 (inter-quartile range 42–64) days. Participant descriptors are detailed in Table 2.

Internal construct validity

Rasch analyses of the seven domains of the Self-Care Component indicated good fit to the model within each musculoskeletal condition (Table 3), items (domains) were free from Differential Item Functioning apart from Differential Item Functioning -by-gender in Cooking (Chronic Upper Limb Conditions) and Cleaning the House (Ankylosing Spondylitis). For the five domains of the Mobility component (Table 4), the overall fit statistics were also good within each musculoskeletal condition. Items (domains) within all musculoskeletal conditions were free from Differential Item Functioning, apart from Differential Item Functioning-by-gender in Moving and Transfers (Osteoarthritis). Both components were shown to be unidimensional with the exception of Chronic Pain in Self Care. Further detailed Rasch analysis of the items sets within each domain (i.e., summating to the domain level) can be found in the Supplementary Tables S1–S7.

Additionally, all conditions were pooled to assess Differential Item Functioning by condition. If Evaluation of Daily Activity Questionnaire domain-items work in the same way across conditions, Evaluation of Daily Activity Questionnaire scores could be directly compared between them. A random, similarly sized sample of data from the previous rheumatoid arthritis study [11] was also included in this analysis. In the Self-Care component, only Personal Care and Laundry/Clothes Care were free from Differential Item Functioning. In the Mobility component, only Moving around Outdoors/Shopping was free from Differential Item Functioning. Consequently, *post-hoc* Tukey tests were conducted to determine which domains were different across conditions, with pairwise tests for each between-condition comparison. Following DIF identification, domain-item splitting then accounted for any cross-conditional Differential Item Functioning present and the analysis calibration remains linked by the common items. Differential Item Functioning-splitting was done on an iterative basis, with the item displaying the largest Differential Item Functioning resolved first. This analysis identified a calibrated common metric for each of the Self-Care and Mobility components, where all cross-conditional Differential Item Functioning has been accounted for. Supplementary Tables 10 and 11 show the breakdown of where Differential Item Functioning splitting was necessary to obtain an unbiased calibration. As a result, Rasch transformation tables were also developed to allow comparison of Evaluation of Daily Activity Questionnaire domain scores between conditions [10].

Internal consistency

In all musculoskeletal conditions, internal consistency (Person Separation Index) for the Self-Care and Mobility components was consistent with group-level use (i.e., >0.7) (Tables 3 and 4) and Cronbach's alpha was good to excellent (i.e., ≥ 0.85, consistent with individual level use) in almost all 12 Evaluation of Daily Activity Questionnaire domains (apart from Communication in

Table 2. Demographic and health status characteristics of participants for each musculoskeletal condition ($n = 1200$).

	Ankylosing spondylitis ($n = 165$)	Osteoarthritis ($n = 184$)	Systemic lupus erythematosus ($n = 164$)	Systemic sclerosis ($n = 170$)	Chronic pain ($n = 194$)	Chronic upper limb disorders ($n = 152$)	Primary Sjögren's syndrome ($n = 171$)
Age (mean (*SD*)	53.48 (13.89)	63.28 (10.41)	53.20 (13.22)	65.52 (10.65)	53.10 (13.47)	54.59 (14.26)	62.88 (11.25)
Gender (female: %)	47 (28%)	143 (78%)	157 (96%)	158 (93%)	170 (88%)	104 (68%)	160 (94%)
Condition duration (years: mean (SD)	24.75 (15.16)	10.43 (10.24)	18.22 (11.54)	16.67 (11.15)	12.96 (11.62)	9.88 (12.48)	16.44 (17.04)
Married/living with partner *n* (%)	126 (77%)	138 (75%)	133 (81%)	112 (66%)	136 (70%)	111 (73%)	117 (68%)
Employment status							
Paid employment	87 (53%)	56 (30%)	62 (38%)	38 (22%)	70 (36%)	78 (52%)	64 (38%)
Education level							
Secondary education only	93 (57%)	120 (66%)	94 (57%)	98 (57%)	105 (54%)	77 (51%)	103 (60%)
Current medication							
Disease modifying anti-rheumatic drugs	11 (7%)	n/a	105 (64%)	27 (16%)	n/a	n/a	54 (32%)
Biologic drugs	65 (39%)		3 (2%)				2 (1%)
Health Assessment Questionnaire 20 median (inter-quartile range)	6 (1–14)	9 (4–19)	8 (2–21)	10 (3–20)	17 (8–28)	6 (1–14)	4 (0–13)
SF36v2: median (inter-quartile range)							
Physical function	44(31–50)	36 (29–46)	36 (27–46)	36 (27–46)	31 (23–38)	48 (40–52)	40 (31–50)
Bodily pain	43 (35–51)	38 (31–43)	38 (31–47)	42 (38–50)	31 (27–38)	38 (34–47)	42 (38–52)
Hand pain (0–10)	3 (2–6)	6 (3–8)	5 (2–7)	4 (2–6)	6 (4–8)	5 (2–7)	3 (1–6)
Quality of Life Scale: 0–112: median (inter-quartile range)	85 (76–93)	84 (75–94)	80 (71–89)	82 (75–93)	69 (56–81)	86 (75–94)	84 (75–93)
Perceived health (1–5)	3 (2–3)	3 (2–4)	3 (2–4)	3 (2–3)	3 (3–4)	3(2–3)	3 (2–3)
Numbers reporting health							
Very poor/poor (1–2)	23	46	44	22	85	32	23
Fair (3)	62	86	52	76	77	65	65
Good/Very Good (4–5)	79	47	68	71	30	53	81

ISCED: International Standard Classification of Education; SF36v2: Short Form 36v2.
Higher scores = better in SF36v2 and Quality of Life scale; lower scores = better in Health Assessment Questionnaire 20, perceived health, hand pain.

Table 3. Rasch analysis summary for the self-care component for each musculoskeletal condition.

	Item residual		Person residual		Chi-square interaction				Unidimensionality	
Analysis	Mean	SD	Mean	SD	Value	DF	*p*	PSI	% *t*-test	CI
AS	−0.34	1.09	−0.4	0.8	20.82	14	0.12	0.74	3.45	[a]
OA	−0.16	1.55	−0.43	1.03	20.1	14	0.12	0.82	5.77	2.30%
SLE	−0.3	0.84	−0.39	0.87	13.83	14	0.46	0.85	6.11	2.40%
SS	−0.29	0.84	−0.41	0.93	10.23	14	0.75	0.85	3.55	[a]
CP	0.02	1	−0.45	1.17	14.06	14	0.45	0.89	9.88	6.50%
CULD	−0.45	1.6	−0.44	0.88	16.06	14	0.31	0.77	4.20	[a]
PSS	−0.54	1.02	−0.46	0.85	20.65	14	0.11	0.75	1.69	[a]
Fit Criteria	0.0 < 1.4[a]		0.0 < 1.4		> 0.05			>0.85	Lower CI <5%	

SD: standard deviation; DF: degrees of freedom; PSI: Person Separation Index CI: confidence interval; AS: ankylosing spondylitis; OA: osteoarthritis; SLE: systemic lupus erythematosus; SS: systemic sclerosis; CP: chronic pain conditions; CULD: chronic hand/upper limb disorders; PSS: Primary Sjögren's syndrome.
[a]Bonferroni adjusted.

Table 4. Rasch analysis summary for the mobility component for each musculoskeletal condition.

	Item residual		Person residual		Chi-square interaction				Unidimensionality	
Analysis	Mean	SD	Mean SD	SD	Value	DF	*p*	PSI	% *t*-test	CI
AS	−0.16	0.52	−0.53	0.95	6.89	10	0.74	0.86	4.07	[a]
OA	−0.25	1.24	−0.49	0.9	5.89	10	0.82	0.83	5.08	0.00%
SLE	−0.46	0.88	−0.43	0.75	8.48	10	0.58	0.82	1.49	[a]
SS	−0.19	0.91	−0.44	0.87	13.47	10	0.20	0.79	5.08	0%
CP	−0.69	1.29	−0.71	1.03	4.36	10	0.93	0.85	8.05	3.50%
CULD	−0.2	1.02	−0.35	0.75	12.93	10	0.23	0.71	4.62	[a]
PSS	−0.29	0.82	−0.53	0.95	7.54	10	0.67	0.72	6.25	0.00%
Fit criteria	0.0 < 1.4[a]		0.0 < 1.4		> 0.05			>0.85	Lower CI <5%	

AS: ankylosing spondylitis; OA: osteoarthritis; SLE: systemic lupus erythematosus; SS: systemic sclerosis; CP: chronic pain conditions; CULD: chronic hand/upper limb disorders; PSS: Primary Sjögren's syndrome.
[a]Bonferroni adjusted.

systemic sclerosis (($\alpha = 0.83$), indicating the components and individual domains could be used individually as well as collectively (Table 5).

Concurrent validity

In Part 1, there were moderate to very strong correlations between comparable numeric rating scales from Part 1 and SF36v2 Mental Health, Vitality and Bodily Pain scales ($r_s = -0.53$ to -0.84; Supplementary Table S8). In Part 2, most (i.e., 75% or more) Evaluation of Daily Activity Questionnaire domains correlated:

- very strongly/strongly with Health Assessment Questionnaire20 (r_s: 0.60 to 0.92) and SF36v2 Physical Function (r_s: −0.61 to −0.91) (Table 5);
- moderately/strongly with SF36v2 Bodily Pain (r_s: −0.40 to −0.75), Hand Pain (r_s: 0.40–0.67) (Table 5) and Perceived Health status (r_s:0.40–0.75) (Supplementary Table S9);
- moderately with SF36v2 Vitality (r_s:−0.40 to −0.59) and the Quality of Life Scale (r_s:−0.40 to −0.56) (Supplementary Table S9).

Discriminant validity

Parts 1 and 2 showed very good discriminant validity. In all seven musculoskeletal conditions, all the Part 1 numeric rating scales and each Part 2 domain showed significant differences ($p < 0.001$) between those who perceived their health status to be good/very good; fair; or poor/very poor (data not shown).

Test–retest reliability

Test–retest reliability for Part 1 was moderate to good (Supplementary Table S8) and for Rasch transformed data for Part 2 domains were excellent (ICC(2,1 $\geq$ 0.9 for most tests) (Table 5). Linear weighted kappa scores for individual items in Part 2 showed moderate to very good test-retest reliability across most domains for most conditions (data not shown).

Sensitivity to change

Most Minimal Detectable Change$_{95}$ scores ranged from 0.27 to 6.00, although some were higher (Supplementary Table S9).

Floor and ceiling effects

All Part 2 domains across most conditions demonstrated some floor effects, with the highest floor effects observed in the ankylosing spondylitis and Primary Sjögrens Syndrome groups in the following domains: Eating, Personal Care, Cooking, Laundry and Communication. No ceiling effects were seen in the domains.

Acceptability

There was a slightly lower response rate for the Acceptability questions. Most (986/1120: 88%) considered that the Evaluation of Daily Activity Questionnaire included about the right amount of activities, or could have been longer; and most (869/1147:76%) considered it would be helpful or very helpful for discussing everyday problems with an occupational therapist.

Discussion

The Evaluation of Daily Activity Questionnaire is a robustly constructed, acceptable, valid, reliable measure of daily activity in these seven musculoskeletal conditions, as well as in rheumatoid arthritis [11]. It includes the commonest activity limitations people with these conditions experience. It thus meets the needs of occupational therapists and physiotherapists for a comprehensive patient reported outcome measure of activity ability for use across

Table 5. Reliability and validity testing of the EDAQ Part 2 for each musculoskeletal condition ($n = 1200$).

Evaluation of Daily Activity Questionnaire domain (score range)	*n*	Test 1 A Cronbach's α	Median (range) Test 1 score	Median (range) Test 2 score	ICC(2,1)	Correlation with Health Assessment Questionnaire20 (r_s)	Correlation with SF36v2: Physical Function (r_s)	Correlation with SF36v2: Bodily Pain (r_s)	Correlation with Hand Pain (r_s)
1. Eating & drinking (0–33)									
AS	161	0.93	0 (0–3)	0 (0–3)	0.85 (0.79,0.90)	0.52[a]	−0.56[a]	−0.42[a]	0.55[a]
OA	175	0.93	5 (1–9)	4 (0.75–8)	0.94 (0.92, 0.96)	0.50[a]	−0.19[b]	−0.40[a]	0.58[a]
SLE	155	0.94	4 (1–8)	3.5 (1–7)	0.90 (0.86, 0.93)	0.81[a]	−0.68[a]	−0.62[a]	0.64[a]
SS	161	0.91	7 (4–12)	6 (3–12)	0.91 (0.88, 0.94)	0.72[a]	−0.54[a]	−0.50[a]	0.55[a]
CP	185	0.94	5 (1–10)	5 (1–10)	0.92 (0.89, 0.95)	0.75[a]	−0.56[a]	−0.53[a]	0.56[a]
CULD	145	0.94	4(1–9)	4 (0.25–9)	0.89 (0.84, 0.93)	0.72[a]	−0.50[a]	−0.55[a]	0.66[a]
PSS	158	0.93	3 (0–7)	3.5 (0–7)	0.94 (0.92, 0.96)	0.72[a]	−0.61[a]	−0.56[a]	0.61[a]
2. Personal care (0–36)									
AS	155	0.91	0 (0–2)	0.5 (0–2)	0.92 (0.88, 0.94)	0.76[a]	−0.69[a]	−0.59[a]	0.44[a]
OA	163	0.89	2 (1–4)	1 (0–3)	0.86 (0.81, 0.90)	0.70[a]	−0.42[a]	−0.44[a]	0.47[a]
SLE	154	0.92	1 (0–3)	1 (0–3)	0.92 (0.88, 0.94)	0.84[a]	−0.72[a]	−0.63[a]	0.56[a]
SS	160	0.85	2 (1–5)	2 (0–5)	0.81 (0.73, 0.86)	0.72[a]	−0.54[a]	−0.46[a]	0.46[a]
CP	185	0.90	3 (0–6)	2 (0–6)	0.94 (0.92, 0.96)	0.84[a]	−0.66[a]	−0.54[a]	0.37[a]
CULD	146	0.91	1 (0–4.25)	1 (0–5)	0.92 (0.88, 0.95)	0.76[a]	−0.51[a]	−0.59[a]	0.53[a]
PSS	160	0.86	0 (0–2)	1 (0–3)	0.94 (0.92, 0.96)	0.71[a]	−0.56[a]	−0.49[a]	0.54[a]
3. Dressing (0–33)									
AS	160	0.91	3 (0–7)	3 (0–6)	0.91 (0.87, 0.94)	0.80[a]	−0.76[a]	−0.63[a]	0.48[a]
OA	174	0.92	4 (2–8)	4 (1.25–7)	0.83 (0.76, 0.88)	0.76[a]	−0.56[a]	−0.50[a]	0.40[a]
SLE	160	0.94	2 (0–8)	1.5 (0–6.75)	0.92 (0.88, 0.94)	0.83[a]	−0.79[a]	−0.62[a]	0.57[a]
SS	166	0.92	4 (2–11)	4 (1–11)	0.94 (0.91, 0.95)	0.81[a]	−0.64[a]	−0.41[a]	0.43[a]
CP	184	0.93	6 (3–11)	5 (2–11	0.91 (0.88, 0.94)	0.86[a]	−0.70[a]	−0.60[a]	0.52[a]
CULD	148	0.94	3 (0–7)	2 (0–6.75)	0.93 (0.89, 0.95)	0.82[a]	−0.61[a]	−0.57[a]	0.46[a]
PSS	160	0.91	1 (0–5)	1 (0–5)	0.92 (0.88, 0.96)	0.79[a]	−0.68[a]	−0.61[a]	0.54[a]
4. Bathing and showering (0–33)									
AS	156	0.89	3 (0–7)	2.5 (0–6)	0.93 (0.89, 0.94)	0.84[a]	−0.77[a]	−0.60[a]	0.42[a]
OA	174	0.92	4 (2–9)	3 (1–6)	0.92 (0.89, 0.95)	0.82[a]	−0.68[a]	−0.59[a]	0.43[a]
SLE	153	0.94	2 (0–8)	2 (0–8)	0.94 (0.92, 0.96)	0.87[a]	−0.79[a]	−0.69[a]	0.61[a]
SS	160	0.91	4 (0.25–9)	4 (0–10)	0.93 (0.90, 0.95)	0.87[a]	−0.79[a]	−0.42[a]	0.45[a]
CP	178	0.93	7.5 (3–12)	6 (2–12)	0.92 (0.88, 0.94)	0.87[a]	−0.76[a]	−0.63[a]	0.47[a]
CULD	148	0.92	3 (1–7)	3 (0–7)	0.91 (0.87, 0.94)	0.88[a]	−0.65[a]	−0.67[a]	0.52[a]
PSS	162	0.92	1 (0–6)	1 (0–5)	0.96 (0.94, 0.97)	0.80[a]	−0.75[a]	−0.65[a]	0.51[a]
5. Cooking (0–42)									
AS	158	0.96	1 (0–6.5)	1 (0–4.5)	0.88 (0.83, 0.92)	0.79[a]	−0.77[a]	−0.61[a]	0.54[a]
OA	174	0.95	5 (1–11)	4 (1–10)	0.94 (0.91, 0.96)	0.75[a]	−0.46[a]	−0.54[a]	0.53[a]
SLE	157	0.96	5 (1–14)	4 (0–12.5)	0.96 (0.94, 0.97)	0.87[a]	−0.78[a]	−0.65[a]	0.63[a]
SS	163	0.95	6 (1–12)	5 (1–12)	0.93 (0.90, 0.95)	0.86[a]	−0.76[a]	−0.52[a]	0.56[a]
CP	177	0.96	10 (4–18)	8 (2–16)	0.93 (0.90, 0.95)	0.84[a]	−0.74[a]	−0.66[a]	0.53[a]
CULD	146	0.95	4.5 (0–10.5)	3 (0–10.5)	0.93 (0.90, 0.95)	0.84[a]	−0.66[a]	−0.67[a]	0.66[a]
PSS	161	0.94	2 (0–6.25)	2 (0–7.5)	0.94 (0.92, 0.96)	0.79[a]	−0.68[a]	−0.62[a]	0.59[a]
6. Moving indoors (0–36)									
AS	159	0.92	4 (2–9)	4 (1.5–7)	0.94 (0.91, 0.96)	0.83[a]	−0.83[a]	−0.66[a]	0.49[a]
OA	170	0.93	6 (2–11)	6 (2–10.5)	0.94 (0.91, 0.95)	0.83[a]	−0.87[a]	−0.66[a]	0.29[a]
SLE	152	0.94	6 (2–13)	5 (1.25–11.75)	0.96 (0.94, 0.97)	0.90[a]	−0.89[a]	−0.73[a]	0.66[a]
SS	162	0.93	6.5 (2–12.5)	6 (2–11)	0.90 (0.86, 0.93)	0.91[a]	−0.86[a]	−0.53[a]	0.48[a]
CP	180	0.92	10 (6–15)	10 (5–16)	0.92 (0.88, 0.94)	0.90[a]	−0.79[a]	−0.63[a]	0.45[a]
CULD	144	0.94	3 (1–6)	3 (0–6.5)	0.95 (0.92, 0.97)	0.85[a]	−0.78[a]	−0.66[a]	0.49[a]
PSS	156	0.92	4 (1–8)	4 (1–7)	0.96 (0.95, 0.97)	0.88[a]	−0.87[a]	−0.73[a]	0.45[a]
7. Cleaning the house (0–27)									
AS	162	0.94	0 (2–7)	1 (0–4)	0.88 (0.82, 0.91)	0.80[a]	−0.80[a]	−0.62[a]	0.47[a]
OA	175	0.92	5 (2–10)	3 (1–9)	0.92 (0.88, 0.94)	0.79[a]	−0.60[a]	−0.58[a]	0.42[a]

(*continued*)

Table 5. Continued

Evaluation of Daily Activity Questionnaire domain (score range)	*n*	Test 1 A Cronbach's α	Median (range) Test 1 score	Median (range) Test 2 score	ICC(2,1)	Correlation with Health Assessment Questionnaire20 (r_s)	Correlation with SF36v2: Physical Function (r_s)	Correlation with SF36v2: Bodily Pain (r_s)	Correlation with Hand Pain (r_s)
SLE	154	0.94	5 (2–12.5)	4 (1–10.5)	0.94 (0.91, 0.96)	0.88[a]	−0.83[a]	−0.71[a]	0.57[a]
SS	162	0.93	5 (1–11.5)	4 (2–10)	0.90 (0.85, 0.93)	0.88[a]	−0.82[a]	−0.56[a]	0.50[a]
CP	177	0.92	9 (5–15)	8 (4–15)	0.89 (0.84, 0.92)	0.84[a]	−0.72[a]	−0.54[a]	0.50[a]
CULD	143	0.95	4 (0–8.5)	3 (0–8)	0.93 (0.90, 0.96)	0.88[a]	−0.70[a]	−0.70[a]	0.64[a]
PSS	162	0.91	3 (0–8)	3 (0–7.75)	0.96 (0.94, 0.97)	0.84[a]	−0.79[a]	−0.73[a]	0.57[a]
8. Laundry and clothes care (0–27)									
AS	158	0.95	1 (0–3)	0 (0–2)	0.77 (0.67, 0.84)	0.74[a]	−0.71[a]	−0.57[a]	0.59[a]
OA	169	0.91	3 (0–7)	2 (0–5)	0.89 (0.84, 0.92)	0.74[a]	−0.45[a]	−0.46[a]	0.53[a]
SLE	154	0.93	3 (0–8.25)	2 (0–7)	0.89 (0.84, 0.92)	0.83[a]	−0.75[a]	−0.67[a]	0.61[a]
SS	160	0.90	4 (1–8)	4 (1–8)	0.93 (0.90, 0.95)	0.79[a]	−0.70[a]	−0.42[a]	0.48[a]
CP	181	0.93	6 (1–10.5)	4 (1–9)	0.93 (0.90, 0.95)	0.80[a]	−0.66[a]	−0.65[a]	0.53[a]
CULD	146	0.92	2 (0–6)	1 (0–4.75)	0.90 (0.84, 0.93)	0.80[a]	−0.56[a]	−0.55[a]	0.57[a]
PSS	164	0.91	1 (0–4)	1 (0–4)	0.94 (0.91, 0.96)	0.76[a]	−0.67[a]	−0.64[a]	0.64[a]
9. Moving and transfers (0–18)									
AS	161	0.90	4 (2–6)	3 (1–5)	0.91 (0.86, 0.93)	0.80[a]	−0.77[a]	−0.74[a]	0.40[a]
OA	177	0.88	4 (1–7)	2 (0–6)	0.89 (0.85, 0.92)	0.78[a]	−0.77[a]	−0.58[a]	0.28[a]
SLE	161	0.90	3 (1–6)	2 (0–5.75)	0.90 (0.86, 0.93)	0.85[a]	−0.73[a]	−0.73[a]	0.67[a]
SS	169	0.88	3 (0–5)	2 (0–5)	0.91 (0.88, 0.94)	0.79[a]	−0.72[a]	−0.55[a]	0.41[a]
CP	191	0.87	6 (4–9)	5 (3–8)	0.90 (0.86, 0.93)	0.84[a]	−0.72[a]	−0.63[a]	0.46[a]
CULD	152	0.88	2 (0–4.25)	1 (0–4)	0.92 (0.89, 0.95)	0.73[a]	−0.66[a]	−0.68[a]	0.44[a]
PSS	165	0.87	2 (0–5)	2 (0–4)	0.95 (0.94, 0.97)	0.81[a]	−0.76[a]	−0.73[a]	0.49[a]
10. Communication (0–18)									
AS	164	0.89	0 (0–1)	0 (0–1)	0.90 (0.85, 0.93)	0.47[a]	−0.45[a]	−0.38[a]	0.54[a]
OA	178	0.90	1 (0–3)	0 (0–2)	0.88 (0.83, 0.91)	0.50[a]	−0.18[b]	−0.40[a]	0.55[a]
SLE	163	0.85	1 (0–3)	0 (0–2)	0.89 (0.84, 0.92)	0.65[a]	−0.54[a]	−0.52[a]	0.56[a]
SS	166	0.83	1 (0–4)	1 (0–4)	0.91 (0.88, 0.94)	0.69[a]	−0.51[a]	−0.47[a]	0.48[a]
CP	190	0.90	2 (0–5)	1 (0–4)	0.91 (0.87, 0.94)	0.65[a]	−0.50[a]	−0.47[a]	0.55[a]
CULD	149	0.87	2 (0–4)	1 (0–3)	0.91 (0.86, 0.94)	0.51[a]	−0.30[a]	−0.38[a]	0.49[a]
PSS	169	0.89	0 (0–1)	0 (0–1.25)	0.89 (0.85, 0.92)	0.56[a]	−0.50[a]	−0.55[a]	0.58[a]
11. Moving outdoors and shopping (0–39)									
AS	157	0.94	4 (0–10)	2 (0–8)	0.94 (0.91, 0.96)	0.83[a]	−0.90[a]	−0.71[a]	0.54[a]
OA	162	0.91	5 (3–13)	5 (2–10)	0.95 (0.92, 0.97)	0.86[a]	−0.85[a]	−0.62[a]	0.35[a]
SLE	153	0.93	7 (2–15)	5 (1–12)	0.96 (0.93, 0.97)	0.92[a]	−0.89[a]	−0.75[a]	0.67[a]
SS	162	0.92	7 (2–14)	6 (2–13)	0.97 (0.95, 0.98)	0.90[a]	−0.91[a]	−0.56[a]	0.49[a]
CP	179	0.91	11 (6–19)	10 (5.75–17.25)	0.89 (0.82, 0.93)	0.85[a]	−0.80[a]	−0.67[a]	0.51[a]
CULD	147	0.94	4 (1–8)	3 (0–6)	0.87 (0.81, 0.91)	0.84[a]	−0.73[a]	−0.69[a]	0.58[a]
PSS	159	0.92	4 (1–9)	4 (0–9)	0.89 (0.82, 0.93)	0.88[a]	−0.90[a]	−0.75[a]	0.54[a]
12. Gardening/house maintenance (0–21)									
AS	155	0.93	3 (1–8)	3 (1–6)	0.85 (0.78, 0.90)	0.80[a]	−0.76[a]	−0.56[a]	0.52[a]
OA	169	0.92	5 (2–12)	5 (2–10.75)	0.84 (0.78, 0.89)	0.66[a]	−0.64[a]	−0.50[a]	0.33[a]
SLE	145	0.94	6 (1–14.5)	4 (1–13)	0.78 (0.66, 0.85)	0.76[a]	−0.69[a]	−0.66[a]	0.55[a]
SS	150	0.92	6 (2–14)	5 (1–12.75)	0.87 (0.82, 0.91)	0.73[a]	−0.72[a]	−0.45[a]	0.36[a]
CP	173	0.91	10 (4–17.5)	7.5 (2–17)	0.88 (0.83, 0.92)	0.64[a]	−0.62[a]	−0.48[a]	0.39[a]
CULD	133	0.95	3 (0–8.5)	2 (0–8)	0.86 (0.79, 0.91)	0.79[a]	−0.65[a]	−0.59[a]	0.55[a]
PSS	150	0.92	2 (0–8)	3 (0–7)	0.79 (0.69, 0.85)	0.60[a]	−0.59[a]	−0.49[a]	0.38[a]

[a] $p = < 0.001$.
[b] $p < 0.05$.
α: Cronbach's alpha; r_s : Spearman's correlation coefficient.
AS: ankylosing spondylitis; OA: osteoarthritis; SLE: systemic lupus erythematosus; SS: systemic sclerosis; CP: chronic pain conditions; CULD: chronic hand/upper limb disorders; PSS: primary Sjögren's syndrome. Negative correlations occur with SF36v2 scores as higher scores represent better function in the SF36v2.

the commonest conditions referred to rheumatology and musculoskeletal rehabilitation services. This overcomes therapists' perceived limitations of physical function measures widely used in Rheumatology (such as the Health Assessment Questionnaire), i.e., as being too short to aid treatment planning, insufficient to show change following rehabilitation and inappropriately worsening scores if assistive devices are used [5,6]. It could also be particularly helpful for junior staff to use, to aid their assessment and treatment planning, who may be less aware of these client groups' potential problems.

The Evaluation of Daily Activity Questionnaire differs from other measures of activity ability, used in musculoskeletal conditions, in that it distinguishes between intrinsic disability (i.e., without ergonomic and environmental modifications, i.e., Part 2, Section A) and actual disability (i.e., with such modifications, i.e., Part 2, Section B). Furthermore, the Evaluation of Daily Activity Questionnaire aims to engage people in the process of identifying their own problems (Part 2, Section A), reflecting on effectiveness of their existing solutions (Part 2, Section B) and empowering them to problem solve, with the aid of a therapist, when necessary. As one participant in the development phase stated: "At first you think a lot doesn't apply to me … but it does when you think about it … it helped me a lot to see there could be solutions … the questionnaire makes you think about your arthritis" [15]. The content was generated by people with rheumatoid arthritis and musculoskeletal conditions [6,7,15], as opposed to other physical function assessments commonly used in musculoskeletal research and practice, in which items were generated by health professionals [3,4]. This contributed to the Evaluation of Daily Activity Questionnaire's high levels of acceptability by respondents, despite its length.

There is increasing pressure on rehabilitation services to make appointments more efficient. This patient reported outcome measure, completed at home in advance of appointments, can speed up assessment (as it reduces the timed needed to interview clients), increasing the time available to collaboratively problem-solve, discuss and try out treatment options and thus potentially improve the effectiveness of and clients' satisfaction with therapy services.

The Evaluation of Daily Activity Questionnaire meets most of the recommendations for patient reported outcome measures of the United States Food and Drug Administration [48] and the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) checklist [49], apart from responsiveness which requires evaluation within a clinical trial or clinical setting. Consequently, the Evaluation of Daily Activity Questionnaire can be used in research and audit, as well as clinical practice. In future, domains could be used as item banks to support computer adaptive testing.

The results show that the 12 domain, two component structure (Self-Care and Mobility), developed for people with rheumatoid arthritis [11], also fits for these other seven musculoskeletal conditions. The results were also similar to the findings in the rheumatoid arthritis study [11]. There were minor differences between genders (Differential Item Functioning) but this was probably affected by the nature of items in some domains and smaller numbers of male participants for some musculoskeletal conditions. For example, men may be more likely to climb ladders (in the House and Garden Maintenance domain). As this structure is robust and satisfies Rasch model expectations, raw scores for items in each domain and component, in each musculoskeletal condition, can be summed to create both total domain and the two component scores. Consequently, individual domains or components can be used in practice or research to meet the needs of the client or research being conducted. Rasch transformation tables for each condition can be used if parametric analyses are required which convert the ordinal total score to an interval scale. These can be found in the Evaluation of Daily Activity Questionnaire manual [10]. As we identified Differential Item Functioning by condition, this indicates that the raw Evaluation of Daily Activity Questionnaire scores are not directly comparable between different conditions. However, if comparison between conditions is required, cross-conditional Rasch transformation tables are available for this purpose [10].

The limitations of the Evaluation of Daily Activity Questionnaire for these musculoskeletal conditions are that floor effects were evident across most domains and conditions. The highest floor effects were observed in the ankylosing spondylitis and Primary Sjögrens Syndrome groups in the Eating, Personal Care, Cooking, Laundry and Communication domains, as participants had few limitations in these activities. Most ankylosing spondylitis participants were men and we identified during the content validity phase that many men did not have limitations in these domains as their hands were unaffected. However, women with ankylosing spondylitis did experience hand problems and found these domains problematic [15]. Thus the items were retained. For the Primary Sjögrens Syndrome group, activity limitations are more often influenced by fatigue than hand function limitations. Furthermore, while test–retest reliability results were moderate to excellent overall, the retest period was longer than planned. Although we analysed data only for those perceiving themselves "about the same" as when completing Test 1, participants' status may not have been stable. In particular, this may account for why Part 1 scales had moderate reliability.

Over a third of respondents were recruited from patient organisations, which potentially could affect the representativeness of the findings, as such groups are often thought to be better educated than clinic populations. This was the case in our samples in three condition groups. However, the key demographic and condition duration factors were very similar in people recruited from the different sources. We consider our wide recruitment strategies to be a strength rather than a weakness as it meant we were able to recruit a broader swathe of the population, than just those who attended clinic during the recruitment period.

Conclusion

The Evaluation of Daily Activity Questionnaire is a psychometrically robust, comprehensive measure of activity limitations which can now be used with a wide range of musculoskeletal conditions. Either the whole Evaluation of Daily Activity Questionnaire, either component or the individual domains can be used in clinical practice to identify clients' daily activity problems and help find solutions, or as an outcome measure in research and audit. Further work is needed to assess the responsiveness of the Evaluation of Daily Activity Questionnaire and its implementation into clinical practice. The Evaluation of Daily Activity Questionnaire also has the potential to be relevant for other client groups (e.g., other musculoskeletal conditions, neurological conditions, such as multiple sclerosis), although further research would be needed to establish content validity in these.

The Evaluation of Daily Activity Questionnaire, a user manual and support materials are available for use by patients, clinicians and researchers [9,10,50].

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Disclosure statement

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